Self Study
Academic Program Review
Horticultural Sciences  HortSciences.tamu.edu  April 5 - 8, 2020
Cover Photo

The cover photo for the 2020 Academic Program Review Self Study document features Texas maroon bluebonnets (top panel), developed by Drs. Jerry Parsons and Larry Stein, that have become the symbol of Aggie Horticulture. The Horticulture Teaching, Research and Extension Center (HortTREC) (left middle) was completed in 2016 and gives our department much needed and improved greenhouse and field space for all horticulture programs. Viticulture and enology programs have taken several steps forward during the last five years as evidenced by the Enology Certificate program, renovations to teaching and research labs, and hiring of additional personnel (right middle panel photo taken during evaluation session of student vintages in fall 2019). Bottom panel is a panoramic view of the Horticulture/Forest Science Building, greenhouses, and surrounding landscape taken from the roof of the Plant Pathology and Microbiology Building.
EXECUTIVE SUMMARY

The process of self-study for the 2020 Academic Program Review has been underway since the departmental leadership began weekly meetings on October 21st, 2019 to address the mandated program assessment. Drs. Lineberger, Klein, Arnold, and Reed have assembled data, solicited input from faculty, debated interpretations, and formulated discussion concerning all aspects of the academic, research and outreach programs of the Department of Horticultural Sciences during the previous five years. While the focus of this report is on the undergraduate and graduate degree program metrics and performance, the very nature of our departmental organization necessitates parallel consideration of contributions from faculty and students funded by Texas A&M Agrilife Research and the Texas A&M Agrilife Extension Service.

Texas A&M Agrilife leadership, and indeed, much of the leadership at Texas A&M University has changed during the review period, ushering in an era of increased expectations and enthusiasm for new goals and priorities. Fortunately, the devastating budget cuts that were so much a focus of the Review in 2013, were not a factor during this period allowing the program to make some significant accomplishments in its programs. Texas A&M Agrilife Research renewed its commitment to plant breeding and crop improvement in general, and specifically, in fruit and vegetable crop improvement, by hiring four faculty with plant breeding-molecular genetics expertise. An additional hire with expertise in physiological genetics, and redirection of appropriated funds to an internal, competitive seed grant program designed specifically to build research teams with increased competitiveness for federal funding has had a substantial, positive impact on our graduate program. Concomitant with the investment in faculty and graduate students, a significant investment in physical facilities was made to accommodate repurposing of the property formerly occupied by the Floriculture Greenhouses, the Horticulture Farm, and the farm shop and equipment area. This resulted in the development of the Horticulture Teaching, Research, and Extension Center complex that includes new greenhouse and lab space, improved field growing areas, and improvements to existing areas to support the research, teaching and extension programs of the department.

Unlike the rapid enrollment growth in the College of Agriculture and Life Sciences as a whole, the Horticulture undergraduate degree programs, especially the Bachelor of Arts degree, have experienced a decline. However, this decline has been offset by a dramatic increase in the number of students choosing to minor in Horticulture, by exceptional growth in the popularity of our HORT courses in the University core, and by the popularity of the Certificate in Enology. On balance, our credit hours taught per FTE have increased over the five-year period.

Increased emphasis on faculty scholarly productivity and competitiveness for federal grant funds has impacted the disciplinary balance of our faculty. As faculty retire or leave to take other jobs, replacement of their positions is not automatic, and both the College-wide priority of the disciplinary expertise and the potential for funding the programs by competitive grants are factors when hiring tenure track faculty. The development of the Academic Professional Track, a parallel career path for non-tenure track faculty, has resulted and is often viewed as the preferred hiring path for faculty hires who have heavy teaching loads in the more applied areas. Horticultural Sciences faculty collectively rank well against national peer horticulture programs, even though these ranking systems tend to underestimate the contribution of commodity and state-funded research programs that are not included in the standard national evaluation tools. Total research expenditures by Horticultural Sciences faculty increased from FY15 to FY19 by 65 % reflecting faculty programs that are productive and well positioned to support outstanding graduate education.

Assembling the self-study has been a rewarding process. We are anxious to have the collective results examined thoroughly by our external review panel and our administration and we anticipate the additional assessment will strengthen our programs going forward.
# TABLE OF CONTENTS

1. **INTRODUCTION**
   - Review Team Members and Charge ................................................................. 1.1
   - Charge to the Review Team ................................................................................. 1.2
   - Introduction and Historical Perspective of Horticulture at Texas A&M University .................................................................................. 1.3
   - An Overview of the Major Horticultural Industry Sectors in Texas ............ 1.3
   - Departmental Administrative Organization .................................................... 1.6
   - Departmental Vision and Mission Statement ................................................... 1.7
   - Fiscal Resources of the Horticultural Sciences Department ....................... 1.9
   - Academic Programs .............................................................................................. 1.11
   - Previous External Review and Discussion of Implications .......................... 1.12

2. **UNDERGRADUATE PROGRAMS IN HORTICULTURE**
   - Bachelors of Science in Horticulture Degree .................................................... 2.1
   - Bachelors of Arts in Horticulture Degree .......................................................... 2.3
   - Minor in Horticulture .......................................................................................... 2.4
   - Certificate in Enology ......................................................................................... 2.5
   - Description of Undergraduate Courses ............................................................ 2.5
   - Undergraduate Enrollment, Student Diversity, and Demographics ............ 2.10
   - Student Retention, Graduation Rates, and Time to Graduation .................. 2.13
   - Course Instruction Metrics .................................................................................. 2.16
   - Institutional Financial Support of Undergraduate Students ........................ 2.19
   - Student Placement and Post-graduation Employment .................................... 2.19
   - Scientific Papers and Presentations by Horticulture Undergraduates ......... 2.20
   - Continuous Bachelors Degree Program Assessment ....................................... 2.21
   - SWOT Analysis for Undergraduate Programs in Horticulture ..................... 2.24
   - Changes Implemented in Undergraduate Program Since Last External Review .................................................................................. 2.26

3. **OVERVIEW OF GRADUATE PROGRAMS**
   - Graduate Programs Offered in the Department of Horticultural Sciences .... 3.1
   - Admissions Criteria and Graduate Degree Plan ................................................ 3.1
   - Description of Graduate Courses Offered in Horticultural Sciences .......... 3.2
   - Graduate Enrollment, Student Diversity, and Demographics ...................... 3.4
   - Student Retention, Graduation Rates, Time to Graduation and Degrees Awarded .................................................................................. 3.6
   - Academic Enhancements/High Impact Graduate Student Opportunities .... 3.10
   - Learning Outcomes Assessment of the Graduate Program ......................... 3.10
   - Financial Support of Students in Graduate Horticulture Degree Programs .... 3.14
   - Student Publications/Presentations ................................................................. 3.15
   - Student Employment Profile ............................................................................. 3.15
   - Summary and Outlook ......................................................................................... 3.16

4. **FACULTY PROFILE**
   - Profile of Faculty in the Statewide Horticulture Program ......................... 4.1
   - Faculty Transitions Since Last Academic Program Review ......................... 4.2
   - Endowed Chairs, Programs, and Faculty Collaborations ............................... 4.3
   - Evaluation, Promotion and Retention of Faculty ............................................. 4.8
Faculty Teaching Load ................................................................. 4.8
Faculty Scholarly Productivity ................................................. 4.10
Faculty Productivity – Other Measures ..................................... 4.11
Summary .................................................................................. 4.14

5. APPENDICES
Appendix 1 – Institutional Profile Prepared for Reviews .................... 5.1
Appendix 2.1 – BA HORT Degree Plan ............................................. 5.36
Appendix 2.2 – BS HORT Degree Plan ............................................. 5.40
Appendix 3.1 – Annual Assessment of Graduate Student Form ............. 5.45
Appendix 3.2 – Graduate Assessment-Faculty Evaluation Form .............. 5.47
Appendix 4 – Faculty Profiles Last 5 Years ........................................ 5.52
Appendix 5 – Horticulture Strategic Plan .......................................... 5.190
Appendix 6 – Endowed Chairs, Programs and Scholarships ................ 5.196
Appendix 7 – Horticultural Sciences Promotion and Tenure Policy .......... 5.198

6. LIST OF TABLES
Table 1.1 – Funds Appropriated to Horticultural Sciences by FY from College .................. 1.10
Table 1.2 - Funds Appropriated to Horticultural Sciences by FY by Agrilife Research .......... 1.10
Table 1.3 – Funds Appropriated to Horticultural Sciences by FY by Agrilife Extension ........ 1.11
Table 2.1 – Undergraduate Enrollment in Horticulture .............................. 2.11
Table 2.2 – FAEIS Ranking of Number of Baccalaureate Degrees Awarded ............ 2.12
Table 2.3 – Proportion of First Generation Students and Student Distribution .......... 2.13
Table 2.4 – Undergraduate Freshman Fulltime First Time Headcount Enrollment .................. 2.14
Table 2.5 – Fulltime Transfer Student Headcount Enrollment Combined B.S. and B.A. .......... 2.14
Table 2.6 – Baccalaureate Degrees in Horticulture Awarded from 2014 - 2019 ............... 2.15
Table 2.7 – Degrees Awarded and Average Time to Degree .......................... 2.15
Table 2.8 – Non-horticulture and Horticulture Majors Enrolled in HORT Courses ........... 2.16
Table 2.9 – Headcount Enrollment in Horticulture Courses from 2014 - 2019 .................. 2.17
Table 2.10 – Proportion of Funding for Students Provided by Institution ..................... 2.19
Table 2.11 – Employment Profiles Compiled from Voluntary Surveys of Graduating Seniors .... 2.20
Table 3.1 – Graduate Enrollment and Demographics in Horticulture .................... 3.5
Table 3.2 – Graduate Fellowships Received by Incoming Graduate Students ................. 3.5
Table 3.3 – Masters Retention/Graduation Percentages for Horticultural Sciences ............ 3.6
Table 3.4 – Doctoral Retention/Graduation Percentages for Horticultural Sciences ............ 3.6
Table 3.5 – Time to Degree for Masters and PhD Students in Horticulture and Plant Breeding .................................................. 3.7
Table 3.6 – Graduate Degrees Awarded between 2014 and 2018 .............................. 3.7
Table 3.7 – Degrees Awarded to Students Adloc’d to Horticultural Sciences .................. 3.8
Table 3.8 – Degrees Awarded by Institution from FAEIS Database ....................................................................... 3.9
Table 3.9 – Proportion of Graduate Students Receiving Institutional Support ................................................................. 3.14
Table 3.10 – Employment Profiles Compiled from MS and PhD Student CVs ................................................................. 3.16
Table 4.1 – Faculty with Academic, Research and Extension Professorial Appointments ............................................... 4.1
Table 4.2 – Listing of Faculty by Primary Adloc Who Have Left, Retired, or Were Hired ................................................. 4.3
Table 4.3 – Student Credit Hours per Faculty FTE by Fiscal Year .................................................................................. 4.9
Table 4.4 – Teaching Assignments of Tenure Track and Academic Professional Track Faculty ...................................... 4.9
Table 4.5 – Academic Analytics® Metrics of TAMU Horticulture Faculty ............................................................... 4.10
Table 4.6 – Total Number of Grants and Grant Dollars for Horticulture Faculty ........................................................... 4.11
Table 4.7 – Accomplishment Metrics of Tenure Track Faculty ................................................................................... 4.13
Table 4.8 – Accomplishment Metrics of Horticulture Extension Faculty .................................................................. 4.14

7. LIST OF FIGURES

Figure 1.1 – Department of Horticultural Sciences Organization Chart .............................................................. 1.6
Figure 1.2 – Horticulture/Forest Sciences Building and Greenhouses ................................................................. 1.8
Figure 1.3 – Horticulture Teaching, Research and Extension Center (HortTREC) ......................................................... 1.9
Figure 1.4 – Aerial map of the HortTREC including field facilities ...................................................................... 1.15
Figure 3.1 – Rolling Five Year Graduation Average for Horticulture and Plant Breeding ............................................. 3.8
Figure 3.2 – Screen Capture of Annual Graduate Student Evaluation Form ............................................................ 3.12
Figure 3.3 – Screen Capture of College-level Faculty Evaluation of Grad Student Form ........................................... 3.13
Figure 4.1 – Research Expenditures in the Agrilife Research Budget Category ......................................................... 4.12
Figure 4.2 – Research Expenditures in the Agrilife Extension Budget Category .......................................................... 4.12
Dr. Ann Marie VanDerZanden
Associate Provost for Academic Programs
1550 Beardshear
Iowa State University
Ames, IA 50011-1100
Phone: 515-294-7184
Email: vanderza@iastate.edu
https://www.provost.iastate.edu/about/staff/vanderzanden

Dr. Vance Baird
A288 Plant & Soil Sciences Building
Michigan State University
East Lansing, MI 48824-1325
Phone: (517) 353-0361
Email: bairdw@msu.edu
https://www.canr.msu.edu/people/dr_william_vance_baird

Dr. Mary Hockenberry Meyer
Department of Horticultural Science
University of Minnesota
424 Alderman Hall
1970 Folwell Avenue
St. Paul, MN 55108
Phone: 612 301 1247
Email: meyer023@umn.edu
https://horticulture.umn.edu/people/faculty/mary-hockenberrymeyer

Dr. Rolston St. Hilaire
Professor and Head
Department of Plant & Environmental Sciences
N127 Skeen Hall
New Mexico State University
Las Cruces, NM
Phone: (575) 646-3638
Email: rsthilai@nmsu.edu
https://aces.nmsu.edu/academics/pes/rolston-st-hilaire.html
Texas A&M University

Academic Program Review (APR)

Charge to the External Review Team

The Academic Program Review (APR) process at Texas A&M University provides the occasion for academic units to plan strategically, assess the quality and efficacy of their programs, and determine the best courses of action for ongoing improvement. APR is at the heart of our institutional commitment to excellence, and we sincerely thank you for assisting us. This letter provides you with the charge to the committee and a brief overview of the department.

External Review Team Charge

Please examine the department and its programs and make recommendations that will help in planning improvements. Your resources are a self-study report prepared by the department, copies of materials from the program’s last review, information you gain through personal interactions while visiting Texas A&M University, copies of strategic plans and goal-setting documents at the department, college, and/or university level, and any additional information requested by you or by the department. Within the broad charge of recommending ways the department can continue to improve are some specific questions that we would like you to address:

- Based on the data / information provided in the self-study report or gathered by the review team, what are the department’s overall strengths and weaknesses?

- How well do the department’s strategic goals align with those of its college and with those of Texas A&M University?

- How would you compare this department with its peers? Specifically, is the curriculum directly related and appropriate to the mission and goals of the institution?

- What improvements (including student learning and faculty development) has the department made since the previous program review?

- With only current resources or a modest infusion of new ones, what specific recommendations could improve the department’s performance, marginally or significantly?
I. INTRODUCTION TO THE SELF STUDY

This self-study document was created as part of the requirements for the comprehensive Academic Program Review, a process through which Texas A&M University fulfills the mandate of the Texas Higher Education Coordinating Board to review all doctoral programs every seven years. The University has extended the review process to include all aspects of departmental programs to include undergraduate and graduate programs as well as research, service, and engagement activities. The Department of Horticultural Sciences graduate programs were reviewed last in April, 2013. Except where noted otherwise, the self-study refers to the 5-year period of 2015-2019 as directed in the Academic Program Review Guidelines document.

Historical Perspective of Horticulture at Texas A&M University

The practice of horticulture has been taught at Texas A&M University since its founding as the A&M College of Texas in 1876. Dr. Carlisle P. B. Martin, a professor of practical agriculture, taught in the Department of Agricultural and Scientific Courses and his subjects included chemistry, farm tillage, horticulture, arboriculture and care of stock. The Department of Horticulture and Botany was formed in 1892 with Robert H. Price as head, and the first degree in horticulture (a Master of Science) was awarded in 1898. Horticulture and Botany were separated in 1906, and the reorganized Horticulture Department was led by E. J. Kyle, namesake of Kyle Field, who later became Dean of Agriculture. Guy Adriance was appointed head of the Department of Horticulture circa 1920, and he served in that capacity until 1961. The Department of Horticulture during the Adriance era had its primary focus on fruit and vegetable crop production, horticultural food processing, and plant breeding for fruit and vegetable variety improvement.

The study of ornamental horticulture had its roots in the Department of Landscape Art which was organized and led by F. W. Hensel beginning in 1925. This department was reorganized to include the study of greenhouse crop production and floristry into the Department of Floriculture and Landscape Art in 1950 and the new unit was led by A. F. DeWerth. In 1961 the name of the department was changed to the Department of Floriculture.

In 1962, the horticulture departments (Horticulture and Floriculture) were merged with the Department of Agronomy and the resulting department was named Soil and Crop Sciences. Horticulture faculty retained their crop and commodity focus and they functioned somewhat like a section of the Soil and Crop Sciences Department. The very large increase in horticulture student enrollment that occurred in the early 1970s served as justification for the horticulture faculty, and their ardent supporters in the horticulture industry, to propose and to be granted the right to form their own department, the current Department of Horticultural Sciences, in 1976. The Horticulture/Forest Sciences Building in which the department resides today was completed in 1985.

The Department of Horticultural Sciences executes the tripartite mission of the landgrant university. Faculty who teach in the undergraduate and graduate programs are all physically located on the College Station campus. Faculty who conduct research and mentor graduate students and postdoctoral research associates are physically located on campus in College Station, or at off campus research centers in Weslaco, Uvalde, Lubbock, Dallas, and Overton. Extension faculty are located in College Station, Weslaco, Uvalde, Lubbock, Dallas, and Fredericksburg.

An Overview of the Major Horticultural Industry Sectors in Texas

The horticultural sectors in Texas are significant contributors to the State’s agricultural economy. Horticultural crops combined are the leading agricultural sector on the crop side and are only second to the livestock sector. Three broad segments comprise the horticultural industry including the ornamental crops production and landscape services sector (the “green industry”), the fruit, nut and vegetable production sector (the “produce industry”), and the vineyard, wine and associated agritourism sector (the “grape/wine industry”). Each is discussed separately in this overview.
The Green Industry Sector

The green industry complex is comprised of wholesale nursery, greenhouse, and turfgrass sod growers; landscape service firms such as architects, designers/builders, contractors, and maintenance firms; retail firms such as garden centers, home centers and mass merchandisers with lawn and garden departments, and marketing intermediaries such as brokers and horticultural distribution centers (re-wholesalers). There is also a substantial allied trade industry that supplies various production inputs to the industry.

Total green industry sales in Texas were $19.5 billion in 2018. The production and manufacturing sales increased 5.34% to a total of $2.0 billion in 2018. Adjustments in the comptroller’s office sales numbers for the past three years reveal that production and manufacturing sales have grown since the previous lowest point of $1.5 billion in 2014. Similar to previous years, the Lawn and Garden Equipment Manufacturing sector is significantly lower compared to the levels prior to 2014. Prefabricated Metal Buildings experienced an increase of 19.35% in 2018 relative to 2017. The Nursery and Greenhouse sector sales increased 4.23% from $1.57 billion in 2017 to the highest all-time sales peak of $1.75 billion in 2018.

The total economic contributions of the Green Industry in Texas were estimated at $23.12 billion in output; 226,772 jobs, and $13.4 billion in value added. For the production and manufacturing sectors, including nursery and greenhouse, lawn and garden equipment manufacturing, and metal building manufacturers, total output impacts were $3.9 billion; employment impacts were 32,170 jobs; and value-added impacts were $1.9 billion. For the horticultural services sectors, including landscaping services and landscape architecture services, total output impacts were $11.2 billion; employment impacts were 125,235 jobs; and value-added impacts were $6.7 billion. For the wholesale and retail trade sectors, total output impacts were $8.0 billion; employment impacts were 69,367 jobs; and value-added impacts were $4.9 billion. The largest economic impact contributions for individual sectors were landscaping services, lawn and garden stores and nursery and greenhouse.

We continue to see a number of structural changes occurring in the green industry. The shakeout that started with the Great Recession has slowed, but nonetheless continues at all levels of the supply chain. Several more reputable growers, landscape service providers, and retailers have gone out of business since last year. Not all of this productive capacity has exited the industry, however; consolidation activity through mergers and acquisitions continues to shrink the number of industry participants but some of the capacity is simply being operated under a different name. Hypercompetitive conditions have fostered a cost-centric mindset, as firms attempt to shave as many costs out of their value chain as possible.

The Produce Sector

Fruit and vegetable production is scattered across the state. However, the six major vegetable producing regions of Texas are the Rio Grande Valley, the San Antonio-Wintergarden corridor, the Laredo-Eagle Pass region, the High Plains, West and East Texas. Other producing areas within the state include the Trans-Pecos, the Coastal Bend, and the North Texas area along the Red River. The leading vegetable producing counties in the State are: Hidalgo, Starr, Cameron, Deaf Smith, Frio, Uvalde, Zavala, Webb, Hale, Castro, Lamb, and Duval.

In Texas, the number of acres for fresh market and processed vegetables was estimated to be 66,400 acres with a value of $276.5 million (NASS, USDA 2018) and an economic impact in excess of $450 million. Crops in that estimate include cabbage, cantaloupe, carrots, chili peppers, cucumbers, honeydew melons, spring onions, summer onions, spinach, squash, sweet corn, tomatoes, watermelon and snap beans. Not included in that estimate are bell peppers, lettuce, broccoli, okra, other leafy greens (mustard, collard, turnip, kale, etc.), herbs, and potatoes.

Historically, Texas has ranked third in vegetable production behind California and Florida. Over the past decade, however, vegetable acreage has steadily declined to the point where Texas now ranks seventh in terms of volume (2% of the U.S. total). The acreage decline is attributed to serious problems with insects,
diseases, and drought conditions during this period in the Lower Rio Grande Valley, the state's major vegetable production region. Competition from imported sources has also increased in the last 10 years. Mexico and other Latin American countries are causing a closing of market windows previously dominated by Texas.

In 2018, Texas grew 15,700 acres of grapefruit and 8,700 acres of oranges in the LRGV, 112,000 acres of pecans, 2,700 acres of peaches (Hill Country and east Texas), and 5,500 of grapes (almost exclusively for wine). The gross value of pecan represented $85 million in 2017 (of that amount, $71.7 million was improved varieties).

Although doctors and public health administrators have stressed the importance of fruits and vegetables since 1991, American consumption is well below recommended levels. In fact, per capita consumption of vegetables has trended downward, falling an annualized 0.2% over the last five years. Consumption was slow during the current five-year period due to the high cost of vegetables; even though fruits and vegetables are food staples, high prices caused fresh fruits and vegetables to comprise a smaller portion of consumers’ diets. Still, vegetable consumption is fairly stable, and demand for industry products does not fluctuate at high levels from year to year, with population growth being the largest driving factor for increases in good demand.

Changes in consumer preferences over the past five years have also led supermarkets and other retail outlets to demand fresh produce year-round. Since the greenhouse crops segment cannot adequately meet this demand, international trade in the fresh market has grown. An additional factor behind the rise in imports is the increasing tendency of vegetable processors to purchase produce overseas, where prices are lower due to the widespread availability of low-cost labor. Along the same lines, industry exports have been constrained by the overall growing value of the US dollar; over the five years to 2019, the trade-weighted index (TWI), which measures the strength of the US dollar against the currencies of major trading partners, has increased an annualized 2.3%. This increase has effectively made exports of US industry products more expensive on international markets, tempering the expansion rate of export volumes. Overall, industry exports are expected to have risen a meager annualized 1.2% over the past five years.

The Texas Grape and Wine Sector

Texas has eight federally designated AVAs (American Viticulture Areas) and more than 4,500 acres of bearing vineyards. Around 579 wineries are in operation (TABC G permit holders, 10 December 2019), according to the Texas Wine and Grape Growers Association (TWGGA), and they’re supported by a number of wine trails. The TWGGA reports that the Texas wine industry contributed more than $13 billion in total economic activity to the state last year.

Despite the Lone Star State’s vast expanse of territory, wine grape-growing is largely centered around two distinct AVAs—the High Plains in the West Texas Panhandle and the Hill Country in Central Texas, with Austin and San Antonio on its eastern border. Established in 1991, the Texas Hill Country is the second-largest AVA in the United States at 9.6 million acres and includes two sub-regions: Bell Mountain and Fredericksburg.

With elevation ranging from 435 feet to 2,100 feet and predominantly clay loam and sandy clay loam soil over limestone and granite, the Hill Country features exceptionally diverse terrain and weather patterns. Meanwhile, the High Plains—the state’s second-largest AVA in Texas and third largest in the United States at about 8 million acres—sits on a plateau at about 2,800 to 4,000 feet above sea level and boasts a more consistent, dry climate. The High Plains AVA currently produces about 80% of Texas’ wine grapes, according to the TWGGA. The state’s other AVAs include Escondido Valley, Texas Davis Mountains, Mesilla Valley, and Texoma.
The direct employment impact of the Texas wine industry includes over 60,000 jobs with an additional 40,000 supported by the industry. The total wages generated by direct, indirect, and induced economic activity of the Texas wine industry are $4.3 billion. Tax revenues from the Texas wine industry include $802 million in state and local taxes, $998 million in federal taxes, and $269 million in state consumption taxes.

**Departmental Administrative Organization**

Horticultural Sciences is under the administrative leadership of a department head, and three associate heads are authorized for undergraduate, graduate, and extension programs. The relationships between the administrators and their support staff is illustrated below (Fig. 1.1).

Figure 1.1. Department of Horticultural Sciences organization chart.

The Department of Horticultural Sciences is one of 15 academic departments in the College of Agriculture and Life Sciences, and the College represents the academic function of Texas A&M AgriLife (led by Vice Chancellor and Dean Patrick Stover). In addition to the College of Agriculture and Life Sciences (Clare Gill, Executive Associate Dean), Texas A&M AgriLife is composed of Texas A&M AgriLife Research (Patrick Stover, Director), Texas A&M AgriLife Extension (Jeff Hyde, Director), Texas A&M Forest Service (Tom Boggus, Director) and the Texas Veterinary Medical Diagnostic Laboratory (Bruce Akey, Director).
Departmental Committees

Promotion and Tenure Committee
David Reed (Chair), all faculty with rank of full professor

Undergraduate Program and Curriculum Committee
Mike Arnold (Chair), all teaching faculty

Graduate Program Committee
Patricia Klein (Chair), the Graduate Program Committee functions as a “committee of the whole;” all graduate faculty are members

Greenhouse Operations Advisory Committee
Matt Kent (Chair), Mike Arnold, Dave Byrne, Terri Starman, Kevin Crosby, Isabel Vales, Mengmeng Gu

Departmental Assessment Committee
Mike Arnold (Chair)

Scholarship Committee
Andrew King (Chair), Mike Arnold, Dan Lineberger, Bill McKinley, Dave Byrne, Patricia Klein, Terri Starman

Climate and Diversity Committee
Patricia Klein, Whitney Griffin, Dorothy See, Charlie Hall, Leo Lombardini, Justin Scheiner

Social Committee
Dorothy See, Andrew King, Patricia Klein, Justin Scheiner, Megan Teel, Lisa Whittlesey, Melinda Knuth, Nolan Bentley, Shana Childers

Departmental Building Proctor and Lab Safety
Paul Greer

Departmental Vision and Mission Statement

The vision for faculty in Horticultural Sciences is that our department will be widely recognized for excellence in all our programs and as the best university horticulture department in the United States. This vision, taken from our departmental strategic plan (Appendix 5), aligns our faculty with the overall goal of the University as stated in the Vision 2020 statement to “enable our university to be recognized as one of the ten best universities in the nation by 2020 and as an invaluable resource to the state, nation and the world.” The goal of being recognized as a leader in our field is further amplified in the vision of the College of Agriculture and Life Sciences as it aspires to “be a world leader in agriculture, life and natural resource sciences and the many related disciplines they contain.” The atmosphere of striving for excellence and recognition is pervasive within our College and the University, and we are urged to assess honestly the programs that we provide and show quantifiable and steady progress toward our goals.

The Department of Horticultural Sciences exists to improve the quality of life through teaching, research, and extension programs related to the aesthetic disciplines of horticulture and the production of high quality, healthful fruits and vegetables. Our mission is accomplished by:

- educating students who seek careers in horticulture and related fields;
- developing and delivering research-based knowledge upon which efficient and profitable horticultural crop production can be built;
- improving the competitive position of the Texas horticulture industry;
• *increasing* the quality, variety, and availability of horticultural products;
• *developing and delivering* research-based knowledge related to how horticulture improves our environment and serves as a source of personal enrichment.

**FACILITIES**

Located in the Horticulture/Forest Science Building (HFSB) on the campus of Texas A&M University, the 90,000 square foot building boasts a beautiful atrium, the Benz Gallery of Floral Art, modern research and teaching laboratories with the latest scientific equipment, and convenient access to greenhouses and growth chambers (Fig. 1.2).

Greenhouse space, totaling 38,000 square feet, is located behind the building and at the HortTREC (Horticulture Teaching, Research, and Extension Center) in the Brazos Bottoms (Fig. 1.3). Adjacent to the building, the HOWDY! FARM and the Barham Heritage Garden are used for classroom support and experiential learning.

![Image of the Horticulture/Forest Sciences Building](image.png)

**Figure 1.2.** The Horticulture/Forest Sciences Building (HFSB) and the on-campus horticulture greenhouses which are used to support the teaching, research and extension programs of the department.

In addition to its central location in HFSB, the department manages facilities at several other locations. The Vegetable and Fruit Improvement Center, located in the Centeq Building in the TAMU Research Park, occupies 7,367 sq. ft. of office and lab space, with labs designed for identification and quantification of phytochemicals, plant tissue culture, and plant molecular biology. The greenhouse and nursery support facilities, vineyard, pecan orchard, peach orchard, and rose test plots are co-located at the HortTREC 10 miles from campus in the Brazos Bottoms off state highway 50.
Figure 1.3. The Horticultural Teaching, Research and Extension Facility is located 10 miles west of campus in the Brazos Bottoms features 12 gutter-connected, computer-controlled sections arranged along a central axis that provides vehicular access. The facility also includes rainwater capture that supplies water to greenhouse and nursery/shade growing area.

FISCAL RESOURCES OF THE HORTICULTURAL SCIENCES DEPARTMENT

Funding for the Horticultural Sciences undergraduate and graduate education programs is provided through the College of Agriculture and Life Sciences, and since faculty appointed within the state agencies (Texas A&M Agrilife Research and the Texas A&M Agrilife Extension Service) are active in graduate education and outreach, a significant portion of those budgets can also be considered as supporting our academic programs and so will be discussed here. All accounting and fiscal management is categorized into three distinct lines: College of Agriculture and Life Sciences (accounts with the 02 prefix); Texas A&M Agrilife Research (accounts with the 06 prefix); and the Texas A&M Agrilife Extension Service (accounts with the 07 prefix). Additional supplemental funds are provided through the Texas A&M University Development Foundation in the form of endowment earnings. These accounts include support for endowed chairs, programs, scholarships, excellence funds, etc. and a comprehensive list is contained in Appendix 6.

The overall base budget provided by the University through the College of Agriculture and Life Sciences has increased during the period of FY14 – FY20. Unlike the catastrophic budget cuts that occurred in FY11 that were the focus of much discussion during the previous Academic Program Review (APR), the fiscal climate during this review is more about specific changes that have resulted in shifts in faculty appointments and support for program enhancements. Specifically, the 9 month salaries of all tenure track faculty were transferred to the College (02) budget, resulting in a reallocation of resources from the Agrilife Research (06) budget (Table 1.1) Also, supplemental fees charged for certain courses were rolled into a category budgeted as “designated tuition.” Additionally, funds were allocated to support high impact programs (internships, undergraduate research, studies abroad) beginning in FY14, and a new supplement based on increases in student credit hours taught (enrollment growth) was allocated in FY16.
Of special note is the fact that funding for graduate teaching assistants has remained constant from FY14 to FY20. As will be discussed in detail in section 3 of this document, the lack of an increase in graduate

<table>
<thead>
<tr>
<th>FY</th>
<th>02-BASE</th>
<th>Designated Tuition</th>
<th>Graduate Program</th>
<th>Enrollment Growth</th>
<th>Computer Access Fee</th>
<th>Total</th>
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<td>$1,852,730</td>
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* SCH/WSC incentive program rolled into 02-BASE budget.
** Faculty salaries up to 9 months for all faculty transferred to TAMU budget.
*** Enrollment growth allocation rolled into base budget.

program funding for teaching assistants has hampered our ability to increase stipends to competitive levels without decreasing the number of students and thereby lab TAs supported, and the proposed mandated stipend increases under consideration will impact the number of TAs further.

Much of the funding to support faculty and graduate student research programs flows through the Agrilife Research budget (Table 1.2). Most of the appropriated Agrilife Research base budget is used to provide one or two months salary for faculty on legacy “12” month appointments (these appointments were compressed to a maximum of 11 months in FY20 when all paid vacation was terminated), salaries of a limited number of support personnel, departmental contribution to startup packages of tenure track faculty, and maintenance of lab, greenhouse and field facilities.

<table>
<thead>
<tr>
<th>FY</th>
<th>BASE</th>
<th>STARTUP</th>
<th>IDC RETURN</th>
<th>INTERNAL GRANTS</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td>14</td>
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<td>$134,324</td>
<td>$109,894</td>
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<td>*$830,060</td>
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* Nine months of all faculty salaries moved to the 02-TAMU base budget.
The decrease in the amount of indirect cost return is becoming increasingly problematic, as that impacts our ability to provide startup funding to new faculty, to maintain old and purchase new equipment and maintain an aging physical infrastructure. Clearly, increasing our competitiveness in IDC generating grants is a high priority.

The Texas A&M Agrilife Extension Service base budget has decreased slightly for the last three fiscal years, but a significant commitment of funds from the permanent university fund was made by the Director’s office to support the remodeling of a seed cleaning/general use lab to create the wine fermentation laboratory (Table 1.4). The Arthur and Gaye Platt wine fermentation lab is an important asset to our academic, research and extension programs and was funded jointly by a grant from the College of Agriculture and Life Sciences, the Agrilife Extension Service, and the Arthur and Gaye Platt endowed program for support of viticulture and enology.

Table 1.4. Funds appropriated to the Department of Horticultural Sciences by fiscal year by the Texas A&M Agrilife Extension Service.

<table>
<thead>
<tr>
<th>FY</th>
<th>BASE FUNDING</th>
<th>STARTUP</th>
<th>IDC RETURN</th>
<th>PUF*</th>
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<td>$51,549</td>
<td>*$200,000</td>
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</table>

*Permanent University Funds allocated for Enology Lab renovation.

ACADEMIC PROGRAMS

The academic programs that are the principal focus of this self study are discussed in detail in sections two (undergraduate) and three (graduate), and are introduced here to place the comments from the previous program review into context.

Undergraduate Programs

Bachelor of Arts in Horticulture
The Bachelor of Arts (BA) degree blends traditional horticulture with the benefits derived from the human association with plants. Emphases include floral design/event planning, residential landscape design, and urban horticulture. Texas A&M University’s department is the only horticulture department in the United States that offers a Bachelor of Arts degree.

Bachelor of Science in Horticulture
The Bachelor of Science (BS) degree is designed to provide students with the knowledge and skills needed for production, management and marketing of horticultural and floricultural crops, as well as residential landscape design, construction, and maintenance. A significant number of our BS graduates elect to pursue more advanced degrees in graduate school.

Graduate Programs
The Department awards the Masters in Horticulture and in Plant Breeding, the Masters of Agriculture in Horticulture (non-thesis), and Doctoral degrees in Horticulture and in Plant Breeding. Departmental faculty participate in the Molecular and Environmental Plant Sciences, Food Science & Technology, and Plant Breeding interdisciplinary graduate programs.
Previous External Review and Discussion of Implications

The Department of Horticultural Sciences Academic Program Review was held during April 21 – 24, 2013, and a follow-up meeting was held with the Provost’s Review team on June 26, 2013. Consistent with the TAMU Academic Program Review Guidelines, the Department submitted a one-year status report on April 24, 2014 and a four-year progress report in 2017.

Summary of Institutional Response to the Academic Program Review

In a letter from Provost and Executive Vice President for Academic Affairs Karan Watson to Department Head of Horticultural Sciences Dan Lineberger dated July 11, 2013, a comprehensive discussion of efforts that were to be undertaken to address the external review team’s recommendations was outlined. The recommendations to be addressed were:

1. Name a faculty member to replace the vacant associate head position overseeing undergraduate activities.
2. Charge the departmental curriculum committee to develop recommendations on the issues raised in the review.
3. Complete the vegetable strategic plan, and initiate a parallel process for the remainder of the departmental programs with a projected outcome being a revised departmental strategic plan targeted for September, 2014.
4. Address the relocation of the Horticulture farm that was recognized as an issue by the Academic Program Review report in 2005, and again in the 2013 report.
5. Pursue creative ways to fill the need for residential landscape design instruction without creating an isolated specialty.
6. Develop a plan to capitalize on the recognition of the Benz School of Floral Design as an area where “Texas A&M can carve a niche in horticulture education” and pursue ways to accomplish this.
7. Charge the departmental graduate faculty to examine course requirements for the various degree programs, and explore means to create “more opportunities, both formal and informal, to build collegiality between [graduate students] and faculty.”
8. The department was challenged to provide more support for graduate assistantships.

Appointment of Associate Head for Undergraduate Programs (accomplished)

The review team recommended that the “undergraduate coordinator position” (they were likely referring to the Associate Head for Undergraduate Programs that had been vacant since Dan Lineberger was appointed as Department Head in August, 2012) be refilled. This was accomplished by appointing Dr. Mike Arnold as the Associate Head of Undergraduate Programs in October, 2013 and appointing Dr. Patricia Klein to fill the vacancy Dr. Arnold left as Associate Head for Graduate Programs.

Recommended Modifications to the Undergraduate Curriculum (accomplished)

The process of curriculum revision incorporating suggestions made by the review team was started in May, 2013 because of the imperative to modify the baccalaureate degrees to account for the revision of the TAMU core curriculum that was included in catalog 2014-15. RENR 205, Fundamentals of Ecology, was added to the required support courses in the BA curriculum and was added to the directed electives list in the BS curriculum in direct response to the review report. The changes to the core requirements were submitted through the College of Agriculture and Life Sciences Undergraduate Program Council, the University Undergraduate Curriculum Committee, the Faculty Senate and the President’s office, and were approved at all levels. They were incorporated into Catalog 137 (fall, 2014).

A more extensive curriculum revision was accomplished in January, 2014 which was designed to allow students more flexibility to move away from traditional commodities emphasis areas toward more individually tailored curricula in direct response to the review team’s recommendation that “Specializations/terminology in the BS degree should be reconsidered. The names could be more contemporary to better reflect the changing demographics and interests of the students. We would suggest that the terminology focus more on career opportunities rather than commodity.” This new system, designed
to integrate more seamlessly with the Degree Planner module in the Howdy degree portal was implemented in July, 2014.

With these changes, the traditional emphasis areas related to commodities were discontinued and categories based on groups of core learning objectives were developed with choices of courses which would satisfy these objectives defined within the Horticulture core courses separately for both the BA and BS degrees. Sets of courses within the core areas were defined separately for the two degrees with sufficient courses within each core to permit students to tailor the degree to their individual interest areas that would replace the traditional commodity-based emphasis areas previously utilized. Beginning in fall, 2015 (catalog 138) both degree programs were structured without emphasis areas.

HORT 326, Plant Propagation, was removed from the required horticulture core of the BA degree as recommended by the review team beginning with Catalog 138 (fall, 2015).

HORT 101, Concepts of Horticultural Science, was merged with HORT 225, Horticultural Learning Community into a new course, HORT 281, Horticulture as a Profession, and beginning in fall, 2015 this course was required of all majors. In addition to exposure to the diverse career paths in our profession, students start their eportfolios and are encouraged to use their eportfolio as an online archive for projects, writing assignments, presentations, and lab reports that will later be completed in HORT 481, Senior Seminar as a capstone project. Student eportfolios from both HORT 281 and HORT 481 are evaluated by the departmental assessment committee as a primary element in our undergraduate learning outcomes assessment process.

In an effort to expand the breadth of experiences available, beginning with Catalog 137 (fall, 2014) the choices of minors satisfying the degree requirements for the BA program was broadened to include a minor in any subject outside of horticulture or any dual degree program other than the sister BS in Horticulture degree.

Creation of new minors was examined as recommended by the review team but determined to not be feasible due to an insufficient number of courses in specialty areas to support whole minors within more narrowly defined fields. Creation of a minor in sustainable crop production was discussed for nearly a year, but that idea was abandoned due to the lack of professional expertise or interest in that area.

Prompted by the very rapid growth of the Texas wine and grape industries, faculty in Horticultural Sciences proposed an undergraduate certificate in enology that requires 15 hours of study in viticulture, pre- and post-fermentation winemaking processes, wine etiquette, and sensory evaluation. This certificate was formally approved in February, 2017 and students began opting into it in fall, 2017.

Completion of Texas Vegetable Strategic Plan and Updating of Departmental Strategic Plan (accomplished)

The Texas Vegetable Strategic Plan was forwarded as a final draft to Vice Chancellor Mark Hussey and the directors of Texas A&M Agrilife Research (Craig Nessler) and Texas A&M Agrilife Extension Service (Doug Steele) on August 20th, 2013. The Vegetable Strategic Plan was circulated to various stakeholder groups and was discussed at several meetings of industry leadership and is considered the final plan at this time. Dr. Mark Hussey approved proceeding with the implementation of the plan on April 12, 2016. One key element in the plan was a reorganization of the Vegetable and Fruit Improvement Center (VFIC), so that decisions on the allocation of appropriated funds were made by an administrative management committee with the advice of the Vegetable Industry Advisory Committee appointed by the Vice Chancellor. The administrative management team consisted of the Head of the Department of Horticultural Sciences, the Directors of the Weslaco and Uvalde Agrilife Research and Extension Centers, and the Executive Associate Director of Texas A&M Agrilife Research. An increasing percentage of the VFIC budget was committed to a competitive seed grant program designed to encourage interdisciplinary teams of Agrilife Research scientists located at off campus centers and on campus faculty to design research projects and write proposals toward
research objectives developed with the participation of the industry advisory committee. The focus of the statewide vegetable program shifted toward using the tools of modern genetics and plant science to develop improved vegetable varieties adapted to environmental conditions in Texas. The first round of these proposals was funded in FY17.

The Texas Horticulture program encompasses faculty with appointments in the College of Agriculture and Life Sciences, with Texas A&M Agrilife Research, and with the Texas A&M Agrilife Extension Service. Faculty are located both on campus and off campus at Overton, Weslaco, Uvalde, Lubbock, Dallas, and Fredericksburg. During the review, off campus faculty participated in one session via videoconference. Given this background, the observation from the review team that “It wasn’t clear to the review committee if there was a strategic plan to guide staffing around the state and what the role of the department was in the process. Involvement of off-campus personnel in the department could yield opportunities for collaboration and student involvement with the horticulturists in the state” is certainly understandable, since time did not allow for a full presentation of the complex programmatic interrelations that exist among our group.

The statewide faculty launched a strategic planning process at its October 3, 2013 faculty meeting and a draft version was submitted for additional comments on March 11, 2014. The mission statement and goals were finalized:

**MISSION:** The Department of Horticultural Sciences exists to improve quality of life through teaching, research, and extension programs related to the aesthetic disciplines of horticulture and the production of high quality, healthful fruits and vegetables. Our mission is accomplished by:

1. Providing educational opportunities for students in the pursuit of careers in horticulture and related fields;
2. Developing and delivering research-based knowledge upon which efficient and profitable horticultural crop production can be built;
3. Improving the competitive position of the Texas horticulture industry;
4. Increasing the quality, variety, and availability of horticultural products;
5. Developing and delivering research-based knowledge related to how horticulture improves our environment and serves as a source of personal enrichment

**STRATEGIES:** Three strategies around which action plans were developed were formulated:

1. Integrate sustainability into the horticulture teaching, research and Extension programs in support of the Grand Challenges to protect the environment and grow our economy.
2. Build upon our knowledge of the relationship between horticultural food crops and human health to grow programs in food crop production in support of the Grand Challenges to feed our world and improve our health.
3. Extend our efforts to describe the relationship between the art and science of horticulture to improve human well-being and quality of life in support of the Grand Challenges to enrich our youth, improve our health and protect our environment.

The strategic plan included the integration of the principles guiding the College’s Grand Challenges strategic effort and acknowledged the importance of incorporating assessment of actions and outcomes by the complex set of metrics being used to evaluate the performance of academic departments and research and extension centers. The guiding strategic plan was last updated on October 28, 2014.

Extended discussions and a draft of the current strategic plan were started in October, 2019 and a near-final draft of the plan is included in Appendix 5.
Relocation of the Horticulture Farm (accomplished)

The review team expressed concern about the lack of support for greenhouses and farms indicating that this concern was mentioned in the previous review (2006) and that “It has changed little since the last review seven years ago.”

Relocation and upgrading of the greenhouse and field facilities to support departmental programs was accomplished because of the opportunity created by the White Creek Apartments and associated construction on west campus and the transfer of the Lubbock Street floriculture greenhouses to the College of Engineering. This project displaced the Horticulture Farm, an area of over 45 acres that included the Howdy! Farm student sustainable farming operation, the Vegetable Breeding Lab (a 5,000 sq ft research and vegetable seed processing facility and 18,000 sq ft of greenhouses), the trial plots of the TAMU peach breeding program, and the potato breeding and teaching programs housed in the floriculture greenhouses. Funds were allocated by the project to partially replace the facilities being displaced.

The move was accomplished in three phases. In phase I, a recently-built private research facility that was previously owned by Ceres, Inc. was purchased to provide office, laboratory, teaching and work space. The initial facility included 10,000 square feet of enclosed space, two large equipment storage sheds, and a 1,500 square foot greenhouse. In phase II, two fields adjacent to the existing pecan orchard were wildlife fenced and equipped for irrigation, serving as the location for the displaced peach germplasm blocks, the SCRI rose rosette grant test area, and the site of teaching and graduate student projects in vegetable, viticulture, and

Figure 1.4  Aerial map of the Horticulture Teaching, Research and Extension Center (HortTREC), greenhouses, and associated field blocks. The USDA Pecan Lab and associated Carya germplasm collection are also labelled.
ornamentals research. In phase III, the new 25,000 square foot greenhouse complex and nursery area were completed. This complex and associated field area is now officially named the Horticulture Teaching, Research, and Extension Center (HortTREC) and it serves as a field laboratory for several Horticulture classes, a meeting facility for Extension short courses, and support for graduate research programs. The resulting facilities compare favorably with those at our peer institutions.
2. UNDERGRADUATE PROGRAMS IN HORTICULTURE

General Introduction

The Texas A&M University Department of Horticultural Sciences currently offers a Bachelor of Science in Horticulture, Bachelor of Arts in Horticulture, Minor in Horticulture, and a new Certificate in Enology. Our B.S. in Horticulture serves the more traditional science and technology-based interests of our students, while the B.A. in Horticulture provides a unique alternative for those students interested in a more artistic based degree. We offer the only B.A. in Horticulture in the country specifically geared to those interested in commercial floristry and event planning careers, which is directly related to the Benz Chair in Floral Design. Minors in Horticulture have risen dramatically in popularity for students in a number of sister disciplines, with participation increasing nearly five-fold in the past five years. A recent addition to our undergraduate offerings is the Certificate in Enology. This certificate program was developed to complement our students with interests in event planning and for those interested in careers in enology or viticulture, both rising fields within the state of Texas.

Bachelors of Science in Horticulture

This degree is designed to provide students with the knowledge and skills needed for production, management and marketing of horticultural and floriculture crops or designing and building residential or small-scale commercial landscapes. This degree also offers students with strong interests in science and/or technology opportunities in research related fields including preparation for graduate studies. Career prospects range from producing specialty crops such as herbs for upscale restaurants, to managing landscape businesses for growing communities, designing sustainable residential landscapes of the future, working with clientele in botanic and community gardens to enhance urban environments, to marketing fruits and vegetables for healthier lifestyles. Many former students are self-employed, owning their own greenhouse, nursery or landscape operation. Others work in upper management of large corporations; serve in educational institutions, government agencies, or community service organizations; and travel the world developing and marketing future horticultural crops. The program of requirements for each of these degrees, minor, and certificate are provided followed by a discussion of the student demographics, trends, and modifications made to these programs since the last review in response to the recommendations provided.

Program requirements for the B.S. in Horticulture (see also Appendix, page 5.40)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FALL SEMESTER (semester credit hours)</th>
<th>SPRING SEMESTER</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>BIOL 101 Botany</td>
<td>4</td>
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<tr>
<td></td>
<td>or BIOL 111 Introductory Biology I</td>
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<tr>
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<td>Language, philosophy and culture</td>
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<tr>
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<td>Mathematics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social and behavioral sciences</td>
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</tr>
<tr>
<td></td>
<td><strong>Semester Credit Hours</strong></td>
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</tr>
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<td></td>
<td>CHEM 119 Fundamentals of Chemistry I</td>
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<td></td>
<td>ENTO 201 General Entomology</td>
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<tr>
<td></td>
<td>RENR 205 Fundamentals of Ecology</td>
<td>3</td>
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<tr>
<td></td>
<td>American history</td>
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<tr>
<td></td>
<td>Government/Political science</td>
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<td><strong>Semester Credit Hours</strong></td>
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<td>Laboratory</td>
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<td>Creative arts¹</td>
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<td>Government/Political science</td>
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<tr>
<td></td>
<td>Mathematics</td>
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<td>GENE 315 Genetics of Plants</td>
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<td></td>
<td>GENE 320/BIMS 320 Biomedical Genetics</td>
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<td>HORT 404/GENE 404 Plant Breeding</td>
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<td>SCSC 304 Plant Breeding and Genetics</td>
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<td>Course</td>
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<td>HORT 315 Issues in Horticulture</td>
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<td>SCSC 301 Soil Science</td>
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<td>Horticulural Crop Production</td>
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<td>HORT 325 Vegetable Crop Production</td>
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<td>HORT 418 Nut Culture</td>
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<td>HORT 419 Viticulture and Small Fruit Culture</td>
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<td>HORT 420 Concepts of Wine Production</td>
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<td>HORT 431 Nursery Production and Management</td>
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<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HORT 306 Trees and Shrubs for Sustainable Built Environments</td>
<td></td>
<td></td>
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<tr>
<td>HORT 308 Plants for Sustainable Landscape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directed electives</td>
<td>2</td>
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</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>16</strong></td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>HORT 481 Seminar</td>
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</tr>
<tr>
<td>Horticulture Elective</td>
<td>3</td>
</tr>
<tr>
<td>HORT 300-499</td>
<td>3</td>
</tr>
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<td>American history</td>
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<td>Directed electives</td>
<td>6</td>
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<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>14</strong></td>
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</tbody>
</table>

**Total Semester Credit Hours**                                        **120**

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1The Graduation requirements include a requirement for 3 hours of International and Cultural Diversity courses and 3 hours of Cultural Discourse courses. A course satisfying a Core category, a college/department requirement, or a free or directed elective can be used to satisfy this requirement. See academic advisor.

2Hours to be selected from among the following AGEC 105, AGEC 216, AGEC 223, AGEC 300-499; AGLS 101; AGSM 125, AGSM 201, AGSM 435, AGSM 300-499; ALEC 425; ALED 339, ALED 340, ALED 341, ALED 344, ALED 426, ALED 440, ALED 441, ALED 494; ANSC 487/NFSC 487; ATMO 201; BESC 201, BESC 204, BESC 300-499; BICH 410, BICH 411; BIOL 112, BIOL 113, BIOL 206, BIOL 213, BIOL 328, BIOL 401, BIOL 451; CHEM 300-499; COMM 203, COMM 205, COMM 210; COSC 253, COSC 254; ECON 202, ECON 203; ENGL 320; ENTO 201, ENTO 300-499; ESSM 351/RENR 405; FINC 201, FINC 409; FRSC 420, FRSC 421; GENY 310, GENY 411; ISTM 209; MGMT 105, MGMT 209, MGMT 300-499; MKTG 300-499; NFSC 201, NFSC 300, NFSC 307/ANSC 307, NFSC 324, NFSC 470/ANSC 470, NFSC 485; PHIL 314; PHYS 100-499; RENR 215, RENR 405/ESSM 351, RENR 410: RPTS 201, RPTS 308, RPTS 370, RPTS 371, RPTS 478, RPTS 300-499; SCSC 105, SCSC 205, SCSC 300-499; SPAN 101, SPAN 102, SPAN 201, SPAN 202, UGST 181, or hours to be selected with approval by the student's academic advisor and the associate department head from 100-400-level courses in ACCT, AGCJ, AGEC, AGLS, ALEC, ANTH, ARTS, BESC, COMM, ECON, ENDS, ENTO, EPSY, ESSM, FINC, GENY, GEOG, HLTH, HORT, INST, ISTM, KINE, LAND, MEPS, MKTG, NFSC, PSYC, RENR, RPTS, SCSC, SCMT, SOCI, SPAN, SPED, STAT, WFSC.

3This course fulfills a writing intensive course requirement.

4This course fulfills a communications requirement.

5Hours to be selected based on the emphasis area chosen in consultation with the student's academic advisor.
Bachelors of Arts in Horticulture

This degree blends traditional horticulture with the benefits derived from the human association with plants. This degree offers students the option of pairing a horticulture degree with electives in social sciences, business, education, art and design. Pairing the horticulture degree with a required minor of the student's choosing from outside of horticulture provides an opportunity for a secondary area of emphasis. Creative opportunities range from planning gala events, operating floral shops, and constructing educational programs for school gardens to pursuing advanced degrees. Graduates may find themselves working in exciting environments including botanical gardens, international flower markets or upscale resorts.

Program requirements for the B.A. in Horticulture (see also Appendix, page 5.36)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FALL SEMESTER (semester credit hours)</th>
<th>SPRING SEMESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BIOL 101 Botany or</td>
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</tr>
<tr>
<td></td>
<td>BIOL 111 Introductory Biology I</td>
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<tr>
<td></td>
<td>HORT 281 Horticulture as a Profession</td>
<td>1</td>
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<tr>
<td></td>
<td>Language, philosophy and culture¹</td>
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<tr>
<td></td>
<td>Mathematics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social and behavioral sciences</td>
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</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
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<tr>
<td></td>
<td>HORT 201 Horticultural Science and Practices</td>
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<tr>
<td></td>
<td>HORT 202 Horticultural Science and Practices</td>
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</tr>
<tr>
<td></td>
<td>Laboratory</td>
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<tr>
<td></td>
<td>Creative arts¹</td>
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</tr>
<tr>
<td></td>
<td>Foreign Language²</td>
<td>4</td>
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<tr>
<td></td>
<td>Government/Political science</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
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<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>CHEM 119 Fundamentals of Chemistry I</td>
<td>4</td>
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<tr>
<td></td>
<td>HORT 203 Floral Design</td>
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<tr>
<td></td>
<td>Art or Art History</td>
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<tr>
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<td>Select one of the following:</td>
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<tr>
<td></td>
<td>ARCH 249 Survey of World Architecture History I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ARCH 250 Survey of World Architecture History II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ARCH 350 History and Theory of Modern and Contemporary Architecture</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ARTS 149 Art History Survey I</td>
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<tr>
<td></td>
<td>ARTS 150 Art History Survey II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ARTS 330 The Arts of America</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ARTS 349 The History of Modern Art</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>LAND 240 History of Landscape Architecture</td>
<td>3</td>
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<tr>
<td></td>
<td>Communication</td>
<td>3</td>
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<tr>
<td></td>
<td>Government/Political science</td>
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<td></td>
<td>Semester Credit Hours</td>
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<tr>
<td></td>
<td>ENGL 210 Technical and Business Writing</td>
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<td>RENR 205 Fundamentals of Ecology</td>
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<td></td>
<td>Principles of Design</td>
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<tr>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td></td>
<td>HORT 308 Plants for Sustainable Landscapes</td>
<td>3</td>
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<tr>
<td></td>
<td>HORT 332 Horticulture Landscape Graphics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HORT 432 Horticulture Landscape Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HORT 442 Horticulture Landscape Design II</td>
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<tr>
<td></td>
<td>HORT 451 Retail Floristry</td>
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<tr>
<td></td>
<td>HORT 452 Floral Design: Weddings and Personal Flowers</td>
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<tr>
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<td>HORT 453 Floral Art</td>
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<tr>
<td></td>
<td>HORT 454 Special Event Design and Production</td>
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<td></td>
<td>American history</td>
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<tr>
<td></td>
<td>General elective¹,³</td>
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<tr>
<td></td>
<td>Semester Credit Hours</td>
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<tr>
<td>3</td>
<td>HORT 315 Issues in Horticulture</td>
<td>4</td>
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<tr>
<td></td>
<td>HORT 335 Sociohorticulture</td>
<td>3</td>
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<tr>
<td></td>
<td>Principles of Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
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<tr>
<td></td>
<td>HORT 308 Plants for Sustainable Landscapes</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HORT 332 Horticulture Landscape Graphics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HORT 432 Horticulture Landscape Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HORT 442 Horticulture Landscape Design II</td>
<td>3</td>
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<tr>
<td></td>
<td>HORT 451 Retail Floristry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HORT 452 Floral Design: Weddings and Personal Flowers</td>
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<tr>
<td></td>
<td>HORT 453 Floral Art</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HORT 454 Special Event Design and Production</td>
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<tr>
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<tr>
<td></td>
<td>Semester Credit Hours</td>
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<tr>
<td></td>
<td>Horticulture Management and Marketing</td>
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<tr>
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<td>Select one of the following:</td>
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<tr>
<td></td>
<td>HORT 425 Landscape Maintenance and Construction</td>
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<tr>
<td></td>
<td>HORT 426 International Floriculture Marketing</td>
<td>3</td>
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<tr>
<td></td>
<td>HORT 451 Retail Floristry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HORT 460 Landscape Estimating, Bidding, and Operations</td>
<td>3</td>
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<tr>
<td></td>
<td>Communication</td>
<td>3</td>
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<tr>
<td></td>
<td>Directed elective¹,⁵</td>
<td>3</td>
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<tr>
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<td>General elective¹,³</td>
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<tr>
<td></td>
<td>Semester Credit Hours</td>
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</tbody>
</table>
High Impact Learning 1
Select one of the following:
HORT 400 Field Studies in Horticulture
HORT 484 Internship
HORT 485 Directed Studies
HORT 491 Research
HORT Study Abroad
Horticulture Elective 3
HORT 300-HORT 499 6
Directed elective1,5 10
Semester Credit Hours 14

<table>
<thead>
<tr>
<th>Credit Hours</th>
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<tr>
<td>HORT 481 Seminar7</td>
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<tr>
<td>American history</td>
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<tr>
<td>Directed elective1,5</td>
<td>6</td>
</tr>
<tr>
<td>General elective1,3</td>
<td>3</td>
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</table>

Total Semester Credit Hours 120

1The Graduation requirements include a requirement for 3 hours of International and Cultural Diversity courses and 3 hours of Cultural Discourse courses. A course satisfying a Core category, a college/department requirement, or a free or directed elective can be used to satisfy this requirement. See academic advisor.

2Student must successfully complete a course of a foreign language beyond that required by the university in general.

3Selected general elective courses should include a student’s required minor or dual major. Any university approved minor or major is acceptable, except a minor or major in Horticulture as the intent is to provide a concentration in a second field of expertise.

4This course fulfills a writing requirement (see Requirements for a Baccalaureate Degree).

5Hours to be selected from among the following AGEC 105, AGEC 223, AGEC 300-499; AGLS 101; AGSM 435, AGSM 201, AGSM 300-499; ALED 339, ALED 340, ALED 341, ALED 426, ALED 440, ALED 441; ANSC 487/NFSC 487; ATMO 201; BESC 201, BESC 204, BESC 300-499; BICH 411; BIOL 112, BIOL 113, BIOL 206, BIOL 213, BIOL 401, BIOL 451; CHEM 300-499; COMM 203, COMM 205; COSC 253, COSC 254; ECON 202, ECON 203; ENGL 320; ENTO 300-499; ESSM 351/RENR 405/ESSM 351/RENR 405/ESSM 351/RENR 405; FINC 201, FINC 409; FRSC 420; GENE 310, GENE 411; ISTM 209; MGMT 209, MGMT 300-499; MKTG 300-499; NFSC 201, NFSC 300, NFSC 307/ANSC 307, NFSC 470/ANSC 470, NFSC 485; PHIL 314; PHYS 100-499; RENR 215, RENR 410, RENR 405/ESSM 351; RPTS 201, RPTS 300-499; SCSC 105, SCSC 205, SCSC 300-499; SPAN 102, SPAN 201, SPAN 202; UGST 181 or hours to be selected with approval by the student's academic advisor and the associate department head from 100-400-level courses in ACCT, AGCJ, AGEC, AGLS, ALEC, ANTH, ARTS, BESC, COMM, ECON, ENDS, ENTO, EPSY, ESSM, FINC, GEOG, GENE, HLTH, HORT, INST, ISTM, KINE, LAND, MEPS, MGMT, MKTG, NFSC, PSYC, RENR, RPTS, SCSC, SCMT, SOCI, SPAN, SPED, STAT, WFSC.

4Hours to be selected based on the emphasis area chosen in consultation with the student's academic advisor.

7This course fulfills a communications requirement.

Minor in Horticulture

An undergraduate minor in Horticulture provides students a concentration of courses that focus on areas of horticulture and floriculture. These may range from a broad based, comparative perspective to a narrower application within the field. Students may choose such diverse topics as fruit and vegetable production, enology, greenhouse and nursery management, floral and landscape design, science and biotechnology, urban and environmental horticulture and much more. Earning a minor in Horticulture provides students with the skills required to have a basic working knowledge in the field of Horticulture.

<table>
<thead>
<tr>
<th>REQUIRED COURSES FOR MINOR IN HORTICULTURE</th>
<th>CREDIT HOURS</th>
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</thead>
<tbody>
<tr>
<td>HORT 201 Horticultural Science and Practices</td>
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</tr>
<tr>
<td>HORT 202 Horticultural Science and Practices Laboratory</td>
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</tr>
<tr>
<td>Upper-level requirement: Select from HORT 300 to 499</td>
<td>9</td>
</tr>
<tr>
<td>Electives: Select from HORT 100 to 499</td>
<td>5</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
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</tr>
</tbody>
</table>

Students must make a grade of "C" or better in all courses and must be in good academic standing with a GPA of 2.00 or above.
Certificate in Enology

The Enology Certificate, offered by the Department of Horticultural Sciences, contains 15 hours of concentrated study in the areas of viticulture, pre- and post-fermentation wine making processes, wine etiquette, and sensory evaluation. The certificate is designed to provide a knowledge base to those individuals who have an interest in pursuing a career that involves the wine industry.

<table>
<thead>
<tr>
<th>REQUIRED COURSES FOR CERTIFICATE IN ENOLOGY</th>
<th>CREDIT HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 416 Understanding Wine: From Vines to Wines and Beyond or HORT 420 Concepts of Wine Production</td>
<td>3</td>
</tr>
<tr>
<td>HORT 419 Viticulture and Small Fruit Culture or HORT 319 Fruit and Nut Production</td>
<td>3</td>
</tr>
<tr>
<td>HORT 421 Enology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 222 Elements of Organic and Biological Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>NFSC 487/ANSC 487 Sensory Evaluation of Foods</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Applicants must be currently enrolled in a degree program at Texas A&M University and, if required, have permission from their departmental advisor to apply for the program. Any major at Texas A&M University can apply. An overall Texas A&M University GPA of 2.0 or higher is required for acceptance into the program. Must complete Certificate in Enology program application.

Description of Undergraduate Courses Offered by the TAMU Department of Horticultural Sciences

Parenthesis with alternative major abbreviation or 4 digit course numbers indicate standard transfer course designations from other state universities or community colleges through the common Texas core. Courses designated as 100, 200, 300, or 400 level numbers represent freshman, sophomore, junior, or senior level courses, respectively. Weighted student credit hours are greater for upper division undergraduate courses relative to freshman and sophomore level courses. Credits indicate the number of semester hours earned when taking the course. A few, such as internships or research classes, are variable and/or repeatable as indicated.

**HORT 101 Concepts of Horticultural Science (discontinued);** Credit 1. 1 Lecture Hour. Introduction to the many facets of horticulture in Texas and the United States including organization, history and nature of the industry; discussion of professional development and identification of career opportunities.

**HORT 201 Horticultural Science and Practices;** Credits 3. 3 Lecture Hours. (AGRI 1315, AGRI 1415*, HORT 1301, HORT 1401*). Structure, growth and development of horticultural plants from a practical and scientific approach; environmental effects, basic principles of propagation, greenhouse and outdoor production, nutrition, pruning and chemical control of growth, pest control and branches of horticulture.

**HORT 202 Horticultural Science and Practices Laboratory;** Credit 1. 3 Lab Hours. (HORT 1101, AGRI 1115, HORT 1401*, AGRI 1415*). Methods and practices related to production of horticultural crops; practical exercises in greenhouse and field. Prerequisite: HORT 201 or registration therein.
HORT 203 Floral Design; Credits 3. 2 Lecture Hours. 2 Lab Hours. Principles of design illustrated with the use of floral materials; floral design elements and techniques including color, form, line and texture; history and utilization of floral art in society.

HORT 225 Horticulture Learning Community (discontinued); Credit 1. 1 Lecture Hour. Understanding the personal and professional competencies that should develop during college career; determine learning style; develop oral and written communication skills, teamwork and leadership characteristics, analytical and critical thinking, research and problem solving skills; exposure to current critical issues in horticulture and science. Prerequisite: Horticulture or floriculture major.

HORT 281 Horticulture as a Profession; Credit 1. 1 Lecture Hour. Comprehensive view of the opportunities in the art and science of horticulture; sub-disciplines by crop (fruit, vegetable, ornamental, floral) and approach (landscaping, production, sales, management, floral design, research); examination of the national and international scope of horticulture including the major horticultural regions in Texas; construction of a professional e-portfolio.

HORT 291 Research; Credits 1 to 3. 1 to 3 Other Hours. Research conducted under the direction of faculty member in horticulture. May be repeated 2 times for credit. Prerequisites: Freshman or sophomore classification and approval of instructor.

HORT 301 Garden Science; Credits 3. 3 Lecture Hours. Identification, propagation, soil management, fertilization, growth control and protection of common garden plants: indoor ornamentals, landscape ornamentals, fruits and vegetables; special topics include home landscaping, container gardens, bonsai, herbs and medicinal plants and hobby greenhouse management. The effects of organic and non-organic practices on the garden ecosystem.

HORT 302 Garden Science Lab; Credit 1. 3 Lab Hours. Practical activities in identification, propagation, fertilization, media preparation, soil management, irrigation and protection of indoor ornamentals, landscape ornamentals, fruits and vegetables common in gardens in Texas. Organic and non-organic methods.

HORT 306 Trees and Shrubs for Sustainable Built Environments; Credits 3. 2 Lecture Hrs. 2 Lab Hrs. Better known woody ornamental trees and shrubs; identification, morphology, classification, nomenclature and adaptability for use in landscape environments. Prerequisite: BIOL 101, BIOL 111, BIOL 113, HORT 201, HORT 301, LAND 101, or RENR 205, or approval of instructor.

HORT 308 Plants for Sustainable Landscapes; Credits 3. 2 Lecture Hours. 2 Lab Hours. Identification and use of indigenous and introduced landscape plants; plants for special uses in urban environments; emphasis on plants’ ornamental attributes, cultural requirements, and adaptability in urban and suburban environments. Prerequisite: BIOL 101, BIOL 111, BIOL 113, HORT 201, HORT 301, LAND 101, or RENR 205, or approval of instructor.

HORT 309 Interior Plants; Credits 3. 2 Lecture Hours. 2 Lab Hours. Identification, selection and maintenance of interior foliage plants; emphasis on design solutions for commercial and private facilities. Prerequisites: HORT 201; junior or senior classification.

HORT 311/NFSC 311 Principles of Food Processing; Credits 3. 2 Lecture Hours. 3 Lab Hours. Principles and practices of canning, freezing, dehydration, pickling and specialty food manufacture; fundamental concepts of various techniques of preparation, processing, packaging and use of additives; processing plants visited. Prerequisites: NFSC 201; junior or senior classification or approval of department head or instructor. Cross Listing: NFSC 311/HORT 311.

HORT 315 Issues in Horticulture; Credits 3. 3 Lecture Hours. Analysis of contemporary economic, technological, environmental, human resource, and regulatory issues that impact the way global horticultural
firms compete; emphasis on problem recognition and analysis of managerial decisions by firms throughout the entire horticultural supply chain. Prerequisites: HORT 201 and HORT 202.

**HORT 319 Fruit and Nut Production:** Credits 3. 2 Lecture Hours. 3 Lab Hours. Rootstocks, cultivars, identification, site selection, pollination, pruning, fruit thinning, dormancy, orchard culture management, irrigation, pest control, harvesting and post harvest physiology of temperate fruit and nut species. Prerequisite: HORT 201.

**HORT 325 Vegetable Crop Production:** Credits 3. 2 Lecture Hours. 3 Lab Hours. Origin, nutritive value, economic importance, botany and cultural practices of the major vegetable crops. Lab activities include organic and non-organic production of major vegetable crops.

**HORT 326 Plant Propagation:** Credits 3. 2 Lecture Hours. 3 Lab Hours. Principles, practices and techniques followed in the sexual and asexual propagation of horticultural plants: seed technology and seed propagation, rooting and propagation of cuttings, grafting and budding systems, layering and propagation by specialized plant structures, biotechnology and tissue culture systems for micropropagation.

**HORT 328 Wild Edible, Cultivated and Poisonous Herbs:** Credits 3. 3 Lecture Hours. Identification, reported uses and cultivation of popular garden herbs, historically useful herbs and wild edible and poisonous herbs; the history of phytomedicinal herbs and the role of horticulture in the advent of select modern pharmaceuticals and nutraceuticals; native Texas wild edible and culturally-useful herbs; reported uses and efficacy of essential oils of herbal plants; propagation and production of cultivated herbs and wild edible plants. Prerequisites: HORT 201 or approval of instructor.

**HORT 332 Horticulture Landscape Graphics:** Credits 3. 2 Lecture Hours. 2 Lab Hours. Graphic representation of landscape design; demonstrations of technique; examination of drawing examples and drawing production; basic hand graphics techniques for visual-thinking and presentation-quality landscape drawings. Prerequisite: Junior or senior classification.

**HORT 335 Sociohorticulture:** Credits 3. 3 Lecture Hours. Horticulture as it relates to humans through people-plant interactions; use of horticulture to improve quality of life; awareness and appreciation of the economic, environmental, social and health benefits of plants. Prerequisite: Junior classification.

**HORT 360 Landscapes of Sustainable Built Environments:** Credits 3. 3 Lecture Hours. Construction and maintenance considerations for landscapes in urban sustainable environments, specifically green roofs, bioretention cells, rain gardens, and living walls; how to maximize benefits of each system, current trends in regulatory and permitting processes of green infrastructure, and the development of industry-wide guidelines versus standards. Prerequisites: Grade of C or better in HORT 201 or concurrent enrollment, or junior or senior classification.

**HORT 400 Field Studies in Horticulture:** Credits 1 to 3. 1 to 9 Other Hours. History of garden design and the development of the field of Ornamental Horticulture; designs of famous designers Capability Brown and Gertrude Jekyll; pastoral and formal design themes; plant selection and placement from an artistic and functional design perspective; European manipulation of plant form. Prerequisites: HORT 201 or HORT 301 and approval of instructor.

**HORT 404/GENE 404 Plant Breeding:** Credits 3. 2 Lecture Hours. 2 Lab Hours. Application of genetics and other sciences to breeding and improvement of horticultural crops; methods and special techniques employed. Offered in even numbered years. Only one of the following will satisfy the requirements for a degree: HORT 404/GENE 404 and SCSC 304. Prerequisite: HORT 201, SCSC 205, or GENE 302, or approval of instructor. Cross Listing: GENE 404/HORT 404.
HORT 416 Understanding Wine: From Vines to Wines and Beyond; Credits 3. 3 Lecture Hours. Facets of wine in the United States and around the world; the history of wine, grape growing and winemaking, types of wine, wine etiquette, beer and spirits, sensory evaluation, wine marketing, and winery tasting room and event management. Prerequisites: Must be 21 years of age; junior senior classification.

HORT 418 Nut Culture; Credits 3. 3 Lecture Hours. Orchard management, native grove development, cultivars, fruit setting, soils, nutrition, propagation, pest control, harvesting, shelling, storage and marketing of temperate tree nut crops grown in the U.S. with major emphasis on pecans. Offered in odd numbered years. Prerequisite: HORT 319 or approval of instructor.

HORT 419 Viticulture and Small Fruit Culture; Credits 3. 3 Lecture Hours. Classic winegrape culture in Europe and U.S. are taught; influence of climate, soil, cultivar, rootstock, canopy and management is presented; nutrition, water, spacing, trellis, pruning, IPM and harvest are integrated for quality yields; culture of muscadines, berries, figs and persimmons are taught. Offered in even numbered years. Prerequisite: HORT 319 or approval of instructor.

HORT 420 Concepts of Wine Production; Credits 3. 3 Lecture Hours. Classic wine grapes of the world and where they are produced; evaluation of wine style and quality through formal laboratory tastings. Prerequisites: HORT 201 or NFSC 201; must be 21 years of age; junior or senior classification.

HORT 421 Enology; Credits 3. 2 Lecture Hours. 3 Lab Hours. Provides a basic understanding of each step of the wine making process; emphasis on home and small scale commercial wine production as related to Texas conditions. Prerequisites: Must be 21 years of age; junior or senior classification.

HORT 423 Tropical Horticulture; Credits 3. 3 Lecture Hours. Production, processing and marketing of coffee, bananas, cacao, mango, cashew, pineapple, coconut and root and tuber crops; recent significant developments in plant breeding and cultural practices. Offered in odd numbered years. Prerequisites: HORT 201 or approval of instructor.

HORT 424 Horticulture as a Medium for Creative Expression; Credits 3. 3 Lecture Hours. Horticultural plants used in gardens and other art forms throughout world history with particular emphasis given to those horticultural plants represented in Italian landscapes and gardens; characteristics of historical art periods and how to ‘read’ and interpret historical gardens; identification of plants in various art forms; appreciation for the enjoyment of plants in daily life and how to nurture and care for plants; production and marketing of horticultural plants and flowers in Europe. Prerequisites: Junior or senior classification; or approval of instructor.

HORT 425 Landscape Maintenance and Construction; Credits 3. 2 Lecture Hours. 3 Lab Hours. Principles and practices of grading, drainage and construction of residential and small commercial landscapes; cost and bid estimation; soil preparation; transplanting operations; control of landscape diseases and pests; maintenance of landscape areas. Prerequisite: HORT 201 or approval of instructor.

HORT 426 International Floriculture Marketing; Credits 3. 2 Lecture Hours. 2 Lab Hours. Importance, cost, and opportunities in marketing floral products, fresh cut flowers, flowering potted plants, foliage plants, and bedding/garden plants; topics include: world production areas, economic value, species grown, marketing channels, retail environments, current/future consumers, postharvest handling, promotion/advertising, perceived/added value, marketing trends and employment opportunities. Prerequisites: HORT 201; junior or senior classification.

HORT 427 Fall Greenhouse Crops; Credit 1. 2 Lab Hours. Hands-on lab for growing and managing fall greenhouse crops including fall bedding plants, cut flowers, foliage, poinsettias and other flowering potted plants.
HORT 428 Greenhouse Technology & Sustainable Crop Production Systems; Credits 3. 3 Lecture Hours. Technology used to operate and manage energy efficient greenhouses for sustainable production of crops; greenhouse structures, equipment and automation; heating, cooling and ventilating systems; environmental computerized controls; environmental inputs as they affect plant physiological processes and influence plant growth and development including temperature and light, root substrates, water quantity and quality, irrigation efficiency, fertilization sources and integrated pest management; sustainable crop production systems and practices for hydroponics, plug production, photoperiodic crops, vernalization and lighting technology to produce vegetative and reproductive plant products; scheduling, controlling growth, harvesting and marketing practices for commercially important, high quality, high value crops. Prerequisite: HORT 201, junior or senior classification, or approval of instructor.

HORT 429 Floriculture Crop Production; Credits 3. 2 Lecture Hours. 2 Lab Hours. Production of floriculture crops in the greenhouse environment; scheduling and controlling crop growth for target market periods; specific flowering crops will be used as models to demonstrate potted flowering plant, cut flower, and garden plant production systems; hands-on crop production experience in lab. Prerequisite: HORT 201 or approval of instructor.

HORT 431 Nursery Production and Management; Credits 3. 2 Lecture Hours. 2 Lab Hours. Container, field and protected culture production of ornamental nursery plants (shrubs, trees, ground covers, bedding plants and herbaceous perennials); retail and wholesale nursery-site selection and development, financing, niche-marketing, personnel and labor management; wholesale nursery production cycles and systems, storage and shipping.

HORT 432 Horticulture Landscape Design; Credits 3. 2 Lecture Hours. 2 Lab Hours. Application of the principles and elements of design to planning and developing both exterior residential landscape designs and interior commercial designs. Prerequisites: HORT 332 or concurrent enrollment; HORT 306 or concurrent enrollment, or HORT 308; or approval of instructor.

HORT 435 Urban Horticulture; Credits 3. 3 Lecture Hours. Introduction to urban horticulture and its role in community development and well-being; emphasis on career opportunities and the roles of the urban horticulture programmer. Offered in odd numbered years. Prerequisite: Junior or senior classification.

HORT 440 International Horticulture; Credits 3. 3 Lecture Hours. Examines the source of horticultural commodities; shows how geography, culture, politics, and history influence our markets, gardens and kitchens; educates students on interpreting different garden styles. Prerequisites: HORT 201 or HORT 301 and approval of instructor.

HORT 442 Horticulture Landscape Design II; Credits 3. 2 Lecture Hours. 2 Lab Hours. Computer-aided-drafting (CAD) to produce site layout, grading and planting plan, and construction details for small-scale landscape design; advanced design principles and practices in their historical context, includes design and drafting of hardscape details, manipulation of earth forms, ecological urban park design to traditional garden design. Prerequisites: HORT 432; HORT 306 or HORT 308, or concurrent enrollment, or approval of instructor.

HORT 446/NFSC 446 Commercial Fruit and Vegetable Processing; Credits 3. 2 Lecture Hours. 3 Lab Hours. Pilot plant and laboratory operations pertaining to processed fruits, vegetables and beverages; new product development emphasized via individual laboratory projects. Prerequisite: NFSC 311/HORT 311. Cross Listing: NFSC 446/HORT 446.

HORT 450 Processing Coffee and High-Value Horticultural Crops; Credits 3. 3 Lecture Hours. Examination of the principles behind coffee processing and other high-value food crops including cultivation;
different unit processing operations; methods for preservation; packaging and marketing strategies; and a processing plant visit. Prerequisite: Junior or senior classification or approval of instructor.

HORT 451 Retail Floristry; Credits 3. 2 Lecture Hours. 3 Lab Hours. Principles of floral design in a commercial shop enterprise; aspects of design in vase arrangements, personal flowers, sympathy flowers and flowers for special occasions; production costs and profit analysis, selling techniques and customer relations; term project required. Prerequisite: HORT 203 or approval of instructor.

HORT 452 Floral Design: Weddings and Personal Flowers Credits 3. 2 Lecture Hours. 3 Lab Hours. Basic principles of floral design as applied to wedding work; design principles and mechanics as applied to corsages, headpieces, hand bouquets and ceremony and reception decorations; history of wedding traditions; selling and pricing weddings. Prerequisite: HORT 203 or HORT 451 or approval of instructor.

HORT 453 Floral Art; Credits 2. 1 Lecture Hour. 2 Lab Hours. Advanced study of floral design as an art form in contrast to a commercial florist operation; interpretive expression of design principles and color stressed along with international design styles. Prerequisites: HORT 203.

HORT 454 Special Event Design and Production; Credits 2. 1 Lecture Hour. 2 Lab Hours. Role of event planners, production managers, designers, and decorators within traditional event management practices; analyze how artistic components are used in visual styling to achieve a specific purpose; impact of collaborative planning, effective research, and strong communication skills, social psychological and economic influences as they relate to event planning. Prerequisite: Junior or senior classification.

HORT 460 Landscape Estimating, Bidding, and Operations; Credits 3. 2 Lecture Hours. 2 Lab Hours. Landscape estimating, bidding and sales processes; business structures, insurance and bonding requirements and business management; overhead costing structures and management; case study involves bidding from a set of landscape plans and specifications. Prerequisites: Junior or Senior classification.

HORT 481 Seminar; Credits 2. 2 Lecture Hours. Advanced preparation for the transition from college to the work environment including career investigation, presentation techniques and practice, resume and e-portfolio preparation, and professional development and career advancement; required of all senior students in horticulture. Prerequisite: Junior or senior classification.

HORT 484 Internship; Credits 1 to 9. 1 to 9 Other Hours. On-the-job experience program in the student's area of horticultural specialization. May be taken three times for credit. Prerequisites: Sophomore, junior or senior classification; approval of instructor; 2.0 GPR in major and overall.

HORT 485 Directed Studies; Credits 1 to 4. 1 to 4 Other Hours. Special problems and projects in any area of horticulture. Prerequisite: Junior or senior classification or approval of department head.

HORT 489 Special Topics in... Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours. Selected topics in an identified area of horticultural science. May be repeated for credit. Prerequisite: Approval of instructor. (NOTE: this is the designation used for new courses prior to obtaining a permanent course number or for one-time offerings on a topic.)

HORT 491 Research; Credits 1 to 3. 1 to 3 Other Hours. Research conducted under the direction of faculty member in horticulture. May be repeated 2 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor.

Undergraduate Enrollment, Student Diversity, and Demographics

Between fall of 2014 and fall of 2018 student enrollment in the B.S. in Horticulture has held steady at around 100 students, whereas the enrollment in the B.A. in Horticulture declined from 40 to 50 majors to 25 to 30
majors in 2018. This resulted in overall enrollment of undergraduate majors declining from 148 in 2014 to 128 in 2018 (Table 2.1). Despite this decline, the Texas A&M University Department of Horticultural Sciences ranked third out of 36 programs in total undergraduate degrees in horticulture awarded behind only Washington State University and North Carolina State University in 2018-2019. Among these institutions during the academic years 2014 to 2018, Texas A&M University ranked 1st, 2nd, 2nd, 2nd (by one student), and 3rd, respectively, in the number of Baccalaureate degrees in horticulture awarded according to the Food and Agriculture Education Information System (Table 2.2). Concerted efforts to enhance recruiting using personal visits to advising staff in agricultural and general studies areas within the university, outreach recruiting from community colleges and selected high schools, the use of targeted recruitment in our large service courses and university core curriculum courses, and upgrading our web and social media presence is beginning to pay off in increased student enrollment. This past fall (2019) we increased to approximately 140 majors, mostly through increases in the B.S. in Horticulture. All of our direct admits as freshman in the department during this time period were from within the state of Texas.

Within our undergraduate programs, females outnumbered male students, two or three to one (Table 2.1). The percentage of male students has range from 23.4% to 39.1% and female students accounted for 60.9% to 76.6%. The predominance of female students is most evident in the B.A. in Horticulture program in which all but three graduates over the past five years were female. Within the B.S. program, the division is closer to a 50/50 split. The proportion of first generation students graduating from the program had declined somewhat in the latter two years, particularly among males (Table 2.2). Students were typically young, graduating by 25 years of age (Table 2.3). Only a small proportion, approximately 10% or less, were over the age of 25 at graduation.

| Table 2.1. Undergraduate enrollment in horticulture based on fall semester 12th day rosters from 2014-2015 through 2018-2019 academic years (data from DARS).z |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|
| Total enrollment (#)             | 148             | 145             | 144             | 128             | 128             |
| Males (%)                        | 31.1            | 23.4            | 27.8            | 33.6            | 39.1            |
| Females (%)                      | 68.9            | 76.6            | 72.2            | 65.6            | 60.9            |
| Ethnicity                        |                |                |                |                |                |
| Caucasian (%)                    | 75              | 71              | 73.6            | 73.4            | 75.8            |
| Hispanic (%)                     | 17.6            | 22.1            | 21.5            | 19.5            | 19.5            |
| Asian (%)                        | 2.03            | 2.76            | 1.39            | 1.57            | 0.78            |
| African American (%)             | 2.03            | 2.07            | 2.78            | 1.57            | 0.78            |
| International (%)                | 0.68            | 0               | 0               | 0               | 0               |
| Multi-racial (%)                 | 2.03            | 2.07            | 0.69            | 2.36            | 2.34            |
| Native Hawaiian (%)              | 0.68            | 0               | 0               | 0               | 0               |
| American Indian (%)              | 0.79            | 0               | 0               | 0               | 0.78            |

zNote: Enrollment for fall 2019 was 140
Table 2.2. Baccalaureate degrees awarded by year. Data obtained from the FAEIS (Food and Agricultural Education Information System) database for 1862 and 1890 landgrant universities that reported in the 01.0309, 0601, 0603, 0604, 0605, 0606, 0608, 0699, 1103, 1104 CIP codes*. In order of descending number of Bachelors degrees awarded in the year 2018. Downloaded 2 January 2020.

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*Horticultural CIP Codes; 01.0309 - Viticulture and Enology; 01.0601 - Applied Horticulture/Horticultural Operations, General; 01.0603 - Ornamental Horticulture; 01.0604 - Greenhouse Operations and Management; 01.0605 - Landscaping and Groundskeeping; 01.0606 - Plant Nursery Operations and Management; 01.0608 - Floriculture/Floristry Operations and Management; 01.0699 - Applied Horticulture/Horticultural Business Services, Other; 01.1103 - Horticultural Science; 01.1104 - Agricultural and Horticultural Plant Breeding
Table 2.3. Proportion of first generation students and student distribution by age graduating from 2014-2015 through 2018-2019 academic years.

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Although not yet representative of the state ethnic demographics as a whole, enrollment in the Bachelors programs in horticulture at Texas A&M University are modestly diverse (Table 2.1). Students designating themselves as white account for the majority of students ranging from 71.0% to 75.8% over the five year period. However, a substantial proportion of the students were Hispanic, accounting for 17.6% to 22.1% of the undergraduate population in the department. The proportions of students indicating they were Asian, Black, or Multi-racial was typically between 1 and 3% in each designation, while only a handful of students indicated they were of Native Hawaiian, American Indian, or had International backgrounds.

**Student Retention, Graduation Rates, and Time to Graduation**

In general retention rates of students within Baccalaureate programs in the Department of Horticultural Sciences is strong for both first time freshman enrollees (Table 2.4) and transfer students from other institutions (Table 2.5). However, it is particularly high with regard to first time, fulltime freshman students, where the departmental means tended to outperform the means for the college over the same time frames in terms of both retention rates and graduation rates (Table 2.4).

These high graduation rates for first time fulltime freshman were associated with the overwhelming proportion of students graduating by the end of the fourth year, with the exception of a single cohort (Table 2.4). This suggests that freshman students are readily assimilating into the department culture and find the department to be a favorable environment for their academic success.
Table 2.4. Undergraduate freshman fulltime first time headcount enrollment combined B.S. and B.A. programs with retention and graduation rates for the six year period after enrollment. The 2013 class is the last class with complete data, 6th year data is not yet available for the 2014 class (data from DARS). For comparison, the college means over the years 2009 through 2014 are also provided.1

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<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Year 4</td>
<td>Retained</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Graduated</td>
<td>60</td>
<td>100</td>
<td>28</td>
<td>90</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>Year 5</td>
<td>Retained</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Graduated</td>
<td>60</td>
<td>100</td>
<td>42</td>
<td>90</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>Year 6</td>
<td>Retained</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Graduated</td>
<td>60</td>
<td>100</td>
<td>42</td>
<td>90</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

1Note that this table does not include change of curriculum (change of majors) or transfers from other institutions. Information on transfer students is included in a separate table.

2Note that retained percentage refers to the end of a given year, whereas graduated percentages are cumulative across the six years.

Retention rates and graduation rates for the undergraduates transferring into the department from other institutions was also similar to or in many cohorts above that of the college mean for the same time frames (Table 2.5). Not surprisingly it was common for transfers, who often brought a year or more of credit with them, to graduate in shorter time frames, frequently within two to four years of admission (Table 2.5). Given the high rates of retention and graduation, it would be desirable to recruit an even larger proportion of majors for the department at earlier academic career stages. Unfortunately, the bulk of our students find us later in their academic career and enter as change of curriculum (the university’s designation for change of majors within the university) or transfers from other institutions (Table 2.6).

Table 2.5. Fulltime transfer student headcount enrollment combined B.S. and B.A. programs with retention and graduation rates for the six year period after enrollment. The 2013 class is the last class with complete data, 6th year data is not yet available for the 2014 class (data from DARS). For comparison, the college means over the years 2009 through 2014 are also provided.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td>9</td>
<td>14</td>
<td>14</td>
<td>18</td>
<td>12</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>Retained</td>
<td>100</td>
<td>71</td>
<td>100</td>
<td>77</td>
<td>75</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Graduated</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Year 2</td>
<td>Retained</td>
<td>66</td>
<td>57</td>
<td>57</td>
<td>55</td>
<td>50</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Graduated</td>
<td>11</td>
<td>7</td>
<td>35</td>
<td>22</td>
<td>25</td>
<td>6</td>
</tr>
</tbody>
</table>
Table 2.5 Cont’d

<table>
<thead>
<tr>
<th>Cohort year</th>
<th>Retained</th>
<th>Graduated</th>
<th>College means (2009-2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 3</td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
</tr>
<tr>
<td>Retained</td>
<td>11</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Graduated</td>
<td>66</td>
<td>57</td>
<td>71</td>
</tr>
<tr>
<td>Year 4</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Retained</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Graduated</td>
<td>77</td>
<td>64</td>
<td>78</td>
</tr>
<tr>
<td>Year 5</td>
<td>2013</td>
<td>2014</td>
<td></td>
</tr>
<tr>
<td>Retained</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Graduated</td>
<td>77</td>
<td>64</td>
<td>78</td>
</tr>
<tr>
<td>Year 6</td>
<td>2014</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>Retained</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Graduated</td>
<td>77</td>
<td>64</td>
<td>85</td>
</tr>
</tbody>
</table>

Note that retained percentage refers to the end of a given year, whereas graduated percentages are cumulative across the six years.

Table 2.6. Baccalaureate degrees in horticulture awarded from 2014-2015 to 2018-2019 academic years based on entry type into the programs. Students entered as Freshman, Change of Curriculum (change of major), or as Transfer Students from other institutions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Freshman (#)</th>
<th>Change of curriculum (#)</th>
<th>Transfers(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2015</td>
<td>8</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>2015-2016</td>
<td>9</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>2016-2017</td>
<td>6</td>
<td>17</td>
<td>26</td>
</tr>
<tr>
<td>2017-2018</td>
<td>7</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>2018-2019</td>
<td>5</td>
<td>23</td>
<td>16</td>
</tr>
</tbody>
</table>

Degrees awarded have ranged from 40 to 49 students per year across the two horticulture degree programs (Table 2.7). It is noteworthy that while the number of degrees awarded to female students is similar in both degree programs, the number earned by male students is drastically greater in the B.S. program than the B.A. program (Table 2.6). In fact over the five year period, only three male students graduated from the B.A. program, whereas graduates from the B.S. program were more of an equal gender split. In addition to strong retention and graduation rates (Tables 2.4 and 2.5), across the two degree programs times to graduation of incoming freshman students steadily reduced by over half a year from 4.69 years to 3.96 years (Table 2.7).

Table 2.7. Degrees awarded and average time to degree for students enrolled in the B.A. and B.S. programs in horticulture for the 2014 to 2019 graduates. Degrees awarded includes transfers and changes of major, while time to degree is only for students originally enrolling within the department or college.

<table>
<thead>
<tr>
<th>Year</th>
<th>BA Horticulture</th>
<th>BS Horticulture</th>
<th>Mean time to degree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female (#)</td>
<td>Male (#)</td>
<td>Female (#)</td>
</tr>
<tr>
<td>2014-2015</td>
<td>11</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>2015-2016</td>
<td>18</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>2016-2017</td>
<td>22</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>2017-2018</td>
<td>17</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>2018-2019</td>
<td>10</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>
Course Instruction Metrics

The number of students from outside our degree programs enrolled in our courses have substantially and steadily increased over the time frame (Table 2.8). This is also reflected in the student credit hours and weighted student credit hours associated with those students (Table 2.8). This increase in non-major enrollment is likely being driven by three factors. We have actively recruited enrollment and increased our offering of service courses with the intent of using them as opportunities to recruit students into the major at earlier career stages. Second we have had a huge increase in enrollment of minors in horticulture. Numbers of minors have increased from around twenty to over a hundred during this time frame, helping to drive enrollment, particularly in upper division courses. The third contributing factor is the development of the Certificate in Enology. This has added interest from a number of students outside of horticulture including those from food science areas and those in hospitality oriented or event planning programs in other departments.

Numbers of horticulture majors enrolled in horticulture courses has decreased as might be expected based on majors in the two degree plans decreasing, predominantly those in the B.A. program (Table 2.8). As a result students within the major in horticulture enrolled in horticulture courses has decreased as have student credit hours associated with majors. Fortunately, increased enrollment by non-majors has more than offset the loss of major enrollment resulting in overall increased numbers of students taking horticulture courses and increases in the associated student credit hours and weighted student credit hours (Table 2.8). Strong increases in enrollment in courses (Table 2.9) has been driven largely by increased emphasis in offering large service courses which satisfy core university requirements as with HORT 201, HORT 203, and HORT 335. HORT 306 and HORT 308 service our green industry horticulture students, ecosystem majors within the college, and are required by students in Landscape Architecture and Urban Planning. Similarly, event planning and hospitality programs in Parks and Recreation have filled out enrollment in our floral design-oriented courses HORT 203, HORT 451, HORT 452, HORT 453, and HORT 454. Enrollment by students in the new Certificate in Enology have helped to drive enrollment in wine, viticulture, and enology courses, HORT 416, HORT 419, HORT 420, and HORT 421. HORT 416 is a newly developed wine appreciation and production course that has attracted nearly 100 students a year, and this coming spring has an enrollment of approximately 200, further demonstrating the viability of this group of courses. Many of our smaller enrollment upper division courses provide in-depth training to prepare graduates for more specialized areas within horticulture.

| Table 2.8. Non-horticulture degree seeking students and horticulture majors enrolled in HORT courses for fall semesters of 2014–2018. Numbers represent individual students enrolled in the courses, while student credit hours represents the total number of credit hours enrolled and weighted student credit hours represents a weighted formula assigning more credit for students who are juniors, seniors, or graduate students. |
|---|---|---|
| Non-Horticulture majors in Horticulture classes | Number of Students (Fall semester of year) | Student Credit Hours (SCH) |
| 2014 | 874 | 2,463 |
| 2015 | 902 | 2,545 |
| 2016 | 1,008 | 2,851 |
| 2017 | 1,146 | 3,296 |
| 2018 | 1,174 | 3,391 |
| Horticulture majors in Horticulture classes | | Total Annual Weighted Student Credit Hours (WSCH) (Majors + Non-Majors) |
| 2014 | 405 | 965 | 23,858 |
| 2015 | 328 | 858 | 24,696 |
| 2016 | 356 | 978 | 26,787 |
| 2017 | 331 | 810 | 25,890 |
| 2018 | 317 | 772 | 27,904 |
Table 2.9. Headcount enrollment in Horticulture courses from 2014-2015 through 2018-2019 academic years. Note that a few courses in Molecular and Environmental Plant Physiology, Plant Breeding, and Food Science are also taught by horticulture faculty.

<table>
<thead>
<tr>
<th>Course</th>
<th>Course name</th>
<th>14-15</th>
<th>15-16</th>
<th>16-17</th>
<th>17-18</th>
<th>18-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Concepts of Horticultural Science</td>
<td>111</td>
<td>89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Hort Science &amp; Practices</td>
<td>616</td>
<td>308</td>
<td>669</td>
<td>334</td>
<td>673</td>
</tr>
<tr>
<td>202</td>
<td>Hort Sciences &amp; Practices Lab</td>
<td>176</td>
<td>18</td>
<td>140</td>
<td>14</td>
<td>149</td>
</tr>
<tr>
<td>203</td>
<td>Floral Design</td>
<td>277</td>
<td>17</td>
<td>280</td>
<td>18</td>
<td>250</td>
</tr>
<tr>
<td>225</td>
<td>Horticulture Learning Community</td>
<td>18</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>281</td>
<td>Horticulture as a Profession</td>
<td>51</td>
<td>51</td>
<td>59</td>
<td>59</td>
<td>53</td>
</tr>
<tr>
<td>301</td>
<td>Garden Science</td>
<td>191</td>
<td>96</td>
<td>224</td>
<td>56</td>
<td>228</td>
</tr>
<tr>
<td>302</td>
<td>Garden Science Lab</td>
<td>19</td>
<td>19</td>
<td>20</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>306x</td>
<td>Trees &amp; Shrubs for Sustainable Built Env.</td>
<td>56</td>
<td>14</td>
<td>53</td>
<td>13</td>
<td>51</td>
</tr>
<tr>
<td>308y</td>
<td>Plants for Sustainable Landscapes</td>
<td>65</td>
<td>16</td>
<td>46</td>
<td>12</td>
<td>52</td>
</tr>
<tr>
<td>309</td>
<td>Interior Plants</td>
<td>19</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>315</td>
<td>Issues in Horticulture</td>
<td>61</td>
<td>30</td>
<td>45</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td>319</td>
<td>Fruit &amp; Nut Production</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>325</td>
<td>Vegetable Crop Production</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>326</td>
<td>Plant Propagation</td>
<td>56</td>
<td>19</td>
<td>48</td>
<td>16</td>
<td>52</td>
</tr>
<tr>
<td>328</td>
<td>Wild Edible Cultivated &amp; Poisonous Herbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>332</td>
<td>Horticulture Landscape Graphics</td>
<td>17</td>
<td>8</td>
<td>24</td>
<td>12</td>
<td>39</td>
</tr>
<tr>
<td>335</td>
<td>Sociohorticulture</td>
<td>454</td>
<td>114</td>
<td>391</td>
<td>196</td>
<td>498</td>
</tr>
<tr>
<td>360</td>
<td>Landscape Sustainable Built Environments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>Field Studies in Horticulture</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>404</td>
<td>Plant Breeding</td>
<td>21</td>
<td>21</td>
<td></td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>416</td>
<td>Understanding Wine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>418</td>
<td>Nut Culture</td>
<td>21</td>
<td>21</td>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>419</td>
<td>Viticulture &amp; Small Fruits</td>
<td>51</td>
<td>51</td>
<td></td>
<td></td>
<td>42</td>
</tr>
</tbody>
</table>
Each undergraduate student in the department is required to take part in a high impact learning experience prior to graduation. This requirement can be satisfied by one of four options: participating in a study abroad (HORT 440), participating in an internship (HORT 484), or participating in a research oriented directed studies (HORT 485) or undergraduate research project (HORT 491) conducted individually with a faculty member. The majority of our students satisfy this requirement using the internship option, followed by study abroad. Those choosing directed studies or undergraduate research projects are typically either place bound students or those interested in potential graduate school entry after graduation. Some students participate in multiple options within this requirement area.
Institutional Financial Support of Undergraduate Students

Financial support of undergraduate students at the Texas A&M University Department of Horticultural Sciences occurs from many pools of funds. Individual costs for tuition and associated fees varies with hours of enrollment, the college in which the courses are located, and the instruction and support fees associated with individual courses or groups of courses.

Financial information provided by the university indicated that our students received on average between $5,307 to $6,151 per year of institutional support during the 2014-2015 to 2018-2019 academic years (Table 2.10). They indicated that the proportion of funding required for these students provided by the institution accounted for between 59.3% and 71.3% of the costs associated with tuition and fees in their courses (Table 2.10). In addition to the various sources of financial aid available through the College and University, the Department of Horticultural Sciences is fortunate to be able to provide approximately 40 scholarships per year ranging from a minimum of $1000 to multiple thousands per scholarship. These funds are obtained from endowed scholarship programs, predominantly from former students, faculty, or industry partners, or are pass-through scholarships funded by non-profit organizations or industry sponsors.

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Proportion of funding from institutional support (%)</th>
<th>Mean amount of institutional support ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2015</td>
<td>60.3</td>
<td>6,151</td>
</tr>
<tr>
<td>2015-2016</td>
<td>60.8</td>
<td>5,307</td>
</tr>
<tr>
<td>2016-2017</td>
<td>59.3</td>
<td>5,412</td>
</tr>
<tr>
<td>2017-2018</td>
<td>54.4</td>
<td>5,759</td>
</tr>
<tr>
<td>2018-2019</td>
<td>71.3</td>
<td>5,503</td>
</tr>
</tbody>
</table>

Student Placement and Post-graduation Employment

Students have access to a number of career building opportunities through the University placement services, College networking and job fairs, and an annual job fair held with industry partners each winter within the Department. In addition to University placement services, the Department maintains the Aggies-for-hire.tamu.edu website specifically to announce horticulture related job and internship opportunities. In conjunction with the job fair, the Department holds an annual mixer with industry representatives. Our industry partners typically offer free student access to their trade conventions and educational events. The Former Students Association (the University’s alumni group) helps to track and maintain contacts with many of our former students. They generously share this information with our academic units to help determine where students are finding and maintaining employment. This organization was able to provide us employment information on 92 of our graduates from this time period, approximately a 40 to 45% sample of that group. The information on their most recent employment was categorized by horticulture, agriculture, and unrelated employment fields (Table 2.11). Three-fourths of our former students were employed by horticultural or other agricultural firms. Over one third of our graduates were employed in Green Industry (ornamentals related areas), which was the largest employment sector. The next three largest categories of horticulture related employment were in commercial floristry, event planning, and production or processing of edible horticultural crops, with each accounting for approximately 10% of our graduates. Employment in miscellaneous agriculture related professions, such as vocational agricultural teachers, chemical or agricultural supply firms, etc. represented a bit over 5% of our former students. Just over 4% of our former undergraduate students were in graduate school, research, university education, or extension positions. Approximately one quarter of our graduates were employed in fields unrelated to agriculture, including pilots,
flight attendants, accountants, sales reps, climbing instructor, youth counselor, etc. While this quarter of the graduates were engaged in an interesting variety of vocations, three quarters of our former students were directly employed in horticulture or agriculture related professions.

<table>
<thead>
<tr>
<th>Graduates</th>
<th>Employment sector %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research, graduate school, extension</td>
<td>4.3</td>
</tr>
<tr>
<td>Event planning</td>
<td>10.9</td>
</tr>
<tr>
<td>Floristry</td>
<td>9.8</td>
</tr>
<tr>
<td>Production / processing of edible horticultural crops; (Includes fruits,</td>
<td>9.8</td>
</tr>
<tr>
<td>vegetables, urban farms, farm to table, vineyard, wineries)</td>
<td></td>
</tr>
<tr>
<td>Green industry (Includes landscape design, landscape installation,</td>
<td>34.8</td>
</tr>
<tr>
<td>interiorscapes, greenhouse and nursery production, commercial green</td>
<td></td>
</tr>
<tr>
<td>industry suppliers, garden centers)</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous agricultural related professions (Includes vocational</td>
<td>5.4</td>
</tr>
<tr>
<td>agriculture teaching, agricultural chemical suppliers, etc.)</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous non-agricultural related professions (Included a huge</td>
<td>25</td>
</tr>
<tr>
<td>range of professions, for example pilots, flight attendants,</td>
<td></td>
</tr>
<tr>
<td>accountants, sales reps, climbing instructor, youth counselor, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

Scientific Papers and Presentations by Horticulture Undergraduates

During the five-year time span of this analysis, 49 undergraduate students engaged in undergraduate research projects. From this work, three papers were coauthored by the students in peer reviewed or editor reviewed journals. In addition, seven students presented papers on their research at formal scientific meetings. A listing of these papers and presented talks is included in detail below. In addition, many other students presented to student groups or lab groups within the Department as a part of their course work.

Undergraduate Papers and Scientific Presentations

**Bold names indicate undergraduate student authors/presenters**

**Peer and Editor Reviewed Papers**


Research Presentations by Undergraduate Students

Local:


Regional:


National:


Continuous Bachelors Degree Program Assessment

A continuous assessment of our undergraduate programs is conducted each academic year. During students’ first fall semester upon entering the Department they are required to take HORT 281 which surveys the profession and begins their development of an eportfolio to which they are expected to add representative samples of their work from their courses, high impact learning involvement, and participation in employment and extracurricular activities. They are encouraged to develop these eportfolios as tools to document their professional skills and competencies. A random sample of eportfolios for both B.S. and B.A. students are assessed for the learning outcomes (copies of the student learning outcomes for both degree programs follow this discussion) for their respective degree programs at this entry level into the Department. These eportfolios are also a component of HORT 481, the senior seminar course, where they are once again sampled and evaluated by a faculty committee for evidence of effectiveness of the degree program learning outcomes. Changes from entry to exit of the program can be estimated for each learning outcome. In addition to these direct measures of the learning outcomes for the degrees, graduating students are surveyed on their perception
of their mastery of these learning outcomes. Also, industry partners are surveyed every three years to gain their opinions as to the efficacy of the program in meeting its stated learning objectives. Information from these three sources are used to determine one or more action plans to address deficiencies or if no deficiencies are identified to enhance performance in one or more of the learning outcomes. The changes are then assessed after an appropriate response time to assess their impacts on student competencies.

**Bachelor of Arts in Horticulture Student Learning Outcomes**

**Outcome 1: Identify horticultural plant characteristics and their uses.**
Graduates should be able to select and explain the selection of appropriate plants based on intended use and function in the human environment, provide a science based explain how plant characteristics determine their usefulness in a given environment, and explain the relationship between plant and design characteristics to maximize aesthetic values.

**Outcome 2: Evaluate the role plants and flowers play in human well-being and environmental sustainability.**
Graduates will be able to define what ecosystem services are and how they are valued, explaining science based terms how plants are affected by their environment and describe the processes by which plants affect their environment, develop designs that incorporate ideas of functional space and human well-being, research and develop examples that demonstrate the interrelatedness of space utilization and human well-being.

**Outcome 3: Analyze and critique the principles and elements of design.**
Graduates will be able to explain the theoretical definitions of the elements and principles of design; recognize and identify the existence of the elements and principles of design in multiple art forms; and analyze designs in order to expand aesthetic values, and conceptual values, as they relate to the elements and principles of design.

**Outcome 4: Explain how care and handling affect horticultural crop quality.**
Graduates will be able to explain the theoretical definitions of the elements and principles of design; recognize and identify the existence of the elements and principles of design in multiple art forms; and analyze designs in order to expand aesthetic values, and conceptual values, as they relate to the elements and principles of design.

**Outcome 5: Apply business and marketing principles to the horticulture industry.**
Graduates will be able to locate, identify and apply regulations related to environmental, health, safety, and other local, regional, state and federal laws; examine current business & marketing principles, financial and human resource management techniques, and cost-benefit analyses of adopting cutting edge technology and marketing tools; and communicate effectively with clients, employees and employers; and develop an effective educational or marketing plan that is persuasive for a range of potential audiences.

**Outcome 6 Collect, manage, analyze and interpret data.**
Graduates will be able to search the literature for information and interpret it in a form appropriate for a variety of audiences, ex. clients, students, garden clubs, master gardeners, civic organizations; perform basic calculations using appropriate software for business applications; interpret different scales and dimensions of data (ex. length, area, geospatial, visual, 3-D) and how these impact possible design concepts; and distinguish between valid information and information from unreliable sources.

**Outcome 7: Communicate effectively in speaking and writing.**
Graduates will be able to present and defend a critical analysis, orally and/or in writing, using horticultural knowledge supported by the appropriate literature and/or data; compose and deliver a presentation of an industry or extension paper, or original research project that demonstrates mastery of the subject; apply concepts and methods of technical writing to produce concise and accurate summary reports; and communicate information in a clear, logical and professional manner using multiple formats for a variety of audiences.
Outcome 8: Work collaboratively in a team setting in both a leadership and team member role. Grads will be able to work in a diverse setting in a manner that recognizes and appreciates the contribution of people of other economic, political, cultural, or religious opinions and practices and scientific disciplines; lead and participate in projects with peers and clients to develop management, business or marketing plans; mentor, motivate and train employees and others; build professional and social team skills, e.g., participation in a professional organization, field trips; and work with others to support a shared purpose or goal.

Outcome 9: Demonstrate personal and social responsibility. Grads will be able to build civic and intercultural awareness, i.e., participation in study abroad, university exchange activities, intercultural activities, community service, field trips; build professional skills and awareness through special projects and/or class projects; critically evaluate the role of globalization in sustainable horticultural systems and sustainable business practices; and recognize and practice ethical standards in personal and professional interaction.

Bachelor of Science in Horticulture Student Learning Outcomes

Outcome 1: Identify horticultural plant characteristics and their uses. Grads should be able to select and explain the selection of an appropriate plant taxa based on intended use, function, and science based environmental constraints; and explain how plant characteristics and species diversity are linked to the environmental conditions.

Outcome 2: Knowledge of water movement, nutrients and energy through the biosphere and resulting impacts on plant growth and physiology. Grads should be able to describe and quantify the movement of water across horticultural systems and explain how water availability changes through time, space and scale; describe the application and cycling of nutrients in horticultural systems and explain the importance of soil and environmental conditions for plant nutrient availability; interpret global, regional and local data related to the movement of water, nutrients and energy across horticultural systems; and describe the science based physiological responses of plants to nutrient, water, light, air pollution, hormones, and temperature stresses and provide management solutions.

Outcome 3: Critically evaluate options for sustainable plant management, including natural, urban and engineered horticultural systems. Grads will be able to select and explain the selection of an appropriate plant variety based on intended use, function, and science based environmental constraints; evaluate environmental constraints to plant growth and production across horticultural systems; select appropriate technology to achieve science based management goals; manage storage and transport conditions to optimize horticultural crop quality; and describe how plant economic value is affected by planting, cultivation, management, harvest and storage decisions.

Outcome 4: Apply business and marketing principles to the horticulture industry. Grads can locate, identify and apply regulations related to water and nutrient management and water quality, herbicide and pesticide management, labor laws, and other local, regional, state and federal laws; examine current business & marketing principles, financial and human resource management techniques, and cost-benefit analyses of adopting cutting edge technology and marketing tools; communicate effectively with clients, employees and employers; and develop an effective business and/or marketing plan that is persuasive for a range of potential audiences.

Outcome 5: Collect, manage, analyze and interpret data. Upon graduation students should be able to apply the scientific method of hypothesis-driven experimental design; search the literature for information related to problems observed and formulate a testable hypothesis; outline a basic experiment to test hypotheses; perform basic calculations using appropriate software such as...
conversions of concentrations, density, volume, flow and application rate; interpret different scales of data such as temperature units and logarithmic scales; distinguish between scientifically valid information and information from unreliable experimental design and interpretation; and describe the difference between a dependent and independent variable and create and interpret graphs accordingly.

**Outcome 6: Communicate effectively in speaking and writing.**
Graduates will be able to present and defend a critical analysis. Graduates should be prepared to present and defend a critical analysis, orally and/or in writing, using horticultural knowledge and supported by the appropriate use of science based research and extension literature and/or data collected; compose and deliver a presentation of a research or extension paper, or original research project that demonstrates mastery of the subject; apply concepts and methods of technical writing to produce concise, and accurate summary reports; and communicate information in a clear, logical, and professional manner using multiple formats for a variety of audiences.

**Outcome 7: Work collaboratively in a team setting in both a leadership and team member role.**
Graduates should have learned to work in a diverse setting in a manner that recognizes and appreciates the contribution of people of other economic, political, cultural, or religious opinions and practices and scientific disciplines; lead and participate in projects with peers and clients to develop management, business or marketing plans for sustainable horticultural systems; mentor, motivate and train employees and others; build professional and social team skills, ex. participation in a professional organization, field trips; and work with others to support a shared purpose or goal.

**Outcome 8: Demonstrate personal and social responsibility.**
Graduates should show evidence civic and intercultural awareness, i.e., participation in study abroad, university exchange activities, intercultural activities, community service, field trips; have built professional skills and awareness through special projects and/or class projects related to sustainable and/or holistic horticultural systems; learned to critically evaluate the role of globalization in sustainable horticultural systems and sustainable business practices; and recognize and practice ethical standards in personal and professional interactions.

**SWOT Analysis for Undergraduate Programs in Horticulture**

**Strengths of our Undergraduate Horticulture Programs**
Our undergraduate programs are among the largest baccalaureate programs in horticulture in the country. We are unique in offering both B.S. and B.A. programs including a diverse array of horticulture courses both within the department and support courses available in sister departments. Active student clubs and organizations are present which help to assimilate new students into the department’s culture. Being a smaller department within a large university our program can offer students the ability for more personal interaction with faculty and fellow students. Former and current students see our department as an open and nurturing environment. Our undergraduate population is more diverse than many in the college and our times to graduation are excellent.

Many of our instructors are award winning teachers and researchers and we have recently gained access to new state of the art greenhouses and outdoor growing spaces at the Horticulture Teaching, Research, and Extension Center (HortTREC). These growing facilities offer excellent opportunities for increasing involvement of undergraduate students in research. The new TAMU Leach Teaching Gardens offers great support for our outdoor laboratories and potential collaborations for hands-on learning. Strong industry support and involvement are invaluable in student placement after graduation. In recent years, the university has taken steps to offer many new services for students to develop study skills aiding in student retention, which is outstanding in our department, and offering support for students with documented disabilities.
Enrollment of students in the Horticulture minor program has grown in leaps from approximately 20 to 25 students five years ago to 116 students in spring of 2019. This has helped immensely with increasing student headcounts and student credit hours in our courses. Growth and sustained numbers in our large and medium size support courses have also contributed significantly to these metrics by bringing non-majors to our courses. Overall, courses are filling regularly in most cases. Likewise, the popularity of our new Certificate in Enology is growing with about 30 to 40 students participating at a given time and our first group of about 10 students completing the program in the past few semesters. This program ties in heavily with our extension efforts in viticulture and enology fields with industry.

Weaknesses of our Undergraduate Horticulture Programs

Enrollment in our B.S. in Horticulture appears to have stabilized at about 100 to 110 students with a renewed emphasis on recruiting by our advising and support staff. However, the enrollment in the B.A. in Horticulture has suffered a substantial reduction to its current enrollment of about 25 to 30 students. We need to continue to find ways to build numbers in these programs.

Reductions in the number of tenure-track faculty members in the department has reduced opportunities for involving undergraduates in research programs and creating close linkages between the research efforts in the department and undergraduate instruction. Tenure-track positions have been largely research focused positions with only modest involvement in undergraduate instruction. Much of the undergraduate instruction formerly provided by tenure-track faculty members is now being provided by non-professorial instructors. While the instructors are in many cases excellent teachers, the linkage between active research programs and undergraduate instruction is eroding.

While formal track or emphasis based degree plans have been replaced with more generalizable and individualized options to facilitate student interests, ease scheduling issues, and decrease time to degrees, we have noticed a decided shift in undergraduate student interests with an increasing component considering careers in food based programs, compared to Green Industry interests. This creates some disconnect between the availability of jobs, which are more readily available in Green Industry areas compared to those in farm-to-table, local foods, or controlled environment areas where an increasing number of students are interested.

Potential Opportunities for our Undergraduate Horticulture Programs

Several positive opportunities exist for the Bachelors programs in Horticulture. Interest and enrollment in our courses is high. With the expansion of our large service courses, which often encounter students earlier in their career paths, we hope to capitalize on recruiting undecided students on horticulture as a major. Similarly, the very large five-fold increase in minors offers an opportunity to convince students that switching to a horticulture major may be even a better option for them.

As we add a newly approved position in controlled environment production, the potential for a new certificate program in urban food production, local foods, or farm-to-table areas may become more feasible. This would allow the opportunity for developing appropriate coursework in this area.

The modern greenhouses, nursery, and field areas at HortTREC offer the potential for enhancing hands on learning opportunities for students and provide strong support facilities to enhance opportunities for undergraduate student research projects. Similarly, involvement of horticulture classes, student special problem courses, and student research projects with the new Leach Teaching Gardens offer synergies for the department and a linking of production and plant evaluation processes at HortTREC with public outreach and demonstration activities with the Leach Teaching Gardens. This also offers possibilities to further tie the teaching programs in with extension activities such as the Junior Master Gardener program which is a major thrust of our extension colleagues in the department.

Potential Threats to our Undergraduate Horticulture Programs

Several challenges may impact our undergraduate horticulture programs. Even though our enrollment in the
B.S. program has remained steady, we are working to reverse declining enrollment in the overall undergraduate program due to significant reductions in B.A. program enrollment.

Recent changes related to minimum stipends and requirements for coverage of both tuition and fees for graduate teaching assistants will impact our ability to continue to offer the same number of existing laboratory sections and will limit our ability to add any lab sections or courses requiring teaching assistants for laboratories unless additional funding is obtained for sponsoring teaching assistantships. Many of the courses assisted by teaching assistants are those involving the most interactive hands on applications which are appealing to students.

Historically increases in teaching funds for classes have not kept pace with the increasing headcounts and semester credit hour increases or rising inflationary costs, resulting in less dollars available per student or semester hour taught. At some point this may limit the ability to offer additional seats or sections as needed to keep pace with enrollment demands.

The demographics of our faculty suggest multiple retirements are likely in the next five years or thereabouts. Within the past ten or so years, faculty hires have not kept pace with departures, particularly for tenure-track positions. This loss of teaching capital and linkage of faculty to cutting edge research programs is likely to limit both the capacity and quality of undergraduate instruction.

Potential trends toward department mergers or reorganizations could pose threats to loss of identity for horticulture teaching programs.

**Changes Implemented As Recommendations Regarding The Undergraduate Programs Since The Last External Review**

Several changes in the horticulture undergraduate programs suggested by past departmental reviews have been implemented. Formal emphasis tracks within the degree programs were eliminated to provide more flexible course selection for students and to streamline advising activities. Degree program of requirements were revised to better reflect categories of courses that targeted student learning outcomes of the programs. These changes and the addition of periodic approval of on-line degree planners has helped to reduce time to graduation.

An ecology course was added to both curricula to provide more ecological perspectives to the programs. Plant breeding courses were added to the curricula as alternative selections to genetics courses. Statistics was added as an option to one of the required math courses. An online version of our introductory horticulture course HORT 201 was developed to increase exposure in summer and to place bound students. A list of frequently accepted courses as directed electives was developed for students and have been incorporated into the online degree planner to streamline degree planning approval. The lab class for introductory horticulture has been added as a requirement to the minor to ensure a greater degree of familiarity with common horticultural practices for minors taking more advanced horticulture courses.

A HIP (high impact learning) opportunity was added as a requirement to both undergraduate degree plans. This can be satisfied by participating in a study abroad, an individualized undergraduate research or directed studies option, or completing an internship. Most students opt for internships and many will participate in more than one of these high impact learning options. Our Department Head has allocated some modest funds to offset the incidental costs of undergraduate research projects and the college has provided some funds to support travel abroad scholarships, further augmenting the appeal of these high impact learning opportunities.

The Certificate in Enology was developed in part at the suggestion of prior reviews to encourage courses that resulted in certifications or licensing. We are currently exploring other certification opportunities. Additionally, all students engaged in greenhouse, nursery, or field activities are required to obtain pesticide handler certification as a safety measure and this can also provide another certification.
3. OVERVIEW OF GRADUATE PROGRAMS

The Department of Horticultural Sciences offers two Masters degrees (Master of Science, Master of Agriculture) and the Doctor of Philosophy in Horticulture as well as an M.S. and Ph.D. in Plant Breeding. A cooperative doctoral program with faculty at Texas A&M University at Kingsville is offered as a component of the Ph.D. in Horticulture. Faculty in Horticultural Sciences participate in several other graduate programs (Molecular and Environmental Plant Sciences (MEPS; formerly Plant Physiology), Nutrition and Food Science, Plant Pathology and Food Science and Technology.

Masters of Agriculture Degree
The Masters of Agriculture in Horticulture degree is a non-thesis professional degree that provides management training and emphasizes problem-solving, critical-thinking and communication skills for students through innovative teaching and directed horticultural internships. The MAgr. degree strives to prepare students for a position in a horticultural-related industry with the idea that the skills obtained through their coursework and internship will allow them to grow into a leadership position within their chosen industry. Students in this degree must take 36 hours of coursework, complete a 3 month professional internship and write a professional paper.

Masters of Science and Ph.D. Degrees
The M.S. and Ph.D degree programs exist to provide an advanced science-based education for students through innovative teaching and directed horticultural research experiences. The program encompasses basic genetic, physiology, production, processing and utilization of horticultural products including fruits, vegetables, flowers, and landscape plants. The overall goal is to provide the student with a strong science-based background in the areas of horticulture, physiology, breeding/genetics, production, etc. for a future in research either in industry, academia or government positions. Students may obtain the M.S. or Ph.D. degrees in Horticulture or Plant Breeding depending on their research and career objectives. The M.S. degree requires 32 hours of coursework, a research proposal, research and a thesis. The Ph.D. degree requires an additional 64 hours of coursework above those taken during the M.S. (96 hours of coursework above the B.S.), a research proposal, preliminary examination, research and a dissertation.

Admissions Criteria
The Associate Head for Graduate Programs oversees admissions to the graduate program. Several criteria are evaluated for each applicant. These include GRE test scores, GPR, letters of recommendation, English language proficiency (ELP) scores for international applicants and the applicant’s personal statement. Applicants are expected to have GRE scores of ~153 verbal/144 quantitative or greater, a GPR above 3.0 and strong letters of recommendation from faculty mentors. For those students applying directly to the Ph.D. program from a B.S., strong undergraduate research experience is required. International students must demonstrate ELP by having a TOEFL score of at least 80 (internet-based) or 550 (paper-based) or an IELTS score of at least 6.0. In addition to the above admissions criteria, no student is admitted unless a graduate faculty member has agreed to accept them into their research program and serve as the Chair of their advisory committee.

Graduate Degree Plan
Although each student in consultation with their advisor and graduate committee develop the degree plan tailored to the individual student, all Horticulture graduate students in the Department must follow the specific guidelines listed below:

1) Regardless of major, take or have taken one graduate level graded statistics course per degree (i.e. one for the Masters and another for the Ph.D.; if none were taken for the Masters, then two are required for the Ph.D.). This may be satisfied by a graduate level statistics course or a graduate level experimental design/data analysis course in a subject matter department; the course chosen must be a graded course (i.e. no S/U courses can be used to fulfill this requirement).

2) Regardless of major, take at least one 681 seminar course per degree (i.e. one for Masters and another for
Ph.D.). The seminar may be in Horticulture (i.e. HORT 681) or in the student’s major (i.e. MEPS 681, NUTR 681 or FSTC 681). Up to three repeated hours of HORT 681 may be applied to satisfy the minimum number of graduate hours required in Horticulture courses. If a student transfers from another major and has already taken a 681 equivalent in that major, then the 681 requirement will be waived for that degree.

3) All HORT majors must take at least one hour of HORT 690 that is taught by a departmentally-designated faculty member as a professional development course. If the course has been previously taken during a Master’s degree at TAMU, then the requirement will be waived for the Ph.D. Additional hours of HORT 690 may be taken under other faculty as various theory of research courses, however these will not substitute for the HORT 690 to be required as a professional development course.

4) All HORT Master of Agriculture or Master of Science students must take nine hours and HORT Ph.D. students must take twelve hours of graduate level instructional HORT courses (excluding HORT 684, 685, 690, 691 or 693) in addition to the HORT 690 requirement as a professional development course. Ph.D. students who have taken nine hours during their M.S. program in the Department can use these nine hours as part of the 12-hour requirement for their degree. Up to three hours of HORT 681 Seminar can be applied toward these 9- and 12-hour requirements, respectively. M.S. and Ph.D. students in Plant Breeding are not subject to the 9- and 12-hour HORT course rule since many of their courses will come from other disciplines.

5) All other curricular matters are at the discretion of the student and his/her Graduate Advisor and Advisory Committee, assuming the requirements of the Department and Graduate Catalog are met.

Description of Graduate Courses Offered in the Department of Horticultural Sciences

Advanced work in horticulture may be conducted with areas of specialization in fruit, nut or vegetable production and breeding, ornamental horticulture and nursery crops, plant-microbe interactions, molecular biology of plant responses to biotic and abiotic stress, genetics and genomics of horticultural crops, economics/marketing/management of horticultural crops, and fruit, nut and vegetable processing. Supporting work may be required in several of the related fields such as chemistry, botany, plant pathology, plant physiology, entomology, soil and crop science, genetics, nutrition, food science and agricultural engineering. The specific objective of the individual student will guide his or her committee in the choice of courses from the departments mentioned above and others in special cases. Credits indicate the number of semester hours earned when taking the course. A few, such as HORT 684, HORT 691 and HORT 693, have variable credit hours and are repeatable.

604. Applied Physiology of Horticultural Crops. (3-0). Credit 3. 3 Lecture Hours. Chemical, biological and environmental factors in growth and differentiation and their application to ornamental, fruit and vegetable crops; growth kinetics; source-sink relations; fruit development; seed development and germination; juvenility; apical dominance; growth retardants; pruning; photoperiodism; flowering; sex expression; and senescence. Prerequisites: MEPS 313 or approval of instructor.

607. Plant Biochemistry (3-0). Credit 3. 3 Lecture Hours. Major metabolic pathways in plant metabolism; emphasis on biochemistry unique to plants. Prerequisites: BICH 410; MEPS 313 or equivalent. Cross-listed with MEPS 605.

608. Plants for Landscape Design. (3-2). Credit 4. 3 Lecture Hours. 2 Lab Hours. Identification and use of indigenous and introduced plants in landscape designs; plants for special uses in commercial and residential developments; emphasis on ornamental attributes, identification, cultural requirements, limitations and adaptability in urban and suburban environments for important taxa; discussion of current issues, research, and trends in selection, marketing, and utilization of plants for landscape design. Only one of the following will satisfy the requirements for a degree: HORT 306, HORT 608. Prerequisite: Graduate classification.

609. Plants for Landscape Design II. (3-2). Credit 4. 3 Lecture Hours. 2 Lab Hours. Identification and use of indigenous and introduced landscape plants; plants for special uses in urban environments; emphasis on plants’ ornamental attributes, cultural requirements, and adaptability in urban and
suburban environments. Only one of the following will satisfy the requirements for a degree: HORT 308, HORT 609. Prerequisites: Graduate classification.

610. Physiological and Molecular Basis for Plant Stress Response. (3-0). Credit 3. 3 Lecture hours. Provides the tools to understand the molecular and physiological consequences caused by environmental factors (abiotic and biotic) on plant growth and development and the mechanisms of adaptation to stress. Prerequisite: MEPS 313 or equivalent. Cross-listed with MEPS 610.

611. Ecology of Urban Landscape. (3-0). Credit 3. 3 Lecture hours. Basic concepts and current topics in ecology or urban landscapes. Role of plants in urban and fragmented ecosystems ranging from individual plant responses to changes in ecosystem function. Students will discuss recent literature in the field of urban plant ecology. Prerequisite: An undergraduate or graduate class in plant biology or plant ecology is recommended.

618. Root Biology. (3-0). Credit 3. 3 Lecture hours. Basic concepts and current topics in root-soil ecology; managed and natural ecosystems including grasslands, cropping systems and forests; role of roots in the rhizosphere, the effects of soil, nutrient and water stress and climate change in C and N cycling and carbon sequestration; participate in discussions and critique recent literature. Prerequisite: Approval of instructor. Cross-listed with MEPS 618.

619. Plant-Associated Microorganisms. (3-0). Credit 3. 3 Lecture hours. Basic concepts and current topics in plant-microbe interactions including the diversity of plant-associated microorganisms; the plant as a microbial environment; endophytes; microbial roles in plant nutrition and fitness; uses of microorganisms for improved plant health and sustainable agriculture; microbial roles in food safety and future challenges; discussion of current literature. Prerequisites: Basic plant biology or plant ecology is recommended; microbiology is helpful, but not required. Cross-listed with PLPA 619 and MEPS 619.

626. International Floriculture Marketing. (2-2). Credit 3. 2 Lecture Hours. 2 Lab Hours. Importance, cost and opportunities in marketing floral products, fresh cut flowers, flowering potted plants, foliage plants, and bedding/garden plants; topics include world production areas, economic value, species grown, marketing channels, retail environments, current/future consumers, postharvest handling, promotion/advertising, perceived/ added value, marketing trends and employment opportunities. Prerequisite: Graduate classification.

630. Post-Harvest Biology, Physiology and Genetics of Plants. (3-0). Credit 3. 3 Lecture hours. Overview of biological, physiological and genetic mechanisms which impart phenotypes associated with quality and value of plant products; current emphasis in areas of ripening, senescence, fruit and flower development, and relevant applications of biotechnology will be focus of course. Prerequisite: Approval of instructor.

640. Phytochemicals in Fruits and Vegetables to Improve Human Health. (3-0). Credit 3. 3 Lecture hours. Current scientific knowledge about the role of phytochemicals in their diet; increase the knowledge and awareness of successful, cost effective, public and private integrated approaches to reduce the health and economic burden of chronic diseases; provide instructional curricular resources media for dissemination through conventional and distance education technology. Prerequisite: Approval of Instructor.

641. Science of Foods for Health. (3-0). Credit 3. 3 Lecture hours. Recent scientific advances on knowledge of foods for health using evidence-based research justification; includes interdisciplinary topics emphasizing horticultural science, nutrition and biochemistry. Prerequisite: Approval of instructor.
645. **World Agriculture and International Plant Breeding. (1-0). Credit 1. 1 Lecture hour.** Evolution of world agriculture; plant breeding and improved varieties; international agricultural research centers and green revolution; population growth; environmental challenges; IPR; role of plant breeding and biotechnology in meeting world food needs. Prerequisite: SCSC 304, HORT 404 or approval of instructor. Cross-listed with SCSC 645.

681. **Seminar. (1-0). Credit 1. 1 Lecture Hour.** Prepares students for presentations in both oral and written formats. Students attend bimonthly departmental seminars as well as prepare abstracts and presentations over horticultural research topics and participate in a departmental poster symposium. Required of all graduate students in horticulture. May be taken more than once but not exceed 3 hours of credit. Prerequisite: Graduate classification.

684. **Professional Internship. Credit 1 to 4. 1 to 4 Other Hours.** Program planned to provide professional training in student’s particular field of interest. Faculty and employer will supervise the activity. Work-study planned as a part of the Master of Agriculture degree program in fruit, ornamentals or vegetable production, processing and handling or landscape or garden design and maintenance. Required of all graduate students in horticulture. Prerequisite: Approval of instructor.

685. **Directed Studies. Credit 1 to 4. 1 to 4 Other Hours.** Individual problems of research or scholarly activity not pertaining to thesis or dissertation, or selected instruction not covered by other courses. Final documentation of directed study is required. Prerequisite: Approval of instructor.

689. **Special Topics in... Credit 1 to 4. 1 to 4 Other Hours.** Selected topics in an identified area of horticulture. May be repeated for credit. Prerequisite: Approval of department head.

690. **Theory of Research. (1-0). Credit 1. 1 Lecture Hour.** Professional development course intended for all incoming Horticulture graduate students. Exploration of various resources available to graduate students at Texas A&M, career choices, funding, research compliance, and other topics related to life as a graduate student and beyond. May be repeated for credit under a different instructor to examine other topics of interest but not to exceed 3 hours of credit towards the degree.

691. **Research. Credit 1 or more each semester. 1 to 9 Research Hours.** Research in horticultural problems for thesis or dissertation.

693. **Professional Study. Credit 1 to 9. 1 to 9 Other Hours.** Approved professional paper undertaken as the requirement for the Master of Agriculture. May be taken more than once, but not to exceed 3 hours of credit towards a degree. Prerequisite: Graduate classification.

**Graduate Enrollment, Student Diversity, and Demographics**

Between 2014-2015 and 2018-2019 overall graduate student enrollment has increased 51% primarily due to an increase in the number of students pursuing a Ph.D. (Table 3.1). Several efforts were initiated to increase the number of Ph.D. students into the Horticulture department beginning in 2014. These included targeting high quality students for direct admission to the Ph.D. from the B.S. degree, utilizing hard-funded departmental teaching assistantships as recruiting tools and nominating more applicants for University and College fellowships (Table 3.2). In addition, a Department Excellence Assistantship was created in 2014-2015 with money from faculty salary savings. Four incoming Ph.D. students received this assistantship before it was discontinued in 2017-2018. The College of Agriculture and Life Sciences as well as Texas A&M AgriLife Research also created new initiatives to recruit Ph.D. students and the Department was successful in obtaining 7 research assistantships through these two competitive programs. In 2017-2018 (last year with complete data), Texas A&M University ranked 3rd in the number of Ph.D. students and 4th in the number of Masters students pursuing degrees in Horticulture at 1862 and 1890 land-grant universities according to the Food and Agriculture Education Information System.
Within our graduate programs, females outnumbered male students for all 5 years although the gap between female and male students has fallen from a high of 56.3% in 2014-2015 to around 30% in 2018-2019 (Table 3.1). The graduate student population within the Department of Horticultural Sciences does not represent the ethnic demographics of the state of Texas, however, it is moderately diverse. Caucasians have typically made up the largest population of our graduate students (37.7-51.4%), while the second largest population are international students. This group is a mix of a number of different ethnicities as students are asked to self-report their race and many (i.e., Asians, Indians, Middle Eastern) do not choose to include this information and thus are only reported as international. In 2018-2019, the international population surpassed Caucasian as being the largest ethnic group. Hispanics make up anywhere between 8.1-16.0% of our graduate student population followed by Asians. Historically we have had very few African Americans in our program with only one student enrolled in 2018-2019. Hispanics and blacks made up ~38% and 12% of the total population of Texas according to the 2010 Census and the representation of these ethnicities among our graduate student population is well below these numbers which indicates that we need to better target these ethnic groups when recruiting.
Student Retention, Graduation Rates, Time to Graduation and Degrees Awarded

When looking at graduate student retention rates for our Master’s cohorts, we retained an average of 82% of those students from 2009 through 2017 which is similar to the overall College average of 83% (Table 3.3). After 2 years, an average of 16% of the Masters students had graduated while after 3 years, 51% had graduated. These percentages are lower than the College averages of 38% and 61%, respectively. When looking at the 1-year retention rate for our doctoral students we are above the college average (96% vs 88%, Table 3.4). Our Ph.D. 5- and 6-year percent graduation rates are similar to the corresponding College averages while the percent of Ph.D. students in Horticulture who graduated after 4 years is slightly lower than the College average. The Master and Doctoral students who left the program cited various reasons including change in career plans, medical issues, being too far away from family, or personal reasons.

Table 3.3. Masters retention/graduation percentages for Department of Horticultural Sciences (retained/graduated from the same department as initially enrolled). Data from DARS. The 2016 cohort class is the last with complete 3 year data. NA = Data not yet available. For comparison, the college means over years 2009 through 2017 are also provided.

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<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Year 2 Graduated</td>
<td>43</td>
<td>13</td>
<td>20</td>
<td>0</td>
<td>11</td>
<td>25</td>
<td>17</td>
<td>0</td>
<td>17</td>
<td>38</td>
</tr>
<tr>
<td>Year 3 Graduated</td>
<td>71</td>
<td>25</td>
<td>40</td>
<td>25</td>
<td>67</td>
<td>75</td>
<td>67</td>
<td>36</td>
<td>NA</td>
<td>54</td>
</tr>
</tbody>
</table>

Table 3.4. Doctoral retention/graduation percentages for Department of Horticultural Sciences (retained/graduated from the same department as initially enrolled). Data from DARS. The 2013 cohort class is the last with complete 6 year data. NA = Data not yet available. For comparison, the college means over years 2009 through 2017 are also provided.

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<tbody>
<tr>
<td>Number of students</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>162</td>
</tr>
<tr>
<td>Year 1 Retained</td>
<td>100</td>
<td>100</td>
<td>80</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>80</td>
<td>88</td>
</tr>
<tr>
<td>Year 1 Graduated</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Year 4 Graduated</td>
<td>0</td>
<td>0</td>
<td>60</td>
<td>20</td>
<td>50</td>
<td>50</td>
<td>14</td>
<td>NA</td>
<td>NA</td>
<td>19</td>
</tr>
<tr>
<td>Year 5 Graduated</td>
<td>0</td>
<td>33</td>
<td>80</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>30</td>
</tr>
<tr>
<td>Year 6 Graduated</td>
<td>50</td>
<td>33</td>
<td>80</td>
<td>40</td>
<td>50</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>27</td>
</tr>
</tbody>
</table>

The average time to degree for the Masters and Ph.D. programs has remained relatively stable over the 5-year reporting period (Table 3.5). On average, a Masters in Horticulture takes ~2.8 years to complete while a Masters in Plant Breeding takes an average time of 3.5 years to complete. The average time to obtain a Ph.D. in Horticulture is 6.2 years. It has varied from 4.8 to 9.0 years over the 5-year period. The 2016-2017 data for the Ph.D. was an anomaly and reflects one Ph.D. student who graduated in that year. Removing that data
point reduced the average time to degree for a Ph.D. to 5.8 years. Only one Plant Breeding Ph.D. student has completed their degree in the department over the 5-year period and their time to degree was 7.5 years. In 2014 we began accepting direct admits from the B.S. to the Ph.D. program. Thus far none of our direct admits have graduated although 2 are slated to graduate in the 2019-2020 academic year. To aid students in time to degree, the department has mandated timely completion of the thesis/dissertation proposal. M.S. students are required to submit an approved proposal before their third long semester while Ph.D. students are required to submit an approved proposal before their fifth long semester. If these deadlines are not met, they are blocked from further registration. We believe implementation of this policy has been successful in keeping our students on track to graduate in a timely manner.

Our doctoral students had a similar time to degree as the overall college average of 5.86 years when excluding the 2016-2017 year while our M.S. students had a slightly higher time to degree than the overall college average (2.8 years for Department vs 2.51 years for the overall College). Work is still needed to continue to lower the time to degree. One possible idea could be to require all graduate students to hold an annual committee meeting to give an update on course and research progress. Additionally, we could implement rules regarding when Ph.D. students must complete their preliminary examinations following completion of their coursework as the University doesn’t adhere to a strict policy.

The number of degrees awarded from fall 2014 through summer 2019 is shown in Table 3.6. This includes those students obtaining either a Horticulture or Plant Breeding degree. Faculty within the department participate in other graduate programs including Molecular and Environmental Plant Science (MEPS), Nutrition and Food Science (NTFS), Plant Pathology and Food Science and Technology (FSTC). Students from these programs are under a different CIP code than Horticultural Sciences (01.1103) or Plant Breeding (01.1101) and they are shown in Table 3.7.

### Table 3.5. Time to Degree for Masters and Ph.D. students in Horticulture and Plant Breeding (data from DARS).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Masters Horticulture</td>
<td>2.67</td>
<td>2.75</td>
<td>2.5</td>
<td>2.92</td>
<td>3.0</td>
</tr>
<tr>
<td>Masters Plant Breeding</td>
<td>-</td>
<td>-</td>
<td>3.0</td>
<td>4.0</td>
<td>-</td>
</tr>
<tr>
<td>Ph.D. Horticulture</td>
<td>6.0</td>
<td>5.83</td>
<td>9.0</td>
<td>5.5</td>
<td>4.8</td>
</tr>
<tr>
<td>Ph.D. Plant Breeding</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7.5</td>
</tr>
</tbody>
</table>

The number of degrees awarded from fall 2014 through summer 2018 is shown in Table 3.6. This includes those students obtaining either a Horticulture or Plant Breeding degree. Faculty within the department participate in other graduate programs including Molecular and Environmental Plant Science (MEPS), Nutrition and Food Science (NTFS), Plant Pathology and Food Science and Technology (FSTC). Students from these programs are under a different CIP code than Horticultural Sciences (01.1103) or Plant Breeding (01.1101) and they are shown in Table 3.7.

### Table 3.6. Graduate degrees awarded between fall 2014 and summer 2018.

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>MAg</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>M.S.</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>M.S.-NTO*</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9</td>
<td>9</td>
<td>4</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

*Non-thesis M.S. is offered through Plant Breeding.
From 2014-2019, 40 graduate degrees have been awarded in the Department of Horticultural Sciences (Table 3.6). This includes 4 M.Agr. degrees, 22 M.S. degrees and 14 Ph.D. degrees. In addition, Horticulture faculty have served as the major advisor for 16 graduates from other degree programs (Table 3.7). The Department has consistently maintained a rolling 5-year average Ph.D. graduation rate above 10 as shown in Figure 3.1. Per the Texas Higher Education Coordinating Board (THECB) we are required to maintain an average of 10 Ph.D. graduates over a 5-year period for the Horticultural Sciences CIP code 01.1103 (red line in Fig. 3.1). We have successfully met or exceeded this average for the past 18 years and have maintained an average of 15.66 Ph.D. graduates over the past six 5-year rolling average cycles. Our Plant Breeding Ph.D. students are combined with those from the Department of Soil and Crop Sciences into CIP code 01.1101. The TAMU Department of Soil and Crop Sciences has significantly more faculty in the area of Plant Breeding than the Department of Horticultural Sciences and thus the Plant Breeding program is able to consistently maintain a rolling 5-year Ph.D. average graduation rate over 10 as well.

Figure 3.1. Rolling 5-year graduation average for Horticulture and Plant Breeding Ph.D. students since 1991.

When compared to other 1862 and 1892 land grant universities, the Department of Horticultural Sciences at Texas A&M University ranked 5th for degrees awarded in the fields of Horticulture from 2013-2014 through 2017-2018 (Table 3.8).
Table 3.8. Degrees awarded. Data obtained from the FAEIS (Food and Agricultural Education Information System) database for 1862 and 1890 land grant universities that reported in the 01.0309, 01.0601, 01.0603, 01.0604, 01.0605, 01.0606, 01.0608, 01.0699, and 01.1103 CIP codes*. In order of descending number of total graduate degrees awarded between Fall 2013 – Spring 2018. Downloaded 2 January 2020. FAEIS data are not yet available for 2018-2019.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>North Carolina State University</td>
<td>4</td>
<td>5</td>
<td>30</td>
<td>11</td>
<td></td>
<td>69</td>
</tr>
<tr>
<td>Auburn University</td>
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<td>3</td>
<td>9</td>
<td>8</td>
<td>1</td>
<td>15</td>
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<tr>
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<td>8</td>
<td>3</td>
<td>6</td>
<td>8</td>
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<td>Washington State University</td>
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<td>6</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Texas A&amp;M University</td>
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<td>6</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Kansas State University</td>
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<td>2</td>
<td>5</td>
<td>5</td>
<td>2</td>
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<tr>
<td>Purdue University</td>
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<td>1</td>
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<td>5</td>
<td>3</td>
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<tr>
<td>Colorado State University</td>
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<td>4</td>
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<td>7</td>
<td>4</td>
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<td>8</td>
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<td>3</td>
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</tr>
<tr>
<td>University of Georgia</td>
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<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>7</td>
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<tr>
<td>University of Delaware</td>
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<tr>
<td>The Ohio State University</td>
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<tr>
<td>Michigan State University</td>
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<td>Pennsylvania State University</td>
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<td>New Mexico State University</td>
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<tr>
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<tr>
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<tr>
<td>University of Puerto Rico</td>
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<tr>
<td>West Virginia University</td>
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<tr>
<td>Mississippi State University</td>
<td></td>
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</tbody>
</table>

*Horticultural CIP Codes; 01.0309 - Viticulture and Enology; 01.0601 - Applied Horticulture/Horticultural Operations, General; 01.0603 - Ornamental Horticulture; 01.0604 - Greenhouse Operations and Management; 01.0605 - Landscaping and Groundskeeping; 01.0606 - Plant Nursery Operations and Management; 01.0608 - Floriculture/Floristry Operations and Management; 01.0699 – Applied Horticulture/Horticultural Business Services, Other; 01.1103 – Horticultural Science
Academic Enhancements/High-Impact Graduate Student Opportunities

All Master of Agriculture and Master of Science – Non-thesis option students within the department are required to participate in a minimum 3-month internship experience as part of the degree program (HORT 684). These internships are conducted off-campus or with other units on campus (i.e. The Texas A&M University Gardens) and are expected to be high-impact professional experiences for these students. M.S. and Ph.D. students do not participate in internships due to time constraints. However, during the 2017-2018 and 2018-2019 years, the department did award travel funds for M.S. and Ph.D. students to attend a national meeting to present their research findings in either poster or oral format. Ten students were selected each of the two years. In addition, at the end of 2014 an endowment was established through a generous donor, Dr. Dudley Smith and his wife Angela, that provides students the opportunity to request travel funds to participate in short-term exploratory research experiences at another university, government facility, private company or similar research centers of excellence. Since spring 2015, 5 students (4 Ph.D. and 1 M.S.) have been awarded funds to travel to research facilities to learn new techniques applicable to their ongoing research projects.

Learning Outcomes Assessment of the Graduate Program

Texas A&M University mandates that graduate programs be subjected to learning outcomes assessment in a manner analogous to the undergraduate academic program. To that end, departments were directed to develop assessment plans to address the following university level learning outcomes:

University Masters Learning Outcomes
https://provost.tamu.edu/Provost/media/Assets/pdfs-essentials/Access-Graduate-Learning-Outcomes.pdf
A student who graduates from Texas A&M University with a master’s degree will:
• Master degree program requirements, including theories, concepts, principles, and practice and develop a coherent understanding of the subject matter through synthesis across courses and experiences; and
• Apply subject matter knowledge to solve problems and make decisions.
• Use a variety of sources and evaluate multiple points of view to analyze and integrate information and to conduct critical, reasoned arguments.
• Communicate effectively.
• Use appropriate technologies to communicate, collaborate, conduct research, and solve problems.
• Develop clear research plans and conduct valid (data-supported), theoretically consistent, and institutionally appropriate research.
• Choose ethical courses of action in research and practice.

University Doctoral Learning Outcomes
http://catalog.tamu.edu/pdfs/DoctoralOutcomes-1pg.pdf
A student who graduates from Texas A&M University with a doctoral degree will:
• Master degree program requirements, including theories, concepts, principles, and practice; and develop a coherent understanding of the subject matter through synthesis across courses and experiences; and
• Apply subject matter knowledge to solve problems and make decisions.
• Apply a variety of strategies and tools, use a variety of sources, and evaluate multiple points of view to analyze and integrate information and to conduct critical, reasoned arguments.
• Communicate effectively.
• Develop clear research plans, conduct valid, data-supported, theoretically-consistent, and institutionally-appropriate research and effectively disseminate the results of the research in appropriate venues to a range of audiences.
• Use appropriate technologies to communicate, collaborate, conduct research, and solve problems.
• Teach and explain the subject matter in their discipline.
• Choose ethical courses of action in research and practice.

Departmental assessment plans are reviewed by a committee of peers and administrators at the College-level and evaluated for compliance with reporting guidelines. The Horticultural Sciences graduate program
assessment was revamped in 2014 and has been reported as in compliance with University level learning outcomes for the past 5 years.

Departmental M.S. and Ph. D. Program Learning Outcomes Assessment Plans
The M.S. and Ph.D. programs in horticulture exist to provide an advanced science-based education for students through teaching and directed horticultural research experience.

Outcomes
- Outcome 1 – Execution of a horticultural research project. Graduates will have an understanding of the scientific method and the ability to apply it to solving horticultural research problems.
- Outcome 2 – Critical Evaluation. Graduates will be able to find and critically evaluate plant science literature.
- Outcome 3 - Effective Communication. Graduates will be able to effectively communicate, both orally and in written form, the results of horticultural research and experiences as it relates to their specific field of horticulture.

Measures
- Annual graduate student assessment
  Each academic year, an assessment between the graduate chair and student will occur to assess yearly course progress, thesis/dissertation research results and set goals/benchmarks for the coming year.
- Committee Evaluation of graduate student learning outcomes
  At the final defense or examination, each committee member as well as the student will complete the College’s Graduate Student Evaluation form to assess the student’s performance relative to learning outcomes for the College and University.

Departmental Master of Agriculture Program Learning Outcomes Assessment Plan
The Masters of Agriculture degree program exists to provide an advanced education for students through teaching and directed horticultural research experience in the form of an internship.

Outcomes
- Outcome 1 – Horticultural knowledge. Graduates will demonstrate mastery of horticultural knowledge and use the information to solve horticulture problems that relate to their specific field of horticulture.
- Outcome 2 – Critical Evaluation. Graduates will be able to find and critically evaluate plant science literature.
- Outcome 3 - Effective Communication. Graduates will be able to effectively communicate, both orally and in written form, the results of horticultural research and experiences as it relates to their specific field of horticulture.

Measures
- Annual graduate student assessment
  Each academic year, an assessment between the graduate chair and student will occur to assess yearly course progress, internship opportunities/results and set goals/benchmarks for the coming year.
- Committee Evaluation of graduate student learning outcomes
  At the final defense or examination, each committee member as well as the student will complete the College’s Graduate Student Evaluation form to assess the student’s performance relative to learning outcomes for the College.

The Departmental annual evaluation form used by chairs to assess their students each year was rewritten to more closely align with our departmental learning outcomes and to measure the student’s mastery of each outcome (Figure 3.2).

Similarly, the College of Agriculture and Life Sciences revised the College level Graduate Student Evaluation form to more accurately align with the Universities learning outcomes (Figure 3.3).

Now that we have streamlined our graduate assessment plans to specifically address student learning outcomes, we have received positive feedback from our College assessment coordinator as well as the Office of Institutional Effectiveness.
Faculty Member’s Evaluation of the Student’s Progress for the Previous Academic Year:

It is anticipated that as a student progresses through their degree program and gains additional experience each year, they will see continued progress in meeting expectations in the areas of research-related knowledge, critical thinking and communication skills. Based on the time your student has been in their current degree program, please evaluate them on these learning outcomes using the ratings provided.

*Exceeds expectations: The student is completing assignments, projects, research, and other duties above and beyond the requirements set. The student is progressing in their dissertation/thesis/course work with dedication and a strong work ethic. The student excels in research-related knowledge and critical thinking skills allowing them to work independently with minimal oversight.

*Meets expectations: The student is completing assignments, projects, research, and other duties as expected by the standards set and agreed upon. The student is demonstrating appropriate knowledge and critical thinking skills commensurate with their time in the degree program.

*Meets minimum expectations: The student is completing assignments/projects, research, and other duties but may be struggling to do so on time, needs constant reminders, guidance, and/or assistance and does not have the necessary knowledge or critical thinking skills that is expected based on their current time in the degree program.

*Below minimum expectation: The student is failing to complete assignments, projects, research, and is failing to communicate with their advisor and/or committee. The student lacks the necessary knowledge and critical thinking skills to progress adequately in their program.

NOTE: If you indicate that a student only meets minimum expectations or is below minimum expectations on any questions, please indicate why and provide suggestions on how the student can improve during the coming year.

1. Based on the time in their degree program, is this student demonstrating the necessary knowledge necessary to progress in their specific program?

   ___ Exceeds expectations; ___ Meets expectations; ___ Meets minimum expectations; ___ Below minimum expectations

2. Based on the time in their degree program, is this student demonstrating an ability to critically evaluate the literature and other resources needed to progress in their specific program?

   ___ Exceeds expectations; ___ Meets expectations; ___ Meets minimum expectations; ___ Below minimum expectations

3. Based on the time in their degree program, is this student demonstrating good oral communication skills?

   ___ Exceeds expectations; ___ Meets expectations; ___ Meets minimum expectations; ___ Below minimum expectations

4. Based on the time in their degree program, is this student demonstrating good written communication skills?

   ___ Exceeds expectations; ___ Meets expectations; ___ Meets minimum expectations; ___ Below minimum expectations

5. Provide an overall assessment of this student’s performance during the past year in the space below and any additional suggestions for improvement.

   ___ Exceeds expectations; ___ Meets expectations; ___ Meets minimum expectations; ___ Below minimum expectations
Figure 3.3. Screen capture of revised College level faculty evaluation of graduate student learning outcomes.

**Faculty Evaluation of Graduate Student Learning Outcomes**

<table>
<thead>
<tr>
<th>How well does the student meet your expectations in the following areas?</th>
<th>Well Above (5)</th>
<th>Above (4)</th>
<th>Approaches Expectations (3)</th>
<th>Below (2)</th>
<th>Well Below (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exhibits a coherent understanding of discipline-specific knowledge</strong></td>
<td>Ideal mastery of critical concepts</td>
<td>Strong mastery of critical concepts</td>
<td>Meets Goals sometimes</td>
<td>Poor mastery of critical concepts</td>
<td>No mastery of critical concepts</td>
</tr>
<tr>
<td>Applies discipline-specific knowledge in a range of contexts to solve problems and make decisions</td>
<td>Applies all recommended information</td>
<td>Applies most recommended information</td>
<td>Applies some recommended information</td>
<td>Rarely applies recommended information</td>
<td>Rarely applies recommended information</td>
</tr>
<tr>
<td>Uses a variety of sources and alternative views when critically evaluating ideas and information</td>
<td>Ideal mastery of critical evaluation</td>
<td>Strong mastery of critical evaluation</td>
<td>Meets Goals sometimes</td>
<td>Poor mastery of critical evaluation</td>
<td>No mastery of critical evaluation</td>
</tr>
<tr>
<td>Communicates effectively?</td>
<td>Critical idea, message, and transition</td>
<td>Very clear, smooth transitions</td>
<td>Meets Goals sometimes</td>
<td>Lacking clarity or poor transitions</td>
<td>Lacking clarity or poor transitions</td>
</tr>
<tr>
<td><strong>Teaches or explains the subject matter in their discipline to a range of audiences</strong></td>
<td>Ideal delivery; ideal for audience</td>
<td>Strong delivery, well designed for audience</td>
<td>Delivery adequate</td>
<td>Poor delivery; inappropriate for audience</td>
<td>Poor delivery; inappropriate for audience</td>
</tr>
<tr>
<td><strong>Exhibits proficiency in technology appropriate to solve problems in their discipline</strong></td>
<td>Expert proficiency</td>
<td>Advanced proficiency</td>
<td>Demonstrates basic knowledge of technology and tools specific to the discipline; may rely on others</td>
<td>Lacking proficiency</td>
<td>No proficiency</td>
</tr>
<tr>
<td><strong>Chooses ethical courses of action in research or practice</strong></td>
<td>Addresses ethical questions</td>
<td>Addresses most ethical questions</td>
<td>Recognizes ethical issues; attempts to apply ethical perspectives &amp; concepts in research and practice</td>
<td>Doesn’t recognize ethical issues</td>
<td>Doesn’t recognize ethical issues</td>
</tr>
</tbody>
</table>

**College of Agriculture and Life Sciences, MS 2402**

INSTRUCTIONS: This section should be completed for ALL students. Check the box most appropriate for this student.
Financial Support of Students in Graduate Horticulture Degree Programs

On average 90% of the graduate students within the Department receive some type of institutional support although this does vary by year (Table 3.9). Department of Horticultural Sciences research assistantships are the predominant funding source of the students, of which nearly 100% is from “soft money” (grants, contracts, temporary bridge funds, other external funds, etc.). The second largest source of funding for graduate students is teaching assistantships. A small percentage of our graduate students who do not receive financial support have other forms of financial support including employment either inside or outside the University.

“Hard money” funded assistantships from internal institutional support remains at the same absolute dollar amount in the Department of Horticultural Sciences as it was in 2002 at $100,379 per year. In addition, we receive Graduate Enhancement funds of approximately $23,000 to $25,000/year. In total, our graduate budget to support the teaching mission of the department is ~$125,000/year. In 2013-2014, our minimum research and teaching assistantships were $16,000/year for an M.S. student and $17,000/year for a Ph.D. student. In addition to a monthly stipend, these assistantships come with a waiver of out-of-state tuition costs and health insurance benefits. In-state tuition costs are covered by the assistantship but mandated university fees are not. Since 2013-2014, the graduate faculty have voted to raise the yearly minimum stipends twice. The current stipend level for a Masters student is $17,500/year, while the stipend for a Doctoral student is $19,000/year although individual faculty can provide a higher stipend level for students whom they support on soft-funded research assistantships.

Table 3.9. Proportion of graduate students receiving institutional support and mean amount per student from 2014-2015 through 2018-2019.

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Proportion of full-time students receiving institutional support (%)</th>
<th>Mean amount of institutional support ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2015</td>
<td>93.6%</td>
<td>22,696</td>
</tr>
<tr>
<td>2015-2016</td>
<td>84.6%</td>
<td>29,560</td>
</tr>
<tr>
<td>2016-2017</td>
<td>100%</td>
<td>25,262</td>
</tr>
<tr>
<td>2017-2018</td>
<td>72.3%</td>
<td>20,311</td>
</tr>
<tr>
<td>2018-2019</td>
<td>94.3%</td>
<td>30,781</td>
</tr>
</tbody>
</table>

The departmental teaching budget of ~$125,000/year is used to support six 50%-effort teaching assistantships for a 9-month period, two 50%-effort teaching assistantships for a 12-month period and two 50%-effort research assistantships for a 3-month period. The College/University cover the cost of in-state tuition (but not fees) for these departmental hard dollar assistantships as long as the assistantship is held by a Ph.D. student. Funds to pay the tuition for M.S. students on a teaching assistantship were eliminated in 2016-2017 due to the University mandate that tuition payment for Ph.D. students on teaching assistantships was required. Because of a trend across the University and College that significantly more teaching assistantships are awarded to Ph.D. students, funds are not available to cover the cost of tuition for M.S. students. As a result, the Department of Horticultural Sciences has prioritized that our teaching assistantships be assigned to Ph.D. students whenever possible. When an M.S. student is assigned to a teaching assistantship position, the chair of the student's advisory committee is expected to cover their in-state tuition costs.

Graduate students within the Department of Horticultural Sciences have been supported by other funding sources including fellowships (either full or partial funding) and by a student’s home country. The Department of Horticultural Sciences has received two College Merit Fellowships and one University Diversity Fellowship over the 5-year reporting period. The Merit Fellowships provide full funding (stipend, tuition, fees and medical benefits) for one year with the Department or advisory committee chair expected to support the student after year one. The Diversity Fellowship is a multi-year offer (two year for M.S. students/three year for Ph.D. students) and provides a stipend, tuition/fees and medical benefits with the Department or

2020 Horticultural Sciences Academic Program Review

Section 3 Page 14
Students supported on research assistantships through soft-money grant support cost a faculty member ~$30,000/year when adding in the cost of health insurance, social security, tuition and stipend. This figure will only get higher as the University has mandated that beginning in fall 2020, all Ph.D. students on assistantships (either teaching or research) must have their fees paid by the entity supplying the assistantship. For those Ph.D. students on teaching assistantships, the College will continue to cover full-time tuition and begin covering fees in fall 2020. However, for those students on soft-money funded research assistantships, the chair of the students advisory committee will have to bear the cost of fees. For the 2018-2019 year, full-time tuition for a graduate student was $6,552/year and fees were $3,495/year for a total cost of $10,047. In addition to the requirement to pay Ph.D. graduate student fees for those on assistantships, the College is also considering a College-wide minimum yearly stipend. Currently each department within the College of Agriculture and Life Sciences sets their own stipend levels and these vary tremendously across the College from $16,000 to $30,000. Discussions are ongoing but it has been suggested that $22,000/year should be the College minimum for Ph.D. stipends. If this change is enacted it will have a tremendous effect on the Department of Horticultural Sciences graduate program. We would likely have to reduce the number of teaching assistantships offered from 8 to 7 and reduce all teaching assistantships to 9-months. For faculty who support students on soft-money funds, the impact of these two changes would be an increase of ~$7,000/year/Ph.D. student. This has created the belief among some faculty that it will be more cost effective to hire a technician or post-doc than to hire graduate students. Considering a mean stay of 5.8 years for Ph.D. students these numbers can easily translate into an investment of over a $200,000 when combining stipend, benefits and tuition/fees for a single Ph.D. student, not including the costs incurred for research experiments, travel to meetings for presentations, etc.

**Student Publications/Presentations**

The Department of Horticultural Sciences does not have a publication requirement for our graduates, although we highly encourage all M.S. and Ph.D. students to publish their thesis/dissertation research in peer-reviewed journals as well as publishing conference proceedings. During the 5 years between 2014 and 2019, 40 students (14 PhD and 26 Masters) have graduated from the Department. Those students have published a total of 55 peer-reviewed first author manuscripts and co-authored another 35 peer-reviewed manuscripts. In addition, these 40 students have authored or co-authored 32 non-peer reviewed publications and made over 111 presentations at local, state and national meetings. As previously indicated the Department is committed to ensuring that students have an opportunity to attend national scientific meetings to present their research. In 2017-2018 and 2018-2019, the Department awarded 20 travel grants totaling $12,500 to current graduate students to attend national society meetings. It is our intent to continue this trend as long as funds are available.

**Student Employment Profile**

Graduate students at TAMU have excellent resources for career guidance. All incoming graduate students in the Department of Horticultural Sciences are required to take HORT 690 as a Professional Development course. In this course they are exposed to the TAMU Career Center and are shown how to set up accounts on HireAggies.com, VirtualPhD, LinkedIn and the Association of Former Students. They are also introduced to the American Association for the Advancement of Sciences myIDP site where they can create a personalized individual development plan. Graduate students are also welcome to attend the Department’s annual career fair to talk with industry representatives from a number of horticultural companies. Many students also attend the annual American Society for Horticultural Sciences meeting to engage in networking activities with
faculty from other Universities. These resources have proven successful in helping our graduate students find employment in the field (Table 3.10).

<table>
<thead>
<tr>
<th>M.Ag., M.S. and Ph.D. Graduates</th>
<th>Employment sector %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>37.5</td>
</tr>
<tr>
<td>Academia</td>
<td>27.5</td>
</tr>
<tr>
<td>Continuing student</td>
<td>15</td>
</tr>
<tr>
<td>Government</td>
<td>7.5</td>
</tr>
<tr>
<td>Self-employed</td>
<td>5</td>
</tr>
<tr>
<td>Unknown</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Overall, the Department had a 92.5% placement rate for our Masters and Doctoral graduates. Six M.S. students went on to Ph.D. programs either at TAMU or other Universities while several of our Ph.D. graduates obtained faculty positions within various Universities, including TAMU. The majority of our graduates that went to industry completed an M.S. degree (11 out of 15 total). Fourteen of the 15 graduates who went to industry are employed in horticulture or plant science related fields. Finally, two of our graduates (1 M.S. and 1 Ph.D.) started their own successful businesses.

**Summary and Outlook**

Overall the Department of Horticultural Sciences has made great strides in increasing the size of the graduate program, especially the size of the Ph.D. program over the past 6-7 years. The number of Ph.D. students has increased 51% since 2014-2015 due to targeted efforts to acquire additional funds to recruit outstanding students. Data from our assessment measures (annual performance evaluations, successful thesis/dissertation defenses, committee evaluation of graduate student learning outcomes) indicate that we are meeting our stated learning outcomes. Our M.S. and Ph.D. graduates have an understanding of the scientific method and the ability to apply it to solving horticultural research problems. They are able to critically evaluate the literature and demonstrate strong oral and written communication skills. Our Master of Agriculture graduates demonstrate mastery of horticultural knowledge and are able to use the information to solve horticulture problems that relate to their specific field of horticulture. A strength of our graduate program is the excellent education and training the students receive across a broad range of horticultural sciences. Although we require all Master’s students to take 9 hours of graduate level horticulture courses and Ph.D. students to take 12 hours, we allow the students the flexibility to choose the individual courses so they can tailor their individual degree plan to meet their specific career objectives and research needs. Our graduate program is contributing to the University and Department’s strategic plans through the research and scholarly activity of our students. The 40 students who graduated during the past 5 years published 55 peer-reviewed manuscripts as first-author and presented their research at more than 100 local, state and national meetings. Graduates have published manuscripts in Nature Horticulture Research (4.44 Impact factor), Food Chemistry (5.39 Impact factor), The Plant Journal (5.775 Impact factor), and Nature Scientific Reports (4.12). Additionally, 77.5% of our graduates are employed across academia, government and industry with another 15% continuing their education.

Although our graduate program is currently thriving, we do face a number of challenges. Most of our on-campus tenure-track faculty are full professors (14 Full professors, 2 Associate Professors) and many will be retiring over the course of the next 2-5 years. Many of these faculty are reluctant to bring in new Ph.D. students given that they will likely retire prior to the student finishing their degree. In addition to an aging faculty, we have lost 5 tenure-track faculty since our last external review while only hiring 2 tenure-track
faculty over the same time period. These two new hires were at the Associate Professor level so we currently have no tenure-track Assistant Professors within the department. While we have hired three Assistant Professors at our off-campus Research and Extension Centers, many students are reluctant to join these programs because they must fulfill their on-campus residency and coursework requirements in College Station before moving off-campus to conduct their research. This can result in an added financial burden to the student and also result in increased time to degree. Interaction with their faculty advisor is also more difficult and challenging while they are residing in College Station.

We are also faced with budgetary challenges for our graduate program. Our hard-funded teaching budget hasn’t increased since 2002, however, our minimum stipend levels have steadily increased and likely will increase again by several thousand dollars over the next 1-2 years. In addition, we have been mandated by the University to begin covering student fees in addition to tuition in fall 2020. We will likely have to eliminate 1 TA position and reduce all TA positions to 9-month appointments. The faculty advisors for these students will need to have funds to cover the students over the summer months or the students will be required to seek outside employment, a factor that can also lengthen the time to degree. With increased stipend levels, tuition and fee payment and medical benefits, a typical Ph.D. student on a soft-funded research assistantship will cost the faculty advisor ~$200,000 over the course of a 5 to 5.5-year program. Many faculty do not have the necessary resources to cover this expense and some will likely opt to hire undergraduate students or part-time technicians to perform the necessary research.

Finally, our graduate student numbers are threatened by competition from interdisciplinary graduate programs such as Molecular and Environmental Plant Sciences and Food Science and Technology or from other graduate programs in which our faculty participate as graduate faculty members. Each of these programs is under a different CIP code and although a faculty member from our department may serve as the committee chair for a student in one of these programs and the department provides facilities and support, we do not receive credit for the student with regards to THECB program metrics. Over the past 5 years faculty in Horticulture have served as the major professor for 16 students (8 Ph.D. and 8 M.S.) seeking degrees other than Horticulture. Even the Plant Breeding program, although administered by both Horticulture and Soil and Crop Sciences, is under its own CIP code and again the Department of Horticultural Sciences does not receive THECB credit for these students.

Maintaining a strong graduate program in the Department of Horticultural Sciences depends heavily on the availability of assistantship funds to attract outstanding students and on recruitment of young new faculty within the Department. Most of our assistantships will likely come from soft-money sources such as grants and contracts, thus hiring young, new faculty that can develop a vibrant externally funded research program will be critical to our continued success.
4. FACULTY PROFILE

The Department of Horticultural Sciences faculty is organized according to the “typical landgrant” model. The faculty as a whole executes the combined teaching, research, extension/outreach missions, but individual faculty may have differing responsibilities depending on their appointment. Funding for salaries comes from Texas A&M University, Texas A&M Agrilife Research (known as the “experiment station” at many institutions), and the Texas A&M Agrilife Extension Service (known as cooperative extension at many institutions). On-campus faculty have Texas A&M University or Texas A&M Agrilife Extension Service appointments, one has a Texas A&M Agrilife Research appointment, but none of the faculty at off campus research and extension centers has a joint appointment with Texas A&M University.

Faculty are located geographically on-campus in College Station or at off-campus research and extension centers at Dallas, Overton, Weslaco, Uvalde, and Lubbock and at the Viticulture and Fruit Lab in Fredericksburg. Location of scientists throughout the state intends to address the needs of the horticultural industry for region-appropriate research and Extension activities and to provide research support facilities for faculty, staff and students as they conduct research appropriate to the diverse cropping systems of the different horticultural regions in the state.

Full time faculty physically located on campus number 22 (19 teaching/research; 3 Extension); 3 faculty are less than full time. Seven off-campus research horticulturists are located at Research and Extension Centers (Weslaco, Overton, Dallas, and Uvalde), 7 Extension specialists are located off-campus (Weslaco, Dallas, Lubbock, Overton, Uvalde, Fredericksburg) and 28 county educators are identified as county horticulturists (Table 4.1).

<table>
<thead>
<tr>
<th>NAME</th>
<th>RANK</th>
<th>DISTRIBUTION OF EFFORT (approximate %T-%R-%E)</th>
<th>CORE FACULTY STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lineberger, R D</td>
<td>professor &amp; head</td>
<td>100% Admin (T / R / E, 33% each)</td>
<td>Member</td>
</tr>
<tr>
<td>Arnold, Michael A</td>
<td>professor &amp; associate head</td>
<td>50% T / 25% R / 25% Admin</td>
<td>Member</td>
</tr>
<tr>
<td>Byrne, David H</td>
<td>professor</td>
<td>25% T / 75% R</td>
<td>Member</td>
</tr>
<tr>
<td>Cisneros-Zevallos, Luis</td>
<td>professor</td>
<td>40% T / 60% R</td>
<td>Member</td>
</tr>
<tr>
<td>Crosby, Kevin M</td>
<td>professor</td>
<td>25% T / 75% R</td>
<td>Member</td>
</tr>
<tr>
<td>Davis, Tim D</td>
<td>professor</td>
<td>80% Borlaug/20% Teaching</td>
<td>Member</td>
</tr>
<tr>
<td>Hall, Charles R</td>
<td>professor</td>
<td>35% T / 45% R / 20% E</td>
<td>Member</td>
</tr>
<tr>
<td>Klein, Patricia E</td>
<td>professor &amp; associate head</td>
<td>25% T / 50% R / 25% Admin</td>
<td>Member</td>
</tr>
<tr>
<td>Koiva, Hisashi</td>
<td>professor</td>
<td>25% T / 75% R</td>
<td>Member</td>
</tr>
<tr>
<td>Nessler, Craig</td>
<td>professor</td>
<td>75% T / 25% R</td>
<td>Member</td>
</tr>
</tbody>
</table>
Faculty Transitions Since Last Academic Program Review

Faculty turnover is expected in the community of professional horticulturists and Texas A&M has experienced substantial turnover since the last academic program review in 2013 (Table 4.2). Refilling faculty positions is no longer within the exclusive purview of the academic departments, rather departments submit proposals twice annually requesting new or replacement hires. Agrilife-level administrators at the Deans and Directors level review the proposals from all units (departments, research and extension centers) to determine the most appropriate hires to advance Agrilife goals and provide the greatest opportunity for success of the faculty member and the department. Hiring faculty members with outstanding research credentials in areas of national scientific priority who have a high likelihood of being able to establish a strong, impactful, federally-funded research and graduate education program is an important consideration for

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Teaching/Research/Admin</th>
<th>Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patil, Bhimanagouda S</td>
<td>professor &amp; director, VFIC</td>
<td>25% T / 50% R / 25% Admin</td>
<td></td>
</tr>
<tr>
<td>Pierson, Elizabeth A</td>
<td>professor</td>
<td>25% T / 75% R</td>
<td></td>
</tr>
<tr>
<td>Reed, David</td>
<td>professor</td>
<td>75% T / 25% R</td>
<td></td>
</tr>
<tr>
<td>Riera-Lizarazu, Oscar</td>
<td>associate professor</td>
<td>25% T / 75% R</td>
<td></td>
</tr>
<tr>
<td>Starman, Terri W</td>
<td>professor</td>
<td>75% T / 25% R</td>
<td></td>
</tr>
<tr>
<td>Vales, Isabel</td>
<td>associate professor</td>
<td>25% T / 75% R</td>
<td></td>
</tr>
<tr>
<td><strong>Academic Professional</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>McEachern, George R</td>
<td>professor</td>
<td>100% Teaching (retired/half time)</td>
<td></td>
</tr>
<tr>
<td>McKinley, William</td>
<td>senior lecturer</td>
<td>100% Teaching</td>
<td></td>
</tr>
<tr>
<td>King, Andrew</td>
<td>lecturer</td>
<td>100% Teaching</td>
<td></td>
</tr>
<tr>
<td>Gerald Burgner</td>
<td>lecturer</td>
<td>100% Teaching</td>
<td></td>
</tr>
<tr>
<td><strong>Texas A&amp;M Agrilife Research; non-tenure track</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avila, Carlos</td>
<td>assistant professor</td>
<td>10%T / 90%R</td>
<td></td>
</tr>
<tr>
<td>Jayakaprasha, G.</td>
<td>research professor</td>
<td>10%T / 90%R</td>
<td></td>
</tr>
<tr>
<td>Jifon, John</td>
<td>professor</td>
<td>10%T / 90%R</td>
<td></td>
</tr>
<tr>
<td>Joshi, Vijay</td>
<td>assistant professor</td>
<td>10%T / 90%R</td>
<td></td>
</tr>
<tr>
<td>Leskovar, Daniel</td>
<td>professor &amp; director, Uvalde</td>
<td>10%T / 40%R / 50% Admin</td>
<td></td>
</tr>
<tr>
<td>Malla, Subas</td>
<td>assistant professor</td>
<td>10%T / 90%R</td>
<td></td>
</tr>
<tr>
<td>Niu, Genhua</td>
<td>professor</td>
<td>10%T / 90%R</td>
<td></td>
</tr>
<tr>
<td>Pemberton, Brent</td>
<td>professor</td>
<td>10%T / 90%R</td>
<td></td>
</tr>
<tr>
<td><strong>Texas A&amp;M Agrilife Extension Service; non-tenure track</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stein, Larry</td>
<td>professor &amp; associate head</td>
<td>50% Extension / 50% Admin</td>
<td></td>
</tr>
<tr>
<td>Anciso, Juan</td>
<td>professor</td>
<td>100% Extension</td>
<td></td>
</tr>
<tr>
<td>Botezatu, Andreea</td>
<td>assistant professor</td>
<td>85% Extension / 15% Teaching</td>
<td></td>
</tr>
<tr>
<td>George, Steve</td>
<td>professor</td>
<td>100% Extension</td>
<td></td>
</tr>
<tr>
<td>Gu, Mengmeng</td>
<td>associate professor</td>
<td>100% Extension</td>
<td></td>
</tr>
<tr>
<td>Helwi, Pierre</td>
<td>assistant professor</td>
<td>100% Extension</td>
<td></td>
</tr>
<tr>
<td>Kamas, Jim</td>
<td>associate professor</td>
<td>100% Extension</td>
<td></td>
</tr>
<tr>
<td>Masabni, Joe</td>
<td>associate professor</td>
<td>100% Extension</td>
<td></td>
</tr>
<tr>
<td>Scheiner, Justin</td>
<td>assistant professor</td>
<td>85% Extension / 15% Teaching</td>
<td></td>
</tr>
<tr>
<td>Wagner, Al</td>
<td>professor</td>
<td>100% Extension (retired/half time)</td>
<td></td>
</tr>
<tr>
<td>Wallace, Russell</td>
<td>professor</td>
<td>75% Extension / 25% Research</td>
<td></td>
</tr>
<tr>
<td>Welch, Bill</td>
<td>professor</td>
<td>100% Extension (retired/half time)</td>
<td></td>
</tr>
</tbody>
</table>
faculty on the tenure track. Positions that have a very substantial commitment to undergraduate education that are critical to departmental curricula are often filled with non-tenure “academic professional track” faculty who devote their time exclusively to teaching and service.

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Position</th>
<th>Adloc</th>
<th>Transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astrid Volder</td>
<td>2013</td>
<td>Tenured Associate Professor</td>
<td>T</td>
<td>resigned; took another job</td>
</tr>
<tr>
<td>Xinwang Wang</td>
<td>2014</td>
<td>Non tenure track Assistant Professor</td>
<td>R</td>
<td>terminated</td>
</tr>
<tr>
<td>Fred Davies</td>
<td>2015</td>
<td>Tenured Professor</td>
<td>T</td>
<td>retired</td>
</tr>
<tr>
<td>Jayne Zajicek</td>
<td>2015</td>
<td>Tenured Professor</td>
<td>T</td>
<td>retired</td>
</tr>
<tr>
<td>C. Greg Cobb</td>
<td>2016</td>
<td>Tenured Associate Professor</td>
<td>T</td>
<td>deceased</td>
</tr>
<tr>
<td>Ed Hellman</td>
<td>2017</td>
<td>Non tenure track Professor</td>
<td>E</td>
<td>resigned; took another job</td>
</tr>
<tr>
<td>Liming Xiong</td>
<td>2017</td>
<td>Non tenure track Associate Professor</td>
<td>R</td>
<td>terminated</td>
</tr>
<tr>
<td>Isabel Vales</td>
<td>2017</td>
<td>Tenure track Associate Professor</td>
<td>T</td>
<td>hired</td>
</tr>
<tr>
<td>Oscar Riera-Lizarazu</td>
<td>2019</td>
<td>Tenured Associate Professor</td>
<td>T</td>
<td>hired</td>
</tr>
<tr>
<td>Leo Lombardini</td>
<td>2019</td>
<td>Tenured Professor</td>
<td>T</td>
<td>resigned; took another job</td>
</tr>
<tr>
<td>Andrew King</td>
<td>2016</td>
<td>Lecturer</td>
<td>T</td>
<td>hired</td>
</tr>
<tr>
<td>Whitney Griffin</td>
<td>2019</td>
<td>Lecturer</td>
<td>T</td>
<td>resigned; took another job</td>
</tr>
<tr>
<td>Gerald Burgner</td>
<td>2019</td>
<td>Lecturer</td>
<td>T</td>
<td>hired</td>
</tr>
<tr>
<td>Joe Masabni</td>
<td>2015</td>
<td>Non tenure track Associate Professor</td>
<td>E</td>
<td>Transferred to Overton</td>
</tr>
<tr>
<td>Genhua Niu</td>
<td>2019</td>
<td>Non tenure track Professor</td>
<td>R</td>
<td>Transferred to Dallas</td>
</tr>
<tr>
<td>Carlos Avila</td>
<td>2014</td>
<td>Non tenure track Assistant Professor</td>
<td>R</td>
<td>hired</td>
</tr>
<tr>
<td>Justin Scheiner</td>
<td>2014</td>
<td>Non tenure track Assistant Professor</td>
<td>E</td>
<td>hired</td>
</tr>
<tr>
<td>Vijay Joshi</td>
<td>2015</td>
<td>Non tenure track Assistant Professor</td>
<td>R</td>
<td>hired</td>
</tr>
<tr>
<td>Subas Malla</td>
<td>2016</td>
<td>Non tenure track Assistant Professor</td>
<td>R</td>
<td>hired</td>
</tr>
<tr>
<td>Andreea Botezatu</td>
<td>2017</td>
<td>Non tenure track Assistant Professor</td>
<td>E</td>
<td>hired</td>
</tr>
<tr>
<td>Pierre Helwi</td>
<td>2018</td>
<td>Non tenure track Assistant Professor</td>
<td>E</td>
<td>hired</td>
</tr>
</tbody>
</table>

### Endowed Chairs, Programs, and Faculty Collaborations

**Ellison International Chair in Floriculture**

The mission of the Ellison Chair in International Floriculture is to advance the health and vitality of the floriculture industry on a national and international scope through exemplary academic leadership, cutting-edge applied research, innovative extension outreach programs, and by mentoring well-educated, impassioned leaders to support the future of floriculture. Chairholder Dr. Charles Hall has become one of the “go to” keynote speakers for national industry conferences and programs. He manages the fee-based Executive Academy for Growth and Leadership (EAGL) which is designed for ornamentals industry leaders, writes an economics-focused blog for the Green Industry, and hosts the Charlie’s Angle video series for the AmericanHort Knowledge Center. Charlie was part of a team of faculty that proposed and obtained funding for the development of the Human Behavior Laboratory, a facility that enables researchers to examine physiological and psychological factors that impact attributes of human behavior related to preferences and purchasing decisions.
**Greenhouse Crops Research and Teaching**
The greenhouse crops research and teaching program is directed by Dr. Terri Starman. Dr. Starman conducts research on floriculture physiology, production, and postproduction. The overall goal of her research program is to reinforce the link between research, problem solving and floriculture practice for the commercial greenhouse floral crop industry. Her research focus is to provide technology to enhance the floriculture industry economy by making it more efficient, productive and profitable. She teaches students about crop production, greenhouse operation and management, floral design, international floriculture marketing and international horticulture (Study Abroad first summer session). Dr. Starman also advises undergraduate and graduate students to train leaders for the commercial floriculture industry.

**Nursery Crops Research and Teaching**
The nursery crops research and teaching program is directed by Dr. Mike Arnold. Dr. Arnold conducts research on development of sustainable urban/suburban landscapes, sustainable low input requiring landscape plants, and efficient establishment of landscape plantings. Mike and his students have crossed, selected and released several ornamentally-improved native species into the nursery trade. A prominent new plant introduction company is in final negotiations with the Office of Technology and Commercialization for licensing one of his *Oenothera drummondii* selections. Mike also explores other ecosystem services from these plants via cooperative studies on pollinator/landscape plants/edible crop with faculty in entomology. He cooperates with marketing specialists to determine economic and consumer impacts of various aspects of establishment of container grown plants in residential and commercial landscapes.

**Benz Endowed Floral Design Program**
Established at the bequest of floral design innovator M. “Buddy” Benz, the Benz Endowed Chair and School of Floral Design is a multifaceted program which includes the academic Bachelor of Arts program in floral design/event planning, the Benz Gallery of Floral Art and the Benz School of Floral Design, which offers a variety of basic and advanced courses for floral designers. The Chair holder is Mr. Bill McKinley, world-renowned designer and floral educator. The Benz Program has an international impact, collaborating with designers in Europe, Australia, Canada and Mexico and established a branch program in South Korea in 2007, The Benz School-Korea. The Benz School-Korea program has grown significantly and began its third sequence of teacher training in August 2013. Mr. McKinley’s collaborations with industry organizations spans many years and includes multi-phased online educational programs as well as state and national certification programs.

**Basye Endowed Chair in Rose Breeding**
Established through the generosity of Dr. Robert Basye to further his passion to develop roses resistant to the blackspot disease, the mission of the Basye Chair in Rose Breeding has expanded to include the evaluation and release of the Moore Roses, a collection of patented varieties and over 350 unreleased selections donated by Ralph Moore in 2008. Under the leadership of Basye Chair Dr. David Byrne, this program has evolved into national research leadership in several funded projects including the SCRI Rose Rosette Disease project, the National Clean Plant Network-Roses, and collaborating on the RoseBREED SCRI. A plan for sustaining this program was developed through Texas A&M Agrilife, and Dr. Oscar Riera-Lizarazu was hired in March, 2019 to work with Dr. Byrne and transition into the leadership of the program.

**Vegetable and Fruit Improvement Center**
The Vegetable and Fruit Improvement Center (VFIC) conducts research to improve human health and reduce risk from chronic diseases such as cancer and cardiovascular diseases. The interdisciplinary center works in partnership with producers, processors, grocery chains, and seed companies to promote increased consumption of fruits and vegetables, and to develop quality fruit, vegetable, and nut varieties with enhanced health and nutritional benefits in an efficient, economical and environmentally sound system. The goal of the VFIC is to provide solutions, through the development of new technologies and plant varieties, for producing quality vegetable and fruit products. Under the leadership of Dr. Bhimu Patil, VFIC scientists have secured significant grants including NIH, NSF, TDA-TIE, USDA-Challenge grants, DOE and USDA-Special grants.
The interdisciplinary center has 21 scientists with diverse research expertise ranging from plant breeding, natural product chemistry, biochemistry, education, economics, postharvest physiology, physiological genetics, plant secondary metabolites, nutrition, medical science, and cropping systems. The VFIC also hosted one national conference and two international symposia in College Station, Houston and South Padre Island. Always a priority for VFIC scientists, teaching and graduate advising has resulted in over 40 graduate students completing their degrees and more than 25 undergraduate students receiving hands-on training in lab techniques.

**Vegetable Breeding, Genetics and Variety Development**

Dr. Kevin Crosby leads a comprehensive breeding program that focuses on development and release of improved vegetable cultivars and germplasm, with emphasis on melons, tomatoes and peppers. He conducts an intensive screening and selection process intended to enhance yield, quality, pest resistance, levels of human health related compounds, and suitability for mechanical harvest. An integral component of his program is fundamental research into the genetics of disease resistance, crop physiology and phytochemical synthesis. Traditional breeding techniques are combined with molecular biology and plant pathology procedures to expedite the process of crop improvement. The elucidation of the relationship between genotype and adaptation to Texas environmental conditions is the overall goal, and key to perpetuating the success of the program. Kevin works cooperatively with other scientists in the Department of Horticultural Sciences, College Station and AgriLife Research and Extension Centers, including Trish Klein and Bhimu Patil on campus, Dan Leskovar, Vijay Joshi and Subas Malla at Uvalde, and Carlos Avila, John Jifon, and Thiago Marconi at Weslaco.

**Potato Breeding and Variety Development**

Seventeen improved varieties have been developed/co-developed and/or released from the Texas Potato Breeding and Variety Development Program. Virtually all of the russet potatoes grown in Texas are the improved Texas Russet Norkotah strains. The farm gate value of the crop has grown from less than $20 million to about $100 million with an annual economic impact to the state estimated to exceed $300 million. Of all varieties released over the past 15 years by the 12 potato breeding programs in the U.S., those developed by the Southwest Project, which includes the Texas and Colorado breeding programs, rank second nationally in total acreage approved for seed certification in 2010. In 2010, the three Texas Russet Norkotah selections (TXNS112, TXNS278, and TXNS296) collectively ranked fourth among the top 50 US varieties in acres accepted for seed certification, behind only Russet Burbank, Frito Lay varieties, and Ranger Russet. Varieties from the program have brought in over $3 million in royalties to the Texas A&M University System. Dr. Isabel Vales was hired in January, 2017 to assume leadership of the program upon Dr. Miller’s retirement to overlap with Dr. Vales to allow for a smooth transition.

**Junior Master Gardener® (JMG) Program**

Created, trademarked, and administered within the Department, this international youth gardening 4-H program enrolls more than 200,000 Texas children annually (representing 1/5 of Texas 4-H annual enrollment) through over 300 registered groups. The program continues to expand with JMG groups in all 50 states; 36 land-grant universities are registered/licensed JMG program partners; and 10 foreign countries, from Guatemala, Honduras, to South Korea, have JMG programs. One of the major programs developed for schools by JMG, the Learn, Grow, Eat & GO! curriculum has been implemented in the Houston Independent School District. Learn, Grow, Eat & GO! received the Jeanne M. Priester Award in 2019, a national award for programs that positively impact the health people across the U.S. JMG celebrated its 20th anniversary recently at a national JMG program leaders conference in College Station.

**The Texas Superstars® Program**

The Texas Superstars® Program is a joint effort among Texas A&M AgriLife Research, the Texas A&M AgriLife Extension Service, Texas Tech, the Texas Department of Agriculture and the Texas green industry to promote the use of better regionally-adapted plants to minimize the resources required to produce, establish plants in regional landscapes, and to maintain plants as valuable components of aesthetically pleasing and environmentally sustainable landscapes. A concomitant effort of this group is to assist the green industry in developing new plant products to provide consumers sustainable choices for Texas’ regional landscapes.
This goal is in part met by promoting in a coordinated fashion plants proven in research trials to provide excellent aesthetic effects with minimal inputs as Texas Superstar® plants. These new or underutilized plants may originate from sources outside the Texas A&M AgriLife system or may be plants selected or bred by programs within the Texas A&M AgriLife system. These trials are often conducted with involvement from undergraduate and graduate students, Master Gardeners, or other volunteer groups as well as faculty and staff in the Texas A&M AgriLife system. Promotional efforts are done in collaboration with the Texas Department of Agriculture and involve numerous media and the statewide horticulture agent group as well as our industry partners. Funding is primarily through the use of tag revenues, licensing and grants. The Texas Superstar® program team is led by Brent Pemberton at Overton, and includes Mike Arnold, Tim Davis, Larry Stein, Greg Grant, and David Rodriguez from Texas A&M Agrilife and Cynthia McKenney and Russ Plowman from Texas Tech.

**Pecan Physiology and USDA Pecan Breeding Cooperation**
The pecan research program involves collaborations with USDA-ARS as well as New Mexico State University and UC Davis. Scientists at the USDA-ARS Pecan Breeding Program are excellent cooperators and their facilities are a tremendous resource for graduate students’ research and are frequent destination for field trips for undergraduate courses. Dr. Grauke, Research Horticulturist & Curator of the USDA-ARS Carya Germplasm collection, has served on graduate student committees and collaborates with Dr. Patricia Klein on projects related to identification and selection of genetic markers.

**Horticultural Genomics of Plants**
The genomics program in Horticulture is led by Dr. Patricia Klein and focuses on developing genomic and genetic tools for various plants including rose, pecan, sorghum and coffee. Approaches include next generation DNA, whole genome transcriptome profiling, genetic mapping and molecular marker development. Dr. Klein collaborates with numerous faculty both within and outside the department. She currently leads a $1.1 M project on sorghum germplasm introgression and conversion project for the improvement of sorghum hybrids and is a sub awardee on a Pecan SCRI grant. She was also a co-PI on the Rose Rosette SCRI grant which recently ended. During the past 5 years, Dr. Klein has published 20 peer-reviewed articles and 36 abstracts with her students and research collaborators

**Horticultural Biotechnology – Stress Physiology**
The abiotic stress physiology program led by Dr. Hisashi Koiwa focuses on understanding plant responses to various osmotic stresses, such as cold, drought, heat, and salinity, as well as responses to nutrition deficiency. Approaches include physiological and molecular analysis of biological processes during plant stress adaptation, and genetic and genomic dissection of plant stress tolerance determinants. Koiwa’s lab also maintains a germplasm collection for studying plant stress responses.

**Horticultural Biotechnology – Plant-Microbe Interactions**
Led by Dr. Betsy Pierson, the plant-microbe interaction research program concentrates on identifying and understanding microbial interactions with plants, other microorganisms, and/or insects with applications for improving plant health and sustainable agriculture. A major focus of this research is on the plant-associated microbes that inhabit the plant rhizosphere, the so-called rhizosphere microbiome. Her lab also conducts research on the potato zebra chip disease, which is causing significant economic impact on potato growers in Texas and elsewhere in the world.

**EARTH-KIND® Landscaping Program**
The EARTH-KIND® landscaping program is a collaboration effort between Extension specialists and county agents, which focuses on education for landscape water conservation, reduction of fertilizer and pesticide use, landscaping for energy conservation, and reduction of landscape wastes entering landfills. The program promotes the use of native and adapted plant species to provide habitat and reduce water requirements while minimizing the use of potentially harmful chemical fertilizers and pesticides. In addition to these water-costs savings, the ultimate societal benefit to Texas is a more efficient use of scarce water resources. Drs. Steve George, Mengmeng Gu and Tim Hartmann conduct applied research and Extension outreach programs in EARTH-KIND® landscaping.
**Borlaug Institute for International Agriculture Programs**

As regional director of the Borlaug Institute programs for Asia, Tim Davis has collaborated with Horticultural Sciences faculty including Drs. Cisneros, Patil, Masabni, and Lombardini to support horticultural development programs at 3 Indonesian universities (Bogor Agricultural University, Udayana University and Sam Ratulangi University). He also cooperated with Mengmeng Gu in her study abroad program in China and is currently developing a plan for increasing the emphasis on scholarly activities involving Texas A&M Horticultural Sciences faculty and their peers in China. Dr. Leo Lombardini served as the Director of the Center for Coffee Research and Education within the Borlaug Institute until September, 2019. Extension faculty and program specialists who have participated in the international effort have included Lisa Whittlesey, Joe Masabni, Monte Nesbitt and Russ Wallace.

**Plant Bioactives & Bioprocessing Research Program**

The vision of the Plant Bioactives & Bioprocessing Research Program is to generate scientific information of drug discovery associated with the prevention and the progression of chronic diseases using US commercial crops and native crops from centers of biodiversity. This vision is complemented by understanding how health-promoting secondary metabolites are synthesized in plants using stresses as well as understanding how microbes and plant surfaces interact to design ways of delivering safe fresh produce. This group aims to have Texas A&M and our collaborators bridge between the US health market (e.g., functional foods, dietary supplements, cosmetics and pharmaceutical) and growers and processors in the US as well as in Latin America in a win-win relationship while using these centers of biodiversity in a sustainable way. Under the leadership of Luis Cisneros-Zevallos, the program has obtained nearly $1.35 million in grants and contracts from TDA, USDA and industry to conduct research in cancer and the metabolic syndrome (obesity, chronic inflammation, cardiovascular and diabetes), post-harvest biosynthesis of secondary metabolites and microbe-plant surface interactions. The program has strong collaboration activities with research institutions in the 3 largest centers of biodiversity in Latin America (Andean region of Peru, Mexico and the Brazilian Amazon), Europe and Asia. The program has strong collaborations with other faculty on campus (A. Castillo, M. Akbulut, C. Wu, M. Taylor) as well as other groups in our Department including the VFIC (B. Patil) and the Borlaug Institute (T. Davis) among others.

**Viticulture and Enology Extension Program**

The Texas A&M Agrilife Extension Service viticulture and enology program has grown markedly in the last 20 years, investing heavily in personnel and facilities funded through state and federal funds targeted toward mitigation of Pierce’s disease and the acquisition of a private donation that transferred the grant-funded facilities from USDA control to Agrilife Extension control. A second major boost came when the 84th Texas Legislature designated funds to support the resumption of the viticulture outreach effort. This program has grown to include a large team composed of Extension specialists and regional program specialists who work closely with faculty in Plant Pathology and with growers and winery operators and the industry organizations whose members include growers and winery owners.

**Commercial Horticulture Outreach**

Texas A&M Agrilife Extension Service specialists are investing heavily in technology to increase the efficiency of program delivery, reduce travel costs, and bring external collaborators into their activities. These activities include Webinars, Instagram and Facebook postings, and YouTube video segments. Workshops/training sessions were conducted on produce food safety, beginning farmer/small acreage, strawberry production, EARTH-KIND® landscaping, pecan production, vineyard management, FDA Better Process certification, and business management for nursery and greenhouse firms.

**Texas Master Gardeners**

Over 7,350 certified Master Gardener volunteers served over 619,957 hours in 2017. This popular program trained over 1,316 new volunteers in 2017, and continues to be an invaluable asset to county educational outreach programs.
Evaluation, Promotion and Retention of Faculty

Faculty performance appraisals are conducted annually with the unit head or program leader taking the lead role. The faculty member submits a portfolio of documents including an up to date position description, an annual achievement report, a cumulative CV, a plan of work for the coming year, and an impact statement. About a week after these documents are submitted, the faculty member and the department head have a face-to-face meeting to discuss accomplishments for the current year and plans for the upcoming year. The department head prepares a written document outlining his evaluation, including a space for a written faculty response, and the evaluation is complete when both sign the document.

Annual evaluations of off-campus faculty appointed through Texas A&M Agrilife Research are initiated by the resident director of the Agrilife Research Center where their administrative location (adloc) resides. The documents prepared are very similar to those described for teaching/research faculty, but minor variations occur as deemed necessary by the resident directors. The annual face-to-face evaluation session usually involves the resident director and the department head of the disciplinary department with which the faculty member is associated.

Annual evaluations of on-campus and off-campus faculty with Extension appointments are the same within each department since the adloc of Extension specialists resides in the academic department. The process in Horticultural Sciences is led by the Program Leader & Associate Department Head for Extension. An annual accomplishments form is completed by the faculty member, the associate head writes an evaluation response, and a face-to-face evaluation session with the faculty member, the associate head, and the department head present is held.

Faculty with budgeted appointments with Texas A&M University (>25% on an 11 month basis, >33% on 9 month basis) are eligible for professorial rank and tenure. Faculty appointed with Texas A&M Agrilife Research and the Texas A&M Agrilife Extension Service are eligible for professorial rank, but are not on a tenure track.

A detailed description of the departmental promotion and tenure policy accompanies this document as Appendix 7, page 5.196. The promotion and tenure policy provides a detailed explanation of eligibility for ranks and tenure, professional expectations of different ranks, expectations to be met prior to the awarding of tenure, composition of the promotion and tenure committee, and the process for post-tenure review. Non-tenured faculty on the tenure track are evaluated during their third year in a process analogous to the tenure review and are provided with extensive feedback to aid them in the process of preparing for tenure review. Junior faculty have an appointed mentoring committee to provide peer-based feedback at each stage in their professional development.

The voting members of the Horticultural Sciences faculty (all professorial titles that don’t have an adjective modifier, ex., research assistant professor) participate in and vote on all modifications of the promotion and tenure policy. The Promotion and Tenure Committee for the department includes all full professors, and the entire committee votes on recommendations for promotion. The entire committee votes on all considerations of promotion and tenure, but the votes of tenured and non-tenured members are recorded separately. According to Texas A&M University regulations, only tenure track faculty can vote on considerations of the awarding of tenure.

Faculty Teaching Load

Tenure track faculty generally teach one or two courses per year and academic professional track teach two or three courses per semester. Teaching loads may be adjusted for administrative appointments, graduate advising, research and other assigned duties and recent hires may not have fully developed teaching programs as of this writing. Faculty members with primary appointments with the Texas A&M Agrilife Extension Service may have up to a 15% teaching appointment and are limited by administrative agreement to one class.
per year. A variety of factors determine teaching assignments, most notably, the expertise of the faculty member and the fit of the subject matter to their expertise, experience and research or extension program.

<table>
<thead>
<tr>
<th>Table 4.3. Student Credit Hours (SCH) per faculty FTE and student FTE per faculty FTE by fiscal year. Departmental means are compared to mean workload for the College of Agriculture and Life Sciences in fall, 2019.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCH per faculty FTE</td>
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<tr>
<td>---------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>FY 2014</td>
</tr>
<tr>
<td>FY 2015</td>
</tr>
<tr>
<td>FY 2016</td>
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<tr>
<td>FY 2017</td>
</tr>
<tr>
<td>FY 2018</td>
</tr>
<tr>
<td>Fall 2019</td>
</tr>
<tr>
<td>Fall 2019, College mean</td>
</tr>
</tbody>
</table>

*SCH per faculty FTE is computed by dividing the SCH generated at a certain level by the faculty FTE at the same level. The FTE of faculty and GATs who are not teaching are excluded in the calculation by level but are included in the Total column. STAR reports at: http://dars.tamu.edu/Faculty; retrieved 23 January 2020.

As of the fall, 2019 STAR (Semester Teaching Analysis) report, Horticultural Sciences faculty taught an average load of 567 SCH (undergraduate), 64.5 Masters level, 46.5 PhD, and total 296.8 per FTE compared to the mean for the College of Agriculture and Life Sciences of 561.8, 90.2, 49.5, and 291.68, respectively, so our departmental average teaching loads are similar to those of the College averages (Table 4.3).

<table>
<thead>
<tr>
<th>Table 4.4. Current teaching assignments of tenure track and academic professional track faculty in the department of Horticultural Sciences.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
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<tr>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Tenured/tenure-track</strong></td>
</tr>
<tr>
<td>Arnold, Michael A</td>
</tr>
<tr>
<td>Byrne, David H</td>
</tr>
<tr>
<td>Cisneros – Zevallos, Luis</td>
</tr>
<tr>
<td>Crosby, Kevin M</td>
</tr>
<tr>
<td>Davis, Tim D</td>
</tr>
<tr>
<td>Hall, Charles R</td>
</tr>
<tr>
<td>Klein, Patricia E</td>
</tr>
<tr>
<td>Koiwa, Hisashi</td>
</tr>
<tr>
<td>Lineberger, R D</td>
</tr>
<tr>
<td>Nessler, Craig</td>
</tr>
<tr>
<td>Patil, Bhimanagouda S</td>
</tr>
<tr>
<td>Pierson, Elizabeth A</td>
</tr>
<tr>
<td>Reed, David</td>
</tr>
<tr>
<td>Riera-Lizarazu, O.</td>
</tr>
</tbody>
</table>
In terms of our student FTE to faculty FTE ratios, the metric for Horticultural Sciences faculty is 37.8 (undergraduate), 5.4 Masters, 5.2 PhD and total 20.6 compared to the College means of 39.3, 7.5, 5.5, and 21.3, respectively. (Data and Research Services, 22 Jan 2020).

Faculty Scholarly Productivity

Texas A&M University uses the Academic Analytics® data warehouse as a tool for assessing aggregate faculty productivity in comparison to our national peers. The peer group to which we most often are compared are the institutions that are members of the Association of American Universities (AAU), but as the discipline of horticulture is absent from many of those institutions, our data are presented here in comparison to the 23 institutions identified as having “horticulture” programs, most typically, the land grant institutions in the states. Selecting data from the “program” option in the Academic Analytics® database compared to the “department” option allows for comparisons to programs in which horticulture is represented in two academic departments (Florida), and institutions where horticulture is located in a combined crop or plant science department or school (Cornell, UC Davis, Ohio State). However, in some cases, institutional designation of “horticulture” faculty is confounded by other disciplines, as is the case at Nebraska and Missouri where the data are based on 51 (Nebraska) and 30 (Missouri) faculty in the horticulture program and our experience indicates that those numbers are considerably higher than the professional horticulturists at those institutions.

The Texas A&M Horticulture Program data summaries are based on 23 faculty who are identified as having “research intensive” appointments, including all tenure track faculty with TAMU appointments, and faculty with professorial titles administratively assigned to Texas A&M Agrilife Research (Table 4.5).

<table>
<thead>
<tr>
<th>Academic Analytics® Metric</th>
<th>Range of Values</th>
<th>TAMU Value</th>
<th>TAMU Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of program faculty</td>
<td>74 - 2</td>
<td>*23</td>
<td>15</td>
</tr>
<tr>
<td>Scholarly Research Index rank</td>
<td>1 - 23</td>
<td>**8</td>
<td></td>
</tr>
<tr>
<td>Publications per faculty (3 years)</td>
<td>17.1 – 1.6</td>
<td>11.7</td>
<td>7</td>
</tr>
<tr>
<td>Citations per faculty (4 years)</td>
<td>386 – 3.5</td>
<td>118.7</td>
<td>12</td>
</tr>
<tr>
<td>% Faculty with a federal grant (4 years)</td>
<td>50 - 0</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>Grant dollars per faculty</td>
<td>$580 K - $0</td>
<td>$128 K</td>
<td>13</td>
</tr>
</tbody>
</table>

*Includes TAMU tenure track and Agrilife Research faculty.

The scholarly research index (SRI) is considered the “grand mean” of the data categories as it is calculated as...
the deviation above or below the mean of the parameter calculated from all institutions. Our data are presented using the default weighting of the different parameters (articles, 30%; awards, 20%; citations, 30%, and grants, 20%). The SRI for the Texas horticulture program ranks us 8th out of the 23 national programs, but if the potential bias in reporting the Nebraska and Missouri are accounted for, we would be ranked 6th. Our administration currently is placing a great deal of emphasis on research citations and program impact rather than number of publications, and number of faculty with prestigious awards, two metrics in which we have considerable room for improvement.

Faculty Productivity – Other Measures

The fact that Academic Analytics® reports only federal grants and publications that have assigned DOI (digital object identifier) numbers overlooks many accomplishments of our faculty. An additional insight into non-federal funding sources (state government, commodity associations, foundations, etc.) can readily be obtained from the Maestro data warehouse administered by the Texas A&M University Sponsored Research Services through which all research proposals must be routed. Access to these data is restricted to the units to which the faculty members are assigned, for example Horticultural Sciences does not have access to grants obtained by Agrilife Research faculty members at off-campus research and extension centers, but we do have access to the Agrilife Extension faculty. This is another explanation for inconsistencies between the total grant dollars reported in Academic Analytics® and those reported in Maestro.

<table>
<thead>
<tr>
<th>FY</th>
<th>Agrilife Research Amount</th>
<th>Agrilife Research Number</th>
<th>Agrilife Extension Amount</th>
<th>Agrilife Extension Number</th>
<th>College of Ag &amp; Life Sciences Amount</th>
<th>College of Ag &amp; Life Sciences Number</th>
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<tbody>
<tr>
<td>2015</td>
<td>$4,903,540</td>
<td>18</td>
<td>$1,214,612</td>
<td>11</td>
<td>$40,939</td>
<td>1</td>
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<tr>
<td>2016</td>
<td>$683,907</td>
<td>11</td>
<td>$835,658</td>
<td>10</td>
<td>$0</td>
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<tr>
<td>2017</td>
<td>$5,347,969</td>
<td>11</td>
<td>$3,936,631</td>
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<td>$0</td>
<td>0</td>
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<td>2018</td>
<td>$2,104,619</td>
<td>13</td>
<td>$529,007</td>
<td>11</td>
<td>$0</td>
<td>0</td>
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<tr>
<td>2019</td>
<td>$1,397,398</td>
<td>13</td>
<td>$419,556</td>
<td>12</td>
<td>$47,779</td>
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<tr>
<td>Total</td>
<td>$14,437,432</td>
<td></td>
<td>$6,935,464</td>
<td></td>
<td>$88,718</td>
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</tr>
</tbody>
</table>

*Does not include research faculty off-campus (Avila, Jifon, Joshi, Leskovar, Malla, Niu, Pemberton)

As many of the grants obtained are multi-year in nature, perhaps a better insight into the trend for the department is to consider the total research expenditures over time (Figs. 4.1, 4.2). The total research expenditures are progressively increasing over time, consistent with the faculty writing more proposals and being more competitive. Many of the grants are not overhead generating as reflected in the indirect costs being fairly small compared to the total, a situation that is problematic when funds are required to match faculty startup packages and to maintain an aging infrastructure of labs, greenhouses, and equipment.

Extension personnel are more likely to be funded by state government sources that are not subject to indirect charges (the Specialty Crop Block grants funded through the Texas Department of Agriculture, for example) (compare Figures 4.1 and 4.2).

Research expenditures for faculty administratively located within TAMU and in the Texas A&M Agrilife agencies have steadily increased over the past five fiscal years (Figures 4.1 and 4.2). The Extension group has slightly less direct expenditures and substantially less indirect expenditures as the grants obtained by
Figure 4.1 Research expenditures in the Agrilife Research budget category of faculty in Horticultural Sciences by fiscal year.

Figure 4.2 Research expenditures in the Agrilife Extension budget category of faculty in Horticultural Sciences by fiscal year.
Departmental reports of faculty productivity were submitted annually for administrative review during the 2014-2018 period. These data are summed by calendar year and are self-reported by the faculty themselves, two factors that make them not directly comparable with data stored in the Maestro research data warehouse (Table 4.7, 4.8). During most years of the period, the department had 12 FTE tenure track faculty, so the

Table 4.7. Accomplishment metrics reported by on-campus, tenure track faculty in the Department of Horticultural Sciences during calendar years 2014-2018.

<table>
<thead>
<tr>
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<th>2014</th>
<th>2015</th>
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<th>2017</th>
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<tr>
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<td>*Federal Funding Received</td>
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<td>199,515</td>
<td>519,020</td>
<td>1,860,670</td>
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<td>Commodity or Industry Funding Rec.</td>
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<td>539,265</td>
<td>125,517</td>
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<td>Other External Funding Received</td>
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<td>187,022</td>
<td>69,871</td>
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<td>318,706</td>
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<td>State/Federal Initiative Funding Rec.</td>
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<td>62,957</td>
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<td>-</td>
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<tr>
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Publications

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<tr>
<td>Variety Release Pub</td>
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<td>1</td>
<td>-</td>
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<tr>
<td>Trade Journal</td>
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<td>11</td>
<td>-</td>
<td>15</td>
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The mean of the metrics in each category represent the contributions of a relatively small number of faculty. These data are presented to illustrate the different sources of funding received, upward trends of funding in most categories, and the diversity of locations in which faculty communicate the results of their research (Tables 4.7, 4.8).
Table 4.8 presents information summarized from the ten Extension specialists in the Horticulture Extension program. Highlights from the Extension perspective include the substantial funding in grants, contracts, gifts, and fee-based programming generated by Extension specialists, the growing number of refereed publications submitted, and the addition of substantial social media outreach that has become an important part of the modern Extension program.

| Table 4.8. Accomplishment metrics reported by Horticulture Extension faculty during calendar years 2014-2018. |
|--------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 2014 | 2015 | 2016 | 2017 | 2018 |
| Contracts, grants, gifts | $1,336,041 | $963,372 | $968,368 | $3,382,666 | $624,474 |
| Total fee-based revenue generated | $226,896 | $208,578 | $253,982 | $315,500 | $1,085,275 |
| Junior Master Gardener | $96,942 | $110,768 | $168,958 | $174,270 | $163,771 |
| Texas Master Gardener | $65,008 | $48,314 | $72,140 | $72,167 | $51,522 |

Table 4.8 cont’d. Accomplishment metrics reported by Horticulture Extension faculty during calendar years 2014-2018.

| 2014 | 2015 | 2016 | 2017 | 2018 |
| Refereed Publications | 24 | 23 | 10 | 18 | 31 |
| New or Revised Factsheets, Manuals, Handbooks | 35 | 8 | 31 | 39 | 24 |
| Popular Press Publications | 27 | 18 | 22 | 30 | 27 |
| Professional Proceedings or Abstracts | 15 | 24 | 32 | 31 | 11 |
| News Releases | 14 | 1 | 32 | 31 | 9 |

*Aggie Horticulture* Webstats

| Page visits | 21,680,593 | 25,007,290 | 28,493,105 | 19,121,716 | 17,748,920 |
| Unique hosts | 8,165,998 | 8,358,072 | 7,698,947 | 6,779,543 | 6,429,932 |
| Social Media (Facebook, Twitter, Instagram) | | | | 14,579 | 27,699 |
| YouTube video views | | | | 21,749 | 39,613 |
| TV segments | | | | | 63 |

**Summary**

Horticultural Sciences faculty are actively engaged in the teaching, research, graduate education, and outreach missions of Texas A&M University and both Texas A&M Agrilife agencies. As a group, their scholarly productivity is ranked in the upper tier of their peers at other land grant programs of horticulture, but the number of faculty with “research-intensive” appointments is of concern, both in the context of comparison to peer horticulture programs as well as the ability to compete successfully for extramural funding sufficient to maintain viable, productive research and graduate education programs. As the career profile of the tenure track faculty suggests several retirements in the not too distant future, we will need additional consideration
from College of Agriculture and Life Sciences and Texas A&M Agrilife administration to refill strategic vacancies as they arise.

The upward trend in research expenditures is a positive indication of faculty who are focused on obtaining external support for their research and extension programs, and meeting the expectation of scholarly productivity for faculty associated with a modern, research-active land grant university.
November 18, 2019

TO: External Program Reviewers and Program Accreditors

FROM: Michael T. Stephenson
Vice Provost for Academic Affairs & Strategic Initiatives

RE: Information required for USDOE Accrediting Bodies

Texas A&M University is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award baccalaureate, master's, and doctoral degrees. Consistent with standard 14.4, the following provides the institution’s official position on its purpose, governance, programs, degrees, diplomas, certificates, personnel, finances, and constituencies and is published in official university documents as noted.

**Purpose**

Classified by the Carnegie Foundation as a Research Doctoral University (Highest Research Activity), Texas A&M embraces its mission of the advancement of knowledge and human achievement in all its dimensions. The research mission is a key to advancing economic development in both public and private sectors. Integration of research with teaching prepares students to compete in a knowledge-based society and to continue developing their own creativity, learning, and skills beyond graduation.

The institution’s official mission statement, published both on the institution’s web page as well as in its annual university catalog, is:

Texas A&M University (Texas A&M) is dedicated to the discovery, development, communication and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic and geographic groups, women and men alike, as it addresses the needs of an increasingly diverse population and a global economy. In the twenty-first century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

**Governance**

The governance of the institution was described in the 2012 certification of compliance submitted to SACSCOC.
Texas A&M University at College Station, the flagship institution of the Texas A&M University System, has branch campuses located in Galveston, Texas and Doha, Qatar. A ten-member Board of Regents, appointed by the Governor, directs the Texas A&M University System. The appointment of each Regent follows Texas Education Code (TEC, Chapter 85, Section 21).

TEC outlines the duties and responsibilities of the Board of Regents. These responsibilities are also defined in System Policy 02.01 Board of Regents and TEC 51.352. The Board elects two officers: Chair and Vice Chair. There are four standing committees: Audit, Academic & Student Affairs, Finance, and Buildings & Physical Plant. Special committees may be appointed by the Chair with Board approval.

At Texas A&M University the President is the chief executive officer; the President is not the presiding officer of the Board of Regents. The President reports to the state-appointed Board of Regents through the Chancellor of the Texas A&M University System. System Policy 2.05 Presidents of System Member Universities defines the duties of the President. The appointment of the President follows conditions set forth in System Policy 01.03 Appointing Power and Terms and Conditions of Employment, section 2.2.

**Personnel**

The institution is led by the President and members of his cabinet:

- Michael K. Young, President
- Carol A. Fierke, Provost and Executive Vice President, Chief Academic Officer
- Jerry R. Strawser, Executive Vice President and Chief Financial Officer
- Michael Benedik, Vice Provost and Chief International Officer
- Michael T. Stephenson, Vice Provost for Academic Affairs & Strategic Initiatives
- M. Dee Childs, Vice President for Information Technology and CIO
- Michael G. O’Quinn, Vice President for Government Relations & Strategic Initiatives
- Col. Michael E. Fossum, Chief Operating Officer, TAMU-Galveston
- Jeff Risinger, Vice President for HR & Organizational Effectiveness
- Robin Means Coleman, Vice President and Associate Provost for Diversity
- Mark Barteau, Vice President for Research
- Greg Hartman, Vice Chancellor for Strategic Initiatives, TAMU & Interim Senior Vice President, TAMU-HSC
- Daniel J. Pugh, Sr., Vice President for Student Affairs
- Joseph P. Pettibon, II, Vice President for Enrollment and Academic Services
- Gen Joe E. Ramirez, Jr. Commandant, Corps of Cadets
- Amy B. Smith, Senior Vice President and Chief Marketing and Communications Officer
- Ross Bjork, Athletics Director
- Jonathan Bowling, Sr. Associate Athletics Director, Athletics Compliance
- Shane Hinkley, Vice President for Brand Development
- Andrew P. Morris, VP of Entrepreneurship & Economic Development, Dean of the I-School
- C.J. Woods, Associate Vice President and Chief of Staff
- Kevin McGinnis, Chief Compliance Officer

**Programs, Degrees, Diplomas, and Certificates**

See the appended Degrees and Programs Offered tables.

**Finances**

See the 2019 SACSCOC Financial Profile and Indicators
INSTITUTIONAL SUMMARY FORM
PREPARED FOR COMMISSION REVIEWS

GENERAL INFORMATION

Name of Institution  Texas A&M University

Name, Title, Phone number, and email address of Accreditation Liaison
Michael T. Stephenson
Vice Provost for Academic Affairs and Strategic Initiatives, and SACSCOC Accreditation Liaison
979.845.4016
mstephenson@tamu.edu

Name, Title, Phone number, and email address of Technical Support person for the Compliance Certification
Alicia M. Dorsey
Assistant Provost for Institutional Effectiveness
979.862.2918
amdorsey@tamu.edu

IMPORTANT:

Accreditation Activity (check one):

x  Submitted at the time of Reaffirmation Orientation
☐  Submitted with Compliance Certification for Reaffirmation
☐  Submitted with Materials for an On-Site Reaffirmation Review
☐  Submitted with Compliance Certification for Fifth-Year Interim Report
☐  Submitted with Compliance Certification for Initial Candidacy/Accreditation Review
☐  Submitted with Merger/Consolidations/Acquisitions
☐  Submitted with Application for Level Change

Submission date of this completed document:  November 13, 2019
EDUCATIONAL PROGRAMS

1. Level of offerings (Check all that apply)

- Diploma or certificate program(s) requiring less than one year beyond Grade 12
- Diploma or certificate program(s) of at least two but fewer than four years of work beyond Grade 12
- Associate degree program(s) requiring a minimum of 60 semester hours or the equivalent designed for transfer to a baccalaureate institution
- Associate degree program(s) requiring a minimum of 60 semester hours or the equivalent not designed for transfer
- Four or five-year baccalaureate degree program(s) requiring a minimum of 120 semester hours or the equivalent
- Professional degree program(s)
- Master's degree program(s)
- Work beyond the master's level but not at the doctoral level (such as Specialist in Education)
- Doctoral degree program(s)
- Other (Specify)

2. Types of Undergraduate Programs (Check all that apply)

- Occupational certificate or diploma program(s)
- Occupational degree program(s)
- Two-year programs designed for transfer to a baccalaureate institution
- Liberal Arts and General
- Teacher Preparatory
- Professional
- Other (Specify)

GOVERNANCE CONTROL

Check the appropriate governance control for the institution:

- Private (check one)
  - Independent, not-for-profit
    - Name of corporation OR
    - Name of religious affiliation and control:
  - Independent, for-profit *
    - If publicly traded, name of parent company:
- Public state * (check one)
  - Not part of a state system, institution has own independent board
  - Part of a state system, system board serves as governing board
- Part of a state system, system board is super governing board, local governing board has delegated authority
- Part of a state system, institution has own independent board

* If an institution is part of a state system or a corporate structure, a description of the system operation must be submitted as part of the Compliance Certification for the decennial review. See Commission policy “Reaffirmation of Accreditation and Subsequent Reports” for additional direction.
1. History and Characteristics

Provide a brief history of the institution, a description of its current mission, an indication of its geographic service area, and a description of the composition of the student population. Include a description of any unusual or distinctive features of the institution and a description of the admissions policies (open, selective, etc.). If appropriate, indicate those institutions that are considered peers. Please limit this section to one-half page.

History. Texas A&M University (TAMU) opened in 1876 as the state’s first public institution of higher education. TAMU is one of a select few institutions in the nation to hold land grant, sea grant (1971) and space grant (1989) designations. A mandatory military component was a part of the land grant designation until 1965; currently, it is one of only three institutions with a full-time Corps of Cadets, leading to commissions in all branches of service. TAMU has two branch campuses, one in Galveston, Texas, (established in 1962, officially merged with TAMU in 1991) and one in Doha, Qatar (established in 2003) and 16 approved off-campus instructional locations. In 2013, the Texas A&M University System Health Science Center merged with TAMU. This same year, TAMU acquired the School of Law from Texas Wesleyan University. Finally, TAMU is classified by the Carnegie Foundation as a Research University (very high research activity).

Mission. Texas A&M University is dedicated to the discovery, development, communication, and application of knowledge in a wide range of academic and professional fields. Its mission of providing the highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity. It prepares students to assume roles in leadership, responsibility and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an intellectual environment nurturing the human mind and spirit. It welcomes and seeks to serve persons of all racial, ethnic and geographic groups as it addresses the needs of an increasingly diverse population and a global economy. In the 21st century, Texas A&M University seeks to assume a place of preeminence among public universities while respecting its history and traditions.

Enrollment Profile. Fall 2018 total enrollment was 69,367 students (across all campuses and locations), with 64,126 (92.4%) located on the main campus in College Station. Undergraduate enrollment made up 78.3% of the total student body, with Hispanic, Black, and American Indian students making up 24.9% of the total student body. TAMU Galveston enrolled 1,815 students as of Fall, 2018, with TAMU Qatar enrolling 549 students.

Admissions Process. Automatic admission is available in two ways: (1) for Texas resident applicants in the top 10% of their high school graduating class; and, (2) for applicants who rank in the top 25% of their high school graduating class and achieve a combined SAT math and SAT critical reading score of at least 1300, with a test score of at least 600 in each component or 30 composite on the ACT with a 27 in the math and English components. The review of all other applicants is based on academic potential, distinguishing characteristics, exceptional circumstances, and personal achievements.

Peer Institutions. Georgia Institution of Technology; The Ohio State University; Pennsylvania State University; Purdue University; University of California at Berkeley, Davis, Los Angeles, and San Diego; University of Florida; University of Illinois at Urbana-Champaign; University of Michigan; University of Minnesota; University of North Carolina at Chapel Hill; University of Texas at Austin; and University of Wisconsin – Madison.

2. List of Degrees

List all degrees currently offered (A. S., B.A., B.S., M.A., Ph.D., for examples) and the majors or concentrations within those degrees, as well as all certificates and diplomas. For each credential offered, indicate the number of graduates in the academic year previous to submitting this report. Indicate term dates.

Does the institution offer any credit, non-credit, or pathways English as a Second Language (ESL) programs? If yes, list the programs.
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| LIBERAL ARTS | HISTORY | BA | 142 |
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| LIBERAL ARTS | INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY | PHD | 1 |
| LIBERAL ARTS | INTERNATIONAL RELATIONS | CERT - UG | 0 |
| LIBERAL ARTS | INTERNATIONAL STUDIES | BA | 178 |
| LIBERAL ARTS | INTERNATIONAL COMMUNICATION &amp; PUBLIC DIPLOMACY | CERT - G | 0 |
| LIBERAL ARTS | LATINO AND MEXICAN AMERICAN STUDIES | CERT - G | 1 |
| LIBERAL ARTS | MARITIME ARCHAEOLOGY AND CONSERVATION | MS | 3 |
| LIBERAL ARTS | MODERN LANGUAGES | BA | 9 |
| LIBERAL ARTS | MUSIC | BA | 2 |
| LIBERAL ARTS | PERFORMANCE STUDIES | BA | 19 |
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| LIBERAL ARTS | PHILOSOPHY | BA | 42 |
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| LIBERAL ARTS | PHILOSOPHY PRE-LAW | CERT - UG | 4 |
| LIBERAL ARTS | POLITICAL SCIENCE | BA | 139 |
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| LIBERAL ARTS | QUANTITATIVE ECON METHODS* | CERT - UG | 0 |
| LIBERAL ARTS | RACE, ETHN &amp; GEN POLITICS | CERT - UG | 1 |
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*Major dependent certificates*
3. **Off-Campus Instructional Locations and Branch Campuses**

List all approved off-campus instructional locations where 25% or more credit hours toward a degree, diploma, or certificate can be obtained primarily through traditional classroom instruction. Report those locations in accord with the Commission’s definitions and the directions as specified below.

**Table 1: Off-campus instructional sites**—a site located geographically apart from the main campus at which the institution offers 50% or more of its credit hours for a diploma, certificate, or degree. This includes high schools where courses are offered as part of dual enrollment. For each site, provide the information below. The list should include only those sites reported to and approved by SACSCOC. Listing unapproved sites below does not constitute reporting them to SACSCOC. In such cases when an institution has initiated an off-campus instructional site as described above without prior approval by SACSCOC, a prospectus for approval should be submitted immediately to SACSCOC.

<table>
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<tr>
<th>Name of Site</th>
<th>Physical Address (street, city, state, country) Do not include PO Boxes.</th>
<th>Date Approved by SACSCOC</th>
<th>Date Implemented by the institution</th>
<th>Educational programs offered (specific degrees, certificates, diplomas) with 50% or more credits hours offered at each site</th>
<th>Is the site currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
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</table>
| Texas A&M Health Science Center | 8441 State Highway 47 Clinical Building 1, Suite 3100 Bryan, TX 77807 | 2000 | 2000 | MEDICAL SCIENCES MS  
MEDICAL SCIENCES PHD  
MEDICINE MD  
NURSING BSN | Yes |
| Baylor University Medical Center | 3500 Gaston Avenue Dallas, TX 75246 | 2012 | 2011 | MEDICINE MD | Yes |
| College of Dentistry | 3302 Gaston Ave. Dallas, TX 75246 | 2001 | 2000 | ADVANCED EDUCATION IN GENERAL DENTISTRY CERT-G  
DENTAL HYGIENE BS  
DENTAL PUBLIC HEALTH CERT-G  
DENTISTRY DDS  
ENDODONTICS CERT-G  
ORAL AND MAXILLOFACIAL SURGERY CERT-G  
ORAL AND MAXILLOFACIAL PATHOLOGY CERT-G  
ORAL AND MAXILLOFACIAL RADIOLOGY CERT-G  
ORAL BIOLOGY MS  
ORAL BIOLOGY PHD  
ORTHODONTICS CERT-G  
PEDIATRIC DENTISTRY CERT-G  
PERIODONTICS CERT-G  
PROSTHODONTICS CERT-G | Yes |
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<th>End Year</th>
<th>Programs Offered</th>
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<td>Texas A&amp;M University School of Law</td>
<td>1515 Commerce St Fort Worth, TX 76102</td>
<td>2013</td>
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<td>HEALTH CARE LAW, INTELLECTUAL PROPERTY, INTELLECTUAL PROPERTY, JURISPRUDENCE, LAW, LAWS</td>
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<td>City Centre</td>
<td>800 West Sam Houston Parkway North, Suite 200 Houston, TX 77024-3920</td>
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<td>2012</td>
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<td>Houston Methodist Hospital</td>
<td>6670 Bertner Avenue, R2-216 Houston, TX 77030</td>
<td>2015</td>
<td>2015</td>
<td>MEDICINE, MEDICAL SCIENCES, MEDICAL SCIENCES, ENGINEERING</td>
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<td>Institute of Biosciences and Technology</td>
<td>2121 W. Holcombe Blvd. Houston, TX 77030</td>
<td>2000</td>
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<td>Rangel College of Pharmacy</td>
<td>1010 W. Avenue B. Kingsville, TX 78363</td>
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<td>PHARMACY</td>
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<td>Lawrence Livermore National Laboratory</td>
<td>7000 East Avenue Livermore, CA 94550</td>
<td>2018</td>
<td>2008</td>
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<td>Sandia National Laboratories, California</td>
<td>7011 East Avenue Livermore, CA 94550</td>
<td>2018</td>
<td>2008</td>
<td>NATIONAL SECURITY AFFAIRS</td>
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<td>Sandia National Laboratories, New Mexico</td>
<td>1515 Eubank S.E. Albuquerque, NM 87123</td>
<td>2018</td>
<td>2008</td>
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<td>School of Public Health - McAllen Teaching Site</td>
<td>2101 South McCall Road McAllen, TX 78503</td>
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<td>Texas A&amp;M Higher Education Center at McAllen</td>
<td>6200 Tres Lagos Blvd McAllen, TX 78504</td>
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<td>Clinical Learning Resource Center</td>
<td>Health Professions Building 3950 North A. W. Grimes Blvd. Round Rock, TX 78665</td>
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<td>2010</td>
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<td>Name of Site</td>
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<td>Date of SACSCOC letter accepting notification</td>
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<td>Educational programs offered (specific degrees, certificates, diplomas) with 25-49% credit hours offered at each site</td>
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<td>Travis Park Plaza</td>
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<td>College of Medicine - Temple</td>
<td>2401 S. 31st Street Temple, TX 76508</td>
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**Table 2: Off-campus instructional sites** at which the institution offers 25-49% of its credit hours for a diploma, certificate, or degree—including high schools where courses are offered as dual enrollment. **Note:** institutions are required to notify SACSCOC in advance of initiating coursework at the site. For each site, provide the information below.

**Table 3: Branch campus**—an instructional site located geographically apart and independent of the main campus of the institution. A location is independent of the main campus if the location is (1) permanent in nature, (2) offers courses in educational programs leading to a degree, certificate, or other recognized educational credential, (3) has its own faculty and administrative or supervisory organization, and (4) has its own budgetary and hiring authority. The list should include only those branch campuses reported to and approved by SACSCOC. Listing unapproved branch campuses below does not constitute reporting them to SACSCOC. A prospectus for an unapproved branch campuses should be submitted immediately to SACSCOC.

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<th>Date Implemented by the institution</th>
<th>Educational programs (specific degrees, certificates, diplomas) with 50% or more credits hours offered at the branch campus</th>
<th>Is the campus currently active? (At any time during the past 5 years, have students been enrolled and courses offered? If not, indicate the date of most recent activity.)</th>
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</table>

4. Distance and Correspondence Education

Provide an initial date of approval for your institution to offer distance education. Provide a list of credit-bearing educational programs (degrees, certificates, and diplomas) where 50% or more of the credit hours are delivered through distance education modes. For each educational program, indicate whether the program is delivered using synchronous or asynchronous technology, or both. For each educational program that uses distance education technology to deliver the program at a specific site (e.g., a synchronous program using interactive videoconferencing), indicate the program offered at each location where students receive the transmitted program. Please limit this description to one page, if possible.
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<td>Energy</td>
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<td>Engineering Systems Management</td>
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<tr>
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<td>Geoscience</td>
<td>MGS</td>
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<td>Health Education</td>
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<td>Laws</td>
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*Major dependent certificates

5. Accreditation

(1) List all agencies that currently accredit the institution and any of its programs and indicate the date of the last review by each.

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<th>Accrediting Agency</th>
<th>Program</th>
<th>Last Reviewed</th>
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<td>Accreditation Council for Pharmacy Education</td>
<td>Irma Lerma Rangel College of Pharmacy</td>
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<tr>
<td>American Bar Association</td>
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<td>American Chemical Society</td>
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<td>• Orthodontics &amp; Dentofacial Orthopedics</td>
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<td>• Maritime Systems Engineering</td>
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| Accrediting Organization                                                                 | Programs Offered                                                                                     | Date
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<td>Society of American Foresters</td>
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<td>March 2013</td>
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<td>Programs in professional education</td>
<td>March 2011</td>
</tr>
</tbody>
</table>

2. If SACS Commission on Colleges is not your primary accreditor for access to USDOE Title IV funding, identify which accrediting agency serves that purpose.

   Not applicable.

3. List any USDOE-recognized agency (national and programmatic) that has terminated the institution’s accreditation (include the date, reason, and copy of the letter of termination) or list any agency from which the institution has voluntarily withdrawn (include copy of letter to agency from institution).

   1. COMMISSION ON ENGLISH LANGUAGE PROGRAM ACCREDITATION (CEA) – The English Language Institute at Texas A&M University voluntarily withdrew from CEA. The English Language Institute was accredited in good standing through August, 2018, at the time of the voluntary withdrawal (with no history of adverse action). The university made the decision to close the English Language Institute as an administrative unit on May 31, 2017. Please see attached correspondence.
(4) Describe any sanctions applied or negative actions taken by any USDOE-recognized accrediting agency (national, programmatic, SACSCOC) during the two years previous to the submission of this report. Include a copy of the letter from the USDOE-recognized agency to the institution.

None.

6. **Relationship to the U.S. Department of Education**

Indicate any limitations, suspensions, or termination by the U.S. Department of Education in regard to student financial aid or other financial aid programs during the previous three years. Report if on reimbursement or any other exceptional status in regard to federal or state financial aid.

None.

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**Document History**

Adopted: September 2004  
Revised: March 2011  
Revised: January 2014  
Revised: January 2018
2019 SACSCOC Financial Profile and Indicators

Institution Name Address: Texas A&M University, College Station, TX

Thank you for completing the 2019 Financial Profile and Indicators:

The Profile was submitted by Michael T. Stephenson on 7/8/2019 and approved by Michael K. Young on 7/12/2019.

**FINAL SUBMISSION**

<table>
<thead>
<tr>
<th>Fields:</th>
<th>Hint</th>
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### University Graduation Requirements

**Writing Requirement (2 courses)** Foreign Language (2 yrs HS OR 2 semesters University). Int & Cultural Diversity (6 hrs) 36 hrs of 300-400 level coursework at TAMU.

<table>
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<tr>
<th>University Core Curriculum</th>
<th>Credit Hours</th>
<th>Grade</th>
<th>Projected Date</th>
<th>Horticultural Sciences Core Courses (Cont.)</th>
<th>Credit Hours</th>
<th>Grade</th>
<th>Projected Date</th>
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<tr>
<td>Communication (6)</td>
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<td>Principles of Design</td>
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<td>Communication Elective¹</td>
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<td>HORT 308, 332, 432, 442,</td>
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<td>Mathematics (MATH Prefix)¹ (6)</td>
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<td>HORT 425, 426, 451</td>
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<td>Lifes &amp; Physical Sciences (9)</td>
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<td>HORT Elective²</td>
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<td>BIOL 101 or 111 or 113 (BIOL 1411 or 1406)</td>
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<td>Any 300 to 499 level HORT course</td>
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<td>CHEM 101 &amp; 111 (CHEM 1411)</td>
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<td>HORT 202 -- Hort Sciences Lab</td>
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<td>Language, Philosophy &amp; Culture¹ (3)</td>
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<td>Creative Arts¹ (3)</td>
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<td>ENGL 210 - Tech Writing (ENGL 2311)</td>
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<td>Social &amp; Behavioral Sciences¹ (3)</td>
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<td>Art or Art History</td>
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<td>American History¹ (6)</td>
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<td>RENR 205 - Ecology</td>
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<td>HIST (American) (HIST 1301)</td>
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<td>Foreign Language *SGNL not accepted</td>
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<td>HIST (Amer. /TX) (HIST 1302 or 2301)</td>
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<td>General Electives Includes Minor</td>
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<td>Government &amp; Political Science¹ (6)</td>
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<td>or dual major (excludes BS HORT)</td>
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<td>POLS 206 (GOVT 2305)</td>
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<td>POLS 207 (GOVT 2306)</td>
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<table>
<thead>
<tr>
<th>Horticultural Sciences Core Courses</th>
<th>Directed Electives³</th>
<th>High Impact Learning:</th>
<th>Total Supporting Field</th>
<th>TOTAL HOURS</th>
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<tbody>
<tr>
<td>HORT 281 -- Horticulture as a Profession</td>
<td>1</td>
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<tr>
<td>HORT 201 -- Hort Science (AGRI 1315)</td>
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<tr>
<td>HORT 203 -- Floral Design</td>
<td>3</td>
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<tr>
<td>HORT 315 -- Issues in Horticulture (900section)¹</td>
<td>3</td>
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<td>HORT 335 -- Sociohorticulture</td>
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<tr>
<td>HORT 481 -- Seminar (900section)¹</td>
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<td>HORT 400, 484, 485, 491 or</td>
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<td>HORT Study Abroad</td>
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</table>

1 Approved requirements outlined in TAMU catalog. Students must complete 6 credit hours of International and Cultural Diversity courses and two courses in their major that are designated as writing intensive (W) 900 section number.

2 Hours to be selected based on the emphasis area chosen in consultation with their academic advisor.

3 Hours to be selected from the approved "Directed Electives" to include HORT courses as indicated by the Departmental Curriculum Committee chosen in consultation with their academic advisor.

4 Some proficiency in a foreign language met by: 2 full years in high school, 2 semesters at college level or exam. See TAMU catalog for full details.
Bachelor of Arts Emphasis Areas [Minor Required]

URBAN HORTICULTURE

The urban horticulture concentration is intended for students interested in professional careers which promote horticulture and emphasize people and their education and enjoyment of plants in an urban setting. Students in this emphasis area can choose to gain skills and experiences in a broad range of areas. This emphasis area prepares students for a variety of career opportunities including careers in public gardens, federal, state, and city horticulture programs, Cooperative Extension Service, professional garden writer/editor or publication manager, horticulture marketing, horticulture education and print and electronic media. Directed technical electives allow the student to concentrate in an area of their interest while encouraging the development of good people skills.

Career Opportunities (Not limited to):
- Horticulture teacher in high schools, technical schools and colleges
- Garden writer for magazines, newspapers, TV, radio and computer technology.
- Director of public garden education and administration
- Employee of federal, state and city horticulture program education and administration

FLORAL DESIGN/EVENT PLANNING

This emphasis provides a strong foundation for undergraduate students who wish to receive a Bachelor’s degree in Horticulture that is concentrated in the area of the art of floral design. Graduates in this area are highly skilled for careers in many areas of floral design including: retail floristry, international and national wholesale and retail floral marketing, floral design publishing, event planning, and floral design education.

Career Opportunities (Not limited to):
- Floral designer
- Retail florist
- Floral crops wholesaler
- Floral design educator
- Floral design garden writer
- Event planner

HORTICULTURE LANDSCAPE DESIGN (Available Fall 2015)

This emphasis is tailored to provide the skills necessary for undergraduate students who wish to receive a Bachelor’s degree in Horticulture that is concentrated in the area of landscape design. This expanding field allows students with artistic capabilities to work in the horticulture arena. Landscape designers create aesthetic concepts and practical plans for improved outdoor living. Students electing this emphasis will gain the skills necessary for designing residential and small scale landscapes. Landscape designers are highly sought by garden centers, botanical gardens, arboreta, landscape maintenance and installation firms, nurseries, and governmental agencies. Private consulting is also a possibility. Some jobs will involve consumer relations and retail sales including landscape communication and publishing, landscape marketing and landscape design education.

Career Opportunities (Not limited to):
- Landscape designer
- Interiorscaper
- Landscape garden writer
- Landscape marketing representative
- Landscape design educator
- Landscape customer sales and service representative
- Garden Artist/Consultant
HORTICULTURE DIRECTED ELECTIVES FOR BA HORT

BA SUGGESTED HORTICULTURE COURSES:

HORT 203 (3) Floral Design
HORT 306 (3) Woody Ornamental Plants (fall)
HORT 308 (3) Landscape Plant Materials (spring)
HORT 332 (2) Horticulture Landscape Graphics (fall)
HORT 423 (3) Tropical Horticulture (fall/odd)
HORT 425 (3) Landscape Maintenance and Construction (spring)
HORT 426 (3) International Floriculture Marketing (spring/odd)
HORT 428 (3) Commercial Greenhouse Management (fall)
HORT 429 (3) Floriculture Crop Production
HORT 432 (3) Horticulture Landscape Design (fall)
HORT 440 (3) International Horticulture (spring even & study abroad)
HORT 442 (3) Horticulture Landscape Design II (spring)
HORT 451 (3) Retail Floristry (spring/odd)
HORT 452 (3) Floral Design: Weddings & Personal Flowers (s. even)
HORT 453 (2) Floral Art (spring/odd)
HORT 454 (2) Special Event Design and Production (fall)
HORT 484 Internship

ADDITIONAL HORTICULTURE COURSE OFFERINGS

HORT 301 (3) Garden Science (spring, summer, fall)
HORT 319 (3) Fruit and Nut Production (fall)
HORT 325 (3) Vegetable Crop Production (fall)
HORT 326 (3) Plant Propagation (spring)
HORT 400 (3) Field Studies in HORT (Guatemala) (spring)
HORT 404 (3) Plant Breeding (spring even)
HORT 416 (3) Understanding Wine (fall)
HORT 418 (3) Nut Culture (spring/odd)
HORT 419 (3) Viticulture and Small Fruit Culture (spring even)
HORT 420 (3) Concepts of Wine Production (fall and s. odd)
HORT 421 (3) Enology (fall)
HORT 427 (3) Fall Greenhouse Crops (fall)
HORT 431 (3) Nursery Production and Management (fall)
HORT 491 Research

RECOMMENDED COURSES FOR THE FOLLOWING EMPHASIS AREAS:

URBAN HORTICULTURE:
HORT 301 (3) Garden Science
HORT 306 (3) Woody Ornamental Plants (fall)
HORT 308 (3) Landscape Plant Materials (spring)
HORT 335 (3) Sociohorticulture

FLORAL DESIGN/EVENT PLANNING:
HORT 203 (3) Floral Design
HORT 451 (3) Retail Floristry (spring/odd)
HORT 452 (3) Floral Design: Weddings & Personal Flowers (s. even)
HORT 454 (2) Special Events Design & Production

LANDSCAPE DESIGN
HORT 306 (3) Woody Ornamental Plants (fall)
HORT 308 (3) Landscape Plant Materials (spring)
HORT 332 (2) Horticulture Landscape Graphics (fall)
HORT 432 (3) Horticulture Landscape Design (fall)
HORT 442 (3) Horticulture Landscape Design II (spring)

*HORT 332 must be taken prior to or in conjunction with HORT 432. HORT 442 requires 332 and 432 the semester prior.
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<thead>
<tr>
<th>BA Horticulture Directed Elective Options <em>(Includes Minor Coursework)</em></th>
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</thead>
</table>

| HORT Course | FINC 201 Personal Finance |
| ACCT 209 Survey of Accounting Principles or ACCT 229 Introductory Accounting | FINC 409 Survey of Finance Principles |
| ACCT 210 Survey of Managerial and Cost Accounting Principles or ACCT 230 Intro. Accounting | FRSC 421 Urban Forestry |
| Any AGCJ Course | GIS Course – Choose from: |
| | AGSM 461 Geographic Information Systems for Resource Management or |
| | ESSM 351 Geographic Information Systems for Resource Management or |
| | GEOG 390 Principles of Geographic Information Systems or |
| | RENR 405 GIS for Environmental Problem Solving |
| | RENR 215 Fundamentals of Ecology - Laboratory |
| Any HORT Course | HLTH 221 Safety |
| ACCT 209 Survey of Accounting Principles or ACCT 229 Introductory Accounting | MGMT 105 Intro to Business |
| ACCT 210 Survey of Managerial and Cost Accounting Principles or ACCT 230 Intro. Accounting | MGMT 209 Business, Government and Society |
| Any AGCJ Course | MGMT 309 Survey of Management |
| Any AGCJ Course | MKTG 409 Principles of Marketing |
| Any AGCJ Course | NUTR 202 Fundamentals of Human Nutrition |
| AGCJ 105 Intro to Agricultural Communications | POLS 341 Urban Administration |
| AGEC 105 Intro to Agricultural Economics | RPTS 201 Foundations of Recreation, Parks, and Tourism |
| AGEC 314 Marketing Agriculture and Food Products | RPTS 302 Application of Tourism Principles |
| AGEC 315 Food and Agricultural Sales | RPTS 304 Administration of Recreation Resource Agencies |
| AGEC 330 Financial Management in Agriculture | RPTS 308 Foundations of Community and Community Development |
| AGEC 340 Agribusiness Management | RPTS 311 Planning and Implementation of Events and Programs |
| AGLS 101 Modern Agriculture Systems and Renewable Natural Resources | RPTS 320 Event Management and Operations I |
| ALED 340 Survey of Leadership Theory | RPTS 321 Event Management and Operations II |
| ALED 441 Agricultural Extension Organization Methods | RPTS 331 Tourism Marketing |
| ALED 442 Professional Communications in Agriculture and Life Sciences | RPTS 340 Recreation, Parks, Tourism and Diverse Populations |
| ANTH 421 Museums and Their Functions | RPTS 370 Youth Development Organization and Services |
| ARTS: Any ARTS Course | RPTS 402 Park Planning and Design |
| BIOL 328 Plants and People | RPTS 423 Tourism Management |
| COMM 203 Public Speaking | RPTS 421 Hotel and Resort Operations |
| COMM 205 Communication for Technical Professions | RPTS 444 Service Quality for Hospitality Organizations |
| COMM 210 Group Communication and Discussion | SCSC 302 Recreation Turf and/or SCSC 312 Introductory Turfgrass Management Laboratory |
| Computer Course – Choose from: ISYS 209 Business Information Systems Concepts or RENR 201 Computer Applications in Agriculture | SOMS *Up to 3 hours of SOMS Leadership coursework |
| ECHE 244 School, Family and Community Dynamics in Early Childhood Education | ECON 202 Principles of Economics |
| ECON 203 Principles of Economics | ECON 202 Principles of Economics |
| EHRD 374 Organizational Development | EHRD 479 Grants and Contracts |
| EHRD 479 Grants and Contracts | ENDS: Any ENDS Course |
| ENTO 320 Honey Bee Biology | ENTD 320 Honey Bee Biology |

*Students in the Bachelor of Arts are required to complete a minor of 15-18 hours in order to receive a degree. Any University approved minor or double major is acceptable, except a minor or major in Horticulture as the intent is to provide a concentration in a second field of expertise.*
### University Graduation Requirements

Writing Requirement (2 courses) Foreign Language (2 yrs HS OR 2 semesters University)\(^4\) - __________

International & Cultural Diversity (6 hrs) ________ 36 hrs of 300-400 level coursework at TAMU

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#### University Core Curriculum

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<th>Grade</th>
<th>Projected</th>
<th>Credit Hours</th>
<th>Grade</th>
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<td><strong>Horticultural Sciences Core Courses (Cont.)</strong></td>
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<td><strong>Mathematics (MATH Prefix)(^1) (6)</strong></td>
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<td>Horticulture Management &amp; Marketing</td>
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<tr>
<td>Mathematics</td>
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<tr>
<td><strong>Life &amp; Physical Sciences (9)</strong></td>
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<td>Plant ID/ Characterization</td>
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**Language, Philosophy & Culture\(^1\) (3)**

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<th>Grade</th>
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<tr>
<td>Social &amp; Behavioral Sciences (^1) (3)</td>
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<td>CHEM 222 (Org. Chem.)</td>
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<td>American History(^1) (6)</td>
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<td>HORT 201 -- Gen. Entomology</td>
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<tr>
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<td>GENE310/320/HORT404/SCSC304-Genetics</td>
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<td>HIST (Amer. /TX) (HIST 1302 or 2301)</td>
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<td>MEPS 313--Intro Plant Physiology</td>
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<td>Total Hours</td>
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**Horticultural Sciences Core Courses**

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<th>Grade</th>
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<th>Credit Hours</th>
<th>Grade</th>
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<tr>
<td>HORT 201 -- Hort Science (AGRI 1315)</td>
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<td>HORT 315 -- Issues in Horticulture (900sect)(^1)</td>
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<td>HORT 481 -- Seminar (900section)(^1)</td>
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**High Impact Learning:**

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<th>Grade</th>
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<th>Credit Hours</th>
<th>Grade</th>
<th>Projected Date</th>
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<td>HORT 400, 484, 485, 491 or HORT Study Abroad</td>
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</table>

**TOTAL HOURS**

\(^1\) Approved requirements outlined in TAMU catalog. Students must complete 6 credit hours of International and Cultural Diversity courses and two courses in their major that are designated as writing intensive (W) 900 section number.

\(^2\) Hours to be selected based on the emphasis area chosen in consultation with their academic advisor.

\(^3\) Hours to be selected from the approved "Directed Electives" to include HORT courses as indicated by the Departmental Curriculum Committee chosen in consultation with their academic advisor.

\(^4\) Some proficiency in a foreign language met by: 2 full years in high school, 2 semesters at college level or exam. See TAMU catalog for full details.
Bachelor of Science Emphasis Areas [Minor Optional]

FRUIT AND VEGETABLE PRODUCTION

More people today are aware of the importance of fresh fruits and vegetables in their diets than at any time in history. As a result, the production of these crops is increasing for domestic use and export.

The emphasis area of fruit and vegetable production specializes in the science and practice of growing, harvesting, handling, storing, processing, and marketing fruits and vegetables. This emphasis area provides students with the knowledge and skills needed to be current on new varieties, cultural practices, mechanization, weed and pest control, harvesting, storage, processing, marketing, and personnel and financial management. Students graduating in this emphasis area are prepared for careers as growers and farm managers; as production field advisors for fresh market, processing, and vegetable seed companies; or as field advisors for allied industries that manufacture production and harvest machinery, fertilizers, and agricultural chemicals. They can also find careers in fruit and vegetable marketing as managers of produce firms; as supervisors of storage; or as sales people, field advisors, buyers, brokers or managers of marketing and promotional organizations. Fruit and vegetable majors also enter the field of international horticulture as overseas supervisors for commercial companies, as participants in Peace Corps and other humanitarian endeavors, or technical assistants with USAID or international food production, research or teaching programs.

Career Opportunities (Not limited to):
- Orchard Manager
- Vegetable Farm Manager
- Technician or field representative for fruit or vegetable processor
- Federal or state inspector for fruit and vegetables
- Producer of fruits, nuts, vegetables, herbs
- Commercial Seed Producer
- Border, Port and Homeland Security Agents
- Sales or technical representative for seed companies, horticultural supply firms and chemical companies
- Wholesale or retail purchaser/sales/technical service dealing with fresh or processed fruits and vegetables for chain stores, garden centers, government institutions and wholesale distributors
- Marketing and Sales Representative of Fruits & Vegetables
- Marketing and Sales Representative of any product associated with the production of fruits and vegetables

NURSERY/FLORAL CROP PRODUCTION

Production of floral and nursery crops has been a rapidly expanding industry and has become a major contributor to the economy of Texas and the nation. This industry requires college graduates who understand the basics of ornamental plant production and use, and have a keen sense of business and management skills.

Greenhouses provide a protected environment for producing potted and bedding plants, cut flowers, transplants for field production and out-of-season fresh vegetables and berries. Excellent career opportunities exist for graduates specializing in greenhouse crop production.

Nursery production includes field and/or container growing of the many woody and herbaceous species utilized in landscapes or planted in orchards and vineyards. Crops types include shade and flowering trees, narrow-leaved evergreens, broad-leaved evergreens, deciduous shrubs, tree and small fruits, vines and ground covers and herbaceous perennials.

In addition, the demands for plants for environment enhancement and the need for personnel trained in the requirements of production, maintenance, marketing and utilization of these plant materials are creating exciting career opportunities. Students who study production are employed as growers and production managers in greenhouses and nurseries and as research technicians, extension specialists, and teachers. Students with interests in marketing may work with producers, wholesale suppliers, garden centers and other retail outlets.

Career Opportunities (Not limited to):
- Producer of nursery/floral crops, cut flowers, herbs
- Greenhouse Crop Manager
- Wholesale Nursery Manager
- Plant Propagator
- Sales or technical representative for seed companies, horticultural supply firms and chemical companies
- Wholesale or retail purchaser/sales/technical service dealing, cut flowers, nursery/floral crops for chain stores, garden centers, government institutions and wholesale distributors
- Marketing and Sales representative of nursery/floral crops
- Marketing and Sales representative of any product associated with the production of nursery/floral crops
- Retail Garden Center Manager
Bachelor of Science Emphasis Areas Continued [Minor Optional]

LANDSCAPE MANAGEMENT

Landscape trees, shrubs, bedding plants, foliage and flowering potted plants and cut flowers have long been valued for their contributions to the quality of the environment in which we live, work and play. Successful landscape management companies provide an integrated approach to landscape contracting and managing landscape projects from inception through maintenance. The Landscape Management emphasis area focuses on plants and landscape materials, plant identification and culture, plant installation, and landscape construction and maintenance. Students in this emphasis area gain knowledge and skills to prepare them to create preliminary landscape designs, install plantings and steward their creations. Job opportunities are plentiful for individuals with targeted educational backgrounds and experience in landscape management including careers in installation, management and maintenance of interior as well as exterior landscapes. Landscape management careers span from hotels and resorts, planned communities, corporate campuses, private estates, municipal properties, golf courses, theme parks, retail and entertainment centers, sports complexes and residential developments.

Career Opportunities (Not limited to):
- Development and maintenance supervisor of landscapes in parks, recreation areas, residential homes, businesses, estates, botanical gardens, public and private gardens
- Landscape supervisor
- Lawn and grounds maintenance manager
- Landscape contractor
- Arborist
- Landscape Construction manager
- Landscape Installation manager
- Botanical gardens research scientist- plant identification and research
- Horticulturist in city, state or national parks
- Horticulturist in golf courses or other recreational parks
- Environmental consultant
- Corps of Engineers employee

SCIENCE & BIOTECHNOLOGY

The Science and Biotechnology emphasis area is intended for, but not limited to, those students who feel they will go to graduate school and provides these students with a strong foundation in basic sciences. Career opportunities for graduates in this area who complete advanced graduate degrees include teaching and research at universities and private industry research. Graduates with good communication skills may also have career opportunities with consulting firms and the Cooperative Extension Service communicating scientific research findings to the public in an applicable and understandable format. Students graduating with a BS and MS degrees, with research experience and skills, will be very competitive for lab bench positions, but the MS will facilitate promotions to supervisor and leadership positions. In addition to larger companies, there are many smaller companies and start-ups looking for recent biotechnology graduates. Skills in tissue culture and transformation, recombinant DNA and molecular biology, protein and nucleic acid biochemistry, genomics, proteomics, and bioinformatics are particularly useful.

Career Opportunities (Not limited to):
- Research scientist or technician at a university, government agency or lab (USDA, NSF, germplasm resource centers)
- Industry research scientist (agrochemical, pharmaceutical, food, seed and nursery)
- Professor, lecturer, instructor or teacher in a college or university, K-12 or museums, parks, nature centers
- Science writing and communication
- Science advisor for patent law, public policy, lawmakers
HORTICULTURE DIRECTED ELECTIVES FOR BS HORT

**BS SUGGESTED HORTICULTURE COURSES:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 306</td>
<td>Woody Ornamental Plants (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 308</td>
<td>Landscape Plant Materials (spring)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 319</td>
<td>Fruit and Nut Production (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 325</td>
<td>Vegetable Crop Production (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 332</td>
<td>Horticulture Landscape Graphics (fall)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>HORT 404</td>
<td>Plant Breeding (spring even)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 418</td>
<td>Nut Culture (spring odd)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 419</td>
<td>Grape and Small Fruit Culture (spring even)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 420</td>
<td>Concepts in Wine Production (fall &amp; s. odd)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 421</td>
<td>Enology (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 423</td>
<td>Tropical Horticulture (fall odd)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 425</td>
<td>Landscape Maintenance and Construction (spring)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 426</td>
<td>International Floriculture Marketing (sp.odd)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 428</td>
<td>Commercial Greenhouse Management (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 432</td>
<td>Horticulture Landscape Design (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 328</td>
<td>Wild Edible, Cultivated &amp; Poisonous Herbs (spring)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 440</td>
<td>International Horticulture (spring even &amp; study abroad)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 442</td>
<td>Horticulture Landscape Design II (spring)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 450</td>
<td>Processing Coffee &amp; Horticulture Crops</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 460</td>
<td>Landscape, Estimating, Bidding &amp; Operations</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 484</td>
<td>Internship</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 491</td>
<td>Research</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

* HORT 332 must be taken prior to or in conjunction with HORT 432. HORT 442 requires 332 and 432 the semester prior.

**RECOMMENDED COURSES FOR THE FOLLOWING EMPHASIS AREAS:**

**FRUIT & VEGETABLE PRODUCTION:**

- HORT 319 (3) Fruit and Nut Production (fall)
- HORT 325 (3) Vegetable Crop Productions (fall)

**NURSERY/FLORAL CROP PRODUCTION:**

- HORT 306 (3) Woody Ornamental Plants (fall)
- HORT 308 (3) Landscape Plant Materials (spring)
- HORT 428 (3) Commercial Greenhouse Management (fall)

**LANDSCAPE MANAGEMENT:**

- HORT 306 (3) Woody Ornamental Plants (fall)
- HORT 308 (3) Landscape Plant Materials (spring)
- HORT 425 (3) Landscape Maintenance and Construction (spring)

**SCIENCE AND BIOTECHNOLOGY:**

- HORT 404 (3) Plant Breeding (spring even)

**ADDITIONAL HORTICULTURE COURSE OFFERINGS**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORT 203</td>
<td>Floral Design (spring, summer, fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 301</td>
<td>Garden Science (spring, summer, fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 302</td>
<td>Garden Science Lab (fall)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>HORT 335</td>
<td>Sociohorticulture (spring, fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 400</td>
<td>Field Studies in HORT – Guatemala (spring)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 416</td>
<td>Understanding Wine (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 427</td>
<td>Fall Greenhouse Crops (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 431</td>
<td>Nursery Production and Management (fall)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 451</td>
<td>Retail Floristry (spring odd)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 452</td>
<td>Floral Design: Weddings and Personal Flowers (spring even)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 453</td>
<td>Floral Art (spring even)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HORT 454</td>
<td>Special Event Design and Production (fall)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
**BS Horticulture Directed Elective Options**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any HORT Course</td>
<td>EHRD 479 Grants and Contracts</td>
</tr>
<tr>
<td>ACCT 209 Survey of Accounting Principles or ACCT 229 Introductory Accounting</td>
<td>ENGL 210 Technical and Business Writing</td>
</tr>
<tr>
<td>ACCT 210 Survey of Managerial and Cost Accounting Principles or ACCT 230 Intro. Accounting</td>
<td>ENGL 320 Technical Editing and Writing</td>
</tr>
<tr>
<td>AGCJ 105 Intro to Agricultural Communications</td>
<td>ENTO 315 Biotechnology and Society</td>
</tr>
<tr>
<td>AGCJ 306 Theory and Practice of Agricultural Public Relations</td>
<td>ENTO 320 Honey Bee Biology</td>
</tr>
<tr>
<td>AGEC 105 Intro to Agricultural Economics</td>
<td>ENTO 401 Principles of Integrated Pest Management</td>
</tr>
<tr>
<td>AGEC 314 Marketing Agricultural and Food Products</td>
<td>ENTO 402 Field-Crop Insects</td>
</tr>
<tr>
<td>AGEC 315 Food and Agricultural Sales</td>
<td>FINC 201 Personal Finance</td>
</tr>
<tr>
<td>AGEC 325 Principles of Farm and Ranch Management</td>
<td>FINC 409 Survey of Finance Principles</td>
</tr>
<tr>
<td>AGEC 330 Financial Management in Agriculture</td>
<td>FRSC 420 Arboriculture</td>
</tr>
<tr>
<td>AGEC 340 Agribusiness Management</td>
<td>FRSC 421 Urban Forestry</td>
</tr>
<tr>
<td>AGEC 344 Food and Agricultural Law</td>
<td>FSTC 201 Food Science</td>
</tr>
<tr>
<td>AGEC 350 Environmental and Natural Resource Economics</td>
<td>GENE/MEPS 411 Biotechnology for Crop Improvement</td>
</tr>
<tr>
<td>AGEC 413 Agricultural Cooperatives</td>
<td>GENE: Any Genetics Course (example, GENE 450 Introduction to Genomics)</td>
</tr>
<tr>
<td>AGEC 452 International Trade and Agriculture</td>
<td>GEOG 435 Principles of Plant Geography</td>
</tr>
<tr>
<td>AGEC 453 International Agribusiness Marketing</td>
<td>MGMT 105 Intro to Business</td>
</tr>
<tr>
<td>AGLS 101 Modern Agri. Systems and Renewable Natural Resources</td>
<td>MGMT 209 Business, Government and Society</td>
</tr>
<tr>
<td>AGLS 105 Research in Agriculture and Life Sciences</td>
<td>MGMT 212 Business Law</td>
</tr>
<tr>
<td>AGLS 125 Life Sciences Learning Community I</td>
<td>MGMT 309 Survey of Management</td>
</tr>
<tr>
<td>AGSM 201 Agricultural Energy and Power Systems</td>
<td>MKTG 409 Principles of Marketing</td>
</tr>
<tr>
<td>AGSM 301 Systems Analysis in Agriculture</td>
<td>NUTR 202 Fundamentals of Human Nutrition</td>
</tr>
<tr>
<td>AGSM 335 Water and Soil Management</td>
<td>NUTR 203 Scientific Principles of Human Nutrition</td>
</tr>
<tr>
<td>AGSM 360 Occupational Safety Management</td>
<td>PHIL 314 Environmental Ethics</td>
</tr>
<tr>
<td>AGSM 435 Irrigation Principles and Management</td>
<td>PHYS: Any Physics Course</td>
</tr>
<tr>
<td>ALED 340 Survey of Leadership Theory</td>
<td>RENR 410 Ecosystem Management</td>
</tr>
<tr>
<td>ATMO 201 Atmospheric Science</td>
<td>SCSC 105 World Food and Fiber Crops</td>
</tr>
<tr>
<td>BESC 201 Intro to Bioenvironmental Sciences</td>
<td>SCSC 302 Recreation Turf and/or SCSC 312 Introductory Turfgrass Management Laboratory</td>
</tr>
<tr>
<td>BESC 314 Pathogens, the Environment and Society</td>
<td>SCSC 311 Principles of Crop Production</td>
</tr>
<tr>
<td>BICH: Any Biochemistry Course (example, BICH 410/411 Comprehensive Biochemistry)</td>
<td>SCSC 422 Soil Fertility and Plant Nutrient Management</td>
</tr>
<tr>
<td>BIOL 111 and 112 Introductory Biology</td>
<td>SCSC 428 Advanced Turf Ecology and Physiology</td>
</tr>
<tr>
<td>BIOL 206 Introductory Microbiology</td>
<td>SCSC 429 Turf Management Systems</td>
</tr>
<tr>
<td>BIOL 213 Molecular Cell Biology</td>
<td>SCSC 430 Turfgrass Maintenance</td>
</tr>
<tr>
<td>BIOL 328 Plants and People</td>
<td>SCSC 435 Ecology of Agricultural Chemicals in Field Crops and Turf</td>
</tr>
<tr>
<td>BIOL 401 Critical Writing in Biology</td>
<td>SCSC 446 Weed Mgmt &amp; Ecology</td>
</tr>
<tr>
<td>BIOL 451 Bioinformatics</td>
<td>SCSC 455 Environmental Soil and Water Science</td>
</tr>
<tr>
<td>CHEM: Any Chemistry Course</td>
<td>SOMS *Up to 3 hours of SOMS Leadership coursework</td>
</tr>
<tr>
<td>COMM 203 Public Speaking</td>
<td>SPAN 101 Beginning Spanish I</td>
</tr>
<tr>
<td>COMM 205 Communication for Technical Professions</td>
<td>SPAN 102 Beginning Spanish II</td>
</tr>
<tr>
<td>COMM 210 Group Communication and Discussion</td>
<td>STAT 302 Statistical Methods</td>
</tr>
<tr>
<td>Computer Course – Choose from: ISYS 209 Business Information Systems Concepts or RENR 201 Computer Applications in Agriculture</td>
<td>STLC 101 Application of Learning Theories to College Studies</td>
</tr>
<tr>
<td>COSC 253 Construction Materials and Methods I</td>
<td>UGST 181 First Year Seminar</td>
</tr>
<tr>
<td>COSC 254 Construction Materials and Methods II</td>
<td>GIS Course – Choose from: AGSM 461 Geographic Information Systems for Resource Management or ESSM 351 Geographic Information Systems for Resource Management or RENR 405 GIS for Environmental Problem Solving</td>
</tr>
<tr>
<td>ECON 202 Principles of Economics</td>
<td>*ESSM 203 &amp; LAND 329 removed fall 2016</td>
</tr>
<tr>
<td>ECON 203 Principles of Economics</td>
<td></td>
</tr>
</tbody>
</table>

*ESSM 203 & LAND 329 removed fall 2016*
Annual Assessment of Graduate Student’s Progress

An annual evaluation is required for each graduate student affiliated (including both funded and non-funded students) to the TAMU Department of Horticultural Sciences to assist in facilitating a timely completion of student’s degree program and to assess specific learning outcomes. The student should complete pages 1 and 2 of this form and then provide the form to their advisor/co-advisor for their evaluation.

Student’s Name: ________________________________ Year of Evaluation: __________

Current Degree Program: ________________________________ Date of Evaluation: __________

General Progress Measures:

Most recent semester GPR: __________ Current overall GPR: __________

Degree plan filed with Office of Graduate Studies: __ Yes ____ No Required semester to be filed? __________

Proposal filed with Office of Graduate Studies: ___ Yes ____ No Required semester to be filed? __________

Is student currently on an assistantship? ___ Yes ____ No

Is student serving as a teaching assistant? ____ Yes ____ No Which classes ? __________________________

Planned semester of graduation: __________________________

Has student (if PhD) successfully completed prelims? ______ Yes _____ No

Date of last graduate committee meeting? __________________________

Is student’s safety and other required training up to date? ___ Yes ____ No

Presentations:

Number of research presentations at meetings not associated with Texas A&M: Scientific Meetings, Industry, etc.

For the current year (summer, fall, spring) only: __________

Cumulative total from beginning of current graduate degree program to present: __________

Number of research presentations at meetings associated with Texas A&M: Student Research Week, TAMU Plant Breeding Symposium, Department of Horticultural Science Poster Presentation, etc.

For the current year (summer, fall, spring) only: __________

Cumulative total from beginning of current graduate degree program to present: __________

Peer-reviewed Journal Publications:

Number of peer-reviewed journal articles published during current year (summer, fall, spring) only: __________

Number of peer-reviewed journal articles from beginning of current graduate program to present: __________

Number of peer-reviewed journal articles submitted or under review for current year: __________
**Non-referred Publications:**

Number of abstracts or publications in a non-referred journal, consumer magazine, extension newsletter, newspaper, etc. for current year (summer, fall, spring) only: __________

Number of abstracts or publications in a non-referred journal, consumer magazine, extension newsletter, newspaper, etc. from beginning of current graduate program to present: __________

**Awards:**

Number of academic awards from the past year (summer, fall, spring). Awards may come in the form of scholarships, fellowships or any other form that is academically reasonable: __________

Number of awards from research presentations (both oral and written) presented at the university, local, or national scientific level for the past year (summer, fall, spring): __________
Faculty Member’s Evaluation of the Student’s Progress for the Previous Academic Year:

It is anticipated that as a student progresses through their degree program and gains additional experience each year, they will see continued progress in meeting expectations in the areas of research-related knowledge, critical thinking and communication skills. Based on the time your student has been in their current degree program, please evaluate them on these learning outcomes using the ratings provided.

*Exceeds expectations:* The student is completing assignments, projects, research, and other duties above and beyond the requirements set. The student is progressing in their dissertation/thesis/course work with dedication and a strong work ethic. The student excels in research-related knowledge and critical thinking skills allowing them to work independently with minimal oversight.

*Meets expectations:* The student is completing assignments, projects, research, and other duties as expected by the standards set and agreed upon. The student is demonstrating appropriate knowledge and critical thinking skills commensurate with their time in the degree program.

*Meets minimum expectations:* The student is completing assignments, projects, research, and other duties but may be struggling to do so on time, needs constant reminders, guidance, and/or assistance and does not have the necessary knowledge or critical thinking skills that is expected based on their current time in the degree program.

*Below minimum expectation:* The student is failing to complete assignments, projects, research, and is failing to communicate with their advisor and/or committee. The student lacks the necessary knowledge and critical thinking skills to progress adequately in their program.

NOTE: If you indicate that a student only meets minimum expectations or is below minimum expectations on any questions, please indicate why and provide suggestions on how the student can improve during the coming year in the space provided under each question.

1. Based on the time in their degree program, is this student demonstrating the necessary knowledge necessary to progress in their specific program?
   
   ___ Exceeds expectations; ___ Meets expectations; ____ Meets minimum expectations; ____ Below minimum expectations

2. Based on the time in their degree program, is this student demonstrating an ability to critically evaluate the literature and other resources needed to progress in their specific program?
   
   ___ Exceeds expectations; ___ Meets expectations; ____ Meets minimum expectations; ____ Below minimum expectations

3. Based on the time in their degree program, is this student demonstrating good oral communication skills?
   
   ___ Exceeds expectations; ___ Meets expectations; ____ Meets minimum expectations; ____ Below minimum expectations
4. Based on the time in their degree program, is this student demonstrating good written communication skills?

___ Exceeds expectations; ___ Meets expectations; ____ Meets minimum expectations; ___ Below minimum expectations

5. Provide an overall assessment of this student’s performance during the past year in the space below and any additional suggestions for improvement.

___ Exceeds expectations; ___ Meets expectations; ____ Meets minimum expectations; ___ Below minimum expectations

**Goals and Benchmarks for the Up Coming Year (to be provided by advisor/co-advisor) in consultation with the student):**

Student Comments (optional):
Advisor’s signature: ______________________  Student’s signature: ______________________

Form revised and approved by the TAMU Horticultural Sciences Graduate Faculty on 4/15/2015

RETURN TO:
Patricia Klein
Associate Head for Graduate Programs
TAMU2123
Texas A&M University, Dept. of Horticultural Sciences
College Station TX 77843-2123.
**Faculty Evaluation of Graduate Student Learning Outcomes**

**INSTRUCTIONS:** This section should be completed for ALL students. Check the box most appropriate for this student.

<table>
<thead>
<tr>
<th>How well does the student meet your expectations in the following areas?</th>
<th>Well Above <em>(5)</em></th>
<th>Above <em>(4)</em></th>
<th><em>USE THIS DESCRIPTION TO CALIBRATE EXPECTATIONS</em></th>
<th>Below <em>(2)</em></th>
<th>Well Below <em>(1)</em></th>
<th>Not Observable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Exhibits a coherent understanding of discipline-specific knowledge?</td>
<td>Ideal clarity on critical concepts</td>
<td>Strong clarity on critical concepts</td>
<td>Articulates foundational concepts across the breadth of the discipline; distinguishes between opposing theoretical frameworks; some clarity</td>
<td>Poor clarity on critical concepts</td>
<td>No clarity on critical concepts</td>
<td></td>
</tr>
<tr>
<td>2 Applies discipline-specific knowledge in a range of contexts to solve problems and make decisions?</td>
<td>Applies all relevant info; ideal resolution</td>
<td>Applies most relevant info; strong resolution</td>
<td>Applies relevant concepts to justify decisions; may not apply all relevant information; may not come to the ideal resolution</td>
<td>Relies on some irrelevant info; poor resolution</td>
<td>Relies on irrelevant info; incorrect resolution</td>
<td></td>
</tr>
<tr>
<td>3 Uses a variety of sources and alternative views when critically evaluating ideas and information?</td>
<td>Ideal sources; considers all views; critical evaluation</td>
<td>Strong sources; considers most views; some critical eval</td>
<td>Sources used to evaluate are both relevant and applicable; student seeks multiple perspectives; information considered is generally thorough; some critical thought applied</td>
<td>Mediocre sources; lacking viewpoints; little critical eval</td>
<td>Poor sources; missing critical viewpoints; no critical eval</td>
<td></td>
</tr>
<tr>
<td>4 Communicates effectively?</td>
<td>Crystal clear; seamless transitions</td>
<td>Very clear; smooth transitions</td>
<td>Central message is clear and consistent in written and oral form; ideas presented in logical order; transitions between ideas are adequate</td>
<td>Lacking clarity or order; poor transitions</td>
<td>Unclear; illogical; no transitions</td>
<td></td>
</tr>
<tr>
<td>5 Teaches or explains the subject matter in their discipline to a range of audiences?</td>
<td>Ideal delivery; ideal for audience</td>
<td>Strong delivery; well designed for audience</td>
<td>Delivery techniques and language choices are appropriate for the audience; student has the ability to transition between different audiences; may not be flawless or smooth</td>
<td>Mediocre delivery; somewhat appropriate for audience</td>
<td>Poor delivery; inappropriate for audience</td>
<td></td>
</tr>
<tr>
<td>6 Exhibits proficiency in technology appropriate to solve problems in their discipline?</td>
<td>Expert proficiency</td>
<td>Advanced proficiency</td>
<td>Demonstrates basic knowledge of, and basic proficiency in technology and tools specific to the discipline; may rely on others for some guidance</td>
<td>Lacking proficiency</td>
<td>No proficiency</td>
<td></td>
</tr>
<tr>
<td>7 Chooses ethical courses of action in research or practice?</td>
<td>Addresses all ethical questions</td>
<td>Addresses most ethical questions</td>
<td>Recognizes ethical questions; attempts to apply ethical perspectives &amp; concepts to research and practice</td>
<td>Doesn't recognize all ethical questions</td>
<td>Doesn't recognize any ethical questions</td>
<td></td>
</tr>
</tbody>
</table>

**College of Agriculture and Life Sciences, MS 2402**

Date Form Completed: ____________

Form Revised: January 2018
INSTRUCTIONS: The following section should be completed for MS-Thesis Option students & Doctoral Students completing a dissertation.

<table>
<thead>
<tr>
<th>How well does the student meet your expectations in the following areas?</th>
<th>Well Above (5)</th>
<th>Above (4)</th>
<th>Meets Expectations (3)</th>
<th>Below (2)</th>
<th>Well Below (1)</th>
<th>Not Observable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develops clear, hypothesis-driven, or data supported research plans?</td>
<td>Ideal clarity; well supported by data</td>
<td>Strong clarity; well supported by data</td>
<td>Articulates research questions supported by data, or relying on clear hypotheses; may not identify all complexities and nuances inherent to the proposed research</td>
<td>Somewhat clear; mildly supported by data</td>
<td>Unclear; unsupported by data</td>
<td></td>
</tr>
<tr>
<td>Conducts valid, data-supported and theoretically consistent research?</td>
<td>Ideal controls, quality or reproducibility; ideal analysis</td>
<td>Strong controls, quality or reproducibility; strong analysis</td>
<td>Executes research with appropriate controls, sufficient quality and reproducibility, and valid analysis using methods appropriate to the discipline</td>
<td>Poor controls, quality or reproducibility; Poor analysis</td>
<td>No controls, quality or reproducibility; Incorrect analysis</td>
<td></td>
</tr>
<tr>
<td>Effectively disseminates research results in appropriate contexts?</td>
<td>Expertly conveys relevance or applicability</td>
<td>Conveys relevance or applicability with skill</td>
<td>Information presented attempts to distill a large body of knowledge into relevant points; demonstrates relevance of completed research; articulates broader applicability of research</td>
<td>Poor ability to convey relevance or applicability</td>
<td>Unable to convey relevance or applicability</td>
<td></td>
</tr>
</tbody>
</table>

11 Did this student pass his/her final defense? (Circle One)  
Yes  No

12 Would you recommend that this student go on to a Ph.D. program or pursue a post-doc position? (Circle One)  
Yes  No

Date Form Completed:_______________
Michael A. Arnold
Professor and Associate Head for Undergraduate Programs
Department of Horticultural Sciences

Email address:
ma-arnold@tamu.edu

Program Summary

Improving the Initial Landscape Performance of Container-Grown Plants (Hatch H-8301)
Nursery Crops and Landscape Systems (SERA27, formerly IEG-63)

The overall goal of group’s program is to improve the sustainability and ecosystem services of container-grown plants established in our regional built environments. From a research perspective we approach the challenge from four aspects. One long-term area of research has been improving transplant establishment practices and production conditions which might have residual impacts on post-transplant performance in the built environment. A second research effort involves the breeding, trialing, and development of native and regionally adapted exotics for use in sustainable resilient urban and exurban landscapes. Colleagues in our regional nursery crops and landscape systems working group and our internal efforts with members of Texas A&M AgriLife Research and Extension and Texas Tech University through the Texas Superstar® program help deliver information and products to the Green Industry. We cooperate with industry partners and university and USDA personnel to bring improved cultivars of native plants to the market with aesthetically competitive appeal and desired environmental stress resistance characteristics. These efforts are integrated with my teaching responsibilities which involve providing courses at the undergraduate and graduate levels focused on imparting plant utilization skills that assist students in achieving sustainable designs for built environments. To this end we also cooperate extensively through consultation services to the new TAMU Gardens and Greenways and more broadly on campus through advisory services to the SSC Corporation administrators who manage our campus landscapes. Cooperative efforts with colleagues from Landscape Architecture and Urban Planning and Engineering have resulted in the installation of LID (low impact development) projects for stormwater control on campus. A third area of research involves determining the propagation and production techniques needed to introduce the new cultivars we introduce. Undergraduate and graduate students participate in many phases of this work. Our final focus area of research involves the utilization of native species as pollinator attracting plants to enhance the yield of fruits and vegetables in space constrained urban sites and small scale production sites. These efforts are in conjunction with colleagues in Entomology and Agricultural Economics.

Academic Background

Degree   Year   Institution                      Major
Ph.D.    1990    North Carolina State University  Horticulture
M.S.     1987    The Ohio State University       Landscape Horticulture
B.S.     1984    The Ohio State University       Landscape Horticulture
B.S.     1983    The Ohio State University       Business Administration: Production Operations Management

Professional Experience

2013-present  Professor & Associate Head for Undergraduate Programs – Department of Horticultural Sciences, Texas A&M University
2012-2013     Professor & Associate Head for Graduate Programs – Department of Horticultural Sciences, Texas A&M University
2008-2012     Professor – Department of Horticultural Sciences, Texas A&M University
2005-2007     Professor and Associate Head for Research & Graduate Studies – Department of Horticultural Sciences, Texas A&M University
2003-2005     Associate Professor and Associate Head for Research & Graduate Studies – Department of Horticultural Sciences, Texas A&M University
1997-2003     Associate Professor – Department of Horticultural Sciences, Texas A&M University
1993-1997     Assistant Professor – Department of Horticultural Sciences, Texas A&M University
1990-1992     Assistant Professor – School of Agriculture & Home Economics, Tennessee Tech. University

Publications 2014-2019

Refereed Publications (underlined names are former or current graduate students)


**Editor reviewed publications or conference proceedings 2014-2019**


**Plant Patents & Variety Releases, 2014-2019**


**Electronic media/software (websites, software, videos, etc.) 2014-2019**

http://landscapeplants.tamu.edu/index.html

HTRT 308 Plants for Sustainable Landscapes
http://aggie-horticulture.tamu.edu/syllabi/308/home/frameset.htm

HTRT 608 Plants For Landscape Design,
http://aggie-horticulture.tamu.edu/syllabi/608/index.html


**Classes taught (2014-2019)**

**Undergraduate courses**

Horticulture 306, Trees & Shrubs for Sustainable Built Environments, taught in fall semester of each year
Horticulture 308, Plants for Sustainable Landscapes, taught in spring semester of each year
Horticulture 425, Landscape Maintenance and Construction, Spring 2019
Horticulture 491, Undergraduate Research, taught Fall 2018, Summer 2018, Summer 2017, Spring 2015, Fall 2014
Graduate courses
Horticulture 608, Plants For Landscape Design, taught in fall semester of each year
Horticulture 609, Plants for Landscape Design II taught in Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018, thereafter in spring semesters of even years.
Horticulture 691, Research, taught every semester Fall, Spring, Summer 2014-2019

Graduate student committees (date is graduation date)
Advisees or co-advised
In progress Jonathan Caples, Ph.D. student, Horticulture
In progress Kaitlin Hopkins, Ph.D. student, Horticulture
2018 John E. Montoya, Ph.D., Horticulture
2015 Sean T. Carver, Ph.D., Horticulture
2015 Lauren Garcia (now Lauren Garcia Chance), Ph.D. Horticulture
2015 Andrew R. King, Ph.D., Horticulture

Non-advisees, served as committee member
In progress Salonee Mahta, M.L.A. student, Landscape Architecture & Urban Planning
In progress Celeste A. Winfield, M. Agric., Horticulture
2018 Yaxuan Han, M.L.A., Landscape Architecture and Urban Planning
2018 Sara Mellard, M.Agric., Horticulture
2016 Anais L. Dion, M. Agric., Natural Resources Development
2014 Hayley Hannah, M.S., Horticulture

Grants and contracts awarded 2014-2019
$4,000 Neuhaus-Shepardson Faculty Development Grant. $4,000. M.A. Arnold (PI). College of Agriculture and Life Sciences Enhancing Faculty Development and TAMU Dept. of Horticultural Sciences Match. Funded, 2018-2019.
$61,000 Aggie B.L.U.E. Print Center: Building Lasting University Environments. $300,000. G. Newman, J. Kim, K-H. Chu, M. Arnold, and M.-H. Li. (co-Pfs). Tier One Program Grant, Texas A&M University Dean of Faculties. Funds to be administered jointly. Funded $300,000 over 3 years 2015-2016 to 2017-2018 academic years; approximately 20% to M.A. Arnold. Used to leverage an additional $65,000 from the Aggie Green Fund to support installation for a total of $365,000.
$9,976 Long-Term Impact of Container Size on Tree Establishment. $9,976. Duling Grant, Tree Research and Education Endowment Fund (TREE Fund). M.A. Arnold (PI).
$158,847 Developing Production Protocols for XXXX XXXXX (blocked out due to nondisclosure agreement) for Pharmaceutical Extractions. M.A. Arnold. Berry Pharmaceuticals. Funded $158,847. 2010-2014. Has since been developed as a commercially available product.
$12,278 Travel funding provided by various scientific, industry, and university groups to provide them presentations or participation in advisory or governance boards. Several NPOs. M.A. Arnold. Funded $10,478.
Fee-based Funding 2014-2019


$8,354  2014-2019 License agreement between Ball Horticultural Company and the Texas A&M University System for Helianthus amarum selections (TAMUS 1699) – Dr. Michael Arnold.

Journals for which papers were reviewed 2014-2019
Journal of the American Society for Horticultural Sciences
HortScience
HortTechnology (served on editorial board)
Journal of Environmental Horticulture (served on editorial board)
Arboriculture and Urban Forestry

Internal university / agency service on committees 2014 – 2019
Texas A&M University Tree Advisory Committee, 2010 – present.
Texas A&M University Institute for Sustainable Communities, Fellow 2017-2020.
TAMU College of Agriculture and Life Sciences Undergraduate Program Council, member 2013-present.
TAMU College of Agriculture and Life Sciences Ad Hoc Faculty Review Committee - Cobb, 2016.
TAMU College of Agriculture and Life Sciences Tom Slick Fellowship Evaluation Committee, member 2005-2015.
TAMU Department of Horticultural Sciences Undergraduate Outcome Assessment Committee, 2008 – present, chair 2013 - present.
TAMU Department of Horticultural Sciences Farm Operations Advisory Committee, 2011 – present
TAMU Dept. Horticultural Sciences Mentoring Committee for Isabel Vales, 2016 – present.
TAMU Dept. Horticultural Sciences Mentoring Committee for Whitney Griffin, chair 2017 – present.
TAMU Dept. Horticultural Sciences Mentoring Committee for Andrew King, chair 2017 – present.
TAMU Dept. Horticultural Sciences Administrative Coordinator I search committee, 2019.
TAMU Department of Horticultural Sciences Enology Position Search Committee; member 2018.
TAMU Department of Horticultural Sciences Ad Hoc Accountant Search Committee; member 2017.
TAMU Dept. Horticultural Sciences Advising/Coordinator Search Committee, 2016, chair.
TAMU Department of Horticultural Sciences Nursery/Landscape Lecturer Position Search Committee, 2015.
TAMU Department of Horticultural Sciences Mentoring Committee for Dr. Joseph Masabni on the College Station Campus, 2009 – 2015.
TAMU Department of Horticultural Sciences Mentoring Committee for Dr. Xin Wang at the Dallas Research Station, 2009 – 2015.
Professional association leadership roles 2014 – 2019
Served as Chair of the Board of Directors for the American Society for Horticultural Science in 2015-2016.
Served as President of the American Society for Horticultural Science in 2014-2015.
Served on American Society for Horticultural Science Board of Directors from 2011 to 2016.
Served as a member of the ASHS Hall of Fame Committee, 2015 – present.
Served as a Texas membership representative for ASHS, 2015 – present.
Served as a member of the ASHS Awards Committee, 2014 – present, chair 2019.
Served on the editorial board of the Journal of Environmental Horticulture from 2000- present.
Served as a member of the ASHS Endowment Committee, 2014 – 2016.
Served as a member of the HortIM peer review of teaching and extension instructional materials committee, chair 2013 – 2016.
Served as a member of the ASHS Membership Committee, 2014- 2016.
Served as a member of the ASHS Endowment Committee, 2014 – 2016.
Served as a member of the ASHS Finance Committee, 2014 – 2016.
Served as a member of the SR-ASHS Smeal Senior Leadership/Administration Award Committee, member 2012 – 2014; chair 2014.
Reviewed the ‘Planting’ Chapter of ISA’s revised Principles and Practices of Planting Trees and Shrubs in the Landscape.
Reviewed the new transplant guidelines destine to become the American National Standards in that field.
Reviewed the ANSI Standards for Best Management Practices - Root Management: Inspecting, Pruning and Minimizing Infrastructure Conflicts.

Awards and recognitions 2014 – 2019
TAMU Institute for Sustainable Communities, Fellow 2017-2020.
Co-recipient of the 2016 Vice Chancellor’s Award in Excellence for Team efforts as a part of the Texas Superstar® selection committee.
Carlos A. Avila

Assistant Professor – Vegetable Breeding and Genetics
Texas A&M AgriLife Research and Extension Center
2415 East Hwy 83 Weslaco, TX 78596-8344
Phone: (956) 969-5636

g address:
carlos.avila@ag.tamu.edu

Program Summary
My research program is focused on the development of tomato and spinach cultivars adapted to Texas conditions. Research work includes the characterization of plant a/biotic stress and vegetable quality trait regulation using molecular, physiological, and biochemical approaches to develop applied strategies to improve breeding efficiency and ultimately crop resistance and quality. For this purpose, my research program consists of three major components:

a) An applied breeding component focused on improving phenotyping and breeding efficiency with the use of molecular breeding tools such as marker-assisted selection, high-throughput genotyping/phenotyping, and utilization of exotic germplasm form crop improvement.

b) A molecular biology component focused on the physiological, biochemical, and molecular interactions responsible of resistance, tolerance and vegetable quality characteristics with the objective of improving production efficiency and quality parameters.

c) A production systems component focused on optimization of agronomic practices and manipulation of growing conditions to explode cultivar genetic potential, extend season availability, and to reach market windows opportunities.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>2008</td>
<td>University of Arkansas</td>
<td>Crop, Soil, and Environmental Sciences</td>
</tr>
<tr>
<td>M.S.</td>
<td>2005</td>
<td>University of Arkansas</td>
<td>Crop, Soil, and Environmental Sciences</td>
</tr>
<tr>
<td>B.S.</td>
<td>1999</td>
<td>Zamorano, E.A.P.</td>
<td>Plant Protection</td>
</tr>
<tr>
<td>Associate</td>
<td>1997</td>
<td>Zamorano, E.A.P.</td>
<td>Agronomy</td>
</tr>
</tbody>
</table>

Publications 2015-2019


Avila, C.A.*, T.G. Marconi, Z. Viloria, J. Kurpis, S. del Rio. 2019. Bactericera cockerelli resistance in the wild tomato Solanum habrochatites is polygenic and influenced by the presence of Candidatus Liberibacter solanacearum. *Corresponding Author


Awika, H.O., T.G. Marconi, R. Bedre, K.K. Mandadi, C.A. Avila*. 2019. Minor Alleles are Associated with White Rust (Albugo occidentalis) Susceptibility in Spinach (Spinacia oleracea). *Corresponding Author


Popular Press Articles 2015-2019

Newspapers and local news:


8. 2015. KHID-FM Public Radio in Harlingen. Dec. 11, 2015. KHID broadcasted Valley-wide a 3.5 minutes long segment on my tomato and spinach research work. It aired on hourly newscasts the entire morning, beginning at 6 a.m. thru 11 a.m. It was narrated by Rod Santa Ana, and introduced on newscasts hosted by program director Mario Muñoz.

Vegetable program in public media:


### Scientific Abstracts & reports


15. T. Marconi, S Silva, R Villanueva, **CA Avila.** 2016. *Nesidiocoris tenuis*, a new invasive insect in South Texas tomato fields. Subtropical Agricultural and Environment Society Annual Meeting, Weslaco, TX

Presentations:

International


National


**State**


4. T. Marconi, S Silva, R Villanueva, **CA Avila**. 2016. *Nesidiocoris tenuis*, a new invasive insect in South Texas tomato fields. Subtropical Agricultural and Environment Society Annual Meeting, Weslaco, TX

5. **Avila, C.A.** 2016. Tomato Research Program at Weslaco-Texas: Breeding, Molecular Biology, and production systems. Plant Breeding Circle. College Station, TX. (Invited)


**Local**

1. **C.A. Avila.** 2018. Development of flavorful-high value tomato cultivars adapted to South Texas production systems. Texas A&M AgriLife Research and Extension Center Annual Field Day. Weslaco, TX. December 5th, 2018


4. **CA Avila.** 2017. Vegetable breeding Program. Texas A&M Vegetable Working Group meeting, College Station, TX October 2017

5. **CA Avila, V. Joshi, K. Cochran, D. Leskovar, K. Mandadi.** 2017. Improving Spinach Productivity by Developing Cultivars Adapted for Conventional and Organic production in Texas. Texas A&M Vegetable Working Group meeting, College Station, TX October 2017

6. **CA Avila, K Crosby, V Joshi, S Zapata.** 2017. Integrated approach to improve tomato fruit quality breeding efficiency and protect intellectual property of Texas A&M tomato germplasm. Texas A&M Vegetable Working Group meeting, College Station, TX October 2017


11. **CA Avila.** 2015. Vegetable breeding and molecular biology. Texas A&M AgriLife Research and Extension Center seminar series. Weslaco, TX

13. CA Avila. 2014. Vegetable Breeding and genetics program. Weslaco Texas A&M AgriLife Research, Annual Report meeting. April 2014 Weslaco, TX


Courses Guest-Lectured

Undergraduate:
1. Vegetable Crop Production (Hort 325). Topic: Production of vegetables on protected structures. Fall 2016, 2017, 2018. Texas A&M University, College Station, TX. Course coordinator: Kevin Crosby

2. Plant Breeding (HORT 404). Vegetable breeding program in South Texas. Topic: Vegetable Breeding Program at Weslaco-Texas: Breeding, molecular biology, and production systems. Spring 2018. Texas A&M University, College Station, TX. Course coordinator: Kevin Crosby

Graduate:


Professional Affiliations:


5. American Society of Plant Biologists (ASPB). Rockville, MD (http://www.aspb.org )

6. Member of the USDA Leafy Vegetable Crop Germplasm Committee (LVCGC)

7. Subtropical Agriculture and Environments Society. (http://www.subplantsci.org )

Grants and contracts awarded 2015-2019

Developing genetic and Molecular Resources to Improve Spinach production and management. PD: Ainong Shi (U. of Arkansas), Co-PI: C.A. Avila, J. Correll, B. Mou, L. Stein, R. Hogan, S. Koike, L Du Toit. USDA-NIFA-SCRI (9/1/17 to 8/31/20) Total $2,447,432, Attributable to C.Avila program $354,593


Maximizing tomato quality in multiple Texas regions with protected culture and Texas A&M elite germplasm. Texas Department of Agriculture, J&D Produce. PI: J&D Produce, Co-PI: K. Crosby, C.A. Avila TDA- Specialty Crop Block (10/1/17 to 3/31/19) Total $71,881, Attributable to C.Avila program $32,951

Exploiting positive genotype x environment interactions to produce high quality tomatoes in south and central Texas. PI: J&D produce, Co-PI: K. Crosby, C.A. Avila. TDA- Specialty Crop Block, Co-PI (12/1/16 to 3/31/18) Total $71,397, Attributable to C.Avila program $8,351

Novel Tomato Fruit Firmness Trait: Breeding for Long Shelf Life While Conserving Flavor is Now Possible. PI: C.A. Avila, Co-PI: K. Crosby, V. Joshi. Texas A&M AgriLife (9/1/18 to 8/31/20). Total $50,000, Attributable to C.Avila program $50,000
Spinach grain production as an additional source of income to Texas spinach growers. PI: C.A. Avila, Co-PI: T. Marconi Texas A&M AgriLife (9/1/19 to 8/31/20). Total $30,000, Attributable to C. Avila program $15,000

Cultivar Development for Yield, Quality and Stress Tolerance in Watermelon. PI: S. Malla, Co-PI: C. Avila. Texas A&M AgriLife (9/1/19 to 8/31/20). Total $32,000, Attributable to C. Avila program $6,400

Integrated approach to improve tomato fruit quality breeding efficiency and protect intellectual property of Texas A&M tomato germplasm. PI: C.A. Avila, Co-PI: K. Crosby, V. Joshi, and S. Zapata Texas A&M AgriLife (9/1/17 to 8/31/18). Total $47,500, Attributable to C. Avila program $22,413

Improving Spinach Productivity by Developing Cultivars Adapted for Conventional and Organic production in Texas. PI: C.A. Avila, V. Joshi, Co-PI: K. Cochran, D. Leskovar. Texas A&M AgriLife (11/22/16 to 8/31/18). Total $97,500, Attributable to C. Avila program $45,175

Cultivar Development via Genomic Selection and Identification of QTL for Anthracnose Resistance in Watermelon. PI: S. Malla, Co-PI: K. Crosby, C.A. Avila. Texas A&M AgriLife (11/22/16 to 8/31/18). Total $87,500, Attributable to C. Avila program $20,000

Tomato Grafting: Development and Screening Rootstock Germplasm to Improve Disease Resistance, Yield, and Quality in High Tunnel and Open Field Systems in Texas. PI: Daniel Leskovar, Co-PI: J. Jifon, C.A. Avila, K. Crosby. Texas A&M AgriLife (11/22/16 to 8/31/18). Total $127,500, Attributable to C. Avila program $19,000

Development of a Novel Bioassay System for High-throughput RNAi and Antimicrobial screening to combat insect-vector plant diseases. PI: K.K. Mandadi, Co-PI: C.A. Avila, I. Badillo-Vargas. Texas A&M AgriLife (10/6/16 to 8/31/18). Total $146,250, Attributable to C. Avila program $19,500

Host and Insect-Vector Transcriptome Dynamics Underlying resistance and susceptibility to the Potato Psyllid and its transmitted bacteria in Solanaceous crops. PI: K.K. Mandadi, Co-PI: C.A. Avila, I. Badillo-Vargas. Texas A&M AgriLife. Total $20,000, Attributable to C. Avila program $6,667

Evaluation of resistance factors in response to potato psyllid-Iso disease complex infestation in tomato. PI: C.A. Avila, Co-PI: I. Badillo-Vargas. COSMOCEL (12/5/16 to 8/27/2018). Total $22,000, Attributable to C. Avila program $11,000

Evaluation of Nematron role on plant defensive signaling in tomato PI: J. Enciso, CoPI: C.A. Avila. COSMOCEL (6/23/16 to 4/26/2018). Total $35,000, Attributable to C. Avila program $20,000


Development and evaluation of integrated insect vector mediated disease management strategies using UAS to improve vegetable production in South Texas. PI: J. Landivar, Co-PI: T.G. Marconi, C.A. Avila, I. Badillo-Vargas, J. Jung. Texas A&M AgriLife (9/1/18 to 8/31/19). Total $400,000, Attributable to C. Avila program $55,000

Development and Evaluation of Integrated Insect Vector Disease Management Strategies to Improve Vegetable Production in South Texas. PI: C.A. Avila, Co-PIs: K.K. Mandadi, I. Badillo-Vargas, J. Enciso, J. Jung, O. Alabi Texas A&M AgriLife (1/1/16 to 8/31/17). Total $547,201. Attributable to C. Avila program $190,000

Award to purchase eye tracking and EEG equipment for vegetable willingness to pay and consumer demand work. PI: M. Palma, L. Ribera, Co-PI: C.A. Avila. Texas A&M AgriLife Weslaco. Total $30,000

Developing of SNP markers associated to white rust resistance in spinach. PI: C.A. Avila. Texas A&M AgriLife Weslaco. $6,323

Genomic approaches to enhance drought tolerance traits of potato. PI: K.K. Mandadi, Co-PI: C.A. Avila. Texas A&M AgriLife (4/28/16 to 8/31/17). Total $10,000
Journal Peer Reviewer:
I have been invited to review manuscript submissions for the following international journals:

1. **Hort-Tech.** Journal publishes technical information to help solve problems and deal with current challenges in production, education, and extension in horticultural crops. Peer reviewer since 2019.

2. **HortScience.** Journal publishes horticultural information of interest to a broad array of horticulturists. Its goals are to apprise horticultural scientists and others interested in horticulture of scientific and industry developments and of significant research, education, or extension findings or methods. Peer reviewer since 2017
http://hortsci.ashspublications.org

3. **Journal of the American Society for Horticultural Science.** Publishes papers on the results of original research on horticultural plants and their products or directly related research areas. Its prime function is to communicate mission-oriented, fundamental research to other researchers. Peer reviewer since 2015
http://journal.ashspublications.org

4. **Plant Breeding Journal.** The journal publishes full-length original manuscripts and review articles by internationally recognized scientists, covering all areas of plant breeding, including plant genetics, plant physiology, plant pathology, and plant development. Peer Reviewer since 2015
http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1439-0523

5. **Arthropods-Plant Interaction.** An international journal devoted to studies on interactions of insects, mites, and other arthropods with plants. Peer reviewer since 2012.
( http://www.springer.com/life+sciences/entomology/journal/11829)

6. **Biological Control.** Biological control is an environmentally sound and effective means of reducing or mitigating pests and pest effects through the use of natural enemies. Peer reviewer since 2012
(http://www.journals.elsevier.com/biological-control/)


8. **Plant Physiology & Biochemistry Journal.** An official journal of the Federation of European Societies of Plant Biology (FESPB) and the French Society of Plant Biology (Société Française de Biologie Végétale (SFBV)). Peer reviewer since 2011. (http://www.journals.elsevier.com/plant-physiology-and-biochemistry/)

9. **PLOS One.** An international, peer-reviewed, open-access, online publication. Peer reviewer since 2012
(http://www.plosone.org)

10. **Journal of Insect Science.** An international, open access, peer-reviewed journal publishing papers in all aspects of the biology of insects and other arthropods from the molecular to the ecological, and their agricultural and medical impact. Published online by the University of Wisconsin Libraries. Peer reviewer since 2013
(http://www.insectscience.org)

11. **International Journal of Molecular Sciences.** An open access journal providing an advanced forum for chemistry, molecular physics and molecular biology. Published by MDPI, Basel, Switzerland. Peer reviewer since 2013
(http://www.mdpi.com/journal/ijms)

Professional association leadership roles 2015-2019

1. Served as Chair of the Vegetable Breeding working group from the American Society for Horticultural Sciences for the period 2018-2018.
   a. Organized and moderated workshop during annual meeting on August 3rd,2018 at Washington, DC titled “Opportunities and Challenges for transgenic and gene-editing approaches to vegetable and fruit breeding”. Invited guest speakers included Dr. Jose Falck-Zepeda (IFPRI), Dr. Kranthi Mandadi (Texas A&M AgriLife Research), and Dr. Sebastian Soyk (Cold Spring Harbor Laboratory)
   b. Organized ASHS-Vegetable Breeding Interest annual award of excellence. 2018 recipient Dr. J. Creighton Miller, Texas A&M University

2. Served as Chair-elect of the Vegetable Breeding working group from the American Society for Horticultural Sciences for the period 2016-2017.

3. Served as Secretary of the Vegetable Breeding working group from the American Society for Horticultural Sciences for the period 2015-2016.

4. Served as moderator for the Vegetable Breeding Oral Session during the American Society for Horticultural Science Annual meeting 2016. Atlanta, GA.

http://www.subplantsci.org
Ioana Andreea Botezatu
Assistant Professor and Enology Extension Specialist
Department of Horticultural Sciences

Email address: abotezatu@tamu.edu

Program Summary
My research is directed towards solving wine quality issues associated with hot climate winemaking, such as low TA, high pH, wine color instability and microbiological instability. My interest continues to focus both on chemical as well as on sensory aspects as they relate to wine quality. Texas wine consumer attitudes are also an area of interest. My mission is also to serve the Texas winemaking industry through applied research as well as through developing educational opportunities for current and prospective winemakers.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph. D.</td>
<td>2013</td>
<td>Brock University</td>
<td>Biological Sciences</td>
</tr>
<tr>
<td>M.S.</td>
<td>2001</td>
<td>USAMV Iasi, Romania</td>
<td>Agricultural Management</td>
</tr>
<tr>
<td>B.S</td>
<td>2000</td>
<td>USAMV Iasi, Romania</td>
<td>Horticulture</td>
</tr>
</tbody>
</table>

Professional Experience

2017- present  Assistant Professor and Enology Extension Specialist – Texas A&M University
2015 – 2017    Instructor – Brock University, Canada
2013 – 2015    Post Doctoral Research Fellow – Brock University, Canada

Publications 2014 – 2019

- Botezatu A., Kemp, B. and Pickering, G.J, 2016 “Chemical and Sensory Evaluation of Silicone and Poly-lactic acid Based Remedial Treatments for Elevated Methoxypyrazine Levels in Wine”, Molecules

Conference Proceedings

- Andreea Botezatu (2019) Current applied research in enology at Texas AgriLife (oral presentation) - Proceedings of the Texas Wine and Grape Growers association Annual Conference, Frederickburg, TX
- Andreea Botezatu (2018) Influence of Flash Détente technology on the quality of Black Spanish wines in Texas (keynote speaker), proceedings of the 8th International Conference “Agriculture for Life, Life for Agriculture” University of Agronomy and Veterinary Medicine, Bucharest, Romania
- Andreea Botezatu. (2014). Further investigation into the capacity of plastic polymers to remove alkylmethoxypyrazines from wine. ORF-RE Researchers’ Meeting, Brock University, St. Catharines, Canada
- Gary Pickering, Debbie Inglis, Andreea Botezatu, Ailin Beh, Eric Humes, Ian Brindle, 2014, “New Approaches To Removing Alkyl-Methoxypyrazines From Grape Juice And Wine” (oral presentation), proceedings of the 4th International Conference “Agriculture for Life, Life for Agriculture” University of Agronomy and Veterinary Medicine, Bucharest, Romania

Electronic media/software 2014 – 2019

Updated the Viticulture and Enology AgriLife website (2017)
Created the Texas AgriLife Extension Enology - Texas A&M YouTube channel (2019 – 222 subscribers)
Created the Enology Webinar Series (2018) – 12 webinars posted on YouTube channel
Created the Dr. B Talks Texas Wine Series (2019) – 10 videos posted on YouTube

**Classes Taught 2014-2019**

- Sensory Evaluation of Wines 2015, 2016 Brock University, St. Catharines, Canada
- Winery Equipment and Processing & Winery Design, 2015, 2016 Brock University, St. Catharines, Canada

**Graduate Student Committees**

- 2017 Jay Caddell, MS in HORT
- 2018 Hannah Laird, PhD in Animal Science
- 2018 Anderson Cabral, PhD in Animal Science
- 2018 Carlos Elizondo, MS in HORT
- 2019 Rachael Simpson, MS in HORT
- 2019 Aaron Essary, MS in HORT

**Grants and contracts awarded 2014-2019**

- Improving the productivity and Quality of Texas Grapes and Wines, Texas Department of Agriculture Specialty Crop Block Grant Program, 2019

**Journals for which you review papers 2014-2019**

- Journal of Food Chemistry
- The Journal of Wine Research
Gerald S. Burgner  
Lecturer  
Department of Horticultural Sciences  

Email address:  
gsburgner@tamu.edu  

Program Summary:  
Landscape Design and Construction Program. A teaching program geared toward applied landscape design, installation, and maintenance. Students may study horticulture landscape graphics, fundamental and computer-aided landscape design, landscape construction and maintenance methods, and landscape business operations, including estimating and bidding on landscape projects. The program is designed for the development of comprehensive projects that will enable students to prepare for continuing education in landscape architecture or careers in the green industry.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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<tbody>
<tr>
<td>Ph.D.</td>
<td>2019</td>
<td>Texas A&amp;M University</td>
<td>Horticultural Sciences</td>
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<tr>
<td>M.L.A</td>
<td>1994</td>
<td>Louisiana State University</td>
<td>Landscape Architecture</td>
</tr>
<tr>
<td>B.S.</td>
<td>1991</td>
<td>University of Tennessee</td>
<td>Ornamental Horticulture and Landscape Design</td>
</tr>
</tbody>
</table>

Professional Experience:

2019-present  
Lecturer, Department of Horticultural Sciences - Texas A&M University  

2015-2019  
Greenhouse and Nursery Manager, Department of Horticultural Sciences, Texas A&M University  

2012-2015  
Research and Teaching Assistant, North Carolina State University  

2000-2014  
Founder, Owner, and Operator, FloraBurst Horticultural Specialists  

1999-2000  
Residential Landscape Designer, John G. Love & Associates, P.A.  

1995-1999  
Landscape Designer and Garden Manager, Windy Hills Ranch  

1994-1995  
Garden Manager, Live Oak Gardens Foundation  

1992-1994  
Landscape Consultant and Assistant Outdoor Nursery Supervisor, Louisiana Nursery, Inc.  

Publications 2014-2019:  
Editor reviewed publications 2014-2019  


Classes Taught 2014-2019:

Undergraduate courses  

Horticulture 332, Horticulture Landscape Graphics. Graphic representation of landscape design; demonstrations of technique; examination of drawing examples and drawing production; basic hand graphics techniques for visual-thinking and presentation-quality landscape drawings.  

Horticulture 309, Interior Plants. Identification, selection and maintenance of interior foliage plants; emphasis on design solutions for commercial and private facilities.  

Horticulture 360, Landscapes of Sustainable Built Environments. Construction and maintenance considerations for landscapes in urban sustainable environments, specifically green roofs, bioretention cells, rain gardens, and living walls; how to maximize benefits of each system, current trends in regulatory and permitting processes of green infrastructure, and the development of industry-wide guidelines versus standards.
Horticulture 425, *Landscape Maintenance and Construction*. Principles and practices of grading, drainage and construction of residential and small commercial landscapes; cost and bid estimation; soil preparation; transplanting operations; control of landscape diseases and pests; maintenance of landscape areas.

Horticulture 432, *Horticulture Landscape Design*. Application of the principles and elements of design to planning and developing both exterior residential landscape designs and interior commercial designs.

Horticulture 435, *Urban Horticulture*. Introduction to urban horticulture and its role in community development and well-being; emphasis on career opportunities and the roles of the urban horticulture programmer.

Horticulture 442, *Horticulture Landscape Design II*. Computer-aided-drafting (CAD) to produce site layout, grading and planting plans, and construction details for small-scale landscape design; advanced design principles and practices in their historical context, including design and drafting of hardscape details, manipulation of earth forms, ecological urban park design to traditional garden design.

Horticulture 460, *Landscape Estimating, Bidding, and Operations*. Landscape estimating, bidding and sales processes; business structures, insurance and bonding requirements and business management; overhead costing structures and management; case study involves bidding from a set of landscape plans and specifications.

**Journals for which you reviewed papers 2014-2019**

*Landscape Journal*

**Internal university/agency service on committees 2014-2019**

2019-present, Horticulture Club faculty advisor
David Hawkins Byrne  
Professor, Basye Endowed Chair in Rose Genetics  
Department of Horticultural Sciences  

Email address:  
dbyrne@tamu.edu  

Program Summary:  

*Develop peach, nectarine, and rose varieties adapted to a humid, mild winter climate.*  

The peach breeding program is focused on the final evaluations of the advanced selections in the program and releasing new cultivars including additional cultivars for the existing peach (White Delight, Fire Zest, Royal Zest, Golden Zest, Flat Delight) and nectarine (Smooth Texan, Smooth Delight, Smooth Zest) series and a new series of low acid yellow fleshed peaches (Royal Delight). Thus far the program has released 22 medium and low chill peach and nectarine cultivars and plans to release another dozen before terminating the project. FlexQTL is being used to discover QTLs and marker associations for a range of traits (ripe date, bloom date, fruit quality) in peach.

The rose breeding project is a long-range project that involves yearly cycles of evaluation and hybridization, phenotypic recurrent selection with the incorporation of genomic tools to accelerate trait introgression and genetic gain. The thrust of the applied plant improvement work is breeding garden roses for adaptation: high continuous flower production, disease (black spot, rose rosette, cercospora, powdery mildew) resistance, heat tolerance, compact plant form, thornlessness and a range of colors and flower forms. In addition, a strong effort is made to collect useful plant material from throughout the world.

With roses the breeding is done independently at the diploid and tetraploid levels. On the diploid level the excellent sources of black spot and RRD resistance derived from once blooming species are introgressed into the disease susceptible everblooming germplasm to develop recurrent blooming black spot resistant genotypes with the best possible bush type and flower characteristics. On the tetraploid level, black spot, cercospora and RRD resistant types are crossed with genotypes with superior bush and flower characteristics. The third breeding program is the diploid to tetraploid introgression. This is to incorporate the generally superior disease resistance from the diploid species into the tetraploid germplasm which has superior horticultural and flower characteristics. This is done via direct crosses and/or by doubling the chromosomes of the diploid selections before crossing into the tetraploid germplasm. Research is focused on the heritability and QTL analysis of major rose traits such as disease resistance (black spot, cercospora, rose rosette resistance), heat tolerance, flower productivity, prickles and plant architecture. Effort is being made to calculate breeding values of the germplasm incorporating both molecular and phenotypic data. Genomic tools (MAS, GWAS, GS) are currently being incorporated into the general breeding program.

Academic background:  

B.S. Plant Science Cook College, Rutgers University, 1971-1975.  
Ph.D. Dept. of Plant Breeding and Biometry, Cornell University, 1975-1980.

Professional experience:  

Professor, 1997-present. Department of Horticultural Sciences, TAMU.  
Robert E. Basye Endowed Chair in Rose Genetics. 2004 - present  
Associate Head for Research and Graduate Studies, Department of Horticultural Studies. 2007 – 2012.  
Fulbright Scholar, August 2004 – February 2005. Fruit and Ornamental Breeding at the Universidade Federal de Pelotas and EMBRAPA, Pelotas, RS, Brazil.  
Adjunct Professor, Department of Horticulture, Kasetsart University, Thailand. July, 2007.  
Honorary Scientist of the Zhengzhou Fruit Research Institute, Peach Breeding and Germplasm, Zhengzhou, Henan, People’s Republic of China
**Associate Professor**, 1989-1997. Department of Horticultural Sciences, TAMU.

**Assistant Professor**, March 1983-1989. Department of Horticultural Sciences, TAMU.


**Publications 2014-2019**

**Referred publications**


**Conference proceedings**


Classes taught


Guest Lectures

HORT 404: Plant Breeding, teach one session on fruit and/or rose breeding (2015, 2016, 2018).

HORT 489: Science of Food for Health, Development of fruit cultivars that have enhanced health properties (2014)

Graduate student committees


**Grants and contracts awarded**


**National Clean Plant Network.** NCPNR, meetings and virus screening.

- 2013-2014, $28,000
- 2014-2015, $69,370
- 2015-2016, $69,369
- 2016-2017, $156,549 (Byrne, $88,496)
- 2017-2018, $263,062 (Byrne, $84,325)
- 2018-2019, $344,557 (Byrne, $109,839)

**American Rose Society.** 2013-2014. Developing the tools to develop sustainable roses. Funded. $13,458.60

**Contracts with fruit nurseries** to test/commercialize new peach/nectarine cultivars. 2014-2019. ~$20,000/year.

**Journal for which review papers**

HortScience
Journal of the American Society of Horticultural Sciences
HortTechnology
Journal of the American Pomological Society
Acta Horticultuarae
Scientia Horticultuarae
Euphytica
Tree Genetic and Genomics
Crop Breeding and Applied Biotechnology
Journal of the Botanical Research Institute of Texas
Luis Cisneros-Zevallos, Ph.D.
Professor, Department of Horticultural Sciences
Food Science Graduate Program
Molecular and Environmental Plant Sciences Program
Director – Plant Bioactives & Bioprocessing Research Lab

Email address: lcisnero@tamu.edu

Program Summary:
Teaching responsibilities include undergraduate and graduate courses in the areas of food processing (HORT 450 – Processing Coffee) and postharvest handling of perishable produce (HORT 630 – Postharvest). Research responsibilities include leading a basic and applied research program focused on functional foods and postharvest biology and technology of fruits and vegetables. The specific research lines include a) studies in drug discovery of active compounds from plants and their molecular mechanism of action and targets at the cellular level, b) studies on secondary metabolism in plants as a result of abiotic stress signaling mechanisms and c) studies on the identification and characterization of surface factors involved in microbial – plant interactions that determine adhesions and thus influence contamination and decontamination processes. We have a strong international program in our group, with several collaborators in centers of plant biodiversity. We use a broad approach multidisciplinary in nature which allows us to conduct fundamental research and be pragmatic at the same time.

Academic Background:
Ph. D.  Food Science. Department of Food Science and Technology, University of California at Davis, 1998.
M. S.  Food Science. Department of Food Science and Technology, University of California at Davis, 1995.
Engineer and B. S., Food Industries Engineering, National Agrarian University – La Molina, Lima, Peru, 1988

Professional Experience:
2016 – present  Department of Horticultural Sciences, Texas A&M University, College Station. Professor
2005-2016  Department of Horticultural Sciences, Texas A&M University, College Station. Associate Professor.
1998-2005  Department of Horticultural Sciences, Texas A&M University, College Station. Assistant Professor.
1992-1998  Department of Food Science and Technology, University of California, Davis. Research Assistant, teaching assistant.

Publications 2014-2019

Referred publications
Underlined authors indicate graduate student advised as chair or committee member


Nair V, Bang WY, Schreckinger E, Andarwulan N and Cisneros-Zevallos L. 2015. The protective role of Ternatin Anthocyanins and Quercetin Glycosides from Butterfly Pea (Clitoria ternatea Leguminosae) Blue flower Petals against LPS-induced inflammation in Macrophage Cells. Journal of agricultural and food chemistry 63 (28), 6355-6365


Jun Kyun Oh, Nandita Kohli, Yuanzhong Zhang, Younjin Min, Arul Jayaraman, Luis Cisneros-Zevallos and Mustafa Akbulut. 2016. Nanoporous aerogel as a bacteria repelling hygienic material for healthcare environment. Nanotechnology 27 (8), 085705

Ambriz-Perez, Dulce; Bang, Woo Young; Nair, Vimal; Angulo Escalante, Miguel; Cisneros-Zevallos, Luis; Heredia, J. Basilio. 2016. Protective role of flavonoids and lipophilic compounds from Jatropha platyphylla on the suppression of Lipopolysaccharide (LPS)-induced inflammation in macrophage cells. Journal of agricultural and food chemistry 64 (9), 1899-1909

Leyva-Lopez, Nayely; Nair, Vimal; Bang, Woo Young; Cisneros-Zevallos, Luis; Heredia, J. Basilio. 2016. Protective role of terpenes and polyphenols from three species of Oregano (Lippia graveolens, Lippia palmeri and Hedeoma patens)
on the suppression of Lipopolysaccharide (LPS)-induced inflammation in macrophage cells. Journal of ethnopharmacology 187, 302-312


Jun Kyun Oh, William Rapisand, Ming Zhang, Yagmur Yegin, Younjin Min, Alejandro Castillo, Luis Cisneros-Zevallos, Mustafa Akbulut. 2016. Surface modification of food processing and handling gloves for enhanced food safety and hygiene. Journal of Food Engineering 187, 82-91


Leandro Camargo Neves, André José de Campos, Ronan Carlos Colombo, Sergio Ruffo Roberto, Luis Cisneros-Zevallos. 2017. Days after anthesis and postharvest behavior define maturity, harvesting time and nutraceutical content of camu-camu fruit. Scientia Horticulturae, accepted


Book chapters (Total of 3)


**Non Peer-, Editor-Reviewed Articles (Total of 3)**


**Inventions/ Patents (submitted)**


**Presentations/invited speaker**

(53 presentations from 2014-2018) in the US and internationally including: US, El Salvador, Italy, Mexico, Spain, Portugal, Mauritius Island, Argentina, Turkey, Israel, Indonesia, Finland, Germany, Peru, Ecuador, Brazil, Colombia, Chile, Nicaragua, Thailand, China, Canada, Guatemala, Bolivia.

**Local and National presentations (2014-2018, 10 presentations)**

**Beltsville, Maryland.** October 29-30. 2014. Presentation on research progress and annual report on the LABEX-USDA-TAMU agreement (contact person: Dr Lazarini, Dr Elesbao Alves).

**Davis, California, UC Davis.** September 2015. Speaker at the international meeting of the ISHS to give a talk on wounding signalling mechanisms of fresh cut produce (contact person: Dr. Marita Cantwell).

**TAMU,** April 2015. Department of Horticultural Sciences. Seminar on strategies and international impact in Horticulture (contact person: Dr. Fred Davies).

**TAMU, May 2015.** Grand Challenges Mini-Symposium: Food Waste (contact person: Dr Alan Sams)
San Marcos, Texas Pecan Grower Association, July, 2016. Invited speaker at the TPGA 95th Annual conference and Trade Show. (contact person: Cindy Wise and Mike Adams)
TAMU, College of Agriculture and Life Sciences, May, 2016. Invited speaker in the Grand Challenges mini-symposium on Coffee Center (contact person: Dr Leonardo Lombardini)

**Frisco, Dallas, Texas Pecan Grower Association,** July 11, 2017. Invited speaker at the TPGA 96th Annual conference and Trade Show. (contact person: Cindy Wise and Mike Adams)

**Raleigh, North Carolina,** June 11-14, 2018. Invited speaker to give a seminar on postharvest technology at North Carolina State University organized by the College of Agriculture (contact person: Jose Cisneros).
San Marcos, Texas Pecan Grower Association, July 15, 2018. Invited to meet with the TPGA board members in the 96th Annual conference and Trade Show. (contact person: Cindy Wise and Rodney Myers)

Palos Verdes - Los Angeles, California, July 17 – 20, 2018. Invited speaker at the annual NBJ summit for Functional Foods and dietary supplements (contact Person Andrew Pittz).

**International presentations (2014- 2018, 43 presentations)**

**Valencia, Spain.** April 7, 2014. Invited speaker at the Universidad Politecnica de Valencia, Department of Food Science and Technology (contact person: Dr Jose Barat).

**Cartagena, Spain.** April 9, 2014. Invited speaker at the international short course in Postharvest Technology sponsored by the Universidad Politecnica de Cartagena (contact person: Dr. Francisco Artes).

**Cartagena, Spain.** April 10, 2014. Invited speaker at the international seminar on future trends on Postharvest Technology sponsored by the Universidad Politecnica de Cartagena (contact person: Dr. Francisco Artes).

**Monterrey, Mexico.** June 11-14, 2014. Invited speaker at the international conference of Functional Foods sponsored by the Tecnologico de Monterrey (contact person: Dr. Sergio Serna, Dr. Gustavo Gonzalez Aguilar).

**Bogota, Colombia.** July 28-August 2, 2014. Invited speaker at a short course in food processing and added value sponsored by the Universidad Nacional de Colombia (contact person: Dr. Coralia Osorio).

**Manizales, Colombia.** July 31, 2014. Invited speaker at a seminar on future trends on fruit and vegetable processing sponsored by the Universidad Nacional de Colombia (contact person: Dr. Coralia Osorio).

**Cuiaba, Mato Grosso, Brazil.** August 24-27, 2014. Invited speaker in the National Conference of Fruticulture sponsored by the XXIII Congresso Brasileiro de Fruticultura (contact person: Dr. João Pedro Valente).

**Quito, Ecuador.** October 9-11, 2014. (2 presentations). Invited speaker at the XVII CONGRESO DE FEFAS y III CONGRESO DEL COLEGIO QF-BF.P., sponsored by the Colegio de Químicos Farmacéuticos y Bioquímicos Farmacéuticos de Pichincha (contact person: Dr. Yolanda Zapata Bustamante).

**Puerto Vallarta, Mexico.** November 5-8, 2014. Invited speaker at the National Congress of Microbiology sponsored by the Universidad de Guadalajara (contact person: Dr. Luz Garay).

**Lima, Peru,** 2015. Invited speaker to give a seminar on functional foods sponsored by the University of San Ignacio de Loyola (contact person: Dr Fausto Cisneros).

**Cartagena, Spain.** April, 2015. Invited speaker at the short course in Postharvest Technology sponsored by the Universidad Politecnica de Cartagena (contact person: Dr. Francisco Artes).

**Cartagena, Spain.** April 10. To participate as invited speaker in the international seminar on future trends on Postharvest Technology sponsored by the Universidad Politecnica de Cartagena (contact person: Dr. Francisco Artes).

**Medellin, Colombia.** August 12-14, 2015. Invited speaker at a seminar on Biofactories sponsored by the Universidad Nacional de Colombia (contact person: Dr. Adriana Ruiz Colorado).

**Huanuco, Peru,** 2015, November, To participate as invited speaker in the National Congress of Entomology of Peru sponsored by the Entomological Society of Peru (contact person: Ing. Benjamin Rey).

**Irapuato, Mexico.** 2015 November 11-14. To participate as invited speaker in the international Agricultural Expo of Irapuato sponsored by CINVESTAD (contact person: Dr. Edmundo Lozoya).

**Hermosillo, Mexico.** February, 2016. Invited speaker at the international conference of Functional Foods sponsored by the CIAD Hermosillo (contact person: Dr. Gustavo Gonzalez Aguilar).

Bogota, Colombia. April, 2016. Invited speaker at the National Congress in Natural products sponsored by the Universidad Nacional de Colombia (contact person: Dr. Barbara Moreno Murillo).
**Cartagena, Spain.** June, 2016. To participate as invited speaker at the short course in Postharvest Technology sponsored by the Universidad Politecnica de Cartagena (contact person: Dr. Francisco Artes).

**Cartagena, Spain.** June, 2016. To participate as invited speaker at the International meeting on postharvest organized by the ISHS and the Universidad Politecnica de Cartagena (contact person: Dr. Francisco Artes).

**Bogota, Colombia.** July 2016. Invited speaker at a short course in functional foods and bioactives sponsored by the Universidad Nacional de Colombia (contact person: Dr. Coralia Osorio).

**Rimini, Italy.** September, 2016. To participate as invited speaker at the international European short course in Postharvest Technology for fresh-cut products sponsored by the University of Foggia (contact person: Dr. Giancarlo Colleli).

**Santa fe, Argentina.** September, 2016. Invited speaker at Horticultural Conference sponsored by the Universidad Nacional del Litoral covering the topic of plant biofactories (contact person: Dr. Mariel Pirovani).

**Trujillo, Peru.** October, 2016. Invited speaker to give a seminar on postharvest technology and on functional foods in the annual short course sponsored by the Association of Agroexporters of the CHAVIMOCHIC irrigation (contact person: Eng Victor Soto).

**Nanjing, China.** October, 2016. Invited speaker to give a seminar on abiotic stresses and secondary metabolism sponsored by the Nanjing Agroecological University (contact person: Dr. Yonghua Zheng).

**Sevilla, Spain.** February 18 – 23, 2017. Invited as committee member of Dissertation defense of Julio Nogales Bueno and to give a seminar by the University of Sevilla (contact person Dr. Francisco J. Heredia).

**Torre-Pacheco, Spain.** March 28-31, 2017. To participate as invited speaker at the “Jornadas Técnicas de la Feria Agrícola del Mediterráneo” sponsored by FAMENOWA 2017 (contact person: Dr. Francisco Artes).

**Cartagena, Spain.** April 1 – 6, 2017. To participate as invited speaker at the short course in Postharvest Technology sponsored by the Universidad Politecnica de Cartagena (contact person: Dr. Francisco Artes).


**Medellin, Colombia.** July 31 – August 3, 2017. Visited ColCafe and gave a seminar for potential collaboration (contact person: Monica Quitero).

**Cartagena de Indias, Colombia.** September 27 - 30, 2017. Invited speaker at the National Congress in Natural products sponsored by the Colombian Chemical Sciences Society (contact person: Dr. Coralia Osorio).

**Trujillo, Peru.** October 17 - 22, 2017. Invited speaker to give a seminar on postharvest technology in the annual short course sponsored by the Association of Agroexporters of the CHAVIMOCHIC irrigation (contact person: Eng Victor Soto).

**Concordia, Argentina.** October 24 – 28, 2017. Invited speaker at the National Horticultural Conference of Argentina sponsored by the Universidad Nacional de Entre Rios covering the topic of abiotic stresses and plants (contact person: Dr. Daniel Chavez).

**Guadalajara, Mexico.** November 12-15, 2017. Invited to give a seminar at the Tecnologico de Monterrey-Guadalajara (contact person: Dr. Daniel Jacobo-Velazquez).

**Santiago, Chile.** November 18 – December 2, 2017. To participate as invited speaker at the Iberomerican Conference on Postharvest of Fresh produce sponsored by the University of Chile (contact person: Dr. Victor Escalona).

**Cartagena, Spain.** March 12 – 15, 2018. To participate as invited speaker at the short course in Postharvest Technology and to give a talk in an international seminar sponsored by the Universidad Politecnica de Cartagena (contact person: Dr. Francisco Artes).

**Rimini, Foggia, Italy.** May 7-11, 2018. To participate as invited speaker at the international European short course in Postharvest Technology for fresh-cut products in Rimini sponsored by the University of Foggia and to give a seminar in Foggia in Dr Colleli’s research group (contact person: Dr. Giancarlo Colleli).
Cali, Colombia. May 15 - 19, 2018. Invited speaker at the National Congress in Natural products sponsored by the Colombian Chemical Sciences Society (contact person: Dr. Coralia Osorio).

Ica, Peru, June 18 - 19, 2018. Invited speaker to give two seminar on postharvest technology in the annual conference organized by the RedAgricola from Chile (contact person: Patricio).

Mazatlan, Mexico, June 20 – 22, 2018. To participate as invited speaker in the third International Congress on Functional Foods (contact person: Dr. Gustavo Gonzalez Aguilar).

Santa Cruz, Bolivia. July 23 – 25, 2018. Visited the Association of Exporters from Bolivia and gave a seminar for potential collaboration and one seminar at the Universidad de Santa Cruz (contact person: Dr Luis Rivera, TAMU).

Trujillo, Peru, August 8 – 9, 2018. Invited speaker to give two seminars on nanotechnology in postharvest and functional foods in the annual conference organized by the RedAgricola from Chile (contact person: Patricio).

Trujillo, Peru, October 17 - 19, 2018. Invited speaker to give a seminar on postharvest technology in the annual short course sponsored by the Association of Agroexporters of the CHAVIMOCCH irrigation (contact person: Eng Victor Soto).

Porto, Portugal. October 10 - 12, 2018. To participate as invited speaker at the international European short course in Postharvest Technology for fresh-cut products sponsored by the University of Foggia (contact person: Dr. Giancarlo Colletti).

Number of citations from 2014-2019.
In general Dr Cisneros has >160 publications in scientific journal articles and book chapters with > 10700 citations. Citations for the period 2014 – 2019 is > 6,700. ([https://scholar.google.com/citations?user=TTUcRFoAAAAJ&hl=en](https://scholar.google.com/citations?user=TTUcRFoAAAAJ&hl=en)),

RESEARCH GRANTS AND CONTRACTS (2014-2018)
My research group received funds and grants from State and Federal agencies, industry and international agencies for approximately $763,256. Brought a total of $950,000 in collaborative work.

**$26,000** 2014. LABEX-USDA. Screening of native crops from Brasil for anti-inflammatory properties.


**$30,000** 2014. TAMU-Conacyt. Proposal on abiotic stress as a non-GMO approach for nutraceutical enhancement in plants and favor Mexican-US trade (PI).

**$50,000** 2015. CAPES-TAMU program. Proposal on promoting Brasilian crops in alternative high value Health markets, (PI).

**$20,000** 2015. Pecan Grower Association. Screening of pecan nuts for anti-inflammatory properties.


**$10,000** 2015. Juicero Co. from California. Gift funds.

**$110,000** 2016. TDA-Texas Pecan Board (Myers, Palm, Lombardini, Cisneros-Zevallos) Proposal on promoting pecans through a science based marketing strategy.

**$30,000** 2016. LEIO Corporation, Dallas (Cisneros-Zevallos). Gift funds.


**$20,000** 2017. Colafe, Colombia (Cisneros-Zevallos).

**$ 7,000** 2017. TDA-supplement (Cisneros-Zevallos) Proposal on promoting pecans through a science based marketing strategy.

**$4,500** 2017. Sawmill Hollow Family Farm, Iowa (Cisneros-Zevallos). Funds for aronia berry research

**$4,500** 2017. Sabinsa, NJ (Cisneros-Zevallos). Funds for herbal extract research

**$158,321** 2018. USDA-awarded December 2018, (Cisneros-Zevallos). Proposal title: Bacteria Super-Repellent and Water-efficient, Self-Cleaning Surfaces for Vegetable Washing, Grading, and Packing Machinery and Equipment (Total amount awarded ~$950,000; Scholar, Cisneros-Zevallos, Masabni, Castillo and Taylor),
Kevin Michael Crosby
Professor
Department of Horticultural Sciences

Email address:
k-crosby@tamu.edu

Program Summary
Phenotypic and molecular characterization of genes involved in regulation of elevated ascorbic acid, carotenoids and flavonoids in pepper, melon, and tomato germplasm. Identification and utilization of genes conditioning resistance to vine decline pathogens, mildews and viruses in melons. Development of novel varieties of melons, tomatoes and peppers with resistance to south Texas diseases and enhanced levels of beneficial phytochemicals. Molecular mapping of important melon, pepper and tomato genes and marker-assisted selection.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>1999</td>
<td>Texas A&amp;M</td>
<td>Plant Breeding</td>
</tr>
<tr>
<td>M.S.</td>
<td>1993</td>
<td>University of Hawaii, Manoa</td>
<td>Horticulture</td>
</tr>
<tr>
<td>B.S.</td>
<td>1991</td>
<td>Texas A&amp;M</td>
<td>Horticulture</td>
</tr>
</tbody>
</table>

Professional Experience

1999-2005 Assistant Professor, Texas A&M AgriLife Research, Weslaco
2005-2008 Associate Professor, Texas A&M AgriLife Research, Weslaco
2008-2013 Associate Professor, Texas A&M, Horticultural Sciences
2013-2015 Associate Professor with tenure, Texas A&M, Horticultural Sciences
2016-present Professor with tenure, Texas A&M, Horticultural Sciences

Referred Publications 2014-2019


Presentations


**Graduate Students (Chair)**
Sixto Marquez, Ph.D. Melon disease resistance genes, in progress.
Jorge Reyes Lucero, M.S. Pepper virus resistance genetics, in progress.
Hee-Jeong Lee, M.S. Pepper genetics, in progress.
Ji Sun Lee- Ph.D. Tomato volatiles and phytochemicals, 2019.
Ashlynn Fix- M.S. Melon genetics of fruit quality, 2019.
Naining Chi- M.S. Tomato heat tolerance traits, 2017.
Limeng Xie- M.S. Tomato root genetics, 2016.
Sat Pal Sharma- Ph.D. currently working on melon GxE effects on beta-carotene, 2014.

**Classes Taught 2014-2019**
- Undergraduate: Plant Breeding: 2014, 2016, 2018

**Grantsmanship**

<table>
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<tr>
<th>Role</th>
<th>2014-2019</th>
<th>Awarded (submitted)</th>
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<td>PI</td>
<td>$345,343</td>
<td>26(34)</td>
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<tr>
<td>Co-PI</td>
<td>$617,637</td>
<td>18(38)</td>
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<td>Gifts</td>
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<td>-</td>
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<tr>
<td>Royalties</td>
<td>$106,000</td>
<td>-</td>
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<td><strong>Total</strong></td>
<td><strong>$1,090,980</strong></td>
<td><strong>44(72)</strong></td>
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</table>

**Academic Awards**
AgriLife Director’s Award- Vegetable research team award (2019)

**Professional Societies**
American Society for Horticultural Science 2000-2019
South African Society of Horticultural Science 2013-2019

**Journals for which you review papers**
Journal of American Society for Horticultural Science
HortScience
Hort Technology
Crop Protection
Plant Breeding
Theoretical and Applied Genetics
Journal of Agricultural and Food Chemistry
Euphytica
Journal of Horticultural Science and Biotechnology
Scientia Horticulturae
Cucurbit Genetics Cooperative
Tim D. Davis
Professor and Regional Director-Asia, Borlaug Institute
Department of Horticultural Sciences
Borlaug Institute of International Agriculture &
Development

Email address:
t-davis5@tamu.edu

Program Summary
Dr. Davis’ current primary responsibility includes serving as
Regional Director for Asia for the Borlaug Institute of
International Agriculture at Texas A&M (approximately
80% FTE). He also teaches HORT 281 – Horticulture as a
Profession. His research background is in adventitious root
formation and plant growth regulation. He was named a
Fellow of the American Society for Horticultural Science in
2006. He served as Department Head from 2003-2011.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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</thead>
<tbody>
<tr>
<td>Ph. D.</td>
<td>1983</td>
<td>Oregon State University</td>
<td>Horticulture/Plant Physiology</td>
</tr>
<tr>
<td>M. S.</td>
<td>1980</td>
<td>Oregon State University</td>
<td>Horticulture/Plant Physiology</td>
</tr>
<tr>
<td>B. S.</td>
<td>1977</td>
<td>Brigham Young University</td>
<td>Horticulture</td>
</tr>
</tbody>
</table>

Professional Experience:

2011-present  Professor of Horticultural Sciences and Regional Director-Asia, Texas A&M University
2003-2011  Professor and Head, Department of Horticultural Sciences, Texas A&M University
1996-2005  Resident Director and Professor, Texas A&M Research & Extension Center, Dallas
1989-1995  Associate Professor, Texas A&M Research & Extension Center, Dallas
1987-1989  Associate Professor of Horticulture – Brigham Young University
1982-1987  Assistant Professor of Horticulture – Brigham Young University

Referred Publications 2014-2019
horticulture graduate programs: Demographics, policies, finances, and metrics. HortTechnology 24: 241-251.
Gehlot, H.S., N. Tak, H.R. Dagla, and T.D Davis. 2014. Indigenous and modern scientific strategies for characterization,
Superstar Program—Using technology to promote the use of well-adapted plants for landscapes in high temperature
regions with limited water resources. J. Arid Land Studies 24(1): 209-211.
clones (Plectranthus amboinicus{Lour.} Spreng.) based on phenotypic characteristics and phenolic content. Amer. J.
Plant Sci. 5: 3673-3683.
HortScience 52: 1141-1144.
extension capacity for improved fodder and forage production in arid and semi-arid Afghanistan. J. Arid Land Studies
28: (in press).

Classes taught (2014-2019)

Undergraduate courses
Horticulture 281, *Horticulture as a Profession*. A course taken primarily by students entering the horticulture major. The focus of the course is on helping the students begin their exploration of horticulture as a career option. Students also begin the development of their eportfolio as one of the writing assignments.

Graduate courses
Horticulture 689, *Global Horticulture and Human Nutrition to Enhance Community Resilience and Food Security*. An online course developed jointly by faculty members at Texas A&M, University of Arkansas, and Texas Tech as part of a USDA Higher Education Challenge Grant. Specifically, Leo Lombardini and I contributed a module on “The Nexus of Horticulture, Human Nutrition, and Agricultural Development.”

Grants and contracts awarded 2014-2019 (Texas A&M PI)
“Afghanistan Agricultural Research and Education Project,” $180,000, USAID-Afghanistan, 2013-2014
“Southeast Asia Regional Codex Training in Indonesia,” $150,000, USDA/FAS, 2014.
“AFANSA Timor Leste Project,” $734,000, USAID, 2015-2017
“China SCERP Exchange Program,” $59,000, USDA FAS, 2015
“Bangladesh LPIN Livestock Improvement Project,” $175,000, USAID, 2015-2016
“Graduate Education at the Nexus of Global Horticulture and Human Nutrition to Enhance Community Resilience and Food Security,” $250,000, USDA-NIFA, Higher Education Challenge Grant, 2017-2019
“Afghanistan Agriculture Value Chain—Livestock Project,” $3.3 million, USAID (subcontract to DAI), 2018-2022 (years 4-5 optional)
“Afghanistan Agriculture Value Chain—High Value Crops Project,” $1.9 million, USAID (subcontract to DAI), 2018-2022 (years 4-5 optional)
“Afghanistan Promote Scholarship Endowment Project,” $12.5 million, USAID, 2018-2022

Journals for which you reviewed papers 2014-2019
*HortScience*
*HortTechnology*
*Journal of Arid Land Studies*
*3 Biotech*

Internal university / agency service on committees 2014 – 2019
Member, College of Agriculture and Life Sciences Peer Review Committee, 2015-16
Chair, College of Agriculture and Life Sciences Peer Review Committee, 2016-2017

Professional association leadership roles 2014-2019
Member, International Advisory Committee, ICAL 2 Conference, Samarkand, Uzbekistan, 2014
President, Southern Region, American Society for Horticultural Science, 2017-2018
Member, Scientific Committee, International Conference on Water Management in Arid and Semi-Arid Land, Irbid, Jordan, October 2017

Member, International Desert Council, 2017-18

Chair, External Review Team, College of Food and Agriculture, United Arab Emirates University, Al Ain, 2017

Awards and recognitions 2014-2019
Vice Chancellor’s Award in Excellence, Team Award, 2016 (Texas Superstar Selection Team, Texas A&M AgriLife)
Program Summary
Earth-Kind® Environmental Landscape Management

Critical Issues Addressed
There is general agreement that the four greatest environmental concerns regarding American landscapes are that many homeowners are: (1) wasting irrigation water, (2) misusing fertilizers, (3) misusing pesticides, and (4) allowing tree leaves and wood chips to become an increasing burden in our already overcrowded landfills.

Earth-Kind Goal
For Americans to enjoy beautiful, productive landscapes that require only minimal maintenance while providing maximum protection for the environment.

Actions Taken
To address these issues, I first developed the overall Earth-Kind® Environmental Landscape Management System, then I created and serve as the National Coordinator for the Earth-Kind Rose Program. We have launched three national programs: two Extension programs, one on Earth-Kind Roses, the other on Earth-Kind Environmental Soil Management, and the American Rose Trials for Sustainability (A.R.T.S.).

Soils, climate, and pest problems vary widely, so the more localized the study, the stronger will be the Extension recommendations based on that trialing effort. Thus a network of environmental trials, testing the same plant germplasm, is by far the strongest approach. So our team created a national network of 52 total sites (30 in Texas, plus 22 in 13 other states ranging from Vermont to Utah, Minnesota to California) of randomized, replicated environmental plant trials to identify the best adapted landscape plants across many different plant types.

In conjunction with Larry Pierce and Paula Butler, Extension Regional Program Leaders, I recently launched a new educational initiative, entitled Earth-Kind® Living, which unites all three major programmatic branches of A&M AgriLife Extension (Agriculture and Natural Resources, Family and Community Health, and 4-H) in a very compelling and timely science-based environmental program that has already received national recognition.

Program Impacts
Results from multi-year Earth-Kind research studies on roses, perennials, and crape myrtles showed outstanding landscape performance with minimal maintenance, 95% estimated reduction in irrigation, 100% reduction in fertilizers, 100% reduction in pesticides on the plants, and that a mulch of recycled yard debris serves as a super-slow-release fertilizer the large-scale use of which would significantly reduce pressure on our landfills.

Based on these remarkable findings, we estimate that widespread adoption of Earth-Kind principles over a recent five-year period in just the city of Dallas would have conserved 27.5 Billion gallons of water, eliminated 3.05 Million potentially-harmful fertilizer applications, and eliminated 2.86 Million potentially-harmful pesticide applications. If adopted all across Texas, the environmental benefits would be enormous. Such high-impact results provide extraordinary water conservation and truly outstanding protection for air and water quality.
Adoption of Earth-Kind by Key Stakeholders: Shelley Gaskins, curator of the Katherine Dulin Folger Rose Garden which is adjacent to the Smithsonian Castle in Washington, D.C., will be installing a randomized, replicated Earth-Kind field trial on dwarf roses at the Smithsonian Gardens Greenhouse Complex in the Spring of 2020. MD Anderson Cancer Center has adopted Earth-Kind landscape management across its entire campus. Earth-Kind has been adopted or supported by Oklahoma State University Cooperative Extension, Iowa State University Extension; the cities of Oklahoma City, Oklahoma, Helena, Alabama, and Portland, Maine; Allen, Texas, Prosper, Texas; as well as Collin, Rockwall, and Midland Counties in Texas.

Our work has been favorably reported on in The New York Times.com (three times), London Financial Times.com (twice), ABC News.com, MSNBC.com, Martha Stewart Living Radio Network (estimated audience: 17 million), Reader's Digest, and Christian Science Monitor. The Associated Press has released a nationwide article devoted exclusively to Earth-Kind Roses. A two-page article highlighting our Earth-Kind® Rose Trialing Program was published by the World Federation of Rose Societies and sent to Federation members in 39 countries around the globe. Our National Earth-Kind Rose Research was featured as the cover photograph for HortScience (a prestigious research journal in the field of horticultural science). Earth-Kind Roses have become, to my knowledge, one of the most popular university programs of its kind in the nation. Earth-Kind Roses and A.R.T.S. are both nationally and internationally recognized. This makes Texas A&M AgriLife Extension a national and international leader in research-based environmental rose horticulture.

### Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>1986</td>
<td>North Carolina State University</td>
<td>Plant Pathology</td>
</tr>
<tr>
<td>M.S.</td>
<td>1980</td>
<td>Oklahoma State University</td>
<td>Horticulture</td>
</tr>
<tr>
<td>B.S.</td>
<td>1970</td>
<td>Oklahoma State University</td>
<td>Zoology</td>
</tr>
</tbody>
</table>

### Professional Experience

- **2001-present**  
  Professor and Extension Horticulturist for North Central District, Texas A&M AgriLife Extension Service, Dallas

- **1991-2001**  
  Associate Professor and Extension Horticulturist for North Central District, Texas Agricultural Extension Service, Dallas

- **1988-1991**  
  Extension Horticulturist for North Central District, Texas Agricultural Extension Service, Dallas

- **1987-1988**  
  Assistant Professor and State Extension Plant Pathology Specialist, Oklahoma Cooperative Extension Service, Stillwater

- **1986-1987**  
  State Extension Plant Pathology Specialist, Arizona Cooperative Extension Service, Phoenix

- **1979-1982**  
  County Extension Agent-Horticulture, Texas Agricultural Extension Service, San Antonio

- **1977-1979**  
  County Extension Agent-Horticulture, Kansas Cooperative Extension Service, Newton

### Scientific Publications

**Refereed Publications 2015-2020**


Editor-reviewed Publications or Conference Proceedings 2015-2020


Abstracts 2015-2020


There is a rich diversity of co-authors for these scholarly works which includes Extension specialists, program specialist, and county agents, a nursery grower, Master Gardeners, research scientists, undergraduate and graduate students, an Experiment Station superintendent, plus public and private-sector rosarians.

Extension Publications

Selected Print Publications 2015-2020


Teammate Support 2015-2020

Pursuing Ph.D. Degrees
With my strong and continued support, two of my outstanding young teammates, Elizabeth Moore and Randy Nelson, are now pursuing their Ph.D. degrees at the University of Wyoming and North Dakota State University respectively.

International Presentations

With my scientific and financial support, two exceptional teammates, Allison Watkins (Co. Extension Agent) and Gaye Hammond (Houston Rose Society), made oral presentations at the World Federation of Rose Societies Convention in Lyon, France, and the VII International Symposium on Rose Research and Cultivation in Angers, France, respectively.

Internal University / Agency Service on Committees 2015-2020

- 2015-2017 College and AgriLife Peer Review Committee
- 2015-2020 Department of Horticultural Sciences Promotion and Tenure Committee

Awards and Recognitions 2015-2020

- 2019 Vice Chancellor's Award in Excellence, Team Collaboration, Earth-Kind Environmental Plant Evaluation and Educational Outreach Team
- 2018 Finalist for the Keep Oklahoma Beautiful Environmental Excellence Award, Team Category, Texas A&M-Oklahoma State Earth-Kind Team
- 2018 Superior Service Award, Team Category, Texas A&M AgriLife Extension Service, Earth-Kind Educational Outreach Team
- 2017 Finalist for the Texas Environmental Excellence Award, Team Category, achieved by our 107-member National Earth-Kind Environmental Initiative Team. The official document formalizing this recognition was signed by Greg Abbott, Governor of the State of Texas.
- 2017 Superior Service Award, Unit Category, Texas A&M AgriLife Extension Service, Extension Horticulture Unit
- 2017 Superior Service Award, Team Category, Texas A&M AgriLife Extension Service, Environmental Landscape Plant Evaluation Team (I led and served as nominator for this team)
- 2017 Recognition from the National Extension Association of Family & Consumer Sciences, Environmental Education Category, Earth-Kind Living Team
- 2015 Distinguished Horticulture Alumnus Award from Oklahoma State University
- 2015 Vice Chancellor's Award in Excellence, Team Collaboration, National Earth-Kind Rose Team (I led and served as nominator for this team)
Mengmeng Gu
Associate Professor and Extension Specialist
Department of Horticultural Sciences, Texas A&M AgriLife Extension Service

Email address: mgu@tamu.edu

Program Summary
Earth-Kind sustainable landscape program. Dr. Gu joined the Department of Horticultural Sciences Texas A&M AgriLife Extension Service on January 1, 2012. She is the liaison between Texas A&M AgriLife Extension and TNLA and works on TNLA Education Committee and Park & Patio Task Force. Dr. Gu provides state-wide leadership on Earth-Kind sustainable landscape education. She is currently leading the multi-disciplinary multi-state effort to manage crapemyrtle bark scale and she’s also interested in sustainable practices in horticulture production and landscapes, such as using biochar in container substrate research.

Academic Background

<table>
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<th>Degree</th>
<th>Year</th>
<th>Institution</th>
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<tr>
<td>Ph. D.</td>
<td>2006</td>
<td>University of Arkansas</td>
<td>Plant Science/Horticulture</td>
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<tr>
<td>M. S.</td>
<td>2001</td>
<td>Beijing Forestry University</td>
<td>Floriculture and Ornamental Horticulture</td>
</tr>
<tr>
<td>B. S.</td>
<td>1998</td>
<td>Beijing Forestry University</td>
<td>Landscape Horticulture</td>
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Professional Experience:
2015-Present   Associate Professor and Extension Ornamental Specialist, Texas A&M AgriLife Extension Service
2012- 2015    Assistant Professor and Extension Ornamental Specialist, Texas A&M AgriLife Extension Service
2006- 2011    Assistant Extension Professor – Ornamental Horticulture, Mississippi State Univ.

Publications 2015-2019

Patent

Refereed Publications (*, **or ^ indicates graduate students, postdoc, or visiting scholars in my program.)


Editor reviewed publications or conference proceedings 2015-2020

Extension Publications 2015-2020
Dou, H. M. Gu, and G. Niu. 2019. Grow more basil faster with cuttings. EHT-109. 01/19
Wu, B, R. Xie, and Gu, M. 2018. New crapemyrtle cultivars. EHT-106. 12/18
Gu, M. 2018 Alternative hosts of crapemyrtle bark scale. 5/18. EHT-103.

Abstracts (Presentations at these conferences resulted in abstracts and page numbers are not always available.)2015-2020
Gu, M., B. Wu, and R. Xie. New Crapemyrtles for urban landscaping in the U.S. CHSLA Landscape Plants and Old Trees Professional Committee Annual Conference 2019 and the 4th Landscape Plants and Human Settlement Environment Construction Symposium, 2019


M. Gu. 2016. Using high tunnel as a sustainable tool for specialty crop production. ASHS Annual Meeting, August 8-11, 2016, Atlanta, GA. HortScience 51 (9): s75.


Cai, X., H. Dou, and M. Gu. 2016. Crapemyrtle bark scale (Eriococcus lagerstroemiae) monitoring at College Station, TX. Southern Region ASHS Annual Meeting, January 30-February 1, 2015, Atlanta, GA. HortScience 50 (9): s47.


**Trade Magazine Publications**


Gu, M.. 2019. Small unmanned aircraft systems (sUAS) resources. TNLA GREEN March/April 22-23.


Robbins, J., J. Hopkins, M. Gu, M. Merchant and E. Vafaie. 2016. We hate to report that ‘crapemyrtle bark scale’ is here. VNLA Newsletter 86(4):32-34.


Gu, M. 2015. Earth-Kind landscape principals IV-3: Selecting healthy plants. TNLA GREEN Mar/Apr

Electronic media/software (websites, software, videos, etc.) 2015-2020

Green Industry Blog
https://greenenvion.wordpress.com/
The green industry blog provide educational information and opportunities related to the green industry and horticulture in general, such as international horticulture trips, plant trials, small unmanned aerial vehicle, and crapemyrtle bark scale. Spring Quick-Bite Webinar Series
https://www.youtube.com/playlist?list=PLxT5cUdFaycpw6kInYE8QLK_1xzRhs8mDs
I provide regular webinars related to the green industry and provide all recordings on the ‘Spring Quick-Bite Webinar Series’ YouTube channel.

Thesis and Dissertation
Lan Huang. 2018. Effects of biochar and composts on container-grown basil (Ocimum basilicum) and tomato (Solanum lycopersicum). Thesis.

Graduate student

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<th>Name</th>
<th>Degree</th>
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<th>Role</th>
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<tr>
<td>1</td>
<td>Yuxiu Zhang/ MS, Hort</td>
<td>2018-</td>
<td>Advisor</td>
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<td>2</td>
<td>Bin Wu/ PhD, Hort</td>
<td>2018-</td>
<td>Advisor</td>
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<td>3</td>
<td>Kunshi Xie/ PhD, Hort</td>
<td>2018-</td>
<td>Advisor</td>
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<td>4</td>
<td>Ping Yu/ PhD, Hort</td>
<td>2017-</td>
<td>Advisor</td>
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<td>5</td>
<td>Kenneth Maslowski/ PhD, Ento</td>
<td>2018-</td>
<td>Committee member</td>
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<td>6</td>
<td>Pulkit Marwah/ PhD, AgEc</td>
<td>2018-</td>
<td>Committee member</td>
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<td>7</td>
<td>Kuo Liu/ MS, AgEc</td>
<td>2018-</td>
<td>Committee member</td>
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<td>8</td>
<td>Sihan Chen/ MS, AgEc</td>
<td>2018-</td>
<td>Committee member</td>
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<td>9</td>
<td>Erfan Vafaie/PhD, Ento</td>
<td>2017-</td>
<td>Committee member</td>
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<td>10</td>
<td>Kyle Gilder/ MS, Ento</td>
<td>2017-</td>
<td>Co-Advisor</td>
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<td>11</td>
<td>Lan Huang/MS, Hort</td>
<td>2016-2018</td>
<td>Advisor</td>
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<td>12</td>
<td>Haijie Dou/PhD, Hort</td>
<td>2015-2019</td>
<td>Co-Advisor</td>
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<td>Nick Noble/ M.Ag., Hort</td>
<td>2012-2015</td>
<td>Committee member</td>
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<td>14</td>
<td>Cassie Warren MS, Hort</td>
<td>2013-2015</td>
<td>Committee member</td>
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Grants and contracts awarded

$8,000. 2018. PI. 2018 IR-4 Ornamental trial. (Gu- $8,000)
$3,279,861. 2017. PI. Systematic strategies to manage crapemyrtle bark scale, an emerging exotic pest. USDA SCRI. (Gu-$ 1,155,945)
$27,162. PI. Biochar research agreement with Shell/Sergio. 2017.
$2,500. 2017. PI. Are there other nursery plants as alternative hosts for crapemyrtle bark scale? CANR. (Gu- $2,500)
$271,359. 2017. PI. Agricultural water conservation through an automated system for monitoring soil moisture and controlling irrigation using low-cost microcontrollers. TWDB. (Gu-$ 224,701)
$59,465. 2017. PI. Nursery water conservation through a sensor-based automated monitoring and irrigation system. Texas Department of Agriculture. (Gu- $59,465)
$37,906. 2017. Co-PI. Risk management for current and potential users of unmanned aircraft systems (UAS), an emerging technology. SRMEC. (Gu- $6,052)
$5,000. 2017. PI. 2017 IR-4 Ornamental trial. (Gu- $5,000)
$12,500. 2016. PI. 2016 IR-4 Ornamental trial. (Gu- $12,500)
$6,000. 2015. PI. 2015 15-003 New Disease Products Crop Safety. IR-4 Ornamental trial. (Gu- $6,000)
$36,956. 2017. PI. Manage crape myrtle bark scale, an exotic pest (Renewed). Horticulture Research Institute. (Gu- $10,831).
$5,000. 2017. PI. 2017 IR-4 Ornamental trial. (Gu- $5,000)
$12,500. 2016. PI. 2016 IR-4 Ornamental trial. (Gu- $12,500)
$6,000. 2015. PI. 2015 15-003 New Disease Products Crop Safety. IR-4 Ornamental trial. (Gu- $6,000)
$25,000. PI. 2015. Manage crape myrtle bark scale, an exotic pest. Horticulture Research Institute.
$47,973. Co-PI. Using emerging technology to reduce risk in the green industry. SR-RMEC. (Gu-$15,991).
$15,060. PI. Determine the efficacy of biofungicides for control of downy mildew in basil.IR-4 Biopesticide Program. 2014-2015. (Gu-$15,060)
$4,000. PI. Unrestricted gift. Texas Nursery and Landscape Association. 2015.
$22,756. PI. 2015 Texas Xeriscaping wildflower field trial.

Journals for which you reviewed papers
Agronomy
Horticulturae
HortScience
HortTechnology
Industrial Crop and Products
JASHS
Molecular Breeding
Molecules
Plant Breeding
PONE
Scientia Horticulturae
Sustainability
Water

Internal university / agency service on committees
TAMU Press Faculty Advisory Committee (2018- )
Nursery Landscape Instructor Search Committee (2015)
Landscape Design Instructor Search Committee (2015)
Greenhouse Manager Search Committee (2015)
TAMU HORT Seminar Committee (2013- )

Professional association leadership roles
ASHS-SR Executive Board 2019-
ASHS Chair of the Extension Publication Award, 2017-2018
ASHS Chair of Ornamental/Turf Professional Interest Group, 2017-2018

Awards and recognitions
2020 Superior Service Award. Extension Specialist. Texas A&M AgriLife Extension
2019 Superior Service Award. Leader of CMBS Team. Texas A&M AgriLife Extension
2017 Outstanding Outreach Award. Southern Region-Risk Management Education Center
2017 Superior Service Award. Part of Horticulture Unit. Texas A&M AgriLife Extension
2016 Superior Service Award. Part of Strawberry Team. Texas A&M AgriLife Extension

Postdoc and Visiting Scholars.
Dr. Qiang Li, Northeast Forestry University, 03/2019-03/2020
Dr. Yike Gao, Beijing Forestry University, 02/2019-08/2019
Dr. Meijuan Huang, Southwest Forestry University, 01/2019-01/2020
Cuiyu Liu, Nanjing Forestry University, 12/2018-12/2019
Dr. Junxin Yan, Northeast Forestry University, 11/2018-11/2019
Dr. Lin Li, Guangxi University, 10/2018-10/2019
Dr. Guangying Ma, Zhejiang Academy of Agricultural Sciences, 11/2017-11/2018
Dr. Jing Li, Southwest University, 09/2017-09/2018
Qianqian Sheng, Nanjing Forestry University, 11/2017-11/2018
Shigeng Yan, Tsinghua University, 06/2017-08/2017
Dr. Xuli Liu, Beijing Forestry University, 02/2016-02/2017
Dr. Chunling Zhou, Qingdao Agriculture University, 01/2016-06/2016
Meiping Cai, Fujian Agriculture and Forestry University, 09/2015-09/2016
Dr. Donghui Peng, Fujian Agriculture and Forestry University, 03/2015-03/2016
Dr. Fengjun Chen, Beijing Forestry University, 03/2015-03/2016
Dr. Ruixian Liu, Jiangsu Academy of Agricultural Sciences, 07/2015-07/2016
Xiaoya Cai. Postdoc----Texas A&M AgriLife Extension. 01/2015-08/2016
Charles R. Hall
Professor and Holder of the Ellison Endowed Chair in International Floriculture
Department of Horticultural Sciences, Texas A&M University, 2133 TAMU, 215 HFSB, College Station, TX 77843-2133
Email: charliehall@tamu.edu

Program Summary
Dr. Hall's expertise is in the production and marketing of Green Industry crops is nationally recognized in academia and among the horticultural clientele he serves. His major research, teaching, & extension areas of specialization include strategic management, market situation/outlook, cost accounting, and financial analysis for Green Industry firms. Dr. Hall currently serves as the Chief Economist for AmericanHort and Co-Chair of the Advisory Council of Seed Your Future. He is former President and Past-President of the board of directors for America in Bloom. He received the Paul Ecke, Jr. award from the Society of American Florists for professional contributions to the floral industry and the Porter Henegar Memorial Award from the Southern Nursery Association for significant contributions to ornamental horticulture research and to the Southern Nursery Association.

Academic Background
Mississippi State University, Ph.D. Agricultural Economics, 1986-1988
University of Tennessee, M.S. Ornamental Horticulture & Landscape Design, 1984-1986
University of Tennessee, B.S. Agricultural Economics & Rural Sociology, 1980-1984

Professional Experience:
Professor & Endowed Chair, Texas A&M University, Horticultural Sciences, August 16, 2007
Professor - tenured, University of Tennessee, Agricultural Economics, February 2002
Professor - tenured, Texas A&M University, Agricultural Economics, September 2001
Associate Professor - tenured, Texas A&M University, Agricultural Economics, September 1997
Assistant Professor, Texas A&M University, Agricultural Economics, December 1988

Publications (2015-2020):
Doi.org/10.1080/00036846.2018.1527448.


Ingram, Dewayne and Charles Hall. 2015. Comparison of carbon footprint and variable costs of selected nursery production systems for a 5-cm-caliper red maple. HortScience. Accepted for publication, Sept. 21, 2015.

Courses taught (2015-2020):
HORT 315 Issues in Horticulture. Credits 3. 3 Lecture Hours. Analysis of contemporary economic, technological, environmental, human resource, and regulatory issues that impact the way global horticultural firms compete; emphasis on problem recognition and analysis of managerial decisions by firms throughout the entire horticultural supply chain.
HORT 335 Sociohorticulture. Credits 3. 3 Lecture Hours. Horticulture as it relates to humans through people-plant interactions; use of horticulture to improve quality of life; awareness and appreciation of the economic, environmental, social and health benefits of plants.
HORT 426 International Floriculture Marketing. Credits 3. 2 Lecture Hours. 2 Lab Hours. Importance, cost, and opportunities in marketing floral products, fresh cut flowers, flowering potted plants, foliage plants, and bedding/garden plants; topics include: world production areas, economic value, species grown, marketing channels, retail environments,
current/future consumers, postharvest handling, promotion/advertising, perceived/added value, marketing trends and employment opportunities.

**HORT 626 International Floriculture Marketing.** Credits 3. 2 Lecture Hours. 2 Lab Hours. Importance, cost and opportunities in marketing floral products, fresh cut flowers, flowering potted plants, foliage plants, and bedding/garden plants; topics include world production areas, economic value, species grown, marketing channels, retail environments, current/future consumers, postharvest handling, promotion/advertising, perceived/added value, marketing trends and employment opportunities.

**Graduate committees:**

<table>
<thead>
<tr>
<th>Role</th>
<th>Student Name</th>
<th>Degree</th>
<th>Department</th>
<th>Year(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Committee Co-Chair</td>
<td>Kaitlyn Hopkins</td>
<td>PhD</td>
<td>Horticultural</td>
<td>2016-2019</td>
</tr>
<tr>
<td>Committee Co-Chair</td>
<td>Melinda Knuth</td>
<td>PhD</td>
<td>Horticultural</td>
<td>2016-2019</td>
</tr>
<tr>
<td>Committee Chair</td>
<td>Jade Wu</td>
<td>PhD</td>
<td>Horticultural</td>
<td>2016-2019</td>
</tr>
<tr>
<td>Committee member</td>
<td>Taya Brown</td>
<td>PhD</td>
<td>Horticultural</td>
<td>2016-2019</td>
</tr>
<tr>
<td>Committee Chair</td>
<td>Gerald Burgner</td>
<td>PhD</td>
<td>Horticultural</td>
<td>2016-2019</td>
</tr>
<tr>
<td>Committee Chair</td>
<td>Sara Mellard</td>
<td>M.Agr.</td>
<td>Horticultural</td>
<td>2016-2018</td>
</tr>
<tr>
<td>Committee Co-Chair</td>
<td>Cecilia Guo</td>
<td>PhD</td>
<td>Horticultural</td>
<td>2015-2018</td>
</tr>
<tr>
<td>Committee Chair</td>
<td>Taylor Payne</td>
<td>M.S.</td>
<td>Horticultural</td>
<td>2011-2016</td>
</tr>
<tr>
<td>Committee Member</td>
<td>Courtney Eberts</td>
<td>M.S.</td>
<td>ALEC</td>
<td>2015-2016</td>
</tr>
<tr>
<td>Committee Chair</td>
<td>Akshata Kulkarni</td>
<td>M.Agr.</td>
<td>Horticultural</td>
<td>2014-2015</td>
</tr>
<tr>
<td>Committee Member</td>
<td>Hannah Miller</td>
<td>M.S.</td>
<td>ALEC</td>
<td>2014-2015</td>
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<tr>
<td>Committee Chair</td>
<td>Morgan Jenkins</td>
<td>PhD</td>
<td>Horticultural</td>
<td>2013-2015</td>
</tr>
<tr>
<td>Committee Member</td>
<td>Lauren Garcia</td>
<td>PhD</td>
<td>Horticultural</td>
<td>2013-2015</td>
</tr>
</tbody>
</table>

**Journals for which you reviewed papers 2007-2012**

*HortScience*
*HortTechnology (consulting editor)*
*Journal of Agribusiness*
*Journal of Environmental Horticulture*

**Service to the Horticultural Industry**

Served as Past President of America in Bloom, 2014-2018.
Served on Board of Directors of America in Bloom, 2010-2018; served as President, 2015-2016; served as Past President, 2016-2018; serving as Special Advisor to the Board, 2018-present.
Serving on the Board of Directors for Smithers-Oasis, Inc., 2009-present.
Serving as a member of the TNLA Education Committee, 2011-present.

**Awards and recognition (2015-2020):**

Received the Paul Ecke, Jr. award from the Society of American Florists for professional contributions to the floral industry.
ASHS Extension Division Education Materials Team Award for “Online Greenhouse Training.”
Outstanding Outreach Team Award presented by the Southern Risk Management Education Center.
Unit Superior Service Award presented to the entire Extension faculty in the Department of Horticultural Sciences.
Outstanding Electronic Media Education Award, Extension section of the Agricultural & Applied Economics Assn.
Named the Hort Hero by Greenhouse Product News magazine.
Received the Porter Henegar Memorial Award from the Southern Nursery Association for significant contributions to ornamental horticulture research and to the Southern Nursery Association.
Received the ARP Award from the Texas Nursery and Landscape Association for outstanding service to the green industry.
Received the Hall of Fame & Honorary Lifetime Member Award from the Tennessee Nursery & Landscape Association.
Pierre Helwi
Assistant Professor and Extension Viticulture Specialist
Department of Horticultural Sciences
Texas A&M AgriLife Research and Extension Center, Lubbock 79403

Email address: pierre.helwi@ag.tamu.edu

Program Summary
Pierre Helwi is an assistant professor and extension viticulture specialist. Dr. Helwi works on a daily basis with several grape growers in Texas High plains and West Texas and conducts educational programs and workshops to enhance vineyard sustainability. Dr. Helwi also conducts applied research demonstrations where he directs his projects towards solving grape quality issues associated with hot climate regions. Currently, he is working on the effect of fruit thinning with a mechanical harvester on crop load and grape and wine quality; The influence of hail netting on V. vinifera physiology, growth, production and fruit quality; and on the assessing of grapevine cold hardiness in Texas High Plains.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>2015</td>
<td>Bordeaux University, France</td>
<td>Viticulture and Enology</td>
</tr>
<tr>
<td>M.S.</td>
<td>2011</td>
<td>Bordeaux University, France</td>
<td>Molecular and Cellular Genetics</td>
</tr>
<tr>
<td>B.S.</td>
<td>2008</td>
<td>Holy Spirit University, Lebanon</td>
<td>Biochemistry</td>
</tr>
</tbody>
</table>

Professional Experience:
2018-present Assistant Professor and Extension Viticulture Specialist - Texas A&M AgriLife Extension Service
2016-2017 Extension Viticulture Program Specialist - Texas A&M AgriLife Extension Service
2012-2013 Laboratory Engineer, Bordeaux University, France

Publications 2015-2020

Refereed Publications

Editor reviewed publications or conference proceedings 2007-2012
Helwi, Pierre. 2017. Effect of vine nitrogen status on grape berry aromatic potential and on wine aroma. *20th International Meeting GiESCO*.

Graduate student committees (non-advisees; date is date degree plan was approved)
2019 Rachael Sampson, MS in HORT

Grants and contracts awarded 2015-2020
Improving the productivity and Quality of Texas Grapes and Wines. 2018. Amount: $56,333.70 from the Texas Department of Agriculture. Specialty Crop Block Grant Project. PI.
Addressing the Challenges of Grape and Wine Production in a Hot Climate. 2017. from the Texas Department of Agriculture. Specialty Crop Block Grant Project. Co-PI.
John L. Jifon
Professor, Environmental Plant Physiology
Department of Horticultural Sciences
Texas A&M AgriLife Research and Extension Center at Weslaco

Email address:
jljifon@ag.tamu.edu

Program Summary

Environmental Stress Physiology of Vegetable Crops
Basic and applied research to understand how vital processes that control crop growth, yield and quality are impacted by environmental factors within the soil – plant-atmosphere-management complex. Use of integrated measurements at leaf, whole-plant, and stand levels to understand the physiological, biochemical and molecular mechanisms and traits study factors (drought, radiation/temperature extremes, nutrient imbalance, etc.) that regulate photosynthetic efficiency, water/nutrient use efficiency, assimilate partitioning, yield and quality. Developing practical strategies to mitigate the negative impacts of stresses and improve productivity, retail/sensory/functional quality, resource use efficiency, and cropping system sustainability by improving crop tolerance to environmental stresses.

Specific focus areas: (i) Identification of pre-harvest management factors that control productivity, retail and consumer-driven quality traits, including functional or health-promoting properties. (ii) alternative/efficient food production systems (e.g. controlled environment production systems - hydroponics, aquaponics, etc.) that are suitable for resource-limited urban environments. (iii) climate change impacts on food production systems and food quality (iv) sustainable feedstock production systems for high-value bioproducts.

Synergy with other programs: The physiology program is efficiently integrated with, and complements other programs within the Center and University including: pathology, breeding, irrigation management, soil science, agronomy, entomology and biotechnology.

Academic Background

Degree Year Institution Major
Ph. D. 1999 Cornell University Plant Physiological Ecology – Vegetable Crops
M. S. 1994 Mississippi State University Plant Physiological Ecology – Forest Science
B. S. 1991 University of Edinburgh, U.K. Ecological Sciences

Professional Experience:
2015-present Professor - Texas A&M AgriLife Research
2008-2015 Associate Professor - Texas A&M AgriLife Research
2002-2008 Assistant Professor - Texas A&M AgriLife Research
1994-1999 Graduate Research Associate - Cornell University
1992-1994 Graduate Research Associate - Mississippi State University

Recent Publications:
Referred Publications (underlined: graduate students)


Book Chapters


Teaching Effort:

Graduate courses
- International Agriculture/Horticulture (HORT 489), Guest Lecture
- Science of Foods for Health (HORT 689; Nutr. 486; FST 694); Guest Lecture.
- Physiological & Molecular Basis of Plant Stress Response (BIOL 4405/5405); Guest Lecture
- International Agriculture/Horticulture (HORT 489); Guest Lecture.

Graduate Student Mentoring: (39 committees; 7 co-chaired, 4 in-progress)

Recent Grants awarded:
- Patil, B., …Jifon, J., et al., 2017. Table to Farm: A sustainable, systems-based approach for a safer and healthier food supply chain in the U.S. USDA-NIFA-SCRI- $4,700,000.

Journals for which you reviewed papers 2007-2012
Journal of the American Society for Horticultural Sciences, HortScience, HortTechnology, Crop Science, Environmental and Experimental Botany, BMC Bioinformatics, etc.

Internal university / agency service on committees 2007 – 2012
- 1995-2012, Horticulture Club faculty advisor
- 2008-present, College of Agriculture and Life Sciences Undergraduate Program Committee
- 2008-present, Horticultural Sciences Assessment Committee
- 2009, Masters of Horticulture Planning Committee
- 2010, TAMU Academic Assessment Committee

Professional association leadership roles 2007-2012
Member/committee affiliations: The American Society for Horticultural Sciences (ASHS); International Society for Horticultural Sciences (ISHS); Crop Science Society of America;

Awards and recognitions 2007-2012
- Texas Environmental Excellence Award (TEEA)-Texas Commission on Environmental Quality’s (TCEQ) Award: Efficient Irrigation Research (Austin TX, 2008).
- Outstanding Irrigation Research Award - Florida State Horticultural Society (2001)
- Dean’s Outstanding Graduate Teaching Assistant Award, Cornell University (1996-97).
Vijay Joshi  
Assistant Professor (System Physiology)  
Department of Horticultural Sciences and  
Texas A&M AgriLife Research and Extension Center  
Uvalde, Texas 78801  

Email address:  
Vijay.Joshi@tamu.edu  

Program Summary  
**Plant System Physiology:** Dr. Joshi joined Texas A&M AgriLife Research and Extension Center in Uvalde as Systems Physiologist and the Department of Horticultural Sciences as an Assistant Professor in December 2015. Before joining TAMU, Joshi worked as a scientist at the Dow AgroSciences. System Physiology program focuses on the gene discovery for nutritional enhancement and plant stress tolerance against abiotic stress and improving plant nutrient use efficiency under diverse environments, including organic and conventional systems. Dr. Joshi's current research projects include enhancing the nitrogen use efficiency of spinach, improving the nutritional qualities of watermelons, and understanding the mechanism of freezing tolerance in olives. These programs are supported by USDA, TDA, State, and Industry. His research work has been published 20 peer-reviewed articles, 2 patent applications, several abstracts, and oral presentations. Dr. Joshi is chairman of the advisory committee and committee member for MS/Ph.D. students. He has served as an assistant editor and reviewer for several scientific journals.  

**Academic Background**  

<table>
<thead>
<tr>
<th>Degree</th>
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<th>Institution</th>
<th>Major</th>
<th>Minor</th>
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<tbody>
<tr>
<td>Ph. D.</td>
<td>1999</td>
<td>Mahatma Phule Krishi Vidyapeeth</td>
<td>Genetics &amp; Plant Breeding</td>
<td>Plant Physiology &amp; biochemistry</td>
</tr>
<tr>
<td>M. S.</td>
<td>1995</td>
<td>College of Agriculture, Pune, India</td>
<td>Cytogenetics &amp; Plant Breeding</td>
<td>Plant Physiology &amp; biochemistry</td>
</tr>
<tr>
<td>B. S.</td>
<td>1993</td>
<td>College of Agriculture, Pune, India</td>
<td>Agriculture</td>
<td></td>
</tr>
</tbody>
</table>

**Professional Experience:**  
2015-present  
Assistant Professor (System Physiologist): Texas A&M AgriLife Research, Uvalde, TX  
2013-2015  
Scientist: Corteva AgroSciences (formerly Dow AgroSciences), Portland, Oregon,  
2010-2013  
Associate Scientist: Corteva AgroSciences (formerly Dow AgroSciences): Portland, Oregon  
2003-10  
Research Associate: Boyce Thomson Institute, (BTI), Cornell University, Ithaca, NY  
2001-02  
Visiting Research Scholar: North Carolina State University, Raleigh, NC.  
1999-01  
Research Associate: Plant Molecular Biology, National Chemical Laboratory, India  

**Refereed Publications:**  
2014-2019 (Total 20 peer-reviewed publications)  

**Scientific Abstracts & reports:**  
2016-2019  

**Selected Grants and Contracts awarded: 2016-2019 (External Funding only)**

- Advancing the competitiveness and sustainability practices of organic spinach production in Texas (2017) **PI - Joshi.** The Texas Department of Agriculture (TDA) Specialty Crop Block Grant (Total funds received $106,142)
- Improving Nitrogen Use Efficiency and Food Safety in Spinach Production (2018) **PI - Joshi.** The United States Department of Agriculture - Agriculture Marketing Services (AMS-USDA) (Total funds received $743,878)
- Developing strategies for mitigating the impacts of freezing and cotton-root-rot on olive production in Texas (2018) **PI - Joshi.** The Texas Department of Agriculture (TDA) Specialty Crop Block Grant (Total funds received $102,428)
- Developing strategies for mitigating the impacts of freezing and cotton-root-rot on olive production in Texas (2019) **PI - Joshi.** The Texas Department of Agriculture (TDA) Specialty Crop Block Grant (Total funds received $82,300.00)

**National/International Meetings: Selected Invited talks (2016-2019)**


**Lectures for graduate and undergraduate teaching: (2016-2019)**

- ‘Metabolic and molecular regulation of phytochemicals in key vegetables and fruits’ for the course ‘Phytochemicals in Fruits and Vegetables to Improve Human health’ at VFIC, College Station (2018) (Course instructor; Dr. Patil).
- ‘Aspartate Derived Amino Acids’ Course MEPS605. at the Department of Horticultural Sciences, College Station (2016, 2017) (Course instructor: Dr. Koiwa)
- ‘Arabidopsis TAIR web-resources” at the Southwest Texas Junior Community College, Uvalde, TX) to Biology II Major Class (2018) (Instructor; Dr. Gabrielle Forbes).
- ‘Insights into amino acid metabolism’ Biology II Major Class at the Southwest Texas Junior College, Uvalde, TX. 2017 (Instructor; Dr. Gabrielle Forbes).

**Patent Applications and Invention Disclosures:**

1. Increasing seed threonine content through alteration of threonine aldolase activity: G Jander and V Joshi (U.S. provisional patent Appl. # 60/519,313)
2. Composition and Methods for Increasing Methionine Content in Plants (2016) G Jander, T Huang, V Joshi (U.S. Provisional Application No. 61/953,727)
Graduate student committees (expected date of graduation) (2016-2019)
Committee Chair:
Committee Member
2017 Andrea Macias (Chair: Dr. Leskovar) (MS completed)
2018 Lokesh Motanam 2018 (Chair: Dr. M Taylor) (March 2020)
2019 Samikshya Bhattarai (Chair: Dr. Leskovar)

Journals for which you reviewed papers (2016-2019)
- Frontiers in Plant Science
- Euphytica
- Phytochemistry
- Plant Growth Regulation Hort Science
- Plant and Cell Physiology
- Physiology and Molecular Biology of Plants
- Crop Science
- Journal of the American Society for Horticultural Science

Professional Leadership Role (2016-2019)
2019-20: Serving as a committee member for the Industry Partnership Development Committee, American Society for Horticultural Sciences (ASHS).

Internal university / agency service on committees (2016 – 2020)
2018 and 2019: Committee member for the Best Employee of the Year Award at the AgriLife Research Center, Uvalde, TX
2018 and 2019: Judge for poster awards session at Annual Meeting of American Society for Horticultural Sciences, Jacksonville, FL, and Las Vegas, NV.
Jim Kamas
Associate Professor and Extension Fruit Specialist
Department of Horticultural Sciences
Texas A&M Agrilife Extension Viticulture & Fruit Lab
Fredericksburg, Texas

Email address:
j-kamas@tamu.edu

Program Summary
Jim Kamas is an Associate Professor in the Department of
Horticultural Sciences and has a 100% Extension appointment with the Texas A&M Agrilife Extension Service. In this role, he works closely with small fruit, tree fruit and grape growers across Texas to solve the problems of the commercial fruit industry. Through formal educational programming, on-site visitations, phone and email contacts, he assists growers with cultural practice problems including fruit nutrition, pruning and crop-load management, orchard/vineyard ground cover management and disease and insect control. He also currently is involved in several applied research projects on Pierce's disease, grape fungal trunk diseases and manipulation of light interception to delay bud-break and evaluation of sustainable fruit cultivars. Kamas currently serves as director of the Texas A&M Agrilife Extension Viticulture & Fruit Lab.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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<tbody>
<tr>
<td>B.S.</td>
<td>1977</td>
<td>Texas A&amp;M University</td>
<td>Horticultural Sciences</td>
</tr>
<tr>
<td>M.S.</td>
<td>1982</td>
<td>Texas A&amp;M University</td>
<td>Horticultural Sciences</td>
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Research, Teaching and Extension Experience

January 1978-September 1983-Research Associate, Texas Agricultural Experiment Station, College Station, Texas (Fruit Breeding and Variety Development)

September 1980-September 1983-Instructor, Department of Horticultural Sciences, Texas A&M University, College Station, Texas. (Introductory Pomology, Temperate Fruit Production, Undergraduate Honors Program)

May 1988- March 1996-Area Extension Grape Specialist & Extension Team Leader Lake Erie Regional Grape Program Cornell University/Penn St. University

March 1996- Present- Asst. Professor & Extension Fruit Specialist, Texas Cooperative Extension, Fredericksburg, Texas (Promotion to Associate Professor & Extension Fruit Specialist effective September 1, 2016)

2005-2006 Adjunct Instructor, Grayson County Community College Viticulture & Enology Program

Publications 2014-2019


**Awards 2014-2019**

2014- Texas A&M Agrilife Extension Superior Service Award  
2015- Texas A&M Vice Chancellor’s Award for Excellence  
2015- Texas Wine & Grape Growers Association- John Crosby Jr. Award for Lifetime Achievement  
2017- Texas A&M AgriLife Extension Superior Service Unit Award. AgriLife Extension Horticulture.

**Overseas Experience 2014-2019**

December 2014 - USAID Caucasus, National Conference for Agriculture and Consultancy Centers, Ministry of Agriculture, Republic of Georgia.

June-July 2015 - USAID Caucasus Extension Mentoring Program, Republic of Georgia

October 2015- Commercial Fruit Production Consulting, Invited Presentation on Producing Temperate Crops in Tropical Settings, Episcopal University of Haiti, Republic of Haiti

November/December 2016- USAID Commercial Fruit IPM Consultancy, Azerbaijan

**University and National Committees 2014-2019**

2014- Present- Tier II Grape Board- National Clean Plant Network  
2001- Present- California Dept. of Food & Agriculture Glassy-winged sharpshooter Scientific Advisory Committee  
2016-2017- Chair of search committee for Texas Hill Country Viticulture Program Specialist  
2016 - Member of search committee for Enology Specialist  
2015-2016- Member of search committee for North Texas Viticulture Program Specialist  
2015-2016- Member of search committee for Texas High Plains Viticulture Program Specialist  
2015-2016- Member of search committee for Texas Gulf Coast Viticulture Program Specialist
Andrew R. King  
Lecturer  
Department of Horticultural Sciences

Email address:  
aking@tamu.edu

Program Summary

Undergraduate Teaching in the Areas of Plant Production and Introductory Horticulture. A teaching program designed to prepare students for careers in plant production. Dr. King teaches Plant Propagation (HORT 326), Nursery Management & Production (HORT 431) in addition to Garden Science (HORT 301) which is an introductory course for non-Horticulture majors. Through the production-based courses, Dr. King interacts extensively with the Texas nursery industry and supplies the industry with a well-educated labor pool. He has designed and instituted a popular course called Wild Edible, Cultivated and Poisonous Herbs (HORT 328) and through this course has taught students to appreciate the positives and negatives of botanical medicine.

Upon arrival at Texas A&M in January of 2016, Dr. King assumed the position of advisor of the TAMU Horticulture Club and is responsible for guiding the club through numerous fundraisers (including biannual plant sales) and educational trips. Beginning in 2018, he also took over as the faculty coordinator for the biannual Landscape Design School, sponsored by the National Garden Clubs, Inc.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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</thead>
<tbody>
<tr>
<td>Ph. D.</td>
<td>2015</td>
<td>Texas A&amp;M University</td>
<td>Horticultural Sciences</td>
</tr>
<tr>
<td>M. S.</td>
<td>2010</td>
<td>Texas A&amp;M University</td>
<td>Horticultural Sciences</td>
</tr>
<tr>
<td>B. S.</td>
<td>2004</td>
<td>Stephen F. Austin State University</td>
<td>Agriculture (emphasis in Horticulture)</td>
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Professional Experience:

2016-present  Lecturer - Texas A&M University
2014-2015    Landscape & Nursery Consultant - Independent
2013        Assistant Lecturer – Texas A&M University
2008-2013    Research Associate – Texas A&M University
2007-2008    Extension Graduate Associate – Texas A&M University

Publications 2015-2020

Referred Publications


Editor reviewed publications or conference proceedings 2015-2020


**Book Chapters Authored 2015-2020**


**Invited Presentations 2015-2020**


**Classes taught (2015-2020)**

**Undergraduate courses**

Horticulture 201, *Horticulture Science and Practices.* – Online Section – This course introduces students to plant structure, morphology, and growth. Plant hormones are discussed in depth, and how those hormones affect plant propagation, pruning, and plant development. Modern topics such as environmental impacts of plants and GMOs will be discussed.

Horticulture 301, *Garden Science.* An introductory course designed for non-Horticulture majors, many of our current students (majors and minors) have come to Horticulture through this course. Topics include, identification, propagation, soil management, fertilization, growth control, and protection of common garden plants: indoor ornamentals, landscape ornamentals, fruits, and vegetables; special topics include home landscaping, container gardens, bonsai, herbs and medicinal plants and hobby greenhouse management. The effects of organic and non-organic practices on the garden ecosystem will be presented.

Horticulture 302, *Garden Science Lab.* Practical activities in identification, propagation, fertilization, media preparation, soil management, irrigation and protection of indoor ornamentals, landscape ornamentals, fruits and vegetables common in gardens in Texas. Organic and non-organic methods are also demonstrated. The Aggie Master Gardener Program was resumed through the interest in this course.

Horticulture 315. *Issues in Horticulture.* Issues in Horticulture is a writing intensive course that describes and analyzes factors that impinge on modern horticultural systems, including technological, environmental, economic, societal and ethical issues. While a brief overview of current practices and technical background information is presented, the focus is
on critical issues that are affecting managerial decision-making in horticultural operations and how graduates can prepare themselves to function in a continuously changing horticultural environment.

Horticulture 326, *Plant Propagation*. Students explore both the practical and theoretical aspects of plant propagation. Students learn detailed information about the sexual propagation of plants via spores and seed and the asexual propagation of plants via cuttings, micropropagation, grafting/budding, layering and division. In the laboratory section, students get hands-on experience with the propagation of 35-40 distinct species, and all of the aforementioned propagation methods.

Horticulture 328, *Wild Edible, Cultivated and Poisonous Herbs*. Identification, reported uses, and cultivation of edible and medicinal herbs; the history of phytomedicinals and the role of horticulture in the advent of modern pharmaceuticals and nutraceuticals; native Texas wild edible and medicinal herbs; reported uses and efficacy of essential oils of herbal and medicinal plants; propagation and production of medicinal plants, wild edible plants, and cultivated herbs.

Horticulture 360, *Landscapes of Sustainable Built Environments*. Design, construction, and maintenance considerations for landscapes in urban sustainable environments - specifically green roofs, bioretention cells, rain gardens, and living walls; how to maximize benefits of each system, current national trends in regulatory and permitting processes of green infrastructure, and the development of industry-wide guidelines versus standards. Course was designed by Dr. Whitney Griffin.


Horticulture 431, *Nursery Management & Production*. Course designed to immerse students into the field of nursery management and production by introducing them to numerous nursery professionals and the language that they use to communicate about the industry. Upon completion of the course, students will understand the various facets of the Texas nursery trade, including wholesale, retail, re-wholesale and mail order commerce.

Horticulture 440, *International Horticulture*. Study abroad course, designed to introduce students to the unique horticultural production practices of the U.K. Students will compare and contrast the plant production systems used in the U.K. and the U.S. Students will also compare and contrast the horticultural marketing efforts (retail garden centers, nurseries, botanical gardens) in the U.S. and the U.K. and be introduced to the cultural and historical importance of plants in the U.K. and Ireland.


**Presentations through Horticulture 491**


**Graduate student committees** (Underlined indicates supervision; *date* is date of graduation)
2020  Timothy Hartmann, PhD in HORT
2020  Rachel Holland, MAg in HORT
2020  Celeste Winfield, MAg in HORT
2020  Jaimi Washburn, MAg in HORT
2019  Daniel Hillin, MS in HORT

**Journals for which you reviewed papers 2015-2020**
*HortScience*
*HortTechnology*

**Internal university / agency service on committees 2015 – 2020**
2016-present, Horticulture Club faculty advisor
2016-2018, Member of Departmental Scholarship Committee
2017-present, Member of Departmental Undergraduate Program Assessment Committee
2017-present, Instruct Students in the WACO Project (students with special needs)
2018-present, Chair of Departmental Scholarship Committee
2019, Member of Search Committee for Horticultural Sciences Lecturer
2019, Member of Holiday Planning Committee

**Professional association leadership roles 2015-2020**

2017-2019, ASHS Teaching Methods Interest Group Officer
2018-2019, Member of the ASHS Collegiate Activities Committee
2019-present, Chair of the ASHS Collegiate Activities Committee
Patricia E. Klein  
Professor and Associate Head for Graduate Programs  
Department of Horticultural Sciences  

Email address:  
pklein@tamu.edu

**Program Summary**  
My research focuses on developing the genomic tools and resources in plants to enable us to map base clone genes of economic/agronomic importance, to understand the underlying mechanisms that plants use to withstand stress (both biotic and abiotic), and to develop molecular markers that can be used in various breeding programs. A major focus of my research has been in the development of genomic tools and resources for sorghum, a model C4 cereal grass. More recently I have expanded my research to include maize, rose, pecan and coffee.

**Academic Background**

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph. D.</td>
<td>1989</td>
<td>Texas A&amp;M University</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>M. S.</td>
<td>1984</td>
<td>Texas Tech University</td>
<td>Crop Science</td>
</tr>
<tr>
<td>B. S.</td>
<td>1982</td>
<td>Texas A&amp;M University</td>
<td>Horticulture</td>
</tr>
</tbody>
</table>

**Professional Experience:**

2016-present  
Professor, Department of Horticultural Sciences - Texas A&M University

2013-present  
Associate Head for Graduate Programs, Department of Horticultural Sciences - Texas A&M University

2002-2016  
Associate Professor, Department of Horticultural Sciences - Texas A&M University

2001-2002  
Assistant Professor, Department of Horticultural Sciences - Texas A&M University

1997-2001  
Assistant Professor, Institute for Plant Genomics & Biotechnology – Texas A&M University

1995-1997  
Research Associate – USDA-ARS

1993-1995  
Assistant Professor – University of Kentucky

1989-1993  
Postdoctoral Scholar – University of Kentucky

1985-1989  
Graduate Research Associate – Texas A&M University

**Publications 2014 – 2019**

**Refereed Publications** *(underlined names indicate graduate students whom I chair or co-chair)*


**Editor reviewed publications or conference proceedings 2014-2019**


**Classes taught 2014 – 2019**

**Undergraduate courses**

Horticulture 301, *Garden Science*. A course taken primarily by non-horticulture majors. The focus of the course is on topics such as basic plant anatomy and growth, soil management, fertilization, pests, and propagation of common garden plants, including indoor ornamentals, landscape ornaments, herbs, fruits and vegetables.

**Graduate courses**

Horticulture 681, *Graduate Seminar*. A course designed to teach students how to write abstracts and develop poster and oral research presentations. Students also attended bi-monthly departmental seminars and provide a synopsis over each speakers presentation.

Horticulture 690, *Theory of Research*. A course designed to cover Professional Development topics for graduate students including looking for funding opportunities, peer-review of literature, writing a literature review, networking, research compliance, and leadership skills. This course also introduces new graduate students to services offered to them including the library, career center, Center for Teaching Excellence and Office of Graduate and Professional Services.

**Graduate student committees 2014 – 2019 (chair or co-chair; date is date degree plan was approved)**

2017 Lauren Fedenia, PhD in HORT
2017 Jeekin Lau, PhD in HORT
2016 Stella Kang, MS in HORT
2016 Ellen Roundey Young, PhD in HORT
2016 Nolan Bentley, PhD in HORT
2016 Fabian Echeverria Beirute, PhD in PLBR
2015 Evan Esau, MS-NTO in PLBR
Graduate student committees 2014 – 2019 (non-advisees; date is date degree plan was approved)

2019  Dario Rueda Kunz, MS in HORT
2019  Jeewan Pandey, PHD in HORT
2019  Yuhui Wang, MS in HORT
2019  Karina Morales, PHD in PLBR
2019  Jales Fonseca, PHD in PLBR
2018  Stephen Perry, MS in HORT
2018  Emily Boak, PHD in HORT
2018  Ammani Kyanam, PHD in PLBR
2018  Cynthia Sias, MS in AGRO
2018  Heber Aquino, PHD in PLBR
2018  CorrieHopkins, PHD in PLBR
2017  David Horne, PHD in PLBR
2016  Huiqiao Pan, PHD in MEPS
2016  Nai Ning Chi, MS in HORT
2015  Emily Ryan, MAG in ADEV
2014  Stephen Anderson, MS in PLBR
2014  Akshata Kulkarni, MAG in HORT
2014  Nicholas Pugh, MS in PLBR
2014  Sabyasachi Mandal, PHD in BIOL
2014  Chad Hayes, PHD in PLBR

Grants and contracts awarded 2014 – 2019

Genetic mapping and deployment of novel resistance traits in high quality, TAMU pepper germplasm. 2019-2020. Funded by Texas AgriLife Research Vegetable Grant, $10,000

Environmental and genetic control of black pericarp traits in sorghum. 2019-2020. Funded through a USDA-ARS Specific Cooperative Agreement, $29,070

Towards understanding and mitigating gene flow between crop sorghum and johnsongrass. 2017-2021. USDA-NIFA, $75,194

Coordinated development of genetic tools for pecan. 2016-2021. Funded by USDA-NIFA. $472,613

Sorghum germplasm introgression and conversion program. 2016-2021. Funded by the United Sorghum Checkoff Program. $306,057

Genomic markers for Carya. 2015-2020. Funded through a USDA-ARS Specific Cooperative Agreement, $41,752

Combatting rose rosette disease: Short and long term approaches. 2014-2019. Funded by USDA-NIFA. $570,042

Sequence-based genotyping, bioinformatics and data curation to enhance sorghum germplasm evaluation and hybrid development. 2014-2019. Funded through a USDA-ARS Specific Cooperative Agreement, $78,097

Revitalizing the Central American coffee sector after the rust crisis of 2012. 2015-2019. Funded by USAID. $150,428


Integrating germplasm from the sorghum conversion program in elite breeding programs. 2014-2017. Funded by the United Sorghum Checkoff Program. $91,525

Journals for which I reviewed papers 2014 – 2019

The Plant Genome (Associate Editor)
Theoretical and Applied Genetics
BMC Genomics
Crop Science
PLoSOne
**Internal university / agency service on committees 2014 – 2019**

2019-present, Department of Horticulture Controlled Environment Horticulture Faculty Search Committee Chair
2017-present, IPGB Growth Chamber Committee member
2017-present, IPGB Multi-crop Transformation Facility Advisory Committee Member
2017-present, Department of Horticulture Mentoring Committee Chair for Dr. Isabel Vales
2017-present, Department of Horticulture Mentoring Committee Chair for Dr. Vijay Joshi
2016-present, Department of Horticulture Climate Committee member
2016-2017, Borlaug International Chair in Crop Improvement Faculty Search Committee member
2016, Department of Horticulture Potato Breeding Faculty Search Committee Chair
2015, Texas A&M AgriLife Research, Uvalde, Vegetable Breeding Faculty Search Committee Co-chair
2015, Texas A&M AgriLife Research, Uvalde, Systems Plant Physiology Faculty Search Committee member
2015-present, Department of Horticulture Seminar Committee Chair
2014, Texas A&M AgriLife Research, Weslaco, Molecular Biology Faculty Search Committee member
2013-present, Department of Horticulture Graduate Program Committee Chair
2011-present, Department of Horticulture Scholarship Committee member
2003-present, TAMU Institutional Biosafety Committee Chair

**Professional Society Memberships**

2010-present, American Society of Plant Biologists – member
2012-present, American Society for Horticultural Science – member
2018-present, Sorghum Improvement Conference of North America Biotechnology Section Chair
H. Koiwa
Professor Department of Horticultural Sciences
Vegetable and Fruit Improvement Center

Email address:
koiwa@tamu.edu

Program Summary

Plant abiotic stress responses: It is estimated that 65 to 87% of the potential yield of annual crops is lost due to abiotic or biotic stress, i.e. salinity, drought, extremes of temperature, flooding, nutrient deficiency and infestations. Many of these stresses impose ion/osmotic imbalance to the plant cells that leads to lower growth rate and eventually, crop failures. Stress adaptation responses of plants include dynamic transcriptome changes that coordinate the protection of plant cells from environmental extremes and facilitate re-establishment of cellular and organismal homeostasis. My research focus is to identify abiotic stress responsive determinants using model plant genetic systems, such as Arabidopsis thaliana, and to apply the knowledge and technology to improve stress tolerance of crop plants.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. S.</td>
<td>1991</td>
<td>Kyoto University, Kyoto, Japan</td>
<td>Agricultural Chemistry</td>
</tr>
<tr>
<td>M. S.</td>
<td>1993</td>
<td>Kyoto University, Kyoto, Japan</td>
<td>Agricultural Chemistry</td>
</tr>
<tr>
<td>Ph. D.</td>
<td>1996</td>
<td>Kyoto University, Kyoto, Japan</td>
<td>Agricultural Chemistry</td>
</tr>
</tbody>
</table>

Professional Experience:

- Sep, 2014- PRESENT Professor, Dept of Hort. Sci., Texas A&M University
- Sep, 2008- Aug 2014 Associate Professor, Dept of Hort. Sci., Texas A&M University
- Aug, 2002-Aug 2008 Assistant Professor, Dept of Hort. Sci., Texas A&M University
- 1999-Aug, 2002 Research Plant Biologist, Dept of Hort. & LA, Purdue University

Publications 2015-2020

Refereed Publications (underlined names indicate graduate students in the faculty member’s lab)

10. Zhang, Z., Guo, X., Ge, C., Ma, Z., Jiang, M., Li, T., Koiwa, H., Yang, S.W. and Zhang, X. (2017) KETCH1 imports HYL1 to nucleus for miRNA biogenesis in Arabidopsis. **Proc Natl Acad Sci USA** **114**, 4011-4016


**Review Article**


**Classes taught (20015-2019)**

**Undergraduate courses**

**Horticulture 491, Undergraduate Research.** Advise undergraduate students on a research problem, including the design, conduct, analysis and writing phases. Jordan Tolley (Spring 2015) Edith Torres (Fall 2016/Spring2017) Michael Bryant (Fall 2016)

**Graduate courses**

MEPS 605/HORT607, Plant Biochemistry A core course for MEPS. Teach students basic metabolic pathway in plants with emphasis on various natural products synthesized in plants. Enzymology, molecular biology of plant metabolism is covered. Offered in every Spring semesters.

MEPS610/HORT610, Physiological and Molecular Basis for Plant Stress Responses. Teach students various strategies of plants to survive adverse environment, covers recent literatures on stress tolerance gene functions. Offered in Fall semesters of even years.

**Graduate student committees**

**Committee Chair**
Yue Feng, Ph, D. MEPS (Graduated in 2010)
Emre Aksoy, Ph, D. MEPS (Graduated in May 2014)
Akihito Fukudome, Ph, D. MEPS (Graduated in 2017)
Jordan Tolley, M.S. HORT (Current)

**Committee Member**
Jaewoon Moon- Ph, D. MEPS (Graduated in 2006)
Sanghyun Lim- M.S. MEPS (Graduated in 2006)
Andriy Nemchenko- Ph, D. Plant Pathology (Graduated in 2006)
Lavanya Reddivari- Ph.D. Horticulture (Graduated in 2007)
Ji-Eun Ahn- Ph, D. Entomology (Graduated in 2008)
Nan-yen Chou - M.S. MEPS (Graduated in 2008)
Jessica J. Ciomperlik - M.S. Plant Pathology (Graduated in 2008)
Joonhee Shin - M.S. Plant Pathology (Graduated in 2010)
Daniel Jacobo - Ph. D. Food Sci. (Graduated in 2010)
Shawn Christensen - Ph. D. Plant Pathology (Graduated in 2010)
Yong-Soon Park - Ph. D. Plant Pathology (Graduated in 2011)
Jinhee Kim - Ph. D. HORT (Graduated in 2011)
Murli Manor - Ph. D. MEPS (Graduated in 2012)
Anne Nelson - Ph.D. Molecular Cellular Biology (Graduated in 2012)
Chi Yao – M.S. Soil and Crop Science (Graduated in 2013)
Jiaxin Lei - Ph. D. MEPS (Graduated in 2014)
Peicheng Huang Ph.D. Plant Pathology (Graduated in 2018)
Ana Casto Ph. D. MEPS (Graduated in 2019)
Wei Chen Ph.D. ENTO (Graduated in 2019)
Incheol Yeo Ph. D. Biochem Biophys (Current)
Di Sun Ph. D. MEPS (Current)
Manish Taklan Ph.D. MEPS (Current)
Sarah Maynard Ph. D. BIOL (Current)
Joe Vasseli Ph.D. PLPM (Current)
Zhen Wang Ph.D. MEPS (Current)
Priyanka Gade HORT (Current)

Scientists trained/hosted

<table>
<thead>
<tr>
<th>Name</th>
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<th>Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>Akihiro Ueda</td>
<td>visiting scholar</td>
<td>Chang Ho Kang</td>
<td>postdoc</td>
</tr>
<tr>
<td>Jaesook Kang</td>
<td>visiting scholar</td>
<td>Xiaqiang Wu</td>
<td>postdoc</td>
</tr>
<tr>
<td>Weimin Wu</td>
<td>visiting scholar</td>
<td>Meenu Vikram</td>
<td>postdoc</td>
</tr>
<tr>
<td>Woo Young Bang</td>
<td>visiting graduate student</td>
<td>Maria Lee</td>
<td>undergraduate</td>
</tr>
<tr>
<td>Sewon Kim</td>
<td>visiting graduate student</td>
<td>Trevor Broyles</td>
<td>undergraduate</td>
</tr>
<tr>
<td>In Sil Jeong</td>
<td>visiting graduate student</td>
<td>Justin Welch</td>
<td>undergraduate</td>
</tr>
<tr>
<td>Curtis Morgan</td>
<td>high school teacher intern</td>
<td>Edwin Mendez</td>
<td>undergraduate</td>
</tr>
<tr>
<td>Mohamed Aslam</td>
<td>Postdoc</td>
<td>Jose Salazar</td>
<td>undergraduate</td>
</tr>
<tr>
<td>Yukihiro Nagashima</td>
<td>Postdoc</td>
<td>Wasim Aktar</td>
<td>visiting graduate student</td>
</tr>
<tr>
<td>Chiu-Ling Yang</td>
<td>visiting graduate student</td>
<td>Midori Tabara</td>
<td>visiting scholar</td>
</tr>
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Grants and contracts awarded 2015-2020

NSF IOS EAGER: Collaborative research: Tracking of KOR1 protein transport in Arabidopsis using Fluorescent-Timer imaging system 08/15/2015-07/31/2017 $257,466 (Overall project funding $300,000)

USDA-NIFA (Co-PI): Molecular and biochemical mechanisms of oxidized lipids signaling in regulating drought tolerance in maize 03/01/2014-08/31/2016 $498,000

(Approx $94,397 direct cost to HK)

USDA-NIFA SCRI (Co-PI): Table to Farm: A sustainable, systems-based approach for a safer, and healthier melon supply chain in the U.S. 09/01/17 - 08/31/21 $4,409,547
($249,485 to HK)

Journals for which you reviewed papers 2015-2020

Journal of Biological Chemistry (reviewing editor)
Journal of Experimental Botany
New Phytologist
BMC Genomics
PLoS One
Proc Natl Acad Sci USA
Plant Journal
Plant Physiology
Journal of Cell Science
PLoS Genetics
Plant Cell
Plant Direct
Nature Communications
Plant Biotechnology Journal
Genes

**Tenure packages reviewed 2015-2020**
Tenure and promotion package of Dr. T. Fukao for Virginia Tech University
Tenure and promotion package of Dr. Z. Almutairi for Prince Sattam Bin Abdulaziz University

**Internal university / agency service on committees 2015–2020**
2015-2020, MEPS executive committee
2015-2020, HORT seminar committee
2017-2020, MEPS admission committee
**Daniel I. Leskovar**  
Professor & Center Director  
Department of Horticultural Sciences  
Texas A&M AgriLife Research – Uvalde

Email address:  
d-leskovar@tamu.edu

Program Summary  
**Vegetable Stress Physiology.** The program is focused on the understanding of plant morphological and physiological adaptation mechanisms to environmental stresses and in the development of sustainable vegetable cropping systems. The research emphasis is on: 1) seed-transplant production and physiology to increase plant survival under drought, nitrogen deficit and heat stress, 2) PGRs, bio-stimulants and soil amendments to enhance soil and plant health, 3) root and shoot trait responses to water conservation strategies and cropping systems, 4) cultivar, fertility and cover crop management for organic production, 5) protected cultivation and hydroponic systems for grafted tomato and leafy greens, and 6) genotype selection for drought, heat tolerance, high yield, quality and water use efficiency. The basic and applied research has been supported by federal, state, industry and foundations and involved collaborations with Spain, Italy, Croatia, Israel, Germany, South Africa, Argentina, Brazil and Mexico.

**Academic Background**

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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<tbody>
<tr>
<td>Ph. D.</td>
<td>1991</td>
<td>University of Florida</td>
<td>Vegetable Crop Physiology</td>
</tr>
<tr>
<td>M. S.</td>
<td>1986</td>
<td>UC Davis</td>
<td>Vegetable Crops</td>
</tr>
<tr>
<td>B.S. Grad.</td>
<td>1983</td>
<td>Univ. Wageningen</td>
<td>Vegetable Crops</td>
</tr>
<tr>
<td>B. S.</td>
<td>1977</td>
<td>UNComahue, Argentina</td>
<td>Horticulure</td>
</tr>
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</table>

**Professional Experience:**

2014- Faculty in Molecular & Environmental Plant Sciences (MEPS), TAMU  
2011- Center Director, Texas A&M AgriLife Research, Uvalde  
2006 - 2016 Assistant Director- Vegetable and Fruit Improvement Center  
2004 - Professor, Vegetable Physiology, Texas A&M University  
1997-2003 Associate Professor, Vegetable Physiology, Texas A&M University  
1991-1996 Assistant Professor, Vegetable Physiology, Texas A&M University  
1987-1991 Graduate Research Associate – University of Florida

**Publications 2019-2015**

**Refereed Publications** *(underlined names indicate graduate students in the faculty member’s lab)*

[https://doi.org/10.1016/j.apsoil.2019.02.024](https://doi.org/10.1016/j.apsoil.2019.02.024)

[https://doi.org/10.21273/HORTSCI13567-18](https://doi.org/10.21273/HORTSCI13567-18)

[https://doi.org/10.21273/HORTSCI13438-18](https://doi.org/10.21273/HORTSCI13438-18)

[https://doi.org/10.1016/j.scienta.2018.11.052](https://doi.org/10.1016/j.scienta.2018.11.052)

[https://doi.org/10.21273/HORTSCI13397-18](https://doi.org/10.21273/HORTSCI13397-18)


Editor reviewed publications or conference proceedings 2019-2015

https://doi.org/10.17660/ActaHortic.2018.1204.30

https://doi.org/10.17660/ActaHortic.2018.1204.31


https://doi.org/10.17660/ActaHortic.2016.1147.20

https://doi.org/10.17660/ActaHortic.2016.1147.21

https://doi.org/10.17660/ActaHortic.2016.1147.38

Book chapters 2020


Classes taught (with no formal teaching appointment at TAMU)

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<tr>
<td>Fall 2015</td>
<td>Class HORT 325. Vegetable Crop Production, Irrigation practices. Dept. Hort. Sciences, Texas A&amp;M</td>
</tr>
<tr>
<td>Spring 2015</td>
<td>‘Hydroponics 101’. Training workshop for County Extension Agents, Kerrville, TX</td>
</tr>
<tr>
<td>Fall 2015</td>
<td>Class HORT 600. ‘Irrigation for Vegetable Crops’. Dept. Hort. Sciences, Texas A&amp;M</td>
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</table>

Editorial Boards

2014-2017 Associate Editor, South African Journal of Plant and Soil
2019-2020 Associate Editor, European Journal of Horticultural Sciences

Professional association leadership roles

American Society of Horticultural Sciences

- Root Growth and Rhizosphere Dynamics Working Group (Chair-elect 2004-2005, Chair 2005-2006)
• Partnership Development and Sponsorship Committee (Member, 2018-2020)
• Board Member-at large (2019-2021)

International Society of Horticultural Sciences
• Convener 4th ISHS Symposium on Seeds and Stand Establishment, Texas (2006)
• Crop Establishment, Seed and Transplant Technology Working Group (Chair 2007-present)
• Section Vegetables (Vice-Chair, 2010-2014)
• Section Vegetables, Quality Production Systems, Leafy Green and Non-Root Vegetables (Chair, 2014-2018)
• Division Vegetables, Root and Tubers (Chair, 2018-2022).
R. Daniel Lineberger
Professor and Head
Department of Horticultural Sciences

Email address:
dan-lineberger@tamu.edu

Program Summary
Application of Computer Technology to Horticultural Teaching and Extension Programs.

Before assuming duties as a full-time administrator, Dr. Lineberger developed and managed a program designed to integrate Web technology into teaching, research, and extension/outreach programs across all horticultural commodities and disciplines. Dr. Lineberger developed the World Wide Web site for the Texas Horticulture Program, Aggie Horticulture (http://aggie-horticulture.tamu.edu/), a gateway to virtual information servers and Web-accessible, interactive databases. Upon assuming the duties of Associate Head for Undergraduate Programs in June 1, 2008, Dr. Lineberger relinquished maintenance of the Aggie Horticulture network, but assumed responsibility for the teaching-oriented HortSciences Website when it was created to reflect the difference in branding between the College and the AgriLife Extension Service. Dr. Lineberger was named Head of the Department of Horticultural Sciences effective August 1, 2012.

Academic Background

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<tr>
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<th>Major</th>
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<tbody>
<tr>
<td>Ph. D.</td>
<td>1978</td>
<td>Cornell University</td>
<td>Floriculture and Ornamental Horticulture</td>
</tr>
<tr>
<td>M. S.</td>
<td>1974</td>
<td>Cornell University</td>
<td>Floriculture and Ornamental Horticulture</td>
</tr>
<tr>
<td>B. S.</td>
<td>1971</td>
<td>N. C. State University</td>
<td>Ornamental Horticulture</td>
</tr>
</tbody>
</table>

Professional Experience:

2012-present  Professor and Head of Horticultural Sciences - Texas A&M University
2008-2012     Professor and Associate Head for Undergraduate Programs,
              Department of Horticultural Sciences, Texas A&M University
1994-2008     Professor of Horticultural Sciences, Texas A&M University
1990-1994     Professor and Head of Horticultural Sciences - Texas A&M University
1987-1990     Professor and Head of Horticulture - Clemson University
1982-1987     Associate Professor - The Ohio State University
1977-1982     Assistant Professor - The Ohio State University
1971-1977     Graduate Research Associate - Cornell University

Publications 2014-2018


**Classes taught (2014-2018)**

**Undergraduate courses**
Horticulture 481, Seminar. Senior seminar is designed to assist students in the development of documentation of their job readiness, including the creation of a comprehensive resume and eportfolio. Students interview a successful member of the industry who holds a job similar to the one they seek and prepare written and oral reports on the nature of the profession and the professional.

**Graduate student committees**
Gerald Burgner, PHD in HORT
Taylor Paine, MAg in HORT

**Grants and contracts awarded 2014-2019**
Internal grant from College of Agriculture and Agrilife Extension Service to remodel the enology lab. Total project cost was $750,000. With Andreea Botezatu and Justin Scheiner.

**Journals for which you reviewed papers 2014-2019**
*HortScience*
*HortTechnology*

**Internal university / agency service on committees 2014 – 2019**
Search Committee for Resident Director, Dallas REC, 2017-2018
Search Committee for Resident Director, Weslaco REC, Chair 2018=2019
COALS Department Head Committee, Chair, 2019-2020
Provost’s Department Head’s Steering Committee 2019-2020

**Professional association leadership roles 2007-2018**
ASHS President-elect, 2000-2001; ASHS President, 2001-2002; ASHS Chairman of the Board, 2002-2003

**Awards and recognitions 2014-2018**
2017 Vice Chancellor’s Award in Excellence for Administration
2017 Vice Chancellor's Award in Excellence, Extension Team Category, Texas Superstar Plant Trialing Program
2016 Paul Smeal Leadership and Administration Award, Southern Region ASHS
2014 Outstanding Alumni Award, College of Agriculture and Life Sciences, N. C. State University
Subas Malla
Assistant Professor
Department of Horticultural Sciences
Texas A&M AgriLife Research, Uvalde

Email address: subas.malla@ag.tamu.edu

Program Summary
The vegetable breeding program at Uvalde is conducting research on understanding host resistance and host-pathogen/pest interactions in onions, watermelon, tomato and peppers. High throughput genotyping such as genotype-by-sequencing is being used to identify molecular markers for marker-assisted selection as well as for genomic selection. The program will also conduct gene edits (CRISPR/Cas9) to develop disease/insect tolerant cultivars.

The goal of the program is to develop disease resistant, high yielding and superior quality cultivars.

Academic Background

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<tr>
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<tbody>
<tr>
<td>Ph. D.</td>
<td>2009</td>
<td>South Dakota State University</td>
<td>Agronomy</td>
</tr>
<tr>
<td>M. S.</td>
<td>2005</td>
<td>South Dakota State University</td>
<td>Agronomy</td>
</tr>
<tr>
<td>B. S.</td>
<td>1998</td>
<td>Tribhuvan University</td>
<td>Agriculture (Plant Pathology)</td>
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</table>

Professional Experience:

2016-present        Assistant Professor - Texas A&M University
2011-2016 Research Scientist - Virginia Tech
2009-2011 Post-doc Research Associate – Texas A&M University
2003-2009 Graduate Research Associate – South Dakota State University

Publications 2015-2020

Referred Publications


Conference Proceedings


**Graduate student committees**

2015 Rahul Raman MS in SCSC  
2016 Edgar Correa, MS in HORT  
2017 Bed Prakash Bhatta, PHD in HORT  
2017 Roshan Paudel, PHD in HORT

**Grants and contracts awarded 2015 - 2020**

Breeding for agronomic, quality and stress tolerance traits in short day onion for south Texas, Texas A&M AgriLife Research, Texas Vegetable Seed Grant

Creating the ability to mechanically harvest Texas sweet onions for fresh markets, Texas Department of Agriculture Specialty Crop Block Grant Program, 2019

Cultivar Development for Yield, Quality and Stress Tolerance in Watermelon, Texas A&M AgriLife Research, Texas Vegetable Seed Grant

Cultivar Development via Genomic Selection and Identification of QTL for Anthracnose Resistance in Watermelon, Texas A&M AgriLife Research, Texas Vegetable Seed Grant

Stop the rot: Combating onion bacterial diseases with pathogenomic tools and enhanced management strategies, USDA-NIFA, Specialty Crop Research Initiative, 2019

**Journals for which you review papers 2015-2020**

Crop Breeding, Genetics and Genomics  
Crop Science  
Egyptian Journal of Agronomy  
HortScience  
Horticulturae  
Journal of Plant Registrations  
Phytochemistry
Joseph G. Masabni
Extension Small-Acreage Vegetable Specialist
Department of Horticultural Sciences
Overton Research and Extension Center
1710 FM 3053 N, Overton, TX 75684

Email address:
jmasabni@ag.tamu.edu

Program Summary
Dr. Masabni’s area of expertise is vegetable production for small-acreage producers. Research interest is to develop production systems for high tunnel vegetable production, aquaponics, urban agriculture, and pesticide and variety trials. Extension outreach includes developing online and printed materials for vegetable organic and conventional producers and homeowners, host workshops and conferences, and assist county extension agents serving Texas clienteles.

Academic Background

<table>
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<tr>
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<tbody>
<tr>
<td>Ph. D.</td>
<td>1998</td>
<td>Michigan State University</td>
<td>Weed Science</td>
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<tr>
<td>M. S.</td>
<td>1989</td>
<td>Michigan State University</td>
<td>Pomology</td>
</tr>
<tr>
<td>B. S.</td>
<td>1985</td>
<td>Michigan State University</td>
<td>Crop and Soil Sciences</td>
</tr>
</tbody>
</table>

Professional Experience:

2018-present  Associate Professor and Extension Vegetable Specialist – Texas A&M University
2008-2019  Assistant Professor and Extension Vegetable Specialist – Texas A&M University
2008  Associate Extension Professor – University of Kentucky
2002-2008  Assistant Extension Professor – University of Kentucky
1998-2002  Research Assistant II – Michigan State University
1990-1998  Research Assistant I – Michigan State University
1986-1998  Graduate Research Assistantship – Michigan State University

Publications 2015-2020

Refereed Publications (underlined names indicate graduate students in the faculty member’s lab)


**Books**


**Book Chapters**


**Extension Publications**


Masabni, J. and T. Sink. 2016. What is Aquaponics? Texas A&M AgriLife Extension. College Station, TX


**Graduate student committees (non-advisees; date is date degree plan was approved)**

2019 Haijie Dou, Ph.D. in HORT

2017 Alana Bryant, Ph.D. in Animal Sciences

2015 Morgan Metting, M.S. in Soil and Crop Sciences

**Grants and contracts awarded 2015-2020**

Next-Generation Smart Surfaces and Coatings to Improve Food Safety and Water-Efficiency of U.S. Specialty Crops during Harvesting, Storage, Sorting, and Processing. 2019. USDA-SCRI. $1,000,000. (Masabni-$82,186)

Southern Regional Center for Food Safety Training, Outreach, and Technical Assistance Continuation, and Lead Regional Coordination Center. 2018. University of Florida. $20,000 (Masabni-$8,154)

To Provide Customized Training, Advice, Technical Support and Expertise on the Final Rule on Produce Safety. 2018. TDA. $50,000 (Masabni-$10,000)

Unrestricted gift from Bayer Corporation to conduct pesticide trials on sweet potato, pecan, and bean. 2018. $6,000 (Masabni-$6,000)

Unrestricted gift from Agriculture Sciences, Inc. to conduct biostimulant trial on banana pepper. 2018. $2,000 (Masabni-$2,000)

To Provide Customized Training, Advice, Technical Support and Expertise on the Final Rule on Produce Safety. 2017. TDA. $191,432 (Masabni-$107,801)

Developing Texas Pomegranate Industry through Cultivar Trials and Statewide Outreach. 2017. TDA Specialty Block Grant. $57,983. (Masabni-$14,675)

Managing Soil and Plant Microbiomes for Enhancing Organic Vegetable Production Systems. 2017. Texas A&M Vegetable Seed Initiative $47,500 (Masabni-$7,500)

Tomato Grafting: Development and Screening Rootstock Germplasm to Improve Disease Resistance, Yield, and Quality in Protected and Open Field Systems in Texas. 2017. Texas A&M Vegetable Seed Initiative $67,500 (Masabni-$2,500)

Developing Texas Pomegranate Industry through Cultivar Trials and Statewide Outreach. 2017. TDA Specialty Block Grant. $57,983 ($14,675).

Watermelon Variety Trial. 2017. Industry support. $5,600 (Masabni-$1,400)

Evaluation of various pesticides. 2017. Bayer CropScience. $8,000 (Masabni-$8,000)

Watermelon Variety Trial. 2016. Industry support. $6,800 (Masabni-$1,700)
Evaluation of Belt insecticide in various vegetables. 2015. Bayer CropScience. $1,500 (Masabni-$1,500)
Determining accurate nitrate level requirements in an aquaponic system. 2015. SARE. $9,737. (Masabni-$9,737)

**Journals for which you reviewed papers 2015-2020**
- Agronomy
- Horticulturae
- HortScience
- HortTechnology
- International Journal of Horticultural Science and Technology
- International Journal of Postharvest Technology and Innovation
- International Journal of Vegetable Science
- SARE Graduate Student Proposals
- Sustainability (MDPI)
- Water (MDPI)

**Internal university / agency service on committees 2015 – 2020**
- 2016-present, Member of Texas Vegetable Roundtable Working Group
- 2015-2016, Member of Food Losses Working Group
- 2016, Judge at the Cherokee County Tomato Fair tomato contest

**Awards and recognition 2015-2020**
- 2017 Extension Communications Award from the American Society for Horticultural Science-Southern Region for the publication of ‘Easy Gardening for Texas’. 2016.
- 2016 Team Award for Superior Service from AgriLife Extension Service for outstanding achievements on the Texas Strawberry Project.
Program Summary

The Benz School of Floral Design is a continuing education program that strives to embody quality and professionalism in educating its students so that they may succeed in the floral and event industries. It is the aim of the school to be the first choice for floral design and floral education whether for retail, events or professional development. The Benz School embraces diversity of thought, innovation and creativity in the art of floral design and encourages collaboration between all levels of the floral industry and with allied organizations, community groups and related industries.

To accomplish the aforementioned mission, the following goals have been established; 1. to educate future floral/event industry members with a solid foundation of the elements and principle of design while encouraging the use of the latest techniques and methods in the floral design industry, 2. to increase the public awareness of the art of floral design through local, regional, national, and international classes, presentations and workshops to garden clubs, civic organization, and other community-based organizations, 3. to be a liaison with floral industry professional organizations to promote continuing education, collaboration and professionalism for the floral industry.

The director also oversees the Benz Gallery of Floral Art and all of the artifacts of the Benz Art Collection (about 1200 artifacts) as well as the publishing of the Benz collection of books.

On the academic side (Senior Lecturer), my responsibilities are for the teaching and oversee of all of the floral design courses as well as providing training for all floral design teaching assistants. I also provide students with high impact learning opportunities by coordinating/supervising the floral designs/decor for university events. Clients include the Board of Regents’, Chancellor’s, and President’s offices.

Teaching Statement

An effective instructor should always strive to:
- Anticipate student needs and endeavor to improve and expand the learning environment
- Participate in innovative thinking and actions to create a positive learning atmosphere
- Incorporate student centered learning processes into the classroom
- Expand knowledge base through professional development opportunities
- Encourage/Empower students to go beyond their preconceived limits and grow intellectually
- Celebrate times of accomplishment while also learning from opportunities for improvement

Academic Background

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<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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<td>M.Ag</td>
<td>1983</td>
<td>Texas A&amp;M University</td>
<td>Floriculture</td>
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<td>B.S.</td>
<td>1981</td>
<td>University of Missouri</td>
<td>Horticulture</td>
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<tr>
<td>Ed.D</td>
<td>Incomplete (11 hours taken)</td>
<td>University of Illinois</td>
<td>Higher Education Leadership</td>
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</tbody>
</table>

Professional Experience

July 2011 to present – Senior Lecturer, Dept of Horticultural Sciences and Endowed Chair/Director Benz School of Floral Design, Texas A&M University, Student American Institute of Floral Designers (SAIFD) Advisor

Courses taught include Floral Design (Hort 203), Retail Floristry (Hort 451), Wedding Designs (Hort 452), Floral Art (Hort 453), Special Event Design and Production (Hort 454). The planning, development, and installation of campus-wide special events is typically incorporated (in part) into classes and/or the SAIFD Floral Club. Clients include the Board of Regents, Chancellor’s and President’s offices.
Advisor to SAIFD. The SAIFD (Floral Club) meets on a weekly basis to create designs for designated campus events and to teach members floral design techniques and trends as well as provide a mechanism for the student leaders to improve their public speaking skills and develop their leadership abilities.

Responsibilities as director of The Benz School of Floral Design include managing the Benz Endowed Chair, scheduling art exhibitions in the Benz Gallery of Floral Design, manage the curriculum and certification of Benz School – Korea program, teach two-week (as well as two day) industry continuing education short courses, and liaison with garden clubs and other industry organizations.

The Benz School is considered one of the finest short courses available in the floral design field, both in the United States and internationally. It is the only professional floristry school associated directly with an institution of higher education and it is academically recognized by the Southern Association of Colleges and Universities, the same agency that accredits Texas A&M University. The Benz School also contains the only endowed chair in floral design in the world. The curriculum for the Benz School is basic in concept and there are no prerequisites for enrolling. Students in the Benz School may choose to receive Continuing Education Units (CEU) if desired.

January 1997 to July 2014 - Contributing Editor for FLOWERS & Magazine, Teleflora, Inc, Los Angeles, CA

Researched and authored the monthly column "Fresh Focus," which highlighted new cut flower and foliage varieties. Researched and authored two or three "Handy Reference" special feature articles per year which details a flower type or materials commonly used in retail floristry. Featured designer for three photo feature articles – Creative Paint Techniques, New Poinsettia Varieties, and Hanging Centerpieces.

July 2005 to July 2011 – Associate Dean, Career Technologies Division, Kishwaukee College, Malta, IL

The Career Technology Division consists of 15 departments which included 21 AAS degrees and 36 certificate programs.

Division duties included assisting with supervision and evaluation of 26 full time faculty and 6 support staff, hiring, supervision and evaluation of adjunct faculty (approximately 35 each semester), maintaining all class scheduling, including the cancellation or creation of sections, department advisory committees, curriculum updates and revisions, assist with budget development and monitoring, student advisement and career counseling, student recruiting at area high schools and technical centers

College-wide duties included Instructional Liaison for Online Education, Art Gallery Committee, Teaching and Learning Center Advisory Committee, International Education Committee, Curriculum Committee, Enrollment Mgmt Committee, Employment Fair Committee, Faculty Search Committees, Administrator Search Committees, New Adjunct Faculty Orientation, Dean’s Council, President’s Council, College Strategic Plan Update, AQIP Adjunct Faculty Development Committee chairman, KishConnect Improvement Team (DataTel college-wide computer system), Served as Acting Dean from July 2006 to January 2007 in the absence of the Dean.

January 1989 to July 2005 - Instructor of Horticulture, Kishwaukee College, Malta, IL

Taught the following classes; Beginning Floral Arrangements (online/hybrid), Advanced Floral Arrangements (online enhanced), Sympathy Design Techniques, Flower Store Management, Floral Marketing I, Floral Marketing II, Wedding & Corsage Design (online enhanced), Interior Plantscapes, Survey of Floral Occupations, Botany for Horticulture, Spring Greenhouse Crops

-Position also involved the planning, development, and installation of college-wide special events including Kishwaukee College Foundation fundraising, holiday decorations for public areas, graduation ceremonies, college-wide faculty dinners, etc.

-Specific departmental responsibilities included student advisement and career counseling, industry relations, and team activities of the department, such as career fairs, judging contests, student recruitment, field studies, and curriculum modification and/or development.
- Developed and led horticulture student international field studies, internships, and exchanges (England, Scotland, Wales, Belgium, The Netherlands). This was a result of my international faculty exchanges in 1994 to England and in 2001 to Finland. Subsequent yearly web conferences (synchronous) with one of the exchange sites provided students with an international experience without leaving the Kishwaukee College campus.

January 1988 to January 2003 - Associate Director, Benz School of Floral Design, Texas A&M University, College Station, TX

Duties of this part-time position included teaching all phases of professional floral design and retail floristry, buying and procuring of supplies for class, team teaching lecture/discussions, demonstrating design techniques, student evaluation, and student advisement. The Benz School of Floral Design is a series of short courses (two weeks), advanced classes (three days) and novice classes (two evenings) taught to both American and international students.

October 1985 to December 1988 - Owner of Botany Pointe Floral Designs, Bryan, TX

All the responsibilities of retail flower shop ownership including purchasing supplies, accounts payable, contract accounts, consultations, continuing education lecturer for local organizations, custom silk and fresh flower designs, management supervision of full and part-time employees, advertising, and marketing.

March 1985 to October 1985 - Floral Designer, Grassroots on the Canal, Irving, TX

Duties included designing for large parties and weddings in the Dallas, TX area. Also did sales and customer relations along with quality control of incoming fresh supplies.

June 1983 to March 1985 - Territory Manager, Floralife, Inc., Waterburo, SC

 Territory encompassed nine states (approximately 200 wholesale accounts) in the Midwest and south central United States. Duties included personal visits to each account, establishing new accounts, recommending and initiating individual advertising for accounts, trouble shooting, open house participation - including personal designing, public relation activities, and new product development.

Publishing Activities

Books
Co-author, The ShopKeeper, James Johnson & William McKinley, Benz School of Floral Design, Revised 2018
Contributing Author, The AIFD Book of Floral Terminology, American Institute of Floral Designers, 2005

Articles

Flowers& Magazine, Teleflora, Inc. Publishers, Los Angeles, CA
‘Fresh Focus’ monthly column from 1997 to July 2014
Flowers& Magazine, Teleflora, Inc. Publishers, Los Angeles, CA
‘Handy Reference’ articles from 1999 to 2015 (~15 articles)

Journals for which you reviewed papers
HortTechnology

Internal University Service on Committees
2013 – present, University Disciplinary Appeals Panel
2012 – present, Departmental Curriculum Committee
2012 - present, Departmental Scholarship Committee
2012 - present, Departmental Scholarship Banquet Committee
Professional Leadership Roles

2009 – present, American Institute of Floral Designs (AIFD) Online Education Administrator
2009 - present, AIFD National Education Committee
1992 – present, Student American Institute of Floral Designers Chapter Advisor
2016 - AIFD National Symposium Leadership Gala Co-Chair
2013 – 2016, AIFD Regional Board of Directors
2010 – 2011, ISFA Strategic Planning Committee Chair
2009 – 2015, AIFD National Board of Directors
2006 – 2011, AIFD National Certification Committee Chair
2003- 2006, AIFD National Educational Partner Chair
2002 – 2005, AIFD National Education Committee Chair
2000 – 2002, AIFD National Student Membership/AIR Committee Chair
1999 – 2003, AIFD Regional Board of Directors
1995- 2011, ISFA Illinois Certified Professional Florist Program - Lead Instructor
1993 – 2011, Illinois State Florists’ Association (ISFA) Board of Directors - Educational Advisor

Honors

2019, Requested to create the gravesite floral designs for First Lady Barbara Bush’s Funeral
2019, Requested to create the gravesite floral designs for President George H.W. Bush’s Funeral
2019, Received TAMU President Michael Young’s “Exemplary Service to the Office of the President” award
2013, Guest Designer for the White House Florist
2012, ISFA “William J McKinley Scholarship” created
2010, American Institute of Floral Designers Distinguished Service to the Floral Industry Award
2009, Illinois State Florists’ Association Hall of Fame Award
2003, National Institute for Staff & Organizational Development Teaching Excellence Award
1996, Received honorary designation of Illinois Certified Professional Florist (ICPF)
1994, Received early tenure appointment at Kishwaukee College
1983, Pi Alpha Xi Floriculture Honor Fraternity
Craig L. Nessler
Professor and Director Emeritus | Texas A&M AgriLife Research
Department of Horticultural Sciences

Email address:
cnessler@tamu.edu

Program Summary

Application of Transgenic Plants for Pharmaceutical Production. Plant are an ideal platform for producing a variety of products including health relevant small molecules and polymers. Among their advantages is ease of purification, scale up and safety compared with other biological platforms. Dr. Nessler returned to Texas A&M in 2009 as Director of Texas A&M AgriLife Research where he led the agency to #1 in NSF ranked Ag research expenditures from 2011-2017. He now teaches a graduate grant writing course and conducts field based research on transgenic pharmaceutical production at the Weslaco Center in South Texas. Dr. Nessler was named Director Emeritus of Texas A&M AgriLife Research in July 2018.

Academic Background

Degree Year Institution Major
Ph. D. 1976 Indiana University Plant Science
M. A. 1972 College of Wm & Mary Biology
B. S. 1971 College of Wm & Mary Biology

Professional Experience:
2017-present Professor of Horticultural Sciences - Texas A&M University
2009-2018 Director, Texas A&M AgriLife Research
2004-2009 Director Virginia Agri Exp Station, Associate Dean for Research, College of Agriculture, VA Tech
2000-2004 Professor & Head Dept of Plant Pathology, Physiology & Weed Science, Virginia Tech
1993-2000 Associate Head, Dept of Biology, Texas A&M University
1979-2000 Assistant, Associate, Full Professor, Dept of Biology, Texas A&M University

Publications 2015-2020
Refereed Publications (underlined names indicate graduate students in the faculty member’s lab)
None since 2011 (full time administrator as AgriLife Research Director)

Classes taught (2015-2020)

Graduate course
Horticulture 689, Competitive Proposal Writing. High quality, high impact research begins with adequate funding to support personnel, equipment, and supply purchases. The course is designed to help students search for research funding opportunities among federal and state agencies as well as develop potential sources of corporate funding. Students learn how to critically examine Requests for Applications/Proposals (RFAs/RFPs) and use that information to craft targeted, responsive, well-written proposals. The importance of contacting agency program leaders for information and guidance supplementary to the RFA/RFP is also emphasized. Because most first-time submissions are generally unsuccessful students are taught how to objectively dissect reviews and develop revised proposals based on panel feedback.

Grants and contracts awarded 2010-2020
Proposal: Grow-out and Delivery of Tobacco Leaf Material to iBio, Inc.
Sponsor: iBio CMO LLC
PI: Juan Landivar
Co-PI: Craig Nessler
Project Dates: 10/21/19-11/15/20
Amount: $367,847

Internal university / agency service on committees 2015 – 2020
Cancer Prevention Research Institute of Texas (CPRIT) TAMU System Committee Member
Council of Principal Investigators Executive Committee, Ex Officio Member
Institutional Officer for AgriLife Research for Biosafety including Animal Welfare and Recombinant DNA Research Compliance Task Force Member
Vice Chancellor of Agriculture Executive Committee Member
National leadership roles 2015-2020
Experiment Station Committee on Organization and Policy (ESCOP):
- Chair's Advisory Committee, Member
- Executive Committee, Member
NRSP Review Committee, Chair
Administrative Advisor for:
- Multistate Research Projects
  - S1021 - Managing and Marketing Environmental Plants for Improved Production, Profitability, and Efficiency
  - S-1038 - Peanut Variety Quality Evaluation Program
  - S1051 - Sustainable Practices, Economic Contributions, Consumer Behavior, and Labor Management in the U.S.
NRSP-6 Inter-Regional Potato Introduction Project: Acquisition, classification, preservation, evaluation and distribution

Awards and recognitions
1983 Award of Merit for Outstanding Undergraduate Teaching,. Gamma Sigma Delta, The Honor Society of Agriculture, Texas A&M University
1992 Distinguished Teaching Award for, College of Science, Association of Former Students of Texas A&M
2004 Henderson Award for Outstanding Research Faculty in the Department of Plant Pathology, Physiology and Weed Science
2012 Resolution of Outstanding Service, Southern Association of Agricultural Experiment Station Directors,
2014 Excellence in Leadership Award, Southern Association of Agricultural Experiment Station Directors/Association of Public and Land-grant Universities,

International agreements signed 2015-2020
Bilateral Research: Texas A&M AgriLife Research and Brazilian Agricultural Research Corporation [EMBRAPA - Empresa Brasileira de Pesquisa Agropecuária] (2011-2016)
Texas A&M AgriLife Research on behalf of IIAD [Institute for Infectious Animal Diseases] and World Organization for Animal Health [OIE] (2014-17)
Texas A&M AgriLife Research on behalf of the Norman Borlaug Institute for International Agriculture and National Chung Hsing University, Taichung, Taiwan (2015-19)
Genhua Niu
Professor
Department of Horticultural Sciences
Texas A&M AgriLife Research and Extension Center
17360 Coit Road, Dallas, TX 75252

Email address: gniu@ag.tamu.edu

Program Summary
Dr. Genhua Niu is a professor in Urban Agriculture at the Texas A&M AgriLife Research Center in Dallas. Her research focuses on development of culture information and best management practices related to urban agriculture, which is the science of growing crops in an urban setting, including peri-urban greenhouses and indoor vertical farms. Prior to this position, Dr. Niu was a professor in urban landscape water conservation at Texas A&M AgriLife Research Center in El Paso.

Academic Background

Degree Year Institution Major
Ph.D. 1997 Chiba University, Japan Horticultural Engineering
M.S. 1987 Zhejiang University, China Agricultural Engineering
B.S. 1984 Zhejiang University, China Agricultural Engineering

Professional Experience:
2019-present Professor, Texas A&M AgriLife Research, Dallas, TX
2016 to 2019 Professor, Texas A&M AgriLife Research, El Paso, TX
2010 to 2016 Associate Professor, Texas A&M AgriLife Research, El Paso, TX
2004 to 2010 Assistant Professor, Texas A&M AgriLife Research, El Paso, TX
2003 to 2004 Visiting Scientist, USDA –ARS, Beltsville, MD
1998 to 2001 Research Associate, Michigan State University
1997-1998 Japan Society for Promotion of Science, Post-doc fellow, Chiba Univ, Japan

Publications 2015-2020

Refereed Publications


**Books**


**Book Chapters**


**Editor reviewed publications or conference proceedings**


Professional Trade Journals and Extension Articles


Graduate student -chair/co-chair (current)
Yuxiu Zhang, M.S. Dept. Horticulture, TAMU (since fall of 2017)
Jun Li, Ph.D., Central South University of Forestry and Technology, China (since fall of 2017)
Ming Chen, M.S., Central South University of Forestry and Technology, China (since fall 2017)
Xinjing Qu, M.S., Central South University of Forestry and Technology, China (since fall 2018)

Graduate student committee (current)
Ping Yu, Ph.D., Horticultural Science, TAMU
Chaoyi Deng, Ph.D., Department of Environmental Science, UTEP
Yi Wang, Ph.D., Department of Chemistry, UTEP
Yuhui Wang, MS, Horticultural Science, TAMU
Andrew Schneck, Ph.D., Biological Engineering, TAMU

Chair/Co-chair (graduated)
2019 Haijie Dou, Ph.D. Dept. Horticulture, TAMU
2018 Hui Wang, MS, Central South University of Forestry and Technology, China
2017 Lizette Grimaldo Pantoja, Ph.D., University of Juarez, Mexico
2016 Arturo Castro Rocha, Ph.D., University of Juarez, Mexico
2014 Xiaoya (Amy) Cai, Ph.D., TAMU Horticulture
2014 Zejin Zhang, Ph.D., China Agricultural University
2014 Xi Wang, MS, Horticultural Sciences, TAMU
2014 Yanjun Guo, MS, Horticultural Sciences, TAMU

Graduate student committees (graduated)
2018 Swati Rawat, Ph.D., Department of Chemistry, UTEP
2019 Peiyao Zhang, MS, Department of Agric. Biol. Eng., TAMU
2018 Chaoyi Deng, MS, Department of Chemistry, UTEP
2018 Lan Huang, MS, Department of Horticulture
2017 Abdelraheem Abdelraheem, Ph.D., New Mexico State University
2013 Ockert Greyvenstein, Ph.D., Horticultural Sciences, TAMU
2015 Ge Li, MS, Department of Agricultural Engineering, TAMU
2011 Evan Call, MS, New Mexico State University
2011 Nicholas Thomas Adams, MS, New Mexico State University
2011 Min Lin, MS, Horticultural Sciences, TAMU
2008 Christine Yen, MS, Horticultural Sciences, TAMU

Grants and contracts awarded 2015-2020
Alternative irrigation water sources for sustainable nursery production and urban landscapes, 2014-2020, around $31,000 per year, USDA-ARS, FNRI (Floriculture and Nursery Crops Research Initiative). PI
Advancement of intelligent spray application technologies in pecan orchards, $3,672,482 ($139,171 to Niu lab), 10/2015 to 09/2020. Co-PI
Diversifying the Water Portfolio for Agriculture in the Rio Grande Basin, 01/01/2017 to 12/31/2021. Project total $5,000,000 (Niu lab, $273,811). Co-PI
Developing alternative water sources for bioenergy crops production on marginal lands. Sun Grant Initiative, 01/ 2017-12/2018, $150,000 (Niu lab: 20,000). Co-PI
Agricultural water conservation through an automated system for monitoring soil moisture and controlling irrigation using low-cost microcontroller, TWDB, 09/2017-04/2021, $193,499 (Niu lab: $31,420). Co-PI
Developing Texas pomegranate industry through cultivar trials and statewide outreach, 12/2017-12/2018, $57,983 (Niu lab: $35,900). PI
Enhancing Production Efficiency and Profitability of Asian Vegetables in Texas, Texas A&M AgriLife Research, Vegetable Strategic Initiatives, 2018-2019, $40,000. PI.

Journals for which you reviewed papers
Acta Horticulturae
HortScience
HortTechnology
Journal of American Society for Horticultural Science
Frontier Plant Science
Scientia Horticulturae
Horticulturae
Photosynthetica
International Journal of Agricultural and Biological Engineering
Journal of Applied Research on Medicinal and Aromatic Plants

Internal university / agency service on committees 2015 – 2020
Safety officer at El Paso research center 2015-2019
Faculty search committee at El Paso Research Center 2018
Faculty search committee at Dallas Center 2017
Faculty search committee at Dallas Center 2019

Professional association leadership roles 2015-2020
Editorial Board Member, Horticulturae, 2018 to present (https://www.mdpi.com/journal/horticulturae/editors)
American Society for Horticultural Science (ASHS). 2000 – present:
Chair, Outstanding International Horticulturist Award Committee, 2015-2016
Southern Region ASHS Outstanding Researcher Award Committee, 2016-
Southern region ASHS Poster Section Chair, 2014-2015
Secretary, Chair-elect, Chair (2012-2015) for Environmental Stress Physiology
Chair, Outstanding Graduate Educator Award Selection Committee, 2014-2015
Outstanding Graduate Educator Award Selection Committee, 2012-2015
Secretary, Chair-elect, Chair for Regional Group NC1186 – “Water Management and Quality for Ornamental Crop Production and Health”. 2012-2015.
Secretary, Chair-elect, Chair for Regional Group WERA 1013 “Intermountain Regional Evaluation and Introduction of Native Plants”, 2012-2017. (2 years per role)

Awards and recognitions 2015 – 2020
2018 ASHS Outstanding Ornamental Publication Award winner for the 2017 publication “Morphological and Physiological Responses of Ten Ornamental Taxa to Saline Water Irrigation” [HortScience 52(12):1816-1822]. (Corresponding and key contributor)
2016 Kenneth Post Award of ASHS (co-author): 'Development of a Rapid Screening Method for Selection Against High Temperature Susceptibility in Garden Roses'.
2016 Recipient of the Distinguished Research Award, Southern Region ASHS.
2016 Texas A&M AgriLife Extension Superior Service Awards, Team member for Texas Strawberry project, Lead PI: Russ Wallace.
Bhimu Patil  
Inaugural University Professor  
Director, Vegetable and Fruit Improvement Center  
Department of Horticultural Sciences  
Director, USDA National Center of Excellence  

Email address:  
b-patil@tamu.edu

Program Summary
Dr. Patil’s contribution, in establishing the concept ‘Foods for Health,’ is integrating the methods involved in production of fruits and vegetables, from plant breeding, agronomic practices, harvesting methods, distribution and sales, health benefits, quality, food safety, to (finally) consumption. For example, while most people might have a slice of melon as a healthy snack, Dr. Patil has identified and characterized the health-promoting compounds in melon, organized work to breed varieties with more of these compounds, tested that these varieties have consumer-preferred attributes (taste, texture), made sure the varieties have key agronomic traits (disease resistance and high yield), explored how storage and processing of melon affect health-promoting compounds, organized and obtained funding for a USDA National Center of Excellence to make sure the melons does not carry food-borne illness, improved the agricultural economics for farmers growing these watermelons, initiated a campaign to encourage consumers to eat fresh melon, and organized an international symposium to help scientists around the world share their discoveries related to Foods for Health, including melons. Moreover, Dr. Patil’s research encompasses many fruits and vegetables (from citrus to kale) and an additional aspect of his work addresses finding uses for food byproducts such as citrus peels. His concept, that the parts of the agricultural system for production of fruits and vegetables must be integrated with the goal of producing Foods for Health, has made a transformational contribution to the food system in the U.S. In in 2005, he has been appointed Director of the Vegetable and Fruit Improvement Center (VFIC) and 2017, USDA has recognized the VFIC and as Center of Excellence and currently he is also director Center of Excellence for melons.

Academic Background

<table>
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<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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<td>1994</td>
<td>Texas A&amp;M University</td>
<td>Horticulture</td>
</tr>
<tr>
<td>M. S.</td>
<td>1986</td>
<td>University of Agricultural Sciences, Dharwad, India</td>
<td>Horticulture</td>
</tr>
<tr>
<td>B. S.</td>
<td>1984</td>
<td>University of Agricultural Sciences, Dharwad, India</td>
<td>Horticulture</td>
</tr>
</tbody>
</table>

Professional Experience
2008 – Present  Professor, Department of Horticultural Sciences, TAMU  
2017-present  Director, National Center of Excellence, USDA  
2005 – Present  Director, Vegetable & Fruit Improvement Center, Texas AgriLife Research  
2005 –2008  Associate Professor, Dept. of Horticultural Sciences, TAMU  
2002 – 2004  Associate Director, Vegetable & Fruit Improvement Center, TAMU  
2002 – 2004  Associate Professor, Texas A&M University-Kingsville, TX  
1997 – 2002  Assistant Professor, Texas A&M University-Kingsville, TX  
1996 – 1997  Faculty (part time), California State University, Fresno, CA  
1992 – 1994  Research Assistant/Teaching Assistant, Texas A&M University, TX  
1989 – 1991  Assistant Professor, University of Agri., Sciences, Dharwad, India  
1971-1977  Graduate Research Associate - Cornell University

Publications 2015-2019  
Refereed Publications (underlined names indicate graduate students/post doc in the faculty member’s lab)


Editor-Books/Symposium series/Conveners


Book Chapters/Symposium Series


Editor-Reviewed Journal Articles and Proceedings

Underlined authors indicate current or former graduate students or postdoctoral research associates under the direction of Patil.


**Funded Projects (2015-2020)** (Total funds-career)-$26.3 million and Patil’s allocation-$17.0 million)

- **$4,409,547** Table to Farm: A Sustainable, Systems-Based Approach For A Safer And Healthier Melon Supply Chain In The U.S. USDA-NIFA-SCRI-2017-51181-26834; PI: Patil and and 23 co-PI’s: September 2017-August 2021. (BP: $1.83 Million).


- **$135,524** Screening watermelon genotypes/cultivars to develop Fusarium wilt-resistant cultivars for Texas growing conditions using metabolite markers-SCRI-Block Grant-2017-SC-1708-022. PI: Patil; Co-PI: Crosby, Ong, and Jayaprakasha (BP-$107,899)-12/2017-03/201


- **$129,241** Optimizing watermelon production by selecting cultivars, testing, seed priming, with green nanotechnology and enhancing nutritional qualities. SCRI-Block Grant-SC-1617-013. PI: Patil; Co-PI: Jayaprakasha and Crosby (BP-$106,705)-12/2016-03/2018

Electronic media/software (websites, software, videos, etc.)
Vegetable and Fruit Improvement Center Website
http://vfic.tamu.edu
The Vegetable and Fruit Improvement Center web site was moved made it compatible to College website.

USDA Center of Excellence for Melons
http://missionmelons.tamu.edu
The new web site is created to communicate the project activities of research and outreach activities. The project entitled, “Table to Farm: A Sustainable, Systems-Based Approach For A Safer And Healthier Melon Supply Chain In The U.S” is funded by USDA-NIFA-SCRI- 2017-51181-26834.

The new course, “the Nexus of Food & Nutritional Security, Sustainability and Hunger” was funded by USDA-NIFA Challenge grant. Developed a new course web site (https://agrilife.org/fnhs) and initiated e-campus for all students from partner institutions- Texas A&M University, Ohio State University and Purdue University.

Classes taught (2015-2020)

Hort 641. The multi-disciplinary course, Science of Foods for Health, was taught in Fall 2016 and 2019. Students from different disciplines including horticulture, nutrition, food science, Agriculture Leadership Education and Communication benefitted from this course. Course material was provided to students through the web site (http://agrilife.org/foodsforhealth) and e-campus. The course was taught by multi-disciplinary experts in the nation through interactive video conference.

HORT 640 Phytochemicals in Fruits and Vegetables to Improve Human Health (taught Fall 2015 and Fall 2018)
Current scientific knowledge about the role of phytochemicals in their diet; increase the knowledge and awareness of successful, cost effective, public and private integrated approaches to reduce the health and economic burden of chronic diseases; provide instructional curricular resources media for dissemination through conventional and distance education technology. The course web site is maintained (http://agrilife.org/phytochemicals).

USDA-NIFA challenge grant funded ($853,071) entitled “Food Security Educational Partnership: The intersection of sustainability, food and nutritional security and hunger”.

Hort 689. Developed and taught a multi-state, multi-disciplinary unique course entitled “The Nexus of Food &Nutritional Security, Sustainability and Hunger” for the first time. To develop unique and multi-institute course involve several challenges: logistics of scheduling, identifying theme areas and needs of diverse students. Several meetings were conducted among four partner institutions- Texas A&M University, Ohio State University, Purdue University and Texas A&M University-Kingsville. The syllabus of this course was developed by curriculum development workshop conducted at Texas A&M University. Experts in the specific areas from multi-state institutes, such as Cornell University, International Food and Policy Institute- Washington, D.C., Montana State University, Ohio State University and Purdue University and West Texas A&M University and TAMU faculty from four departments participated in a two-day curriculum development workshop in College Station. Students from different disciplines including Bush School, horticulture, nutrition, food science, Agriculture Leadership Education, and Communication and Ag Engineering, benefitted from this course. Purdue University students from Youth Development and Ohio State University students from diverse departments such Food Science, Horticulture and Nutrition Sciences were able to participate in the course. Texas A&M University-Kingsville students from Agronomy and Resource Science also participated in this course. Course material was provided to students through the web site (https://agrilife.org/fnhs/) and e-campus. The course was taught by multi-disciplinary experts in the nation through interactive video conference.

The course was taught in Fall 2017, to 35 (12- TAMU, 9-Purdue, 9- OSU, 5-TAMUK) graduate students from four Universities. Total of 15 content modules were developed and delivered through a flipped classroom model. For the first time, the recorded videos of the speakers were provided to students online and class room time was used for thematic discussion by providing opportunities of interested students. PowerPoint presentations and video recordings. The syllabus was created and evaluated to ensure clarity for students. Instructional guidelines were also evaluated and expanded to provide guidance to lecturers. Social media communication enhanced learning opportunities on this complex topic to exchange current knowledge.

FSTS 685, Directed Studies. Individual problems of research or scholarly activity not pertaining to thesis or dissertation, or selected instruction not covered by other courses.
NFSC 685-Director Studies- Fall 2018-Majitha Dristhi, Valerie Rizzi, Junyi Wang.
Hort 684- Professional Internship- Program planned to provide professional training in student's particular field of interest. Faculty and employer will supervise the activity. Work-study planned as a part of the internship. Students will undergo internship and present their work. Priyanka Chaudhary- Fall 2016; FSTS 684- Tsai Wan-Shan Summer 2016.

Hort 491- James Semper- Summer 2018.
**Graduate student committees** *(non-advisees; date is date degree plan was approved)*

**Chair or Co-Chair of Graduate Students**

Graduated (September 2015-December 2019)

- Ph.D.- Chair- Priyanka Chaudhary- Dept of Horticultural Sciences
- Ph.D Jose Perez- Dept of Horticultural Sciences
- Ph.D. Jisun Lee- Dept. of Horticultural Sciences.

- M.S. -Noorani Barkat-Dept. of Horticultural Sciences
- M.S. -Isabella Yang Fan-Dept. of Nutrition and Food Science
- M.S. -Maricella Gomez-Dept. of Nutrition and Food Science
- M.S.-Ripan Goswami-Dept. of Nutrition and Food Science.
- M.S. Karen Corleto-Dept of Nutrition and Food Science
- M.S. Siddhu Shivangouda- Dept of Horticultural Sciences
- M.S. Wan-Shan Tsai- Dept. of Nutrition and Food Science
- M.S. Junyi Wang- Dept. of Nutrition and Food Science
- M.S. Rizzi Valerie, Dept. of Nutrition and Food Science

**Current students (Chair or Co-Chair)**

- Jayashan Adhikari, Ph.D student in Nutrition and Food Science, 2019-present.
- Diwas Silwal, Ph.D student Dept. Horticultural Sciences, 2018-present
- Pratibha Acharya- Ph.D. Student, Department of Horticultural Sciences, TAMU College Station, 2015-present.
- Priyanka Gade, Ph.D. Student, Department of Horticultural Sciences, TAMU College Station, 2015-present.
- Kishan Biradar, M.S. student Dept. Horticultural Sciences, Texas A&M University, College Station, TX. (Chair).
- Varsha Ravi- M.S. Student, Department of Food and Nutrition, TAMU College Station. (Chair)
- Drishti Majithia- M.S. Student, Department of Food and Nutrition, TAMU College Station. (Chair)

**Graduate student Committee members Graduated (2015-2019)**

- Shima Shayanfar, 2017, Ph.D in Food and Nutrition, TAMU
- Shima Agah, 2017, Ph.D. Student, Department of Soil and Crop Science, TAMU
- Ge Li, 2017, MS in Agriculture Engineering, TAMU
- Shreeya Ravishankar, 2019, Ph.D in Food and Nutrition, TAMU
- Zainab Mansur, 2018, Ph.D in Horticulture, TAMU.
- Connar Gorman, 2019, Ph.D. in Plant Pathology

**Current students (member of committee)**

- Julie Bransten, Ph.D., Student, Department of Nutrition and Food Science, TAMU.
- Bree Vculek (M.S., Student, Department of Nutrition and Food Science, TAMU)

Direction of Undergraduate Students/Summer Internship Training:
- Stephanie Stringer
- Cory Mahry
- Mariana Trevino
- Madison Medley
- Kassandra Toledo
- Yarigza Barron Ruiz
- Kona Kuaiwa

**Visiting Scientists/Post doc/Res Assistant/Research Professor**

- Dr. Jashbir Singh, Postdoctoral Research Associate
- Dr. Wilmer Perera, Postdoctoral Research Associate
- Dr. Deepak Kasote, Postdoctoral Research Associate
- Dr. Jayaprakasha, G.K., Research Professor
- Dr. Chandrasshekar Sindagi
- Dr. Narayan Moger
- Dr. Haripriya Shanmugam
Internal university / agency service on committees 2015 – 2019

Elected President- Friends of India Network, TAMU Office for Diversity, Vice President of Diversity 2014-present.
Member, TAMU
Member, Texas A&M University President’s Council on Climate and Diversity
TAMU coordinator-US-India Knowledge Based Initiative on Agricultural Research and education

Professional association leadership roles 2015-2019

International Society for Horticultural Science
- Chair, Division-Horticulture for Human Health (2018-current).
- Chair, Section Medicinal and Aromatic Plants (2014-2018).
- Vice Chair, Commission Fruits and Vegetables and Health (2011-2014)
- International Advisory Member- ISHS-Third International Symposium on Underutilized Plant Species-Exploration and Conservation for Future Generation- Madurai, India
- Executive Committee Member-ISHS (2014- present)

American Society for Horticultural Science
- Member, Fellow Screening committee-2017-present.
  Chair- Colloquia-Role of Horticulture in interdisciplinary Centers related to Foods for Health (2005)
- Fellow, American Society for Horticultural Sciences-2009
- Chair- Produce, Quality, Safety and Health Properties (QUAL)-2004-06.
- Chair-Tropical Horticulture (TROP) working Group (2001-02; 2005-06; 2008-2011)
- Chair-International Topics of Concern (ITCH) working group-1999-00
- Founding Chair- Association of Horticulturists of Indian Origin (AHIO)-2005-07

American Chemical Society- Division of Agriculture and Food Chemistry
- Fellow, American Chemical Society, Division of Ag Food Chemistry
- Program Chair-2006- Division of Agricultural and Food Chemistry (2,700 members) of the American Chemical Society (14,000 members).
- Chair-2007-Division of Agricultural and Food Chemistry (2,700 members) of the American Chemical Society (14,000 members).
- Nomination Committee Chair- 2008. Division of Agricultural and Food Chemistry.
- Co-Chair: International symposium on "Pre-and postharvest and processing effect on bioactive health maintaining properties" as a part of the AGFD division of the ACS-2008
- Co-chair: International Symposium on "Agricultural and Food Derived Natural Products for Preventing and Combating Disease" as a part of the AGFD division of the American Chemical Society- 38 speakers-2010
- Chair-International symposium on “Potential Health Benefits of Citrus” as a part of the AGFD division of the American Chemical Society-August 22-24, 2004, Philadelphia, PA.

Awards and recognitions 2015-2019
- 2019- Fellow, Indian Horticulture Society, Raipur, India.
- 2017-Healthy Living Lifetime Achievement Award-Texas International Producers Association
- 2016- Fellow, Brazilian Horticulture Society, Recife, Brazil.
- 2013-Distinguished Service Award-American Chemical Society- Division of Agriculture and Food Chemistry
- 2013-American Society for Horticultural Sci. Outstanding Graduate Education Award
- 2013-Dean’s Outstanding Achievement-Research, Texas A&M University
  * 2010-Vice Chancellor Research Excellence, Texas A&M University-2010.
  * 2010-Special Recognition-North America by the Association of Kannada Koota of North America, Edison, New Jersey, USA
  * 2009-Fellow, Division of Agril. and Food Chemistry, American Chemical Society
  * 2009-Fellow, American Society for Horticultural Sciences
  * 2009-Faculty Fellow, Texas A&M University AgriLife, College Station, TX.
Dr. H. Brent Pemberton  
Professor and Regents Fellow

Texas A&M AgriLife Research, Texas A&M University System  
Texas A&M AgriLife Research and Extension Center  
P.O. Box 200, Overton, Texas 75684  
Phone: (903) 834-6191, Email: b-pemberton@tamu.edu

**Academic Background**

<table>
<thead>
<tr>
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<th>Institution</th>
<th>Major</th>
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<tr>
<td>Ph. D.</td>
<td>1983</td>
<td>University of Minnesota</td>
<td>Ornamental Horticulture</td>
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<td>B.S.</td>
<td>1978</td>
<td>Texas Tech University</td>
<td>Ornamental Horticulture</td>
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**Research and Professional Experience**

Professor, Horticulture, Texas A&M AgriLife Research & Extension Center, Overton, Texas, 2000 – present;

Associate Professor, Horticulture, Texas A&M AgriLife Research & Extension Center, Overton, Texas, 1988 – 1999;

Assistant Professor, Horticulture, Texas A&M AgriLife Research and Extension Center, Overton, Texas, 1982 – 1988;

Member of the Graduate Faculty, Texas A&M University, 1985 – present;

Research Assistant, Floriculture, University of Minnesota, 1978 – 1982

**Awards and Honors**

2016 Vice Chancellor’s Award in Excellence Team Award. Awarded by the Vice Chancellor for Agriculture, Texas A&M University System, in recognition of excellence as a member of the Texas Superstar® Selection Committee in TEAM COLLABORATION. January 2016.


2013 Regents Fellow Service Award. Awarded by the Texas A&M University System Board of Regents for meritorious service. November 2013.


**Professional Service Activities**

- Consulting Editor for The Journal of ASHS in the area of Development Physiology. April 2004 to present.
- National Clean Plant Network. Advisory Board for Roses since creation in 2014. Active member of the Strategic Planning Committee and the Education and Outreach Committee for the national program.
- Associate Editor for The Journal of Horticultural Science and Biotechnology. January 2015 to present.

**Publications, Grants and Presentations**

Dr. Pemberton is author of 43 refereed publications, 182 non-refereed publications, 8 books or book chapters, and 110 published abstracts. He has secured over $1.5M in grant support with over $500,000 during the last 5 years. He has made over 222 invited industry and consumer group presentations. He has participated in hosting over 329 Field Days and tours highlighting research activities.

**Refereed Publications from last 4 years**


**Selected Non-refereed Publications**

Elizabeth (Betsy) Pierson
Professor, Plant-microbe Interactions
Department of Horticultural Sciences

Email address
eapierson@tamu.edu

Program Summary

Research Program: Since joining Texas A&M in 2009, Pierson’s research program has focused on:
- The study of plant-microbe interactions that promote plant health and tolerance of biotic and abiotic stress (microbial ecology, bacterial signaling, bacterial secondary metabolites, biofilms, gene regulation, induced systemic resistance, drought and salt stress);
- The epidemiology of emerging diseases caused by Candidatus Liberibacter pathogens;
- The use of Pseudomonas as a platform for next generation biofuels.

Teaching: Member of the graduate faculty in Horticultural Sciences, Plant Pathology and Microbiology, and the Molecular and Environmental Sciences Interdisciplinary Program

Academic Background

Degree Year Institution Major
Ph. D. 1988 Washington State University Botany (Ecology)
B. S. Honors 192 Indiana University Ornamental Horticulture

Professional Experience

2017-present Professor, Department of Horticultural Sciences, Texas A&M University
2009-2017 Associate Professor, Department of Horticultural Sciences, Texas A&M University
1999-2009 Research Associate Professor, School of Plant Sciences, University of Arizona, Tucson, AZ
1990-1999 Research Assistant Professor, Department of Plant Pathology, University of Arizona
1989-1990 Research Associate, USDA-ARS Root Disease and Biological Control Research, Pullman, WA
1987-1989 Statistical Consultant, Computer Information Center, Washington State University, Pullman, WA
1982-1987 Teaching/Research Assistant, Dept. of Botany, Washington State University, Pullman, WA

Awards and Synergistic Activities

Organizer, American Phytopathological Society Special Session: Root Biology & Plant Microbiology, 2019
President, VP, Poster Chair, Planning Committee, Texas Plant Protection Association 2013-2017
Elected, Council of Principle Investigators and Executive Committee, Texas A&M University 2017-present
Associate Editor, Molecular Plant Microbe Interactions 2013-2017
Outstanding Teaching Professor of Year Award, 2018, Dept. Plant Pathology and Microbiology, TAMU
Chair USDA: Plant Disease Ad Hoc Review 2013
Ad hoc Reviewer: Citrus Research Board, Environmental Microbiology, FEMS Microbiology Ecology Frontiers in Microbiology, Molecular Genetics and Genomics, Molecular Microbiology, Molecular Plant Pathology, Molecular Plant Microbe Interactions, Nature Communications, Plant Pathology Journal, Pathogens Open Access Journal, Physiological and Molecular Plant Pathology, Phytopathology, PloSOne

Current Funding

Professional Memberships
American Society for Microbiology, American Phytopathological Society, American Society for Horticultural Science, Texas Plant Protection Association, American Association for the Advancement of Science
Publications (2014-2020: 67 total)


Classes taught (2014-2020)

Undergraduate courses

HORT301—Garden Science. An elective course for non-horticulture majors. Pierson was one of the major contributors to revising this course in 2010 and teaches a 96-student section every Fall semester. The course provides basic information on the science and art of horticulture as it relates to vegetable, fruit and nut production and houseplant and landscape maintenance. It also provides agricultural literacy on topics such as soil health, sustainable production,
integrated pest management (including biostimulants and biopesticides, worker safety and chemical labels), production systems and methods (including organic agriculture, community supported agriculture, slow food, genetically modified and gene edited crops), sociohorticulture, and landscape interiorscape design. This course attracts students from other disciplines into the Horticulture double major or minor programs.

HORT 491—Undergraduate Research. Advise undergraduate students on a research problem, including the design, research, analysis and writing phases.

BESC 484—Writing-Intensive Professional Internship: A semester-long professional internship to expose the student to a research laboratory or professional experience with a bioenvironmental sciences-related company, government agency (local, state, national, or international), or a faculty-approved project.

**Graduate courses**

HORT/MEPS618 – Root Biology is a 3 credit course that previously has met twice weekly and is taught Spring semesters, even years. Because of the breadth of the course content, it features guest lectures in many of the topic areas, including current research. *I took the lead in developing this course and am the primary instructor.* It will be switching to a 3 meetings per week format as described for HORT 619. The course explores basic concepts and current topics related to root biology through lectures, classroom discussions, integrated readings, and student research presentations. We cover root structure, development, growth regulation, function, and stress responses. We examine mechanisms and applications of root-rhizosphere interactions. We discuss issues related to plant productivity, propagation, breeding, phenomics, and carbon and nitrogen cycling. Importantly, we focus on what variables to measure when characterizing root system structure and function. Another emphasis of the course is professional skill development. Students are required to discuss and critique recent literature. Students also are required to design a research project that focuses on a specific plant-microbe interaction where increased knowledge of the interaction might result in agricultural gains. Students are required to give a 10 minute, 1-slide research pitch to the class emphasizing the importance of the specific question being addressed, the merits of the specific approach and deliverables, and why the research should be funded. Students must defend their research in a 10 minute exchange with class members. Students are graded not only on their prepared written mini proposal and oral research pitch, but on their ability to defend their ideas during questioning. The “audience” is graded on their ability to formulate good questions and critique and discuss the student presentations and defenses. One of the best metrics of the class is that approximate 50% of the students actually do the new area of research proposed in the class project as part of their dissertation research.

HORT/MEPS/PLPM619 – Plant-Associated Microorganisms is a 3 credit course with 3 meetings per week, and is taught Spring semesters, odd years. *I developed the course and cross-listed it in all three of the graduate programs in which I am a faculty member.* It covers basic concepts and current topics on plant-microbe interactions including the diversity of plant-associated microorganisms; the plant as a microbial environment; endophytes; and microbial roles in plant nutrition and fitness. We discuss issues related to sustainable agriculture and uses of microorganisms for improving plant health and fitness. Because of the fast pace at which the field is progressing, the course needs to be revised every time it is taught. It is a highly interdisciplinary course in terms of subject matter and student backgrounds. As in 618, a major focus of the course is the development of professional skills, and it features the same types of learning opportunities. We spend 2 days/week on course content and 1 day/week skills. This includes learning how to read and critique research papers (including omics and research methods papers, and product research literature paying special attention to figures and tables and the extent to which data support efficacy claims), write research proposals, make a research poster, make a research pitch and defend it, ask good questions, and develop a grading rubric, etc. One of the desired outcomes of the course is students gaining confidence in their oral discussion and presentation skills—and many have commented that this part of the course has helped them perform better in lab meetings and prelims.

HORT/MEPS/PLPM691 – Graduate Research.

**Graduate student Advisor or Co-Advisor, at Texas A&M**

2018  Robert Dorosky PHD in PLPM  
2017  Tessa Mahmoudi, MS in PLPM  
2016  Eric Olivier Tienebo, MS in HORT  
2016  Jun Myoung Yu, PHD in PLPM  
2014  Jenita Thinikaran, PHD in HORT (Co-Advisor)  
2014  Yan Yang, MS in HORT  
2010  Anne Estes PHD in EEB, University of Arizona  
2008  Krishna Maddula PHD in PLPM, University of Arizona

**Current students:**

Huiqiao Pan, PHD candidate MEPS  
Emily Boak, PHD candidate HORT
David William Reed
Professor
Department of Horticultural Science

Email address: dwreed@tamu.edu

Program Summary
Dr. Reed’s research ranges from basic to applied and primarily focuses on nutrition, especially iron nutrition in alkaline soil, and the effects of water quality and salinity on ornamental greenhouse crops. His research findings are routinely published in the scientific literature. He is a Fellow of the American Society for Horticultural Sciences and has been Vice-President for Education at the national level, and President and Secretary-Treasurer at the Southern Region level. His “first love” is teaching. He has taught many undergraduate and graduate courses over the years, but the one constant is HORT 201 Horticulture Science and Practice, which he has taught consecutively since 1979 - 41 years. He teaches HORT 201 to a packed house of about 260 to 340 students each fall and spring semesters for a total of over 20,000 students taught. HORT 201 is a STEM course that is accepted as a Science Core Elective course in the University Curriculum, so he teaches majors and non-majors. His greatest joy is getting non-STEM majors excited about science. He also taught internationally in Mexico and Sri Lanka. He is the author of Horticulture – Science and Practices, Pierson Publishing, and co-author and editor of Water Media and Nutrition for Greenhouse Crops, Ball Publishing. As an extension of his desire to teach, he has presented over a hundred talks at various industry and professional meetings throughout the country. As Associate Dean for Graduate Programs and Faculty Development he developed the College’s first Graduate Student Learning Community for Exemplary Mentoring (initially funded by the Sloan Foundation), the College’s first faculty mentoring program towards success in tenure and promotion, and the College’s first workshops on implicit bias in the promotion and tenure process. He will stepped down from the Associate Dean position June 1, 2019 and returned full-time to the department.

Academic Background

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<tr>
<td>Ph. D.</td>
<td>1979</td>
<td>Cornell University</td>
<td>Floriculture and Ornamental Horticulture</td>
</tr>
<tr>
<td>M. S.</td>
<td>1977</td>
<td>Cornell University</td>
<td>Floriculture and Ornamental Horticulture</td>
</tr>
<tr>
<td>B. S.</td>
<td>1974</td>
<td>University of Southwestern Louisiana</td>
<td>Horticulture</td>
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Professional Experience:

1978-1983 Assistant Professor, Dept. Horticultural Sciences, Texas A&M University
1983-1990 Associate Professor, Dept. Horticultural Sciences, Texas A&M University
1990-present Professor, Dept. Horticultural Sciences, Texas A&M University
1989-1990 Interim Head, Dept. Horticultural Sciences, Texas A&M University
1994-1995 Interim Head, Dept. Horticultural Sciences, Texas A&M University
2001-2003 Interim Head, Dept. Horticultural Sciences, Texas A&M University
2008-2009 Interim Head, Dept. Agriculture Leadership, Education & Communications
2008-2019 Associate Dean for Graduate Programs and Faculty Development, College of Agriculture and Life Sciences, Texas A&M University

Selected Refereed Publications
Valdez-Aguilar, L. and D.W. Reed. 2007. Response of selected greenhouse ornamental crops to alkalinity in irrigation water. J. Plant Nutrition 30(3):441-452

Classes taught
UNDERGRADUATE:
HORT 201 - General Horticulture (fall, spring 1979-present)
HORT 202 - General Horticulture Laboratory (fall, spring 1979-present)
HORT 320 - Exotic Plants (fall 1984-87)

GRADUATE:
HORT 602 - Environmental Relations of Horticultural Crops (alt. fall 1980-84)
HORT 604 - Applied Physiology of Horticultural Crops (alt. spring 1985-2008)
FLOR 616 - Asexual Plant Propagation (alt. spring 1979-83)
PPHY 620 – Exp. Tech. in Plant Physiology; lab on Use of Liquid Scintillation Counting (spr. 1983-87)

INVITED INTERNATIONAL UNDERGRADUATE:

INVITED INTERNATIONAL GRADUATE:
Applied Physiology of Horticultural Crops, Fall 1985, University of Peradeniya, Peradeniya, Sri Lanka
Applied Physiology of Horticultural Crops, July 2007, Colegio de Postgraduados, Montecillo, Mexican. invited and sponsored by the Mexican Academy of Sciences in cooperation with the Colegio de Postgraduados.

Graduate student committees Chair
Turner, M.A. 1984. Ph.D.
Spurlin, Q. 1986. M.Ag.
Lang, H.J. 1986. M.S.
Neary, B.C. 1986. M.Ag
Rajapakse, N. 1986. Ph.D.
Lee, L.W. 1989. Ph.D.
Stevens, A.B. 1990. Ph.D.
McDonald, G.V. 1990. M.S.
Campos Nunez, R. 1990. M.S.
Todd, N. 1996. M.S.
Vollmar, C.. 1998 M.Ag
Richards, D. 1999 M.S
Blessington, T. 2002. M.S.
Valdez-Aquilar, L. 2004. Ph.D.
Cartmill, Andrew. 2004 (started), Ph.D.
Davis, Emily. 2006 Master of Agriculture

Recent Grants and contracts awarded
AGEP-T: Collaborative Research: Advancing Interdisciplinary STEM Graduate Education in Energy and Sustainability Disciplines, Award Number:1308144; Principal Investigator: :Karen Butler-Purry; Co-Principal Investigator: Cesar
Malave, Marcetta Darensbourg, David Reed, Adrienne Carter-Sowell; Organization: Texas A&M University Main Campus; NSF Organization: HRD Start Date:09/15/2013; Award Amount:$703,000.00
Alfred P. Sloan Foundation Program in Exemplary Mentoring, Mentoring for Success in Research and Leadership Learning Community. Program Directors David Reed and Kevin Heinz, Participating CoPI Summer Odom, Date: Sept 2013-Sept 2015, Award Amount: $60,000 (Continued institutionally 2016 to present)

Journals for which you reviewed papers
HortScience
HortTechnology
Journal American Society for Horticultural Sciences

College/University/National Service
College
Ag Program Tenure and Promotion Committee, 1) member 1990s, b) Chair, late 1990s) Chair, 2005-2006
Merit Fellowship Committee, Chair, 1998, 1999

University
Minority Merit Fellowship Selection Committee, member 1987, 1995.

National/Regional
American Society for Horticultural Sciences - member 1976- present.
Outstanding Senior Awards Committee, member 1981-82, Chair 1983.
Graduate Activities Committee, Chair 1983, Member, 1997-98.
Outstanding Graduate Educator Award Selection Committee, 2002
Collegiate Branch Activities Committee, member 1983, Chair 1984.
Fellow, American Society for Horticultural Sciences, 2002
Southern Region American Society for Horticultural Sciences, member 1979-present.
Secretary-Treasurer, 2006-present

Awards and recognitions
Special Honors
Keynote Speaker “Become the Best You Can Be”, 2004 Freshman Convocation, Texas A&M University,
College Level Teaching Awards and Honors
Distinguished Achievement Award for Teaching, College Level, 1990, Association of Former Students, Texas A&M University
Vice Chancellor’s Award in Excellence for Undergraduate Teaching, 1995, College Level, The Agriculture Program, Texas A&M University
Outstanding Teacher in the College of Agriculture and Life Sciences, 2011, Gamma Sigma Delta.
Honor Professor, College of Agriculture and Life Sciences, 2011
University Level Teaching Awards and Honors
Distinguished Achievement Award for Teaching, University Level, 1999, Association of Former Students, Texas A&M University
Distinguished Achievement Award for Teaching, University Level, 2016, Association of Former Students, Texas A&M University
Gail and David Marion ’65 Teaching Award, 2019, Association of Former Students, Texas A&M University
Professional Scientific Society Teaching Awards
L.M. Ware Distinguished Teaching Award, 1989, Regional Award, Southern Region of the American Society for Horticultural Sciences
Outstanding Undergraduate Educator Award, 2002, National Award, American Society for Horticultural Sciences
Professional Society Honors
Elected President 2003, Southern Region of the American Society for Horticultural Sciences
Elected Fellow of the American Society for Horticultural Sciences
Elected Vice-President for Education, 2010-2011, American Society for Horticultural Sciences.
Oscar Riera-Lizarazu
Associate Professor
Department of Horticultural Sciences

Email address: o.riera-lizarazu@tamu.edu

Program Summary
Rose Genetics and Breeding. A program designed to develop, test, and release improved varieties of roses with regional and national adaptation. The program also aims at conducting research on the use of genomics-based tools for rose variety development and understanding the genetic basis of traits in Rosa and related horticultural crops.

Academic Background

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<td>Ph. D.</td>
<td>1996</td>
<td>University of Minnesota</td>
<td>Plant Breeding and Genetics</td>
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<tr>
<td>M. S.</td>
<td>1990</td>
<td>Utah State University</td>
<td>Plant Science</td>
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<tr>
<td>B. S.</td>
<td>1986</td>
<td>Utah State University</td>
<td>Plant Science</td>
</tr>
</tbody>
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Professional Experience:

2019-present  Associate Professor - Texas A&M University
2017-2018    Technology Leader - Corteva Agriscience
2016-2017    Global Wheat and Sorghum Breeding Leader - Dow AgroSciences
2015-2017    Global Breeding Leader for Wheat - Dow AgroSciences
2013-2016    Senior Wheat Breeder and Station Leader - Dow AgroSciences
2011-2012    Research Program Director - International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
2010-2010    Global Theme Leader for Biotechnology - International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
2004-2010    Associate Professor - Oregon State University
1998-2003    Assistant Professor - Oregon State University
1996-1998    Post-Doctoral Research Associate - University of Minnesota
1991-1996    Graduate Research Assistant – University of Minnesota
1990-1991    Visiting Research Fellow - International Maize and Wheat Improvement Center (CIMMYT)
1990-1990    Research Scientist – Utah State University
1987-1990    Graduate Research Assistant – Utah State University
1986-1987    Research Agronomist - Instituto Boliviano de Tecnologia Agropecuaria (IBTA)

Publications 2015-2020

Refereed Publications (underlined names indicate graduate students in the faculty member’s lab)


Inventions 2015-2020


Research Reports 2015-2020


Classes taught 2015-2020

Undergraduate courses
Graduate courses

Graduate student committees (non-advisees; date is date degree plan was approved)
2019    Daniel Crozier, MS in SCSC
2019    Jeewan Pandey, PhD in HORT

Grants and contracts awarded 2015-2020

Journal Associate Editor 2015-2020
Crop Science
BMC Genetics

Internal university / agency service on committees 2015 – 2020

Professional association leadership roles 2015-2020
Member of the Crop Science Editorial Board, Crop Science Society of America, 2017 to date.

Awards and recognitions 2015-2020
2016    Innovators’ Day Award for Recognition of Innovative Scientific Contributions, Dow AgroSciences, Indianapolis, IN
2015    Innovators’ Day Award for Recognition of Innovative Scientific Contributions, Dow AgroSciences, Indianapolis, IN
Justin Scheiner
Assistant Professor and Extension Viticulture Specialist
Department of Horticultural Sciences

Email address:
jscheiner@tamu.edu

Program Summary
Best Management Practices for Vineyards in Areas Affected by Pierce’s Disease. Develops educational content and programs for prospective and current grape growers in the state of Texas. Dr. Scheiner created a high school viticulture curriculum complete with a textbook, presentations, and supporting content. He conducts applied research on best management practices for vineyards in areas of Texas affected by Pierce’s Disease. His current research interests include viticultural factors that influence grape and wine quality in hot climates and methods of spring frost protection.

Academic Background

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<th>Year</th>
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<td>2007</td>
<td>Texas A&amp;M University</td>
<td>Molecular and Environmental Plant Sciences</td>
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<td>B. S.</td>
<td>2005</td>
<td>Sam Houston State University</td>
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Professional Experience:

2014-present Assistant Professor and Extension Viticulture Specialist – Texas A&M AgriLife Extension Service
2010-2014 Professor and Director of Viticulture & Enology Program – Grayson College
2009-2010 Adjunct Instructor – Finger Lakes Community College
2007-2010 Graduate Research Assistant – Cornell University
2005-2007 Graduate Research Assistant – Texas A&M University
2002-2005 Propagation Team Lead – Color Spot Nurseries

Publications 2015 - 2020
Refereed Publications (underlined names indicate graduate students in the faculty member’s lab)


Editor reviewed publications or conference proceedings 2015 - 2020
Scheiner, J.J. Barriers to Table Grape Production in Texas, In the Proceedings of the Texas Plant Protection Conference, College Station, TX. December, 2016.


Classes taught 2015 - 2020
Undergraduate courses
Horticulture 416, Understanding Wine: From Vines to Wines and Beyond. A course taken by a wide range of majors as an elective or as part of the Enology Certificate Program. The course covers the many facets of wine in the United States and around the world including the history of wine, grape growing and winemaking, types of wine, wine etiquette, beer and spirits, sensory evaluation, wine marketing, and winery tasting room and event management.
Horticulture 421, Enology. A course taken by a wide range of majors, as an elective or as part of the Enology Certificate Program. This course provides a basic understanding of each step of the wine making process; emphasis on home and small scale commercial wine production as related to Texas conditions.

Graduate Student Supervision (date is completion)
2022 Jacy Lewis. Ph.D.
2020 Rachael Sampson, M.S.
2020 Tim Hartmann. Ph.D.
2019 Danny Hillin. M.S.
2018 Yessica Garcia. M.S.
2017 Christina Olivarez. M.S.

Graduate student committees (date is completion)
Present Aaron Corsi, Ph.D. in HORT
Present Mike Sipowicz, Ph.D. in FSTC
2019 Carlos Elizondo M.S. in HORT
2018 Crystal Dozier. Ph.D. in ANTH
2018 Allison Tomalson. M.S. in BEE
2016 Albre Brown. M.S. in PLPA
2016 Melyssa Stricklin. M.S. in RPTS
2016 Ben Jacobson. MWMHS
2015 Sheila McBride. in PLPA
Grants and contracts awarded 2015 - 2020


Impact of Maturity and Select Winemaking Techniques on Blanc Du Bois and Black Spanish. Austin County Grape Grower Committee. 2015. Amount: $2,000.

North Texas Grapevine Cultivar and Rootstock Trial. Texas Department of Agriculture Specialty Crops Block Grant. 2014-2016. Amount: $34,000.


Improving the Productivity and Quality of Texas Grapes and Wine. Texas Department of Agriculture Specialty Crops Block Grant. 2016-2018. Amount: $54,600.


National Viticulture Enology Extension Leadership Conference Travel Grant. 2018. Amount: $2,000.


Journal Reviews 2015 - 2020
Internal university / agency service on committees 2015 – 2020
2015-2016 Chair of search committee for North Texas Viticulture Program Specialist
2015-2016 Chair of search committee for High Plains Viticulture Program Specialist
2015-2016 Chair of search committee for Gulf Coast Viticulture Program Specialist
2015-2016 Judge Graduate Student Poster Competition
2015 Member of search committee for Horticultural Sciences Extension Program Assistant
2016 Member of search committee for Horticultural Sciences Business Coordinator
2016 Chair of search committee for Enology Specialist
2016-present TAMU Climate and Diversity Committee
2016-present TAMU Hort Seminar Committee
2016 Member of search committee for Hill Country Program Specialist
2019 Member of search committee for Horticultural Sciences Administrative Coordinator

Professional association leadership roles 2015 - 2020
Serve on the American Society for Enology and Viticulture Eastern Section (ASEVES) Board of Directors, 2014-present.
ASEVES Secretary, 2017-present.
National Viticulture Enology Extension Leadership Conference Co-Chair, 2018-2019.

Awards and recognitions 2015 - 2020
2019 Texas A&M AgriLife Extension Vice Chancellor’s Award in Excellence. Earth-Kind Environmental Plant Evaluation and Educational Outreach Team
2018 Texas A&M AgriLife Extension Superior Service Team Award. Earth-Kind Educational Outreach Team.
2017 T.V. Munson Award for exemplary contributions to grape growing. Texas Wine and Grape Growers Association. Presented annually to one individual.
2017 Texas A&M AgriLife Extension Superior Service Team Award. Environmental Landscape Plant Evaluation Team.
2017 Texas A&M Extension National Earth-Kind® Environmental Initiative Team member, Finalist for the Texas Environmental Excellence Award.
2017 Texas A&M AgriLife Extension Superior Service Unit Award. AgriLife Extension Horticulture.
2020 Horticultural Sciences Academic Program Review

Appendix 4 page 5.173

Terri Woods Starman
Professor
Department of Horticultural Sciences

Email address
tstarman@tamu.edu

Program Summary
Floriculture: Science, Art and Business: A program embracing the land grant mission designed to educate students for industry and academic employment, improve greenhouse production practices by implementing new technologies and resolving challenges while developing new products to serve the U.S. and Texas floriculture industries. Dr. Starman’s major research accomplishments have included providing guidelines for: (1) reducing water use in greenhouse production while improving shelf life quality of floriculture crops; (2) combining plants into mixed hanging baskets and container gardens to add value to floral products; (3) producing new crops including vegetative annuals and field grown cut flowers; (4) determining label rates for newly introduced plant growth regulators; and, (5) optimizing fertilization and vernalization of dendrobium orchids. Dr. Starman has developed 15 floriculture courses while teaching at four universities, most recently active learning courses in greenhouse technology and sustainable production practices and international floriculture marketing. She taught Study Abroad in Italy during five summers. Dr. Starman shares the responsibility for HORT 203 Floral Design, a university Visual and Performing Arts credit course on the TAMU campus. She has published 47 refereed publications and trained over 20 undergraduate researchers and 19 graduate students: three M.Ag.; 12 M.S.; and 4 PhD students. She serves as advisor for the Psi Chapter of Pi Alpha Xi the National Honorary Horticulture Society. Dr. Starman has given 101 invited presentations to the international and national greenhouse industry and authored over 70 industry publications. Dr. Starman takes pride in incorporating the science, art and business of horticulture into her teaching, research and service program.

Academic Background

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<th>Institution</th>
<th>Major</th>
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<td>1977</td>
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Professional Experience

2012-present
Professor of Horticultural Sciences - Texas A&M University

2000-2012
Associate Professor, Department of Horticultural Sciences, Texas A&M University

1997-2000
Associate Professor, Dept. of Ornamental Horticulture and Landscape Design, Univ. of Tennessee

1991-1997
Assistant Professor, Dept. of Ornamental Horticulture and Landscape Design, Univ. of Tennessee

1986-1991
Assistant Professor, Dept. of Plant & Soil Science, Southern Illinois University

1982-1986
GRA and TA, Department of Horticultural Sciences, Texas A&M University

1977-1981
Instructor, Department of Horticulture, University of Missouri


Refereed Publications (underlined names indicate graduate students in the faculty member’s lab)


**Editor reviewed publications or conference proceedings (selected)**


**Books and book chapters authored/co-authored**


**Classes (currently teaching)**

**Undergraduate courses**

Horticulture 428, Greenhouse Technology & Sustainable Production Systems. (web-based, flipped classroom format). Principles of greenhouse management for commercial production of floral crops; greenhouse construction and operation; regulating and controlling the environment; applying cultural practices as they affect plant processes and influence growth and development; management and marketing of high quality floriculture crops. Taught every fall semester.

Horticulture 426, International Floriculture Marketing. (web-based, flipped classroom format), team-taught. An overview of the importance, cost, and opportunities in marketing floral products. Taught every other spring semester.

Horticulture 203, Floral Design. Principles and elements of design as they apply to all art forms with emphasis on floral design, care and handling of flowers, history of floral design and marketing of cut flowers. Taught every spring and fall semester.

Horticulture 491, Undergraduate Research. Advise undergraduate students on research problems, including the design, execution, analysis and writing phases.

**Graduate courses**

Horticulture 626, International Floriculture Marketing. (web-based, flipped classroom format), team-taught. An overview of the importance, cost, and opportunities in marketing floral products. Taught every other spring semester.

**Graduate student committees chaired or co-chaired**

2016-present Melinda Knuth, PhD, Economic analysis of various floriculture value chain practices.

2015-2018 Yanjun Guo, PhD, Quality and shelf life of bedding and potted plants while reducing water usage.

2010-2014 Xiaoya Cai, PhD, The responses of selected garden roses (Rosa × hybridra) to drought and salt stresses.

2010-2013 Ockert Greyvenstein, PhD, Phenotyping of high temperature susceptibility in garden roses (Rosa × hybridra).

2009-2012 Alison Bingham, M.S., Substrate moisture content effects on growth and shelf life of Angelonia angustifolia.

2008-2011 Min Lin, M.S., Effects of vernalization on flowering of nobile dendrobium hybrids.


2005-2008 Christine Yen, M.S., Effect of nutrient supply and cooling on the nobile dendrobium orchid.

2004-2006 Rebecca Bichsel, M.S., Nutritional requirements for flowering of the nobile dendrobium as a potted orchid.
2002-2005 Shannon Beach, M.S., Shipping and nitrogen toning effects on postharvest shelf-life of vegetative annuals.
1999-2001 Hope Onken, M.S., Photoperiod and plant growth regulators on vegetative annuals.
1990-1991 David Annis, M.S., Effects of growth regulators, photoperiod and postharvest treatments on Craspedia.

Graduate student committee membership (last 5 years)
2017-2018, MA, Sara Melar, Dept. of Hort. Sci., TAMU
2017-2018, MS, Jose Teran, Dept. of BAEN, TAMU
2014-2015, MS, Shuyin Liang (Sharon), Dept. of Hort. Sci., TAMU
2013-2016, MS, Wu Xuan (Jade), Dept. of Hort. Sci., TAMU
2012-2014, M.S., Yanjun Guo (Cecelia), Dept. of Hort. Sci., TAMU

External grants and contracts awarded (for research, selected)


Starman, T. and C. Hall. 2013-2018. Resource efficiency in the floriculture production and value chain. USDA Floriculture and Nursery Research Initiative. ($175,000 as $35,000 per year for 5 years).

Bogran, C.E., T.W. Starman and S.D. Suresh. 2009. Effectiveness of irradiation as a post-harvest quarantine treatment of imported cut flowers, Ceniflores, ($75,000, $15,000 to my program).


Internal grants and contracts awarded (for teaching, selected)
Starman, T.W. 2015. Neuhaus-Shepardson Faculty Development Grant to attend the 14th Annual Conference of Team Based Learning Collaborative in St. Petersburg, FL, College of Agri., ($1500), Dept. of Hort. Sci. ($500).
Starman, T.W. 2010. Neuhaus-Shepardson Faculty Development Grant to supplement Study Abroad funding for Italy, College of Agri., ($2000).
Starman, T.W. 2010. Study Abroad Faculty Grant to supplement Study Abroad funding for Italy, Study Abroad Office and Santa Chiara Center., ($5000).

Consulting editor for HortScience (2009-2013)

Internal service on committees (2006-present)
University
2016-present University Press Faculty Advisor Committee
2007-2009 Instructional Technology User’s Group
College
2019 Agricultural and Natural Resources Policy (ANRP) Internship Program-Rome, Italy Faculty Screening Committee
2001 and 2010-2011, 2013-2014 CASNR Policy Congressional Intern Program Faculty Screening Committee

Department
2019 Search Committee for Controlled Environment Assistant Professor
2019 Search Committee for Greenhouse Manager
2016 Faculty Annual Evaluation Committee
2015 Search Committee for the Nursery Instructor
2013-2014 Seminar Committee, chair
2012-present Promotion and Tenure Committee
2011-present Scholarship Committee
2011-2013 Curriculum Committee
2010 Search Committee for the Benz Endowed Chair
2010 Committee to Internationalize Curriculum
2010 Faculty Panel for Expectations of New Graduate Students
2009-2012 Teaching Matters
2007-2010 Seminar Committee
2007 Floriculture Degree Evaluation Committee
2006-2007 Ellison Intl. Floriculture Chair Search Committee

Professional association leadership roles (selected)
2013-2014 Scholarship Task Force for American Floral Endowment (AFE)
2011 National Floriculture Forum (NFF) national academic conference organizer
2001-2007 National Pi Alpha Xi board member

Awards and recognitions (selected)
2016 Kenneth Post Award for best floriculture manuscript published in a 2015 ASHS journal
2009 International Flower Juror for Proflora, Bogota, Colombia
2008 Kenneth Post Award for best floriculture manuscript published in an 2007 ASHS journal
2005 Seeley Scholar at The Seeley Conference at Cornell University
2002 J.B. Edmond Undergraduate Student Award 2nd place presentation (by Chris Wiesinger)
Larry A. Stein  
Professor and Associate Department Head, Extension Horticulturist  
Department of Horticultural Sciences  
Texas A&M AgriLife Research and Extension Center, Uvalde

Email address:  
larrystein@tamu.edu

Program Summary  
Dr. Stein’s work has emphasized production horticulture working with pecans, fruits, grapes and vegetable crops. He has done a great deal of work on variety screening in both fruits and vegetables. In addition, some of his work has focused on using drip irrigation to not only conserve water, but to also improve fruit quality and production. He is currently doing a lot of work on best management practices for pecans including crop-load management of pecans via trunk shaking. His extensive knowledge of horticulture shows up in numerous areas on Aggie Horticulture, http://aggie-horticulture.tamu.edu/. Dr. Stein updated the highly respected “Texas Pecan Handbook” in 2012 along with Dr. McEachern and Monte Nesbitt. Jim Kamas and Stein have recently published the Texas Peach Handbook and he has authored or co-authored a number of other publications on a wide range of subjects, such as table grapes, reducing tree stress, and how summer and fall moisture stress and irrigation scheduling influence pecan growth and production.

Academic Background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
<th>Major</th>
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<td>Ph.D.</td>
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<td>Horticulture</td>
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<td>M.S.</td>
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<td>B.S.</td>
<td>1979</td>
<td>Texas A &amp; M University</td>
<td>Horticulture</td>
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Professional Experience:

- September 2017 – present  
  Regents Fellow  
  AgriLife Research and Extension Center, Uvalde, TX
- September 2012 – present  
  Associate Department Head for Extension Horticulture  
  September 1999 – present  
  Professor and Extension Horticulturist, Texas A&M
  AgriLife Research and Extension Center, Uvalde, TX
- September 1992 – September 1999  
  Associate Professor and Extension Horticulturist, TAMU  
  Research and Extension Center, Uvalde, TX
- December 1991 – August 1992  
  Associate Professor and Extension Horticulturist, TAMU  
  Research and Extension Center, Stephenville, TX
- June 1985 – December 1991  
  Extension Horticulturist, TAMU Research and Extension Center, Stephenville, TX
- June 1982 – June 1985  
  Extension Assistant in Horticulture, Extension Horticulture, College Station, TX
- January 1982 – May 1982  
  Technician II, Department of Horticultural Sciences, College Station, TX
- December 1981 – June 1980  
  Graduate Assistant in Research, Department of Horticultural Sciences, College Station, TX
- August 1979 – May 1980  
  Graduate Assistant in Teaching, Department of Horticultural Sciences, College Station, TX

Refereed Publications (abs)


**Commodity Journal**


**Summary of Stein’s work with Texas Pecan Program**

Stein attended the Texas Pecan Management Shortcourse, a premiere educational event for the Texas A&M AgriLife Extension Service held every year during the last week of January as a student, taught this class as a graduate student and today coordinates and lectures at this world renowned class, which has expanded and grown under his leadership. Highlighted impacts include:

- Senior Editor of Pecan Handbook – text for the Pecan Management Shortcourse
- Over 425 clientele trained from (2014- 2019), International clientele from Australia and Mexico, and numerous states including Georgia, Alabama, Oklahoma and New Mexico
- Program evaluation – Attendees reported that program taught them to “analyze their situation and make better orchard management decisions.” Other salient points include:
  - 93% were completely satisfied with Stein’s subject matter knowledge and 89% were completely satisfied with his responses to questions.
  - 89% completely satisfied with Stein’s response to questions
  - 67% of clientele planned to adopt the crop load management program that Stein outlined
- Every participant increased his/her knowledge on at least one content tCoordinated and authored paper at mini-shortcourse held at Texas Pecan Growers Annual meeting since 2000, with annual registration of 850, total of 16,150 people reached (2000-2019)

**Summary of Stein’s work with Texas Spinach Program**

Over the past 7 years, 121 programs have been developed with a major emphasis on spinach. In 2008, 2009, and 2010 Stein put in trials to determine the feasibility of growing baby leaf spinach in the Wintergarden region of Texas; the standard for the industry had been curly fresh market spinach, which has 5 to 6 inch leaves and is harvested at about 70
days. Baby and teen spinach are harvested earlier and have smaller leaf sizes, namely one to two inches for baby and 3 to 4 inches for teen. Stein’s trials were promising and the first baby leaf spinach was shipped out of the Wintergarden region in 2010. His educational efforts not only led to baby and teen spinach becoming a norm for the area, but also led to renewed interest in the crop and a return to profitability of many growers in the area. Stein’s work has been instrumental in supporting the steady increase in spinach production and profit in Texas as detailed below:

- 2011 – 30 acres grown, 2012 – 150 acres grown, and 2018 – 658 acres baby spinach grown, 90% increase in acreage in baby leaf spinach production in 7 years
- 2.8 million pounds of baby leaf spinach grown from 2014-2015 with economic value of $2.3 million

Additionally, Stein organized first International Spinach Conference in 2000 and served as program chairman for the educational session and tour of the Wintergarden region’s spinach fields. This program expanded and Stein has organized International conferences in Texas in 2004, 2008, 2012, and 2016. Average attendance is 100 attendees, with a total program impact of reaching over 500 clientele including research scientists from Denmark, Holland, Spain, Australia and the United Kingdom. Stein gave invited presentations at these International Spinach meetings in LaConner, Washington (2006), Fayetteville, Arkansas (2009), Amsterdam, Netherlands (2011), Guangzhou, China (2013), Yuma, Arizona (2015) and Murcia, Spain (2018).

Summary of support to Texas A&M AgriLife County Programs
As the AgriLife Extension Horticulture Unit leader, (2012-present) Stein has organized and coordinated the annual Horticulture Conference and Professional Development program each spring for statewide Extension Horticulture Specialists, Program Specialists, and County Extension Agents – Horticulture. This program expands content expertise of faculty and staff in the field and provides a venue for strategically addressing emerging issues including citrus greening, crape myrtle bark scale, strawberry high tunnel production, growth of the Texas viticulture program and providing accurate information to clientele with regard to control of weeds and pests. This program reaches 60 Extension faculty and staff each year.

Stein has provided extensive agent training in the areas of horticulture programming and crop production for county programs including individual assistance with County Extension programs working both in commercial and residential horticulture. He also has provided broad support of the adult Master Gardener program (over 7,000 volunteers) through providing guest lectures for Master Gardener programs, chapter author of Texas Master Gardener handbook, and presentations at regional and state meetings. To support and expand the horticulture resources for Path to the Plate (2018-present), Stein provided leadership to the development and printing of one page vegetable and fruit resources to be used by county programs and at local farmer’s markets. From 2008-2019, Stein has given 404 county programs reaching 16,889 contacts.

Committee Assignments
Texas A&M AgriLife Extension Director search committee (2018-2019)
Chair, Search committee for Associate Director for State Operations (2017-2018)
Assit. Director & State 4-H program leader search committee (2017)
Enology Specialist search committee (2016)
Healthy South Texas program specialist search committee (2015)
Viticulture program specialists (4) search committee (2015)
Graduate Faculty – Texas A&M University, 2015.

Graduate student committees
PhD. Jacy Lewis (co-chair)
PhD. Tim Hartmann (co-chair)
PhD. Monte Nesbitt
PhD. Andrew Labay
PhD. John Montoya
M.S. Bryan Roth, Texas A&M University.
PhD. Hector M. Escamilla-Santana, Texas A&M University


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<td>Co-Pi</td>
<td>2016-2017</td>
<td>$14,440</td>
<td>Wintergarden Spinach</td>
<td>Support spinach research</td>
<td>$7,220</td>
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Co-Pi 2017-2018 $23,446 TDA Expand pomegranate production in Texas $9,500
Pi 2017-2020 $2,396,466 SCRI Developing genetic and molecular resources to improve spinach production and management. $228,570

Awards and recognitions
Vice Chancellor award in excellence, Specialist, 2020
Regents Fellow, 2017.
Team Superior Service award, Texas A & M AgriLife Extension Service, 2017
Unit Superior Service award, Extension Horticulture, Texas A & M AgriLife Extension Service 2016
Vice Chancellor award in excellence, Texas SuperStar Team, 2016
Team Superior Service Award, Texas A & M AgriLife Extension Service, 2016.
State Specialist Award, TCAA, 2015.
M. Isabel Vales
Associate Professor
Department of Horticultural Sciences

Email address: isabel.vales@tamu.edu

Program Summary
The Texas A&M Potato Breeding and Variety Development Program integrates research, teaching, and outreach. Dr. Vales has been leading the Program since January 2017. The goal of the Program is to develop new potato varieties for the processing and fresh markets (including specialty types). The main target area is Texas, but broad adaptability is emphasized. Selection criteria includes high yield, quality, resistance/tolerance to important biotic and abiotic stresses and to enhanced health, nutrition, and culinary properties. Conventional and molecular approaches are used to breed and study the genetic basis of important traits. New potato varieties developed by the TAMU program are entered in tissue culture, cleaned to maintain as disease-free in vitro stocks, multiplied, promoted, and protected (PVP-Plant Variety Protection). This results in royalty income that is reinvested in the Program. We work in close collaboration with potato growers and potato research groups nationwide. Dr. Vales teaches undergraduate courses in Plant Physiology (face-to-face and online) and trains undergraduate and graduate students in areas related with plant breeding and genetics.

Academic Background

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<td>Licentiate</td>
<td>1992</td>
<td>Univ. Santiago de Compostela, Spain</td>
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Professional Experience:
2017-present  Associate Professor of Horticultural Sciences - Texas A&M University
2013-2016     International Scientific Consultant - Pullman, WA
2010-2012     Principal Scientist - International Crops Research Institute for the Semi-Arid Tropics, India
2010-2015     Associate Professor, Courtesy Faculty - Oregon State University
2005-2010     Associate Professor - Oregon State University
1999-2005     Assistant Professor Senior Research - Oregon State University
1997-1998     Post-Doctoral Research Associate - University of Minnesota
1993-1996     Graduate Research Assistant - Spanish National Research Council

Publications 2015-2020

Refereed Publications (underlined names indicate graduate students in the faculty member’s lab)


Editor reviewed publications or conference proceedings 2015-2020

Electronic media/software (websites, software, videos, etc.) 2015-2020

http://potato.tamu.edu/ Texas A&M Potato Breeding & Variety Development website. It describes the Program, available varieties, reports (annual reports: Texas, SW, Western Regional Red/Specialty) and field day handbooks, team members, cooperator, publications and links.

https://hortsciences.tamu.edu/people/faculty-2/isabel-vales/ Personal website

Classes taught (2015-2020)

Undergraduate courses
MEPS 313, Intro Plant Physiology. A core course offered face-to-face (Spring semester) and online (Fall semester) taken primarily by students from multiple programs (HORT, WFSC, ENGL, GEOL, ENTO). This is an undergraduate level course covering acquisition of water, carbon, nutrients, and light, physiological processes (photosynthesis, respiration, transpiration, and production of secondary metabolites), plant growth, and response to biotic and abiotic stresses. Spring 2018 (face-to-face), Fall 2019 (online)

Horticulture 491, Undergraduate Research. Advise undergraduate students on a research problem, including the design, conduct, analysis and writing phases. Ruth Preslar, 2018-19.

Graduate courses
BOT 685, Direct Studies. Provides customized training and experience to students in the Biotechnology Program; topics can include laboratory research, scientific literature reviews. Tanya Sharma, 2019.

HORT 691, Graduate research. Samuel Vigue MS, 2018; Jeewan Pandey PhD Student, 2017 to date; Sanjeev Gautam PhD Student, 2018 to date.

Graduate student committees (non-advisees; date is date degree plan was approved)
2019 Mitchell Kent, MS in SCS
2018 Seza Noyan, MS in HORT
2018 Selfinaz Kubra Velioglu, MS in SCS
2019 Lorin Harvey. PhD Student, MS in SCS
2017 Stephany Toinga Villafuerte. PhD, MEPS

Grants and contracts awarded 2015-2020


Potatoes USA Research. National Chip Program. NCPT Southern Trials. FY18), Texas Vales, I. and C. Miller. 1/1/2018 - 12/31/2018. US$10,000


**Journals for which you reviewed papers 2015-2020**

*Associate editor:*
- American Journal of Potato Research
- Spanish Journal of Agricultural Research

*Reviewer (manuscripts)*
- American Journal of Potato Research
- Open Agriculture
- Genomic Selection and Crop Improvement (book chapter)

*Reviewer (proposals)*
- Bill and Melinda Gates Foundation
- Agriculture and Agri-food Canada
- NRSP-6 – United States Potato Genebank
- Crop Germplasm Committee – National Plant Germplasm System

**Internal university / agency service on committees 2015-2020**

*Professional association leadership roles 2015-2020*

2017 to date. Potato Crop Germplasm Committee.
2017 to date. Northwest Potato Variety Development committee.
2017 to date. Western Regional Potato Variety Development technical committee.
Alfred B. Wagner Jr.
Professor of Food Science
Department of Horticultural Science

Email address:
a-wagner@tamu.edu

Program Summary
I am a process authority recognized by the Food and Drug Administration and work with food processors to make sure their fruit and vegetable based food products are safe for public consumption. This testing and issuance of a food product evaluation forms generates over $40,000 each year. I also provide consultations with new processors and help established processors with technical issues. I am half time and do not have an active research program.
In addition I work with the Texas Food Processors Assn. as their Executive Director. They provide travel funds for me to support my work.
Russell W. Wallace, Ph.D.
Professor and Extension Vegetable Specialist
Department of Horticultural Sciences
Texas A&M AgriLife Research & Extension Center
1102 E. Drew St., Lubbock, TX 79403
Email: rwwallace@ag.tamu.edu

Program Summary

High Plains Vegetable and Statewide Strawberry Programs: Dr. Wallace holds a 75/25 percent extension/research split. His efforts have been to develop meaningful extension and research programs with other scientists, growers, commodity groups, and county, regional, statewide and national extension personnel involved in horticulture. Efforts include increasing production and profitability in the region and state. He has created long-term research projects that emphasize small farm agriculture including season-extension with tunnels for vegetables and strawberries, heat tolerance, and weed control and pest management. His work on high and low tunnels is recognized statewide and nationally. He provides expertise on vegetable and strawberry production for the High Plains and throughout Texas.

Academic Background:

<table>
<thead>
<tr>
<th>Year</th>
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<th>Institution</th>
<th>Major</th>
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<td>1993</td>
<td>Ph.D.</td>
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<td>Vegetable Crops/Weed Science</td>
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<tr>
<td>1987</td>
<td>M.S.</td>
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<td>1985</td>
<td>B.S.</td>
<td>Cal. State - Fresno</td>
<td>Plant Science/Crop Protection</td>
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Professional Experience:

2016-Present  Professor & Extension Vegetable Specialist, Texas A&M AgriLife Research & Extension, Lubbock
2008-2016  Associate Professor & Extension Vegetable Specialist. Texas A&M AgriLife Extension
2002-2008  Assistant Professor & Extension Vegetable & Weed Specialist. Texas A&M AgriLife Extension
1996-1997  Area Extension Specialist, Cornell Cooperative Extension, Cornell University
1993-1996  Research Associate, Dept. of Fruit and Vegetable Science, Cornell University
1987-1993  Research Technician and Graduate Student. Dept. of Fruit and Vegetable Science, Cornell University

Publications 2015-2019

Refereed Publications 2015-2019

DOI:10.21273/HORTTECH04135-18. 3.

Editor Reviewed Publications or Conference Proceedings 2015 - 2019


Electronic media/software (websites, software, videos, etc.) 2015 - 2019:
The Texas Strawberry Project Facebook Page - https://www.facebook.com/texasstrawberryproject/?ref=bookmarks. A
Facebook page to share extension and research information regarding strawberry production and events in Texas.

Classes Taught 2015 – 2019:
None
Graduate courses 2015 – 2019:  
None

Graduate student committees (as an adjunct professor at Texas Tech University)

Azeez Ahmed Shaik (Ph.D., Texas Tech University, Dept. of Plant and Soil Sciences)  
Manpreet Singh (M.S., Texas Tech University, Dept. of Plant and Soil Sciences)  
Ved Parkash (M.S., Texas Tech University, Dept. of Plant and Soil Sciences)

Grants and contracts awarded 2015 - 2019:


Weed Control in Spinach. Wintergarden Spinach Producers Board. 2015. $6,000

Evaluating Organic Pest Control Products for Strawberries in Combination with High and Low Tunnels for Limited Resource Farmers in the Mid-South. USDA-SARE Grant. $246,413.

Tomato Grafting: Development and Screening Rootstock Germplasm to Improve Disease Resistance, Yield, and Quality in Protected and Open Field Systems in Texas. 2016. Leskovar, Lead PI. Texas Vegetable Seed Grant. $80,000.


Weed and Disease Control in Rosemary and Watermelons. 2016. Syngenta $5,500

Texas Vegetable Seed Grant Program for Tomato Grafting. 2017. $3,000

Nematode control in strawberries. 2018. $20,000 (confidential contract)

Pumpkin research: SynTech Research. 2018. $4,000

Enhancing Resiliency and Productivity of Texas-Grown Strawberries. 2018. TDA SCRI-SCB.  $68,862.60

Journals for which I reviewed papers 2015 – 2019

HortScience
HortTechnology

Internal university/agency service on committees 2015 – 2109

Professional association leadership roles 2015-2019

Awards and recognitions 2015 - 2019

2019 Texas A&M University Vice Chancellor’s Award in Excellence for Partnership Award
2018 Texas A&M University Superior Team Award
2016 Friend of the Association Award. West Texas Growers and Producers Association, Lubbock, TX.
2016 Texas A&M AgriLife Extension Superior Unit Award
2015 Texas A&M AgriLife Extension Superior Service Award: Team Category
2015 Texas A&M AgriLife Extension Superior Service Award: Specialist Category
**Vision Statement:** We will be foremost among peer institutions—both nationally and internationally—as leaders in education, extension, and research in the horticultural sciences. Our discoveries and new technologies will produce economic, environmental, and health benefits that are key to Texas’ success and vital in the lives of its citizens.

**Mission Statement:** The Department of Horticultural Sciences is focused on improving the quality of life related to the aesthetic disciplines, the production of high quality, healthful fruits and vegetables, and improving the utility and sustainability of the built environment. This is accomplished by developing new knowledge and tools through basic and applied research, by translating research results to clientele through extension programing and by providing our students with the knowledge, resources and skills needed to be productive professionals.

Our mission is to 1) provide educational opportunities for students in the pursuit of careers in horticulture and related fields; 2) develop and deliver research-based knowledge upon which efficient and profitable sustainable and environmentally-compatible horticultural crop production can be built; 3) improve the competitive position of the Texas horticulture industry; 4) increase the quality, variety, and availability of horticultural products; 5) develop and deliver research-based knowledge related to how horticulture improves our environment and serves as a source of personal enrichment.

**Goals, Strategies and Performance Measures**

1. **Education: Enhance Opportunities for Undergraduate Student Success, Global Awareness, and Promote Life-long Learning.**

   1.1 **Goal 1: Attract students with high academic potential, diverse backgrounds and experiences**

   As the population of the Texas continues to grow, it is imperative that the Department of Horticultural Sciences attract and train students to help meet the challenge of providing nutritious foods and sustaining an aesthetically-pleasing and healthy environment to support the health and well-being of Texas’ citizens.

   1.1.1. **OBJECTIVE:** Increase the total number of undergraduate majors in the Department to 200 by 2025; increase the number of graduate students to 70 by 2025.

   1.1.2. **BENCHMARK:** There were 158 undergraduate majors and 55 graduate students enrolled in the Department in fall semester 2019.

   1.1.3. **STRATEGY:** Continue to offer horticulture courses as Core Curriculum electives to enhance internal transfer to HORT majors and grow HORT Minors.

   1.1.4. **STRATEGY:** Use existing undergraduate certificate in enology and develop new certificate in landscape gardening to enhance interest in horticulture as an undergraduate major.

   1.1.5. **STRATEGY:** Collaborate in the development of a hospitality emphasis to extend benefits associated with the Bachelor of Arts degree.

   1.1.6. **STRATEGY:** Further develop social media recruiting materials on major platforms to reach potential students in high school and 2-year colleges with emphasis on career opportunities and societal contributions of the horticultural sciences. Enhance our Core Curriculum courses to recruit internal transfer majors and minors.

   1.1.7. **TIMELINE:** Increasing enrollment at the undergraduate and graduate levels is a long-term goal and will require additions to faculty and improvement of facilities. International engagement of students through studies abroad are especially challenging due to the time and money commitment.
1.2. **Goal 2: Educate, train and graduate additional students**

1.2.1. **OBJECTIVE:** Develop well-educated graduates with the creative and technical knowledge and skills for success in their chosen area of horticulture including the scientific, production, business, or design emphases.

1.2.2. **BENCHMARK:** There were 158 undergraduate majors and 55 graduate students enrolled in the Department in fall semester 2019.

1.2.3.

1.2.4. **STRATEGY A:** Analyze the student population of horticulture minors and determine their associated majors and develop a strategy for attracting those students into the horticulture major.

1.2.5. **STRATEGY B:** Leverage the strong departmental research programs in social science to analyze workforce needs at the BS/BA and Masters levels.

1.2.6. **STRATEGY C:** Increase graduate enrollment by 10% by 2025.

1.2.7. **STRATEGY D:** Use annual undergraduate planning retreat to address issues related to workforce development and student success.

1.2.8. **STRATEGY E:** Add, delete and revise courses according to changing needs and trends in the industry accounting for the focus areas of the department.

1.2.9. **STRATEGY F:** Continue to provide excellent student advising and identify barriers to timely graduation.

1.2.10. **STRATEGY G:** Encourage faculty development opportunities for course revision and adoption of modern pedagogy, including exploration of Web-based course delivery.

1.2.11. **TIMELINE:** Using annual departmental retreats, by 2023 conduct a comprehensive curriculum review and revision.


   Public health is not only a major financial concern, but it is also integral to quality of life. It is vital that research be conducted to maintain and enhance public health and well-being. Public health is not just physical health, it is also emotional and psychological health; in that regard aesthetic horticulture is food for the mind and the sole, thus improves the well-being and quality of life.

2.1. **OBJECTIVE:** Promote nutrition and healthy lifestyles to prevent acute and chronic illness. We will conduct research to provide consumers, nutritionists, and health professionals with the fruits and vegetables that embody good nutrition as part of a healthy lifestyle that is critical to preventing acute and chronic illness.

2.1.1. **STRATEGY A:** Develop new fruit and vegetable cultivars with improved human health benefits. Identify beneficial phytochemicals and molecular markers linked to key genes for health-related traits.

2.1.2. **STRATEGY B:** Work with retailers to prioritize the needs of their customers for key marketing traits such as appearance, texture, shelf-life and taste recognizing that in order to be effective healthy food must be consumed.

2.1.3. **STRATEGY C:** Conduct research to establish best production practices to minimize foodborne hazards and biosecurity threat agents. Collaboratively develop post-harvest methods to ensure the safety of imported fruits and vegetables.
2.1.4. **STRATEGY D**: Foster the development of integrated, multi-disciplinary research that minimizes the impact of climate variability on the food supply and the built environment. Apply new approaches for the reliable detection of plant stress and plant phenotypes related to biotic and abiotic plant stress.

2.1.5. **STRATEGY E**: Continue studies on the health and well-being benefits of the people:plant interaction.

2.1.6. **TIMELINE**: Identification of health promoting traits will take 2-5 years and breeding them into production germplasm an additional 5-10 years.


   The ornamentals production, landscape services, and floral industries (commonly referred to collectively as the Green Industry) are big business in Texas, accounting for $20.1 billion in sales in 2017 (Palma & Hall, 2018 TNLA report). Total economic impact of green industries includes production and manufacturing, wholesale and retail sectors, as well as nursery and greenhouse production. It is therefore crucial that we engage in research activities that protect and enhance competitiveness, prosperity, and sustainability of Texas horticulture.

3.1 **OBJECTIVE**: Improve horticultural production, efficiency, and environmental stress mitigation through advances in plant breeding, management, and marketing.

   Although branding of horticultural goods and services is increasing, many products are still marketed as ‘generics.’ As such, little opportunity exists to improve profitability through selling branded products at a higher price. A primary means for producers to survive and prosper is through cutting costs. We will continue and expand our efforts to increase efficiency through plant breeding, design and testing of novel management and marketing systems, as well as improvements in plant health.

3.1.1. **IMPERATIVE**: Provide research-based solutions to industry that support economic and environmental sustainability.

3.1.2. **STRATEGY A**: Determine the effects of environmental stress on plant production and quality, and develop mitigation strategies to improve the growth, reproduction, and health, of floriculture and nursery crops.

3.1.3. **STRATEGY B**: Investigate improvements in greenhouse and nursery management systems that take a long-term, holistic view rather than a narrow focus on a few parameters or traits of economic importance.

3.1.4. **STRATEGY C**: Develop and apply genomic tools, including marker assisted breeding, gene editing, and genomic selection where appropriate.

3.1.5. **STRATEGY D**: Develop and apply new high-throughput phenotyping technologies for early detection of biotic (pathogens, insects) and abiotic (nutritional deficiencies, drought) in greenhouse and field production systems. Use eye tracking technologies to evaluate consumer preferences and focus breeding and production priorities.

3.1.6. **STRATEGY D**: Assess market structure and performance that link final consumer demand to production, varietal development and resource allocation.

3.1.7. **TIMELINE**: Make short (1-2 year) and long term (5-10 year) gains in evaluating and developing consumer driven products in floriculture and nursery crops. Capture value for the breeders through plant variety protection and royalties to support programs.
Research Goal 3: Elevate Departmental Research Metrics

Extramural support is critical to sustaining relevant, high-impact research programs. It should also be recognized that such funding can come from a variety of sources based on the specific research needs and objectives of the grantor. This approach is critical to the mission of a landgrant university. Scholarship outputs take many forms, although the primary metric of productivity remains refereed publications. Although specialty journals are important for disciplinary recognition, they are sometimes discounted as second tier because of their narrower focus. Nevertheless, these publications remain crucial to stakeholder success. Therefore, the department will value all forms of scholarship output.

3.2. **OBJECTIVE**: Increase funding from competitive federal grants and contracts by 20% in 5 years.

3.2.1. **STRATEGY A**: Provide support for faculty, post-docs and graduate students to attend grant writing workshops locally and off campus where appropriate.
3.2.2. **STRATEGY B**: Encourage faculty to work with the AgriLife Research Office of Corporate Engagement & Research Support to organize, write and assemble large ($1M+) proposals.
3.2.3. **STRATEGY C**: Incentivize faculty to volunteer and participate on federal grant panels.
3.2.4. **STRATEGY D**: Strengthen multi-disciplinary teams to achieve excellence in nursery and greenhouse crops, fruit and vegetable breeding. Increase royalty streams to support and expand breeding and plant selection programs.

3.3. **OBJECTIVE**: Increase the visibility of the Department of Horticultural Sciences at the national and international levels.

3.3.1. **STRATEGY A**: Encourage publication in more high impact journals and review articles to increase impact and citation levels.
3.3.2. **STRATEGY B**: Encourage faculty to participate as editors, on editorial boards, and *ad hoc* reviewers.
3.3.3. **STRATEGY C**: Encourage faculty to serve on federal grant review panels and communicate with program managers on a regular basis.
3.3.4. **STRATEGY D**: Sharpen faculty and post-doc writing skills through writing mentors and workshops.
3.3.5. **STRATEGY E**: Initiate a Horticulture Program Awards Committee. Nominate more faculty for regional and national awards, offices, and honorific titles.
3.3.6. **TIMELINE**: As senior faculty retire, size the opportunity to recruit junior level faculty in research areas considered a high priority for federal competitive funding.

4. **Extension: Improve Health through Improved Nutrition Education; Promote economic sustainability of horticultural crop producers; build upon volunteer base to enhance program delivery**

The impact of poor diets on acute and chronic illness is undeniable, yet the U.S. healthcare system is based on treating ill patients rather than on prevention. The AgriLife Extension Service has long been dedicated to improving lives through education and the Healthy Texas Initiative is but one example of the power of community-based learning to affect positive change.

3.1 **OBJECTIVE**: Promote dietary information on making healthy food choices to prevent acute and chronic illness. The relationship between the importance of fruits and vegetables and health is well established. We will deliver programs to provide consumers, nutritionists, and health professionals with information...
on the horticultural products that embody good nutrition as part of a healthy diet and lifestyle. Continue to utilize aesthetic horticulture to promote well-being and quality of life.

4.1.1. **STRATEGY A**: Improve knowledge of traditional and alternative crops and farming systems on yield, biomass production, soil carbon, soil nutrient cycling, and greenhouse gas emissions and provide for both mitigation practices and production adaption to maintain economically viable systems.

4.1.2. **STRATEGY B**: Incorporate Healthy Texas and nutrition concepts into the Junior Master Gardener program

4.1.3. **STRATEGY C**: Establish and deliver data on ‘health premiums’ associated with horticultural products that can be used by producers and marketers to drive demand and increase profitability.

4.1.4. **STRATEGY D**: Continue studies on how plants promote well-being and quality of life.

4.2. **OBJECTIVE**: Support the expanding wine industry in Texas by developing and delivering science-based information in viticulture and enology.

4.2.1. Support a continuous feedback system in which producer’s issues are addressed through education programs and where gaps exist, carry out applied research.

4.2.2. Assist with addressing quality issues in enology that are traceable to viticultural conditions and/or practices.

4.2.3. Identify and analyze market trends that will inform wineries how to adjust their products to anticipate future consumer demand.

4.2.4. Enlist specialists from other disciplines such as plant pathology and soil science to enhance program development in viticulture.

4.3. **OBJECTIVE**: Support the traditional horticultural industries of Texas by providing research-based extension information in a variety of media formats.

4.3.1. **STRATEGY A**: Continue to support, organize and deliver quality educational programming in cooperation with the horticultural commodity groups in Texas.

4.3.2. **STRATEGY B**: Continue to develop workshops, field days, and other traditional extension programming where appropriate.

4.4. **OBJECTIVE**: Enhance Program Outreach through Volunteer Programs

4.4.1. **STRATEGY A**: Grow the Master Gardener and Junior Master Gardener programs.

4.4.2. **STRATEGY B**: Partner with, utilize and support joint educational efforts with The Gardens at Texas A&M University.

4.4.3. **TIMELINE**: Increase enrollment in online training programs for volunteers by 20% by 2025 to enable volunteer coordinators to focus on program updates and expansion. Develop two “co-branded” educational programs or events with the Gardens at TAMU within the next two years.

**Measuring Success**

The ultimate measure of the successes we achieve in executing and implementing our Departmental Strategic Plan will be the educational, scholarship, and societal impacts of our programs. Metrics that enable faculty to monitor key inputs and outputs have been included in our Strategic Plan as management controls and harbingers of the impacts we can expect to realize in the future.
Inputs

- Seek to double restricted and unrestricted giving over the next five years
- Increase the total value of research awards by 10% per year. Expand our portfolio of royalty supported research by 20% within five years.
- Increase the number, quality and diversity of undergraduate and graduate students.

Outputs

- Increase the number and impact of peer-reviewed publications and strive for placement in upper tier journals with enhanced citation rates.
- Train professionals and scientists that are in high demand and are being recruited by top organizations.
- Develop additional intellectual property and double the number of invention disclosures by 2025.
- Continually improve visibility of each mission area through improved Websites and an expanded social media footprint.
Endowed Chairs, Programs and Scholarships

**Endowed Chairs**

**Basye Chair in Rose Breeding and Genetics**
Robert Basye was a mathematics professor by vocation, but a world-class rose breeder by avocation. Breeding roses to increase resistance to diseases was his passion and conquering the blackspot disease of roses was his lifetime goal. His generous donation established an endowed professorship to support rose breeding and genetics. The current holder of that distinguished professorship is Dr. David Byrne.

**Ellison Chair in International Floriculture**
The Ellison Chair in International Floriculture is named after Jim and Ellen Ellison, who spearheaded the campaign to generate industry funding for the Chair. The mission of this Chair is to advance the health and vitality of the floriculture industry on a national and international scope through exemplary academic leadership, cutting edge applied research, innovative extension outreach programs, and by mentoring well-educated, impassioned leaders to support the future of floriculture. The current holder of the Ellison Chair is Dr. Charlie Hall.

**Benz Chair in Floral Design**
The only floral design endowed chair in the world, the Benz Chair was established at the bequest of floral design innovator M. “Buddy” Benz. The Benz Endowed Chair and School of Floral Design is a multi-faceted program which includes the Benz Gallery of Floral Art, located in the expansive atrium of the Horticulture/Forest Sciences Building, and the Benz School of Floral Design, which offers a variety of basic and advanced training courses for floral designers annually. The bequest also supports the teaching activities of the Chair holder, Mr. Bill McKinley, world-renowned designer and floral educator.

**Endowed Programs**

**Vegetable and Fruit Improvement Center**
The Vegetable and Fruit Improvement Center (VFIC) was established in 1992 under the direction of Dr. Leonard M. Pike, to support and strengthen the total vegetable industry through research. Its goal is to develop new technologies for producing quality vegetable products in an efficient, economic and environmentally sound system, with a focus on achieving health and nutrition benefits. In March 1999, fruit was officially added to the name and research scope of the Center. The Center is directed by Dr. Bhimu Patil. The Vegetable Improvement Center Endowment was established to strengthen the Texas vegetable industry by attracting and maintaining the highest quality scientists, attracting and training the highest quality students, improving innovative research and extension programs, developing new and advanced research technologies to improve economic productivity, and protecting and improving the environment while sustaining vegetable production.

**Texas Pecan Endowment**
The Texas Pecan Endowment supports research, education and extension activities that benefit the pecan industry and supports ongoing development activities for the benefit of the fund.

**Texas Ornamentals Program Enhancement Endowment**
This endowment was established to strengthen the Texas ornamental horticulture industry by attracting and maintaining the highest quality scientists, attracting and training the highest quality students, improving innovative research and extension programs, developing new and advanced research technologies to improve economic productivity, and protecting and improving the environment while sustaining ornamental horticulture.

**Lou Cashion Memorial Garden Fund**
This fund supports all activities and needs at the TAMU Horticultural Gardens and Field Laboratory, with a focus on maintaining the area identified as the Lou Cashion Memorial Garden. After transferring this garden to University physical facilities in 2011, and its subsequent loss of maintenance, this garden and the supporting endowment will be transferred to The Gardens at TAMU by agreement of all concerned.
Ralph S. Moore Miniature Rose Excellence Fund
The Moore Rose Excellence Fund are used for activities that preserve the legacy of Mr. Ralph S. Moore’s research in miniature roses and woody ornamentals and enhance the teaching, research and extension mission of the department.

Horticulture Teaching Technology Endowment
The Teaching Technology Endowment intends to insure that horticulture students receive instruction in the use of state of the art equipment, software and educational tools that pertain to the art and science of horticulture. The goal is that Texas A&M horticulture graduates will be recognized nationally as having received the most advanced instruction in the application of advanced technology to horticultural problems.

Horticulture Scholarship Endowments
A growing list of endowed scholarships provide awards to outstanding students annually in amounts ranging from $1,000 to $2,000 (Appendix 1.1). In addition to the endowed scholarships, other benefactors including commodity groups, garden clubs, and individuals provide funding and our department generally awards in excess of $50,000 to students at our annual awards banquet held on Parent’s Weekend every year.

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<tr>
<th>Endowments</th>
<th>Corpus</th>
<th>Market Value</th>
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<tr>
<td>Benz Endowed Chair in Floral Design</td>
<td>942,373.59</td>
<td>2,133,133.72</td>
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<tr>
<td>Basye Endowed Chair in Rose Genetics</td>
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<td>Robert Rucker Scholarship</td>
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<td>Everett R. Emino Endowed Scholarship</td>
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<td>Jason Guy Harris Endowed Scholarship</td>
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<td>J. Benton Storey Endowed Scholarship in Horticulture</td>
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<td>Robbie Jane Paup ’07 Scholarship</td>
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<td>William C. Welch Landscape Horticulture Scholarships</td>
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<td>Creighton Miller Endowed Scholarship in Plant Breeding &amp; Genetics</td>
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<td>Horticultural Gardens Field Lab</td>
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<td>Ornamentals Programs Enhancement Endowment</td>
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<td>Pecan Orchard Excellence Fund</td>
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<td>Viticulture Development &amp; Research Fund</td>
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<td>Holistic Garden Fund</td>
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<tr>
<td>Arthur &amp; Gaye Platt Viticulture Fund</td>
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<td>Dickson-Allen Foundation Olive Orchard Excellence Fund</td>
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DEPARTMENTAL PROMOTION AND TENURE POLICY
Department of Horticultural Sciences
Texas A&M University

(Revised and approved September 23, 2009; January 11, 2013; October 6, 2015, October 19, 2016)

Sections

Introduction

I. Definition of Faculty, Rights and Privileges
II. Composition, Voting and Tenure on the Promotion and Tenure Committee
III. Timing of Reviews
IV. Mid-Term Review (3-Year Review for 7-Year Probationary Period)
V. Promotion and Tenure Review
VI. Post-Tenure Review

Introduction

The Texas A&M Department of Horticultural Sciences is judged by the quality of its academic,
extension and research programs and the total professional contributions of its faculty. For this reason,
the Department of Horticultural Sciences seeks to hire and retain faculty members who develop
distinguished teaching programs, at the graduate and undergraduate levels, develop distinguished research
and/or extension programs, and share their time and professional expertise in service both within and
outside of the Texas A&M University System (TAMUS).

In order to increase the probability of retaining outstanding faculty, various guidelines and policies
for promotion and tenure have been developed. The policies and procedures for promotion and/or tenure
set forth in this document apply to both tenure-track and non-tenure-track faculty within the Department
of Horticultural Sciences on the Texas A&M University campus and at off-campus locations.

These guidelines are intended to inform candidates concerning the expectations of the faculty of
the Department of Horticultural Sciences and the procedures for promotion and tenure within this
program. In all cases, the policies and procedures of Texas A&M University College of Agriculture and
Life Sciences, Texas A&M AgriLife Research and the Texas A&M AgriLife Extension Service supersede
those contained herein. Candidates are urged to familiarize themselves thoroughly with the policies and
procedures of the appropriate system part(s) and to exercise due diligence in adhering to deadlines and expectations. The Rules for TAMU are set forth in University Rule 12.01.99.M2 - University Statement on Academic Freedom, Responsibility, Tenure, and Promotion. The Dean of Faculties Office publishes yearly guidelines and the process to follow for that year.

I. Definition of Faculty, Rights and Privileges

Consistent with Texas A&M University College of Agriculture and Life Sciences, Texas AgriLife Research, and Texas AgriLife Extension policy, to be considered a faculty member of the Department of Horticultural Sciences, an individual must hold one of the following titles:

- Professor
- Associate Professor
- Assistant Professor
- Research Professor
- Research Associate Professor
- Research Assistant Professor
- Adjunct Professor
- Adjunct Associate Professor
- Adjunct Assistant Professor
- Visiting Professor
- Visiting Associate Professor
- Visiting Assistant Professor
- Instructor
- Lecturer
- Senior Lecturer
- Distinguished Lecturer
- Assistant Lecturer

Rights and Privileges of Faculty Members

All faculty members should receive communications intended for “faculty” and are invited to participate in faculty meetings. To be a voting member of the faculty, individuals must be adloc’d to the Department of Horticultural Sciences (with a title of Professor, Associate Professor, Assistant Professor, Instructor, Lecturer, Senior Lecturer, or Distinguished Lecturer), and have Horticultural Sciences designated as their home department (as in the case of off-campus Texas A&M AgriLife Research appointments), and have no modifiers in their professorial titles. Therefore, Adjunct, Visiting, and Research modifiers are non-voting faculty members. Issues which require a faculty vote typically include
department-wide issues (e.g. hiring of a new faculty member or Head, changes in departmental policy).

In addition, for agency (TAMU COALS, Texas A&M AgriLife Research, the Texas A&M AgriLife Extension Service) specific issues, votes may be taken that are restricted to faculty that carry those agency appointments.

II. Composition, Voting and Tenure on the Promotion and Tenure Committee

The Promotion and Tenure Committee is composed of all full Professors in the Department of Horticultural Sciences, including Professors with TAMU, Texas A&M AgriLife Research and the Texas A&M AgriLife Extension appointments, both on-campus and off-campus, but not including Professors with modifiers (Research, Visiting or Adjunct). There will be a minimum of 2 full Professors each from the following categories:

A. On-campus, TAMU or joint Texas A&M AgriLife Research-TAMU or joint Texas A&M AgriLife Extension Service-TAMU appointments

B. On-campus, Texas A&M AgriLife Extension appointment

C. Off-campus, Texas A&M AgriLife Research appointment

D. Off-campus, Texas A&M AgriLife Extension Service appointment

If no or only one full Professor in any of these categories exists in the current Department of Horticultural Sciences and/or off-campus units, then the remaining slot(s) in the category(ies) will be filled by an Associate Professor(s) from the deficient category as recommended by the Promotion and Tenure Committee and appointed by the Department Head.

Voting

The whole committee will vote on matters related to promotion with the following exception: Associate Professors cannot participate in decisions regarding promotion to full Professor. When tenure considerations are made, all committee members may participate in discussion of the candidate's credentials and all members may register a vote. The vote will be reported separately for tenured
committee members and non-tenured and/or non-tenure-track committee members. As per TAMU policy, only the vote of committee members already holding tenure will be reported as the formal tenure vote.

The Chair of the Promotion and Tenure Committee will tally votes, communicate committee decisions to the department head, and communicate the department head's comments to the committee.

**Abstain, Absent and Recuse Votes**

The committee should attempt to minimize abstain and absent votes in order for the committee’s recommendation to carry maximum influence as the packets move forward through the process. Recuse votes should be used sparingly, and for valid reasons that compromise one’s decision.

**Tenure on Departmental Promotion and Tenure Committee**

Appointment to the Departmental Promotion and Tenure Committee is permanent, but contingent on participation as follows:

- If a committee member fails to participate and register a vote in tenure and promotion considerations for two consecutive academic years, then they will be removed from the committee. Abstain or absent votes do not constitute a participating vote. A recuse vote (given a valid reason) does constitute a participating vote.

- Two years after removal, the faculty member will regain eligibility, and may be re-appointed to the committee by petition to the Head.

**III . Timing of Reviews**

**Tenure and Promotion from Assistant to Associate Professor**

The general time line for reviews is as follows (exact dates will vary from year to year): March-May, candidate solicits input on dossier from senior faculty members; mid-June, candidate submits dossier and names of possible external peer reviewers to the Department Head; mid-August, dossier is assembled in preparation for going to the Department Promotion and Tenure Committee; early to mid-September, Department Promotion and Tenure Committee convenes and votes on cases; late September, Department Promotion and Tenure Committee report and Department Head letter is submitted to Dean’s or Director’s
offices. Candidates are strongly encouraged to seek input from their mentoring committee and other senior faculty members regarding the timing for submitting their dossiers.

Any individual hired in a tenure-track position will be required to submit materials for review during the academic year prior to the end of their probationary period. The exact timing of this depends upon the length of the probationary period (see the formula below or as superseded by TAMU system policy). The start of a tenure-track faculty member’s mandatory consideration year (academic year) can be calculated as follows:

**Calendar year hired + Probationary period – 2 years = Tenure Consideration Year**

For example, for a faculty member hired in 2017:

<table>
<thead>
<tr>
<th>If probationary period is:</th>
<th>Mid-Term Review will occur between:</th>
<th>Mandatory Tenure Review (at all levels) will occur:</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 years</td>
<td>Mar – Dec 2020</td>
<td>2022/23</td>
</tr>
<tr>
<td>6 years</td>
<td>Mar – Dec 2019 (encouraged)</td>
<td>2021/22</td>
</tr>
<tr>
<td>5 years</td>
<td>Mar – Dec 2019 (encouraged)</td>
<td>2020/21</td>
</tr>
<tr>
<td>4 years</td>
<td>N/A</td>
<td>2019/20</td>
</tr>
<tr>
<td>3 years</td>
<td>N/A</td>
<td>2018/19</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Semester of hire does not necessarily constitute “hire year.”
2. The probationary period will be found in the faculty member’s original letter of hire.
3. The Board of Regents will review recommendations in the spring semester of the tenure consideration year.
4. See the separate Guidelines for Annual and Midterm Reviews for more information about midterm review timing.

A faculty member must be informed of a negative tenure decision at least 1 year before the termination of employment (except in the case of financial exigency as defined by TAMU System policy).

Promotion from Assistant to Associate Professor, with or without the granting of tenure, will take place prior to the beginning of the last probationary year (i.e. going up for tenure and/or promotion early).
only in exceptional cases. Such an action recognizes the accomplishments of the faculty member in making unusually quick progress in the development of teaching, research or extension programs.

**Promotion from Associate Professor to Professor**

There is no set schedule for consideration of promotion from Associate Professor to Professor. The timing should be part of the discussion between the faculty member and the Head, Resident Director or Associate Head for Texas AgriLife Extension during the Annual Review. Twelve total years in rank (Assistant plus Associate) would be a typical time in rank to begin the discussion on timing of promotion to Professor; however, the exact timing is dependent on the progress and accomplishments of the faculty member.

**IV. Mid-Term Review (3-Year Review for 7-Year Probationary Period)**

http://dof.tamu.edu/admin/faculty/annual-midtermguidelines.pdf

The Mid-Term Review often is referred to as “3rd Year Review” because many tenure-track faculty are hired with a 7 year probationary period; therefore, the mid-term review would take place in the third year. Tenure-track faculty with a probationary period of 7 years are required (by University Rule 12.01099.M2) to have a Mid-Term Review. Tenure-track faculty with a probationary period between 4 and 6 years are encouraged to have a Mid-Term Review. Unless the appointment letter states otherwise, the probationary period in the department will be 7 years. See the previous table on Timing of Review for the when the Mid-Term Review is to be conducted.

**Purpose of Mid-Term Review**

The purpose of the Mid-Term Review is mentoring. The decisions and opinions of the Head, Resident Director, Associate Head, and Promotion and Tenure Committee are not terminal. The Mid-Term Review informs faculty members as to how they are progressing towards promotion and/or tenure, and in sufficient time in advance to allow the faculty member to correct deficiencies. The Annual Review by the Head, Resident Director or Associate Head for Agrilife Extension allows annual mentoring. The Mid-Term Review gives candidates an indication as to how the Promotion and Tenure Committee views
their progress towards promotion. Candidates are expected to confer with their mentoring committee in
preparation for the mid-term review.

**Mandatory for all Faculty – TAMU, Texas A&M AgriLife Research and Texas A&M AgriLife Extension**

Mid-Term Reviews are mandatory for TAMU and Texas A&M Agrilife Research faculty with
seven year probationary periods. Since the main purpose of the Mid-Term Review is mentoring,
departmental policy also requires Mid-Term Reviews for Texas A&M AgriLife Extension faculty, both
on-campus and off-campus.

**Mid-Term Review Process**

The Mid-Term Review should be similar to the tenure/promotion review process, including the
submission of a dossier. However, no outside letters are sought; but internal letters of recommendation
can be included. The Mid-Term Review packet is put together according to the Guidelines for Tenure
and Promotion Packages for that year:

(http://dof.tamu.edu/Faculty-Resources/CURRENT-FACULTY/Promotion-and-Tenure)

At the discretion of the Head, Resident Director or Associate Head for Texas A&M AgriLife
Extension, the Mid-Term Review can take the place of the Annual Review during the year of the Mid-
Term Review.

The Mid-Term review package goes only to the level of Dean of the College, or Directors of Texas
A&M AgriLife Research or Texas AgriLife A&M Extension.

**V. Promotion and Tenure Review**

**Eligibility for Promotion and Tenure**

To be eligible for tenure consideration, an individual must hold the title of Instructor, Assistant
Professor, Associate Professor, Professor or Distinguished Professor, and have a minimum salaried
appointment of 33% on a 9-month basis (25% on a 12-month basis) with Texas A&M University (TAMU).
Persons with majority appointments with the Texas A&M AgriLife Research, Texas A&M AgriLife
Extension, or with joint appointments with less than 33% funding on a 9-month basis, or 25% on a 12-month basis through TAMU are eligible for professorial rank, but are not eligible for tenure consideration. Lecturers, Senior Lecturers, Visiting, Adjunct, and Research Professors of any rank, graduate students serving as teaching assistants, post-doctoral fellows, technicians or Research Scientists are not eligible for tenure consideration and are evaluated annually for reappointment by the department head or his/her designate.

New faculty members who have only recently earned terminal degrees or have only postdoctoral training, are accorded a probationary period not to exceed 7 years during which they must demonstrate competence for promotion, and if the position is on the tenure-track, for the awarding of tenure. The duration of this probationary period must be clearly stated in the initial letter of offer and is governed by the policies of Texas A&M University. Persons with prior appropriate full time service at other institutions of higher education may be accorded lesser probationary terms. Under certain circumstances, advanced professorial rank and tenure or advanced professional rank and tenure probation may be awarded during the process of hiring. Typically, hiring of faculty at advanced professorial rank or granting of tenure upon hiring only will be considered if the individual currently possesses that rank and/or tenure at another institution of higher education, and in all cases, the Department of Horticultural Sciences Promotion and Tenure Committee will vote on this action.

Assistant Professors in the tenure-track will not be recommended for promotion without also being recommended for tenure. Associate Professors in tenure-track positions, hired without tenure, may have a maximum of 7 years to qualify for tenure as agreed upon at the time of hiring. The awarding of tenure to an Associate Professor is not always accompanied by promotion to Professor.

Promotion of tenured faculty from Associate Professor to Professor will be based on the documentation of distinguished achievement in teaching, research and extension/professional/public service activities. Consideration may be given to promotion of an individual whenever criteria as set forth in the following section are met.
There are four ways in which candidates to be considered for promotion and/or tenure may be identified:

1. As mandated by the probationary period.
2. By recommendation of the Department Head or Resident Director;
3. By the Department of Horticultural Sciences Promotion and Tenure Committee;
4. By the request of the individual faculty member;

Except with the mandatory probationary period, the candidate is ultimately the person who makes the decision as to when consideration for promotion will occur. This decision should be made after strongly considering the advice from their mentoring committee, other senior faculty members and the Department Head.

Criteria for Promotion and the Awarding of Tenure

General Policy

The criteria for promotion and for the awarding of tenure (if on the tenure-track) in the Department of Horticultural Sciences are identical, that is, tenure or promotion is recommended only if the candidate clearly meets the criteria for promotion not only among others in the Program, but also in comparison with scientists throughout the System and those at peer institutions with horticulture programs.

Assistant Professor

The rank of Assistant Professor usually pertains to an initial appointment, rather than a promotion. Qualifications for appointment to this rank include receipt of the terminal degree in the discipline, high potential for future teaching, research or extension programming ability, which is based on evaluation of service as a teaching assistant and/or instructor, the candidate's dissertation or other written evidence of original research, prior involvement in extension programming activities, or prior service as an Assistant Professor at another institution.

An Assistant Professor with a teaching appointment will have responsibility for teaching undergraduate and/or graduate courses and for assisting in course and curriculum development, may
supervise the efforts of undergraduate and graduate student assistants, assist student organizations within
the Department, College or University, and, as a member of the graduate faculty, advise graduate students
and serve on graduate student committees. The Assistant Professor may also assume major responsibility
for supervising graduate students who are completing theses or dissertations, and may serve as a member
of College and/or University committees. The Assistant Professor will also have a responsibility to
develop a productive research or extension program, to seek external support for such programs and
publish the results of these efforts, to advise students on curricular and career choices, engage in public
service activities and serve on faculty committees. The Assistant Professor will develop scholarly
maturity as evidenced by professional achievement, such as publication of research results in refereed
journals, and by creative and effective teaching or extension activities. As with all faculty members, the
Assistant Professor will also be responsible for providing professional service to the Department, College,
University and/or their profession, in accordance with their position description.

**Mentoring Committee:** A Mentoring Committee will be assigned by the Department Head to all new
Assistant Professors within one year of employment. The Mentoring Committee normally will consist of
two to four senior faculty (Associate Professor or Professor) who have experience relevant to the new
Assistant Professor. Once the Mentoring Committee is assigned, it is the responsibility of the new faculty
member to communicate with them on a regular basis regarding professional development activities and
progress towards promotion. One member of the Mentoring Committee will assume the role of primary
contact. The Assistant Professor is encouraged to solicit an annual review of their progress from the
mentoring committee.

**Associate Professor**

Appointment or promotion to the rank of Associate Professor requires evidence of superior ability
as a teacher, researcher and/or extension professional. The demonstration of a substantive research or
extension program, excellence in classroom instruction, and publications that reflect one's original
contributions are required for advancement to this grade. Other professional and scientific activities, as well as involvement in departmental improvement programs, are positive factors.

The Associate Professor with a teaching appointment will be responsible for teaching undergraduate and/or graduate courses, and for assisting in course and curriculum development. The Associate Professor must have demonstrated skill in teaching undergraduate and/or graduate courses, must have received favorable evaluations from students and departmental administrators, and must have demonstrated a sincere interest in working with students. He/she should manifest a high degree of scholarly maturity by conducting research/extension programs of a high caliber in a disciplinary or commodity specialty, by seeking external support for such research, and by publishing the results of these efforts. If assigned extension responsibilities, the individual should have organized an effective extension program to include publications, media development, programs, workshops, and collaborative efforts with county extension professionals, and other means considered appropriate to a comprehensive program. The Associate Professor with teaching and research appointments will assume major responsibility for supervising graduate students who are completing theses or dissertations, and may serve as a member of college, university, or agency committees. He/she might have other responsibilities, as assigned by the Department Head. He/she may also be responsible for serving as a resource person for appropriate commodity groups, and for undertaking leadership roles in appropriate professional organizations at the state, regional, or national level. As with all faculty members, the Associate Professor will also be responsible for providing professional service to the Department, College, University and/or their profession, in accordance with their position description.

**Professor**

Appointment or promotion to the rank of full Professor requires evidence of superior and sustained performance as a teacher, researcher and/or extension professional. Some individuals are better teachers than others, just as some are better researchers than others. The combination of these principal academic
functions, at a level of superiority and as appropriate to the appointment, is required of a full Professor. The Professor must have achieved national/international recognition for scientific accomplishment or creative activity. In addition, significant contributions are expected by way of faculty governance and visible participation in national academic and scientific affairs.

The Professor should be recognized as a highly competent professional in his/her discipline, and should also have a record of success in assigned teaching and scholarly accomplishment consistent with their position description. The Professor should continually strive for professional improvement.

Measures that weigh heavily in evaluation for promotion to this rank include quality of teaching; quality of theses and/or dissertations prepared under the candidate's active supervision; chairing/co-chairing Ph.D. student committees for those with on-campus research and teaching appointments; the candidate's own research productivity, quality of extension programming, grantsmanship, participation in departmental, college, Texas AgriLife Research, Texas AgriLife Extension, and university affairs, and leadership in the affairs of relevant professional and scientific organizations, and where appropriate, commodity organizations.

The Professor is responsible for providing leadership in developing the educational and/or research program(s) in his/her area of expertise and for attracting high-quality students. He/she assumes major responsibility for discharging successfully the tasks assigned to department, college, agency, and/or university committees. The Professor exhibits the highest caliber of instructional, extension programming, and/or scholarly skills, and is uniquely responsible for, and capable of, providing leadership for the overall good of the Texas A&M University System. As a seasoned and mature professional, the Professor contributes significantly to regional and national organizations. Likewise, the Professor is responsible for using his/her skills and reputation to advance the horticulture professions, and to seek ways in which the discipline can assist in improving the quality of life. As with all faculty members, the Professor will also be responsible for providing professional service to the Department, College, University and/or their profession, in accordance with their position description.
Criteria for Evaluation

All faculty are expected to develop distinguished teaching, research and/or extension programs, consistent with the expectations of their position descriptions and annual plans of work, and to serve their profession and TAMUS by participating on committees and in administrative functions as needed. Teaching, research and extension performance will be evaluated with respect to the proportion of budgeted time assigned to each activity. However, the major emphasis for evaluation will be on the quality and balance of effort in the individual's overall academic and professional programs. The criteria for evaluation are (in no particular order of importance):

1. Criteria for the Teaching Function
   a. Superior teaching performance in the classroom based on student evaluation, etc.
   b. Development of innovative and effective instructional approaches, materials, books, manuals, and techniques
   c. Development of new academic programs
   d. Incorporation of activities and instructional materials that enhance students’ exposure to diversity and international awareness and/or increase the students’ involvement in interdisciplinary courses and curricula.
   e. Chairship/co-chairship of graduate advisory committees and direction of graduate programs, particularly Ph.D. students for those faculty with the rank Associate Professor or Professor
   f. Publication in educational journals
   g. Recipient of awards for teaching from the university and/or professional organizations
   h. Effective student advising
   i. Effective student recruitment
   j. Satisfactory review by at least one peer (selected by Department Head) who has observed personally the candidate in the classroom and who has evaluated relevant teaching materials
such as course syllabi, web sites, handouts, assignments, examinations, and/or grading
methods

2. Criteria for the Research Function
   a. Evidence of independent research in a well-planned and developed program and/or a key
      role in strong multi-disciplinary research
   b. Demonstration of significant contributions to interdisciplinary research collaborations
      involving faculty with different departments in the College of Agriculture and Life
      Sciences, faculty in other colleges at Texas A&M University, or colleagues from other
      institutions. International and interdisciplinary collaborations which result in publication
      of scholarly works are encouraged.
   c. Publication of research in scholarly and professional refereed journals
   d. Publication of research in forms that are targeted for user groups
   e. Recipient of awards for excellence in research
   f. Significant research funding from external sources
   g. Presentation of invited papers at regional, national, or international professional and
      scientific meetings
   h. Maintenance of effective relationships with research user groups
   i. Evidence that research has contributed to the advancement of knowledge or has produced
      a tangible benefit to society, e.g., improved crop variety
   j. Chairship/co-chairship of graduate advisory committees and direction of graduate
      programs, particularly Ph.D. students for those faculty with the rank Associate Professor
      or Professor

3. Criteria for the Extension Function
   a. Evidence of leadership in extension programming, as judged by substantial impact on
      clientele served
b. Quantity and quality of extension materials including bulletins, pamphlets, fact sheets, electronic or multimedia presentations, videos, computer programs, newsletters, web pages and other educational works prepared by the individual
c. Quantity and quality of extension educational efforts in mass media
d. Quantity and quality of educational activities in service to individuals, county programs, and commodity groups
e. Participation in research, independently or in cooperation with others, and the subsequent publication of results in refereed journals and/or industry and trade journals
f. Demonstrated ability to obtain grant support from external sources
g. Presentation of invited papers at regional, national, or international industry, professional and/or scientific meetings
h. Maintenance of effective relationships with commodity groups
i. Receipt of awards, commendations, or other recognition indicative of excellence in scholarly or service activity
j. Evidence of effectively communicating research findings of TAMUS research personnel, or evidence of effective communication or cooperation with TAMUS or researchers from other institutions or entities.

4. Criteria for the Public Service Function
   a. Service to the College, University, and System through committee assignments and leadership roles
   b. Service to professional and scientific societies
   c. Maintenance of strong working relationships with counterparts in the Department
   d. Service to state, regional, and national levels of government
   e. Service to students, student organizations, etc.
   f. Presentation of technical information to commodity groups
5. Contributions to a Safe Workplace

Faculty must demonstrate an awareness of and their support for making the departmental environment a safe workplace for themselves, their employees, their students and the University community. Criteria to be assessed in this regard include completion of all mandated safety and risk management trainings, integration of safety instruction and accountability into classroom and laboratory instruction, on-the-job training of all employees and graduate students in appropriate safety measures to be taken in their research, teaching, and extension programs, and correction of variances under their control noted in University safety inspections. No faculty member will receive an unqualified satisfactory performance evaluation who is deemed by the Department Head to be out of compliance with University training and safety guidelines.

International activities related to teaching, research and service toward the broadest mission of the TAMUS will be recognized as a contribution toward faculty professional development.

In addition, where appropriate, consulting is considered a recognition of unique abilities and programmatic excellence, and will be evaluated in the tenure and promotion processes. Consulting, when done in accordance with university/agency policy, improves academic competence and can bring recognition to the individual, Department and University.

Tenure and Promotion Responsibilities

Individual Responsibilities

Each faculty member has the responsibility to be aware of the criteria for tenure and promotion within the Department, College, University and System and to meet or exceed these criteria. Faculty members should insure that their annual achievement reports and plans of work are current and complete.

The faculty member being evaluated for tenure or promotion or both is responsible for accumulating the information for review as outlined by TAMU policy, and to ensure its accuracy and
Faculty members should also be prepared to provide a list of three to six peers (who are not their major Professor or former students) external to the University who can provide an evaluation of their merit for promotion and tenure. A similar list of industry leaders or clientele can also be submitted. The faculty member may submit a “do-not-contact” list, and letters from individuals on the “do-not-contact” list cannot be submitted to the Tenure and Promotion Committee. When called upon for evaluations, each referee will be provided with an up-to-date achievement report of the candidate. The department head or resident director will provide additional names and will select the group to be contacted. The group to be contacted will consist of approximately one third to half of the peers suggested by the faculty member and the remainder to be selected independently by the department head or resident director.

**Department of Horticultural Sciences Responsibilities**

All faculty will be reviewed yearly, based on their annual achievement reports, by the Department Head, Associate Department Head for Extension/Program Leader, and/or Resident Director, as appropriate. Assistant Professors will be comprehensively reviewed in their mid-term review with the timing depending upon their probationary period. Associate Professors and Assistant Professors will be evaluated by the Department Head, Resident Director and/or Associate Department Head for Extension/Program Leader and informed annually about their progress toward promotion and/or tenure. The role of the Promotion and Tenure Committee is advisory only. The Department Head (for TAMU or TAMU/Texas A&M AgriLife Research), the Department Head in consultation with the Associate Department Head for Extension/Program Leader (for Texas A&M AgriLife Extension) or the Resident Director in consultation with the Department Head (for off-campus Texas A&M AgriLife Research) makes the recommendation for the Department of Horticultural Sciences. The faculty member has the right to seek counseling from the Promotion and Tenure Committee, as well as from the Department Head,
Promotion & Tenure Review and Evaluation Process

Department of Horticultural Sciences Level Review

The dossier of candidates recommended for promotion and/or tenure will be reviewed by the Promotion and Tenure Committee, which will then vote on the recommendation. Only tenured committee members may vote on tenure decisions. The Department Head, the Department Head in consultation with the Associate Department Head for Extension/Program Leader or the Resident Director in consultation with the Department Head, as appropriate, will prepare his or her own recommendation, but must include the vote of the Promotion and Tenure Committee in the recommendation and letter to the Dean or Director.

After the vote and final decision is made, the Department Head (or Resident Director, in the case of off-campus Texas A&M AgriLife Research personnel, or Associate Department Head/Program Leader in the case of Texas A&M AgriLife Extension personnel) shall inform the candidate of the decision. The recommendation is then forwarded to the Vice Chancellor for Agriculture (who is the Dean, COALS and Director, Texas A&M AgriLife Research) or the Director of Texas A&M AgriLife Extension as appropriate.

College, University, and System Level Review

Reviews by promotion and tenure committees and/or administrators at the College, University, and System levels follow according to their current respective policies. Efforts will be made by the Unit Head to keep the candidate notified of the recommendations made at each step in the process in a timely manner. Only the Board of Regents can grant tenure. Promotion and tenure approved by the Board of Regents typically becomes effective the following September 1.

Non Reappointment

Since the probationary period consists of a series of one-year contracts, a decision not to reappoint an individual who is on probation can be made any time up to the year of the mandatory review. Non-
reappointment should be considered if performance is unsatisfactory to the point that it is clearly unlikely
the person will qualify for tenure, as neither party benefits from prolonging an unsatisfactory situation.
Such a decision is made, of course, with great care and only in compelling circumstances. Please note
that notification of non-renewal may be made in spite of a prior decision to extend the probationary period.
However, once notification of non-renewal is made, no probationary period extension may be requested.

Candidate’s Right to Withdraw
At any point in the process, a candidate may elect to withdraw his or her name from further
consideration. This must be a written request. In the case of mandatory tenure considerations, this will
mean submitting a written resignation.

Right of Appeal
All appeals and grievances will follow the procedure as outlined (http://dof.tamu.edu/) in the
Statement on Academic Freedom, Responsibilities, Tenure, and Promotion Policy cited in the Faculty
Handbook.

VI. Post-Tenure Review
Post-tenure review at Texas A&M University applies to tenured faculty members and is comprised
of annual review of performance (Standard Administrative Procedure 12.06.99.M0.01 rev. 6 October
2016) and, in case of unsatisfactory performance as delineated in this policy, the construction of, and
subsequent review of, performance in a professional development plan.

As specified in University Rule 12.01.99.M2, annual reviews of performance are to be conducted
for all faculty; must result in a written document of expectations for each faculty member, commensurate
with his or her rank and seniority; and provide that evaluations of performance in scholarship, teaching,
service, and other assigned responsibilities be made in writing. The evaluation of performance will include
categories of Unsatisfactory, Needs Improvement, and Satisfactory (SAP 12.06.99.M0.01). In order for
the annual review to be an integral part of post-tenure review, it will have these additional characteristics:
1. In each department, stated criteria for categories of performance to be assessed in the annual review will be established by departmental faculty and approved by the department head and dean. The categories established by departmental standards are outstanding, exceeds expectations, satisfactory, needs improvement, and unsatisfactory.

2. An annual review finding unsatisfactory performance shall state the basis for finding unsatisfactory performance in accordance with the criteria. “An overall unsatisfactory rating is defined as being unsatisfactory” in any single category; teaching; research; scholarship; or creative work; service; and other assigned responsibilities, or a rating of “needs improvement” in any two categories.” (SAP 12.06.99.M0.01).

3. A report to the dean of unsatisfactory performance as assessed by annual review will be accompanied by a written plan, developed by the faculty member and department head, for near-term improvement. The department head may request a periodic peer review of the faculty member upon the finding of a unsatisfactory rating.

4. If a faculty member receives a “needs improvement rating in any single category, he or she must work with his or her department head immediately to develop an improvement plan. For teaching, this plan should take 1 year or less to complete successfully. In other areas (e.g. research, scholarship, and creative work), this plan may take up to 3 years to complete successfully. The rating of “Needs Improvement” can stay as “Needs Improvement” as long as pre-determined milestones in the improvement plan are being met, otherwise the rating will be changed to “Unsatisfactory”. (SAP 12.06.99.M0.01 section 2.5).

Criteria for Categories of Performance to be Assessed in Annual Review
1. Criteria for the Teaching Function
   a. Superior teaching performance in the classroom based on student evaluation, etc.
   b. Development of innovative and effective instructional approaches, materials, books, manuals, and techniques; development of new academic programs
   c. Chairship/co-chairship of graduate advisory committees and direction of graduate programs, particularly Ph.D. students for those faculty with the rank Associate Professor or Professor
   d. Publication in educational journals
   e. Recipient of awards for teaching from the university and/or professional organizations
   f. Effective student advising; effective student recruitment

2. Criteria for the Research Function
   a. Evidence of independent research in a well-planned and developed program and/or a key role in strong multi-disciplinary research
   b. Publication of research in scholarly and professional refereed journals; publication of research in forms that are targeted for user groups
   c. Recipient of awards for excellence in research
   d. Significant research funding from external sources
   e. Presentation of invited papers at professional and scientific meetings
   f. Chairship/co-chairship of graduate advisory committees and direction of graduate programs, particularly Ph.D. students for those faculty with the rank Associate Professor or Professor

3. Criteria for the Extension Function
   a. Evidence of leadership in extension programming, as judged by substantial impact on clientele served and or relationship within commodity groups.
b. Development of extension materials including bulletins, pamphlets, fact sheets, electronic or multimedia presentations, videos, websites, computer programs, newsletters, mass media and other educational works prepared by the individual
c. Development of educational activities in service to individuals, county programs, and commodity groups
d. Participation in research, independently or in cooperation with others, and the subsequent publication of results in refereed journals and/or industry and trade journals; evidence of effectively communicating research findings of TAMUS research personnel, or evidence of effective communication or cooperation with TAMUS or researchers from other institutions or entities
e. Demonstrate ability to obtain grant support from external sources
f. Presentation of invited papers at industry, professional and/or scientific meetings
g. Receipt of awards, commendations, or other recognition indicative of excellence in scholarly or service activity

4. Criteria for the Public Service Function

a. Service to the College, University, and System through committee assignments and leadership roles
b. Service to professional and scientific societies
c. Maintenance of strong working relationships with counterparts in the Department
d. Service to state, regional, and national levels of government
e. Service to students, student organizations, etc.

Mandatory Periodic Review of Tenured Faculty

In accordance with University Rule 12.06.99.M0.01, Post-Tenure Review, prior to the sixth anniversary of the date of the awarding of tenure or the receipt of an academic promotion and once every six years thereafter, or in the year following a second successive unsatisfactory annual performance
review, each tenured faculty member will submit to the departmental Promotion and Tenure Committee 
(exclusive of the individual(s) being reviewed) the same documentation submitted to the department head 
for the annual review for that year. The Committee will review the faculty member’s scholarly 
productivity, in accordance with the criteria for categories of performance to be assessed in the annual 
review defined in this document, make a determination of its merit, and report this determination as either 
satisfactory or unsatisfactory to the department head. The Committee will consider the faculty member’s 
position description when making the determination of merit.

Three Consecutive Unsatisfactory Reviews

Professional Development Review

If a faculty member receives three consecutive unsatisfactory reviews, or is rated as unsatisfactory 
in any particular category during the periodic peer review, a professional development review is initiated. 
See the university guidelines for the professional review, hearings, appeals and grievances (http://rules-
saps.tamu.edu/PDFs/12.06.99.M0.01.pdf); University Rules at http://rules-saps.tamu.edu/; and "Faculty 
Grievance Procedures Not Concerning Questions of Tenure, Dismissal, or Constitutional Rights at 

Voluntary Post-Tenure Review

A tenured faculty member may seek the counsel of peers through a periodic peer review or a professional 
development review at any time by making a request to the department head.