Self-Study Report

External Review
January 27-30, 2013

This document was completed on Dec. 1, 2012
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December 1, 2012

Greetings. I write as Chair of the Self Study Committee which put together the report that hopefully will give you information, metric data and insight into the Department of Chemistry here at TAMU. The principal sections listed in the Table of Contents include details regarding our department as a whole, the graduate and undergraduate academic programs, a profile of the faculty, and descriptions of our staff and infrastructure. We also provide details about our departmental budget, our resources and our policies for their allocation. The last section of this report provides a list of issues that we see as critical for the future of our department.

I hope that, in advance of your travel, you will be able to explore and search this document for any information that you may find useful. Should crucial information be missing, please let us know and we will do our best to provide it. Of course we will be available to assist you in any way we can during your days here in College Station. We greatly appreciate the time and intellectual focus you will give to us during this review.

Sincerely yours

Francois P. Gabbai
Professor of Chemistry and
Chair, Self-Study Committee

Self-Study Committee:
James Batteas
Tadhg Begley
Marcetta Darensbourg
Holly Gaede
Timothy Hughbanks
Wenshe Liu
Simon North
Daniel Romo
Karen L. Wooley
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I. The Department of Chemistry, Texas A&M University

A. Description and Brief History (written by Michael P. Rosynek)

History of the Chemistry Department, 1966-2005

1966-1980

Prior to 1966, the principal role of the Department of Chemistry at Texas A&M University was to teach service courses to students in the Colleges of Agriculture and Engineering. Only a few faculty members at that time conducted research programs, and these were fairly modest, with only minimal external funding and relatively few graduate students. In 1966, the Department of Chemistry (along with four other departments at Texas A&M) was formally earmarked by the University for development into a major research department. To this end, Arthur E. Martell was appointed Department Head in that year by the Dean of the College of Science, Clarence Zener, and given a mandate by the University administration to develop the research and graduate programs of the department into nationally recognized programs of excellence.

Aided by funds provided by the University and by a National Science Foundation Development Grant in 1969, Martell was successful in hiring more than 50 new faculty members, including nine senior faculty, during the late 1960's and throughout the 1970's, in an effort to begin developing excellence in the department’s research programs. In addition, twelve research-active faculty members left the department during this period. Because of the substantial increase in research faculty, the number of departmental graduate students, in turn, more than tripled (to a total of more than 200) during this period, and the number of postdoctoral researchers increased ten-fold to approximately 80. This growth in the department’s research and graduate programs was also made possible by the completion in 1972 of a major additional wing to the Chemistry Building, which provided more than 35,000 net sq.ft. of laboratories and offices devoted to research activities.

When Martell’s term as Department Head ended in Fall 1980, the total number of tenure-track faculty had increased to 54, of whom 45 were research-active. More than $5 million in major research instrumentation had been acquired, and total funding of the department’s research programs from all sources was approximately $5.3 million per year.

1980-1986

After having had only one Department Head for almost 14 years, the department had three Department Heads during the next six years. When Martell stepped down as Head at the end of the 1979-80 academic year, Choo-Seng Giam was appointed Head by Dean Thomas T. Sugihara, beginning with the Fall 1980 semester. However, Giam left the University less than one year later to assume the position of Dean of the College of Science at the University of
Texas-El Paso. (He returned to the department in Fall 1981, after serving only one year at UT-El Paso.) Three new faculty, including one senior faculty member, were hired during Giam’s one-year term in office, but three other research-active faculty members left the department during that year, including the death of one senior faculty member. Giam was instrumental in establishing the department’s Industry-University Cooperative Chemistry Program (IUCCP), an industrial affiliates initiative that existed until 2009.

After Giam’s departure, Joseph B. Natowitz was appointed Head by Dean John B. Beckham, effective with the Fall 1981 semester. Natowitz served as Head for four years, during which period 11 new faculty were hired, including three senior appointments. However, 11 other faculty left the department during this period, including two senior faculty. By the end of Natowitz’ term as Head, the total number of graduate students had increased to more than 250, and funding for the department’s research programs was more than $8.3 million per year. Planning and construction of a major addition to the Chemistry Building, providing more than 65,000 net sq.ft. of both teaching and research laboratories and support facilities, was initiated during Natowitz’ term as Department Head. The new wing was completed and first occupied in Spring of 1987.

When Natowitz announced his intention to step down as Head after a single four-year term, the department undertook an external nationwide search for a replacement (the first time that such a search had been made since Martell was appointed almost 20 years earlier). As a result of this search, Donald T. Sawyer was appointed Head in Fall 1985 and was given a substantial commitment of resources by the Dean of the College of Science, John P. Fackler, and by the University to further develop the department’s research stature by hiring several more junior and senior faculty members during the next four years. However, because of an unexpected and substantial budget shortfall by the State of Texas during the 1985-86 fiscal year, the University’s budget was decreased substantially by the State, and it was not possible for the University to honor the financial commitment that had been made to Sawyer for faculty hiring and development. As a result, Sawyer resigned as Head prior to the beginning of the 1986-87 academic year, and no new faculty hires were made during his term. The department’s Center for Chemical Characterization and Analysis (CCCA), which combined NMR, MS, XRD, and elemental analysis services under a single administrative oversight, was formally established by Sawyer during his term as Head. Emile A. Schweikert was appointed Director of the new Center.

1986-1994

Following Sawyer’s resignation as Head, Dean John P. Fackler elected to forego an external search for a replacement and appointed Michael B. Hall as Head in Fall 1986. Hall served two four-year terms, during which period 13 new faculty were hired, including three senior faculty. This period also saw the departure of five research-active faculty, four of whom were Full Professors. Development of the department’s graduate program continued while Hall was Head, with the total number of graduate students exceeding 300 for two years during this period. However, a substantial number of these students were admitted under the auspices of various special programs, and many of them did not successfully complete a graduate degree. As a result, the graduate enrollment subsequently decreased to approximately 250-260 by the end of Hall’s term as Head. Largely because of the above-mentioned departure of several senior faculty members during this period, total funding for the department’s research programs
remained approximately constant at $10.0 to $10.5 million during this eight-year period, despite the net addition of several junior faculty.

In addition, the department’s non-salary operating budget was decreased substantially in the early 1990's because the new Dean of the College of Science, Richard E. Ewing, who was appointed in 1991, wished to re-distribute financial resources among the several departments in the College. The concomitant freeze on hiring of support staff and loss of staff salary savings further exacerbated the department’s financial situation.

The three oldest wings of the Chemistry Building underwent a substantial renovation as part of two major projects during the late 1980's and early 1990's. These renovations provided approximately 70,000 net sq.ft. of substantially upgraded and modernized laboratory, office, and support spaces in these areas of the building.

1994-2005

During the last year (1993-94) of Hall’s second four-year term, Dean Ewing organized a comprehensive review of the department’s programs by an external committee. One of the conclusions of this committee was that the department had developed sufficient maturity and experienced leadership that an external search for a new Department Head was probably unnecessary. Accordingly, upon the subsequent unanimous recommendation of a faculty search committee appointed by the Dean, Emile A. Schweikert was appointed as the new Department Head, effective in Fall 1994.

Schweikert’s term as Department Head saw a resurgence in several areas of departmental operations. A total of 15 new faculty have been hired between 1995 and 2005. However, this same period saw the departure, retirement, or death of 10 research-active faculty, including seven senior faculty. The department’s Division of Biological Chemistry was established from among several existing faculty in 2002. Research funding increased substantially during this period, to a total of more than $14.4 million per year in 2003, of which $9.7 million was from federal sources. During his re-appointment negotiations in 1998 and 2002, Schweikert was successful in restoring a substantial portion of the non-salary operating funds that had been removed from the departmental budget in previous years. He was also able to establish budgeted funding through the Vice-President for Research for certain departmental analytical instrumentation services. Increased emphasis has also been placed on extending and strengthening departmental interactions with industry. Unfortunately, the department again lost a substantial portion of its non-salary operating budget (as did many other departments on campus) in 2003, as a means of partially funding the President’s Faculty Re-Investment Program, a four-year University-wide faculty hiring initiative. This has again required careful re-allocation and prioritization of departmental financial resources.

2005-2012

In Spring of 2005, in the penultimate year of Schweikert’s third and final term as Department Head, Dean Newton arranged another review of departmental programs and operations by an external committee, with particular emphasis on assessment of the graduate program, in preparation for appointing Schweikert’s successor. The visiting committee concluded that the Chemistry Department continued to be the flagship science department at TAMU and had made substantial progress in faculty development and in improvement of research and instructional programs during Schweikert’s 12-year tenure as Department Head, but
that several issues still required further, and in some cases urgent, attention. Particularly cited by the committee were the need to: (a) ensure that momentum gained from the Faculty Reinvestment Program not be lost by immediately initiating a rigorous search for a new Department Head to replace Schweikert when his final term ended prior to the 2006-07 academic year; (b) take maximum advantage of the Faculty Reinvestment Program by identifying thrust areas for “cluster” hires of new faculty, anchored by a senior hire in each area; and (c) develop a long-range space plan that is coupled to faculty hiring and retention and graduate student recruiting.

A faculty search committee, appointed by Dean Newton, interviewed both external and internal candidates for the position of Department Head, and unanimously recommended to the Dean that David H. Russell, an internal candidate, be designated as the new Department Head. The Dean enthusiastically accepted the search committee’s recommendation, and Russell was appointed as Head, effective in Fall 2006.

The department has made substantial progress during Russell’s tenure as Head toward addressing several of the most critical issues that were cited by the external review committee. Chief among these has been faculty hiring, at both the junior and senior levels. Since the 2006-07 academic year, the department has hired a total of 11 faculty, including six senior faculty. Three of these new faculty, including one senior hire, were in the area of Biological Chemistry, which substantially increased the department’s strength in this field. Unfortunately, this success in hiring new faculty has again been tempered by the loss, due to retirement or departure, of nine faculty, including five senior faculty, during the period 2006-2012. In addition, three research-active senior faculty have died since 2006, further depleting our faculty ranks. The net result of these additions and departures has been to decrease the number of tenure-track faculty from 44 in Fall 2006 to 42 in Fall 2012. Despite the net decrease in faculty during the last six years, however, funding for faculty research programs, has increased substantially since 2006, largely due to the new faculty hires during this period. Research funding for calendar year 2011, for example, was $19.2M, of which $15.4M was from federal sources. This represents an increase of more than 30% from calendar year 2007, for which the corresponding figures were $14.4M and $11.4M, respectively.

It should be noted that all of the new faculty hires described above occurred during the period 2006-2010. Decreases in funding allocations to TAMU from the State have resulted in severe budgetary constraints that have prevented new faculty hires during the last two years. Our total budget for the 2011-12 academic year has essentially returned to the same level as it was for the 2009-10 academic year. This has again required careful re-allocation and prioritization of departmental financial resources, a challenge that remains if we are to maintain the excellence of our faculty research programs.
<table>
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<th>Year (Fall)</th>
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<th>No. of Tenure-Track Faculty</th>
<th>Annual Research Funding ($ million)</th>
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</table>

1. Associated Centers, Laboratories, and Institutes

Along with the Cyclotron Institute, various special interest, collaborative, and service groups exist within or are associated with the Department as Centers and Laboratories. These are listed below and descriptions of their roles are provided in Appendix A2.

- Center for Atmospheric Chemistry and the Environment, Director: Renyi Zhang
- Cyclotron Institute, Director: Robert E. Tribble
- Center for Chemical Characterization and Analysis, Director: Emile Schweikert
- Elemental Analysis Laboratory, Manager: Williams James
- X-ray Diffraction Laboratory, Manager: Joseph Reibenspies
- NMR, Manager: Steven Silber
- Laboratory for Biological Mass Spectrometry, Director: David H. Russell
- The Natural Products LINCHPIN Laboratory, Director: Daniel Romo
- Laboratory for Molecular Simulation, Director: M. B. Hall
- Laboratory for Synthetic-Biologic Interactions (LSBI), Director: Karen L. Wooley

B. Vision and Plans (written by David Russell, Head)

1. Vision

In the mid-1960s, Texas A&M University started to invest in its chemistry department. A sustained effort over the past 40 years moved the chemistry department from a “no rank” into the top ten national programs at public universities. However, this ranking is not cast in stone. We compete in a dynamic national environment where societal needs and research priorities continue to evolve. The number of U.S. students specializing in chemistry has been declining, yet the need for chemical expertise that contributes to scientific and technological progress keeps growing.

Texas has the second largest population in the Union, and as such, it must contribute a proportionate share of scientific manpower and research expertise to the nation’s chemical expertise. Texas must, at a minimum, have two nationally prominent chemistry programs. This minimum can be met by the departments at Texas A&M and UT-Austin. The challenge for Texas A&M is to maintain and strengthen its key asset. Our overarching goal must be to enhance the effectiveness of our programs. As the 2005 NRC ranking (see section F, Analysis of the Department – National Research Council Ranking on page 14) showed, we have maintained
a good reputation (26th) but there are signs of concerns in our ranking based on criteria that scholars say are most important (41st).

The issues to be tackled are clear and in line with the first three imperatives of the University’s Vision 2020 project: (a) retain and recruit the best chemists; (b) increase graduate enrollment; (c) improve the undergraduate learning experience.

The first imperative requires that our faculty view A&M as the place where they can do their best work. That state of mind started to gel during the last few years, but it is still fragile. The departure of some of our lead faculty has adversely affected faculty morale, and the looming retirements of others cast additional shadows. Our goal must be to reach the level of faculty loyalty one finds at the top ten programs. A continuing concern must be to sustain faculty effectiveness in teaching and competitiveness in research as individuals evolve in their careers. An effective response should be to encourage team efforts, and so, we must develop a departmental culture conducive to team projects.

Our claim to be one of the country’s prominent chemistry programs should evolve into aspiring to be Texas’ premier chemistry department. As a State University, we must strive for expertise in all facets of chemistry, justified by and in support of the large teaching enterprise. We must leverage our efforts with interdisciplinary initiatives in structural and computational biology and in oceanic, atmospheric, materials, energy-related and nuclear sciences to further our programs’ renewal and growth. The faculty’s record of leadership in establishing cutting edge research resources and campus-wide collaborations (shared experiment and training grants) augurs for successful future interdisciplinary initiatives.

The second imperative, strengthen our graduate programs, recognizes graduate education as a key mission of the University. Indeed, some have argued that the most innovative research is done by professionals working with “amateurs”, a.k.a., graduate students. The challenges for the department are to increase graduate enrollment (which will be necessary to remain commensurate with faculty expansion) and to provide the resources, environment, and programs that support our graduate students’ needs and aspirations. A major concern is the University’s unclear stance as to the priority it assigns to its graduate programs. There is an urgent need to reaffirm the University’s commitment to a top tier graduate program, including elimination of the 99-hour cap for Ph.D. students, remission of tuition and fees, and adequate teaching assistant budgets. A corollary to graduate student issues is the status of postdocs. They have no official standing within the University.

The third imperative, enhance the undergraduate academic experience, must be addressed from the viewpoint of the majors program and from that of the service courses. The challenge is to offer a better experience to the students without greatly increasing the cost. A key unknown is the evolution of enrollments. Indications from the administration suggest that overall undergraduate enrollments will continue to increase. Given this assumption, we expect that even with a successful faculty reinvestment effort, the size of the lecture sections in the large-enrollment courses cannot continue at the current level. Recruiting more faculty members would allow us to offer additional honors and specialized courses, enrollments which would be kept below 50 students per section.

A deficiency in our undergraduate program is the lack of upper-level honors courses. A shortage of faculty, chemistry majors, and other qualified students interested in such offerings has held us back. As noted already, the faculty reinvestment program, coupled with an expansion of the number of majors, should remedy the situation.
The majors program in chemistry is small in relation to the size of Texas A&M. A large majority of our B.S. and B.A. graduates go on to successful completions of graduate and professional degrees or to successful careers as chemists or chemistry teachers. The key concern, stated already, is that the field of chemistry needs its fair share of talented young people. *The number of majors must grow* for enhanced offerings of courses including upper level honors courses.

2. **Plans for FY12-FY17**

*Faculty.* The highest priority is the retention of successful faculty. This effort requires a salary budget with yearly increases (~7%) for merit raises and equity adjustments. Of equal importance is the support of the faculty’s research competitiveness, *i.e.*, maintaining and developing major research facilities and the availability of matching funds for new shared instrumentation ($0.3-0.5M/year).

An aggressive hiring effort must be pursued to maintain the department’s reputation given our numbers of aging faculty, reduced numbers at the junior ranks, and our recent losses of mid- to senior level faculty. The current university climate also provides enormous opportunities. Chemistry is central to major university-level efforts and ventures that include the emerging “bio-corridor,” the Chancellor’s Research Initiative, the “Grand Challenge” effort, especially “One Health” and “Renewable Energy,” and related programs, *i.e.*, National Center for Therapeutics Manufacturing (NCTM), Texas Institute for Pre-Clinical Studies (TIPS), and the National Center for Innovation. Chemistry is positioned to take leadership roles in many of these ventures. There are two faculty-level challenges to achieving such goals: (i) faculty must abandon their silos and embrace the community responsibilities of the “central discipline,” and (ii) we must add three talented and creative new faculty members per year over the next five years. To achieve this, we will require start-up funds in the range of $2.5 to $3.5M/year.

We have a competitive edge as well as certain liabilities in recruiting. The comparatively low cost of living in College Station and the amenities of a small university town are definite advantages for young families. However, we as a department struggle with space, diversity and partner placement.

Regarding space, we are hampered in offers to synthetic chemists by our outdated and poor-quality laboratory space. Significant improvements have been achieved by laboratory renovation in the Reed-McDonald building, the 4th floor of the 1972 wing, and the laboratories assigned to chemistry faculty in the Interdisciplinary Life Sciences Building; however, less than 20% of our faculty have benefitted from these efforts.

Diversity is a necessary, but arduous, objective. A realistic indication of what we can expect in faculty diversity in the next few years is to have around one-third of new appointments be women and/or underrepresented minority groups. Another disadvantage is that, given our location, we have limited options for partner placement. The administration is commended for setting aside funds for this purpose, but the amounts of these funds are insufficient considering the size of the university faculty and the total campus growth.
<table>
<thead>
<tr>
<th>Table I. Faculty Hiring FY012-FY0116</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytical Chemistry: 3 [will only provide replacement for expected retirements]</td>
</tr>
<tr>
<td>Biological Chemistry: 2</td>
</tr>
<tr>
<td>Inorganic Chemistry: 2 [materials, bioinorganic]</td>
</tr>
<tr>
<td>Organic Chemistry: 3 [synthesis, materials]</td>
</tr>
<tr>
<td>Physical Chemistry: 3 [does not include replacing Cremer and Goodman]</td>
</tr>
</tbody>
</table>

Hiring plans are outlined in Table I. Of the projected 13 hires, only half of these represent increases in the total faculty numbers. As to rank, we want to be flexible; an important consideration is to re-center the faculty demographics. In practice, at least three-fourths of the hires should be at the rank of Assistant Professor. The difference between the proposal of three hires/year for five years and the 13 hires listed is the anticipated need to replace (yet unspecified) retirements or departures. It should also be noted that some of the hires (regardless of field) should be senior appointments. While local political climate favors NAS membership, we have more pressing needs to fill the Martell chair (formerly held by Paul Cremer) and the Robert A. Welch Chair (formerly held by D. Wayne Goodman). To meet the hiring targets, the administration must be prepared to underwrite six offers per year with an expectation of three acceptances. At least for FY13 we are seeking applications in all areas of chemistry, with emphasis on organic and physical/analytical; however, the highest priority should be given to the very best possible hire, independent of the subdiscipline. The Biological group is the least well-staffed and should at this time continue their recruiting efforts. Some issues remain regarding the future role of Nuclear Chemistry in the department’s program, but the continued development of the Nuclear Science Institute and other programs, especially TIPS, provide excellent opportunities for the department.

The department has endeavored to recognize the contributions and professional aspirations of the Senior Lecturers. Currently, their salaries are pegged to a floor of 80% of the starting salary of Assistant Professors. The appointments are on a three-year rolling basis, and the department subsidizes active participation (oral/poster presentation) at one scientific meeting per year. Following the Lichter committee’s recommendation, the faculty mandated that the Department Head present to the faculty a specific proposal related to issues of concern to Lecturers including “a mechanism for lecturers to achieve long-term appointment” and “pathways for lecturer professional advancement”. In response to this challenge, the department has instituted a designation of “Instructional X-Professor (X denotes Assistant, Associate, and Professor), and currently three of our former Senior Lecturers carry this designation.

Planning and funding for faculty replacements would be further facilitated if the University had a proactive retirement program that incentivizes multi-year teaching/consulting contracts to faculty (70+ years) retiring on an A&M Foundation charitable gift annuity.
C. Industry partnerships (written by Simon North)

Since our last departmental review (2005), the Industry-University Cooperative Chemistry Program (IUCCP) which was established in 1980 was formally ended. The purpose of the IUCCP was to foster a long term relationship between industrial companies and the Department of Chemistry to provide 1) support to the Department of Chemistry, specifically the graduate/undergraduate programs and faculty and 2) tangible benefits to the member companies. In the 10 years prior to the end of the IUCCP program industrial membership has varied from 4 to 12 companies. Membership dues were used in support of undergraduate scholarships and graduate fellowships, the annual graduate research symposium, and funding of provisional patents by chemistry faculty. In addition, the annual Industry-University IUCCP symposium facilitated onsite industrial recruiting and provided an opportunity for our graduate students and postdoctoral associates present their research.

The graduate office continues to coordinate onsite industrial recruiting efforts and every year many companies (e.g. Dow, Conoco-Phillips, Eastman, BASF, and others) participate. We are actively engaged in expanding the number of companies. Over the past several years the University Career Fair has grown and many chemical/pharmaceutical companies participate in this event which is open to our students. There are several other recent initiatives which partially fill the role of the IUCCP program. Student Research Week (SRW), an event held by the Graduate Student Council (GSC) in conjunction with the Office of Graduate Studies, the Vice President for Research, and other TAMU organizations, provides a forum for our graduate and undergraduate students to present their results. The Dow Chemical Company has recently established an endowment to recognize an outstanding chemistry graduate student with the Dow Chemical Company/Charlene Black Miller '79 Endowed Memorial Fellowship which will be presented annually at SRW. Partnerships with BASF, Eastman Chemical, and Dow Chemical Company are currently being pursued. We anticipate that these partnerships will provide long-term support for graduate and undergraduate programs and research opportunities for our faculty. Finally, two years ago the department established an annual graduate awards ceremony to recognize outstanding performance in research and teaching. We are optimistic that this event, attended by industrial representatives who have endowed Fellowships and awards, is an ideal time to schedule departmental-industrial interactions.

D. Previous Reviews and Assessments - Departmental Review of 2005

The previous review was conducted on April 24-27, 2005. The external review panel consisted of:

Dr. George L. McLendon
Dr. R. Graham Cooks
Dr. Michael P. Doyle
Dr. Daniel G. Nocera
Dr. Geraldine L. Richmond
Dr. John C. Tully

The report from the 2005 external review committee is found as Appendix A3. Departmental responses to the principal issues raised by the external review committee were reviewed by professors in the Chemistry Department in 2005 and revisited in 2009. The relevant
reports can be found as Appendix A3. The main concerns raised by this external review can be summarized by the following bullets:

- Lack of transparency and inadequate governance structure
- Lack of space both in terms of quality and quantity
- Lack of a department long term space plan
- Need for aggressive faculty recruiting with resources from the VPR and the Dean
- Poor diversity among the faculty and the graduate cohort
- Graduate student stipend
- Health care and tuition disparity among domestic and international students
- Master in chemical eduction not working as planned
- Aging instrumentation in the shops and user facilities

The 2012 Self-Study Committee has concluded that several of these problems have been addressed. However, the economic crisis that has affected our nation in the past several years, as well as the death of Al Cotton, Wayne Goodman and Ian Scott, or the departure of Paul Cremer, Richard Crooks, and Ray Schaak have made new problems surface. These unanticipated conjunctures have affected our ability to work toward the recommendations made by the 2005 external panel. As a result, some of the previously noted issues remain and several new problems have now emerged. Top priority issues for 2012 and onward are listed in the Grand Challenges Section XII.

**E. Analysis of the Department by Academic Analytics**

**Who is Academic Analytics?**

As stated on the company’s website, Academic Analytics is a provider of high-quality, custom business intelligence data and solutions for research universities in the United States and the United Kingdom. Their mission is to provide universities and university systems with objective data that administrators can use to support the strategic decision-making process as well as a method for benchmarking in comparison to other institutions. Rooted in academia, they intend to help universities identify strengths and areas where improvements can be made. For more details, please visit: [http://www.academicanalytics.com/](http://www.academicanalytics.com/).

In the following sections, we will present a comprehensive graph (Department Radar) as well as a table of strengths and weaknesses that capture the current standing of our department with respect to 230 other comparable chemistry programs in the nation. In any given area, the best program will be given a percentile score of 100%. The time-intervals used for data collection and analysis can be found below the graph or table.
Academic Analytics Department Radar - All Variables

Academic Analytics 2010 Data Coverage

Faculty: Academic Year 2010-2011
Journal Articles: 2007 - 2010
Citations: 2006 - 2010
Books: 2003 - 2010
Grants: 2007 - 2010
Awards: Varies by award and ranges from the previous 5 to 50 years
## Academic Analytics Department Strengths and Weaknesses

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<th>Rank</th>
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<th>Z-Scores</th>
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### Academic Analytics 2010 Data Coverage

- **Faculty:** Academic Year 2010-2011
- **Journal Articles:** 2007 - 2010
- **Citations:** 2006 - 2010
- **Conference Proceedings:** 2007 - 2009
- **Books:** 2003 - 2010
- **Grants:** 2007 - 2010
- **Awards:** Varies by award and ranges from the previous 5 to 50 years
**F. Analysis of the Department – National Research Council Ranking**

In 2005, the National Research Council assessed programs according to 21 different criteria. Here are the NRC's five major ratings summarizing those criteria.

- **S-Rank:** Programs are ranked highly if they are strong in the criteria that scholars say are most important.
- **Research:** Derived from faculty publications, citation rates, grants, and awards.
- **Students:** Derived from students' completion rates, financial aid, and other criteria.
- **Diversity:** Reflects gender balance, ethnic diversity, and the proportion of international students.
- **R-Rank:** Programs are ranked highly if they have similar features to programs viewed by faculty as top-notch.

For a more detailed explanation, please visit the NRC website at [http://chronicle.com/article/NRC-Rankings-Overview-/124713/](http://chronicle.com/article/NRC-Rankings-Overview-/124713/)

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<th>INSTITUTION, PROGRAM</th>
<th>S-Rank High</th>
<th>Research High</th>
<th>Students High</th>
<th>Diversity High</th>
<th>R-Rank High</th>
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<tbody>
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<td>Harvard U., Chemical Physics</td>
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<td>8</td>
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<td>4</td>
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<td>32</td>
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<td>Rice U., Chemistry</td>
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<td>Students High</td>
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<td>R-Rank High</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-------------</td>
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<td>33</td>
<td>103</td>
<td>4</td>
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<td>13</td>
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II. **Administration and Governance (provided by Marcetta Darensbourg)**

**A. Administrative Structure**

The administrative structure for the TAMU Department of Chemistry is illustrated in the Flow Charts 1-8 (see following pages). Departmental bylaws were developed initially as response to a Departmental Review in 2000, and accepted by Faculty in 2002. They were reviewed and revised in 2008, and again in March, 2012. Appendix A11 contains the bylaws with description of the responsibilities and organization of various components of the department, a brief narrative of which is below.

The Texas A&M University Chemistry Department is administered by a department head, appointed by the dean of the College of Science, who receives input in filling this position, or reappointment, from the department faculty. The standard term of office is four years and the current Head is Professor David H. Russell, initially appointed in 2006 and now in his second term. Prof. Russell is assisted by the associate department head, Professor Michael Rosynek, for academic operations, and the assistant department head, Mr. Ronald Carter, for all business and facilities operations of the department. Prof. Rosynek chairs the committee which is responsible for assignment of research, office, and teaching space. He also assists the Head by overseeing the teaching assignments of the faculty and graduate students. He may also manage concerns for the facilities and shop services with the Department Head. Additional administrative positions, typically part time, are filled by faculty – these exist in the offices of graduate studies: graduate recruitment (Ozerov), graduate advising (North); and undergraduate studies: undergraduate advising (Gaede) and First Year Program director (Hughbanks).

The department is divided into five separate divisions for the purpose of teaching assignments, seminar scheduling, faculty recruiting, and the writing of cumulative exams. The current division chairs are: James D. Batteas (analytical), Tadhg P. Begley (biological), Janet Bluemel (inorganic), Daniel Romo (organic), and Robert R. Lucchese (physical/nuclear). The assistant department head, Mr. Ron Carter, manages the department business office. His purview ranges from overseeing the personnel and accounting staff to the management and maintenance of the buildings in the chemistry complex. The business office currently has 13 staff members. Approximately 17 administrative assistants in various ranks support faculty research groups. Four additional support staff are assistants to associate editors or an editor of journals.

The department holds faculty meetings at least twice each semester, which are conducted by the department head. Decisions ranging from tenure and promotion to the modification of the department bylaws are discussed and voted upon in this format as advice to the department head. An Advisory Executive Committee, the AEC, makes recommendations to the Department Head regarding major departmental actions, long-range planning, and policy issues related to research activities. An Academic Operations Council, the AOC, advises the Head with regard to policy.
issues relevant to academic operations. The compositions of these advisory groups are described in Appendix A7.

ADMINISTRATION (Flow Chart 1)
ACADEMIC OFFICES (Flow Chart 2)

David H. Russell
Department Head

Michael P. Rosynek
Associate Head

Pat Forman
Assistant to Dept. Head
Faculty Support

Holly C. Gaede
Undergraduate Advisor

Joe Mawk
Associate Undergraduate Advisor

Marilyn Warren
Senior Office Associate

Simon W. North
Graduate Advisor

Oleg Ozerov
Graduate Recruiting Coordinator

Rebecca Breeding
Lead Office Assistant

Joanna G. Pellois
Associate Graduate Advisor

Sandra Manning
Program Coordinator

Valerie McLaughlin
Program Coordinator
UNDERGRADUATE ORGANIC LABORATORIES (Flow Chart 4)

David H. Russell
Professor & Department Head

Michael P. Rosynek
Professor & Associate Head

Kenn Harding
Professor & Director
Organic Chemistry Laboratories

Robert Hildreth
Technical Laboratory Coordinator

Hanan Abdou
Laboratory Operations Technician
Chemical Operations

Student Technicians
Labs

Lyles Burch
Laboratory Operations Technician
Equipment Operations

Student Technicians
Equipment Room

Faculty Laboratory Supervisors

Graduate Assistants
Teaching Laboratory

Carrie Nichols
Administrative Assistant

Janet Robinson
Senior Office Assistant
Administrative Operations

Graduate Assistants
Teaching Administrative
CHEMISTRY DEPARTMENT SHOPS (Flow Chart 6)

- David H. Russell
  Department Head

- Shop Advisory Committee
  Simon North (Committee Chair) – Machine
  Emile Schweikert – Electronics
  François Gabbaï – Glass

- Timothy Pehl
  Research Instrumentation Specialist
  Electronics Shop

- Student Workers

- William C. Merka III
  Research Instrumentation Specialist
  Glass Shop

- Student Workers

- William Seward
  Research Instrumentation Specialist
  Machine Shop

  - Ronald Page
    Master Instrument Maker

  - Student Workers
*Editorial Assistants for associate editors Gabbai, Dunbar and editor-in-chief Gladysz
B. Departmental Committees

The following are standing committees within the Department. Ad hoc committees, such as Faculty Search committees, are formed at the wish of the Head. A complete listing of current standing committee members is found in Appendix A7.

- **Executive Committee (elected)** - The purpose of the Executive Committee is to review major departmental actions and make recommendations to the Department Head, and to serve as a resource for long-range planning and policy issues related to research activities within the department.

- **Academic Operations Council** - The purpose of the Academic Operations Council is to advise the head and serve as his or her resource for long range planning and policy issues relevant to the academic operations of the Department.

- **Advisor to the American Chemical Society Student Affiliate Chapter** - Advises and encourages development of professional interests of undergraduate chemistry majors.

- **Colloquium and Seminar Committee** - Organizes and coordinates departmental colloquium and seminar program; coordinates and supervises Department's participation in Southwest Speakers Exchange program.

- **External Faculty Awards Committee** - Solicits and reviews nominations of department faculty members for external professional society awards.

- **Internal Faculty Awards Committee** - Solicits and reviews nominations of department faculty members for internal and University-administered awards.

- **Promotion and Tenure Committee** - (elected) Reviews instructional/research performances and professional activities of departmental lecturers and tenure track faculty members; advises Department Head on promotion, tenure, and appointment recommendations.

- **Faculty/Graduate Student Working Group** – Provide a forum for all Graduate Students, via their elected GSAC representatives, to voice their concerns and opinion regarding issues of interest to Graduate Students. Provide information flow from Chemistry Department Administration to Graduate Students.

- **Graduate Recruiting, Admissions and Review Committee** - This committee is chaired by the Coordinator of Recruiting, Admission, and Review. It establishes and periodically reviews departmental standards for admission of prospective graduate students; reviews academic records and qualifications of marginal applicants; reviews progress of probationary graduate students and makes recommendations to the Graduate College.

- **Graduate Awards Committee** – Reviews and identifies nominees, from among graduate students, for various awards, fellowships, and honors.

- **Graduate Curriculum Committee** - Establishes and reviews departmental standards related to graduate instructional programs; periodically reviews departmental policies regarding preliminary examinations, degree programs, student research proposals, and course requirements; reviews faculty proposals for new graduate courses.

- **Library Committee** – Solicits, reviews, and expedites chemistry-related acquisitions by the University and Libraries.

- **Information and Communications Technology (ICT)** - Serves as an advisory panel to formulate the departmental policies of information and communications technology.

- **Research Infrastructure Committee** - Provide guidance to the existing research infrastructure as well as develop plans for future needs. Planning for shared instrumentation grants, identifying people to write grant proposals.
- **Staff Advisory Committee** – Serves the Head in an advisory capacity on a regular basis; represents the staff in the governance of the department. This committee serves as a communication link between the staff, faculty, and department administration. Member elections and appointments are self-governed.

- **Space Committee** - Reviews requests and allocates laboratory space within the Department.

- **Undergraduate Curriculum Committee** - Reviews curricula and requirements of undergraduate B.A. and B.S. chemistry majors; plans program modifications and improvements.

- **Undergraduate Student Awards Committee** - Reviews and identifies nominees, from among undergraduate chemistry majors, for various awards, scholarships, and honors.

**C. Bylaws**

Following the advice of the 2005 External Review team, Bylaws for the Departmental governance were revised and approved by the faculty on July 8, 2008 and again on March 1, 2012. A copy of the bylaws can be found in Appendix A11.
### III. Budgets (provided by Julie Allen (College of Science) and Ron Carter (Chemistry))

#### A. Goldplate Budget Allocation from College of Science (FY06-12)

The following table is of Goldplate (amount of money that is appropriated by the University and College to the Department) budget allocation to the five Departments within the College of Science for fiscal years 2006-2012.

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#### B. Department of Chemistry Goldplate* Budget (FY06-12)

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*Goldplate = Amount of money that is appropriated by the University and College to the Department.

**Includes a $43,868 subsidy provided to account for increased enrollment after 9/1/09.

## C. Staff Funding by Source

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<td>143,662</td>
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<td>157,504</td>
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<td>Mass Spec</td>
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<td>Operations</td>
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<td>195,925</td>
<td>182,951</td>
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<td>Stockroom Services</td>
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<td>61,875</td>
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<td>Organic Labs</td>
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<td>3,545</td>
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<td>FYP Labs</td>
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<td>194,100</td>
<td>194,100</td>
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<td>FYP Office</td>
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<td>Secretarial</td>
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<td>557,577</td>
<td>461,915</td>
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<td>Graduate Office</td>
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<td>EAL</td>
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<tr>
<td>LMS</td>
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<td>79,697</td>
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<tr>
<td>Journals</td>
<td>4</td>
<td>173,252</td>
<td>173,252</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>72</td>
<td>3,460,193</td>
<td>2,002,131</td>
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### D. Salary Range Listings

#### Faculty (per month)

<table>
<thead>
<tr>
<th>Position</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distinguished Professors</td>
<td>$26,250 - $13,281</td>
</tr>
<tr>
<td>Professors</td>
<td>$20,841 - $8,557</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>$9,673 - $9,257</td>
</tr>
<tr>
<td>Assistant Professors</td>
<td>$7,956 - $6,802</td>
</tr>
<tr>
<td>Instructional Assistant Professors</td>
<td>$8,436 - $6,801</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td>$8,489 - $4,742</td>
</tr>
<tr>
<td>Lecturers</td>
<td>$6,406 - $3,692</td>
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</table>

#### Staff (yearly)

<table>
<thead>
<tr>
<th>Position</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Research Instrumentation Specialist</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Research Instrumentation Specialist</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Senior Systems Analyst I</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Systems Analyst I</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Software Applications Developer</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Facilities Coordinator</td>
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</tr>
<tr>
<td>Master Instrument Maker</td>
<td>$43,765.00</td>
</tr>
<tr>
<td>Electronics Technician II</td>
<td>$43,472.00</td>
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<tr>
<td>Senior Information Technology Manager</td>
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<tr>
<td>Laboratory, Stores &amp; Procurement Officer II</td>
<td>$33,180.00</td>
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<tr>
<td>Technical Laboratory Coordinator</td>
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</tr>
<tr>
<td>Technician II</td>
<td>$35,780</td>
</tr>
<tr>
<td>Laboratory Operations Technician</td>
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<tr>
<td>Assistant to Department Head</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Business Coordinator I</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Administrative Coordinator I</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Program Coordinator</td>
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</tr>
<tr>
<td>Lead Office Associate</td>
<td>$34,668</td>
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<tr>
<td>Senior Office Associate</td>
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</tr>
<tr>
<td>Office Associate</td>
<td>$29,226.00</td>
</tr>
<tr>
<td>Lead Office Assistant</td>
<td>$27,940.00</td>
</tr>
<tr>
<td>Senior Office Assistant</td>
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</tr>
<tr>
<td>Assistant Department Head</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Business Administrator I</td>
<td>non-classified exempt</td>
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<tr>
<td>Payroll Services Supervisor</td>
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</tr>
<tr>
<td>Business Associate II</td>
<td>$29,617.00</td>
</tr>
<tr>
<td>Business Associate I</td>
<td>$28,875.00</td>
</tr>
<tr>
<td>Research Chemist</td>
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<tr>
<td>Research Scientist</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Associate Research Scientist</td>
<td>non-classified exempt</td>
</tr>
<tr>
<td>Assistant Research Specialist</td>
<td>non-classified exempt</td>
</tr>
</tbody>
</table>
IV. Graduate Program (provided by Simon North and Joanna Pellois)

A. Mission Statement

The Department of Chemistry offers programs of study leading to the MS and PhD degrees in chemistry, with primary emphasis on admitting students who intend to pursue the PhD degree. Although the department had an MS degree in Chemical Education, this option has been discontinued. The program leading to the PhD degree is designed to ensure that the student receives extensive research experience. There are significant professional development opportunities and on-site industrial recruiting for students.

B. Demographics

Enrollment

During the Spring 2012 semester 270 students were enrolled in the graduate program. This represents a 35% increase in total enrollment from 2000 and a 15% increase from 2005. Over the past 10 years the percentage of international students enrolled has varied from 42% to 50%. International enrollment is currently 50% and has been increasing steadily since 2007. The percentage of female students enrolled has fluctuated between 29% and 39%. Although female enrollment declined between 2006 and 2009, women currently represent 37% of the graduate population (compared to 27.4% nationally in 2008). The total enrollment data from 2001-2012 is plotted in Figure 1.

With rare exceptions, the Chemistry Department does not accept entering graduate students seeking to obtain only an M.S. degree. As a result, most students obtaining M.S. degrees have switched from the Ph.D. program, either by their own choice or at the recommendation of their research advisor.

As the percentage of international students enrolled has increased, the percentage of domestic female students enrolled has decreased and the percentage of international females enrolled has increased. The percentages of domestic and international male students enrolled have not changed significantly. These trends are illustrated in the snapshots of the Spring 2012 and 2005 graduate program enrollments represented in Figure 2 and Figure 3.
residents, representing 1.3% and 3.3% of the respective 2005 and 2012 student populations, are included in the domestic population counts.

<table>
<thead>
<tr>
<th>Figure 2. Graduate students enrolled in Spring 2012 (270 Students)</th>
<th>Figure 3. Graduate students enrolled in Spring 2005 (235 Students)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dom. M 31%</td>
<td>Dom. M 30%</td>
</tr>
<tr>
<td>Int. F 18%</td>
<td>Int. F 15%</td>
</tr>
<tr>
<td>Int. M 32%</td>
<td>Int. M 31%</td>
</tr>
</tbody>
</table>

**Ethnicities**

A majority (86%) of the 136 domestic students enrolled in our graduate program identify themselves as being Caucasian. Hispanic (6%) and Asian/Pacific Islanders (5%) make up the next largest ethnic groups represented amongst domestic graduate students. The ethnic make-up of the current domestic graduate population is shown in Figure 4. The only ethnic minority that has seen a decline in representation since 2005 is the Hispanic population, which decreased from 12% to 7%. Concurrently the Caucasian population increased from 77% in 2005 to 82% in 2012. By comparison the 2008 national average for underrepresented minorities is 5.2%.

<table>
<thead>
<tr>
<th>Figure 4. Domestic student ethnicities, 2012</th>
<th>Figure 5. International student nationalities, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>White 86%</td>
<td>China 31%</td>
</tr>
<tr>
<td>Hispanic 6%</td>
<td>Taiwan 15%</td>
</tr>
<tr>
<td>Amer Indian 1%</td>
<td>India, Nepal, Sri Lanka 17%</td>
</tr>
<tr>
<td>Asian or Pacific Islander 5%</td>
<td>Indonesia, Philippines 4%</td>
</tr>
<tr>
<td>Black 2%</td>
<td>Europe, Russia, Turkey 5%</td>
</tr>
<tr>
<td></td>
<td>Africa 3%</td>
</tr>
</tbody>
</table>
Nationalities

There are currently 134 international graduate students enrolled in our graduate program. The nationalities of the international students enrolled during the Spring 2012 semester are shown in Figure 5. The countries that are most frequently represented by these students are China (31%), Taiwan (15%), India (14%) and Korea (10%). The percentage of Chinese students in enrolled in our program has remained constant at about 30% over the past 5 years. Over the same time period the percentage of Korean students enrolled in our program has decreased by approximately 50%. Conversely the percentage of both Indian students and Taiwanese has approximately doubled.

Divisional Breakdown

There are 5 divisions, Analytical, Biological, Inorganic, Organic and Physical/Nuclear, within the Department of Chemistry. Although many faculty members associate themselves with more than one division, each has a primary divisional assignment. Students within a research group may choose to associate themselves with any division within the department. However, a majority of students identify themselves as being members of the same division as their research advisor. In Figure 6 and Figure 7, students were assigned to divisions according to the primary association of the research advisor. The differences in the 2005 and 2012 snapshots highlight recent trends in divisional membership. Over the past 5 years the memberships of the Analytical and Organic divisions have decreased and the memberships of the Biological and Inorganic divisions have increased.

<table>
<thead>
<tr>
<th>Figure 6. 2012 Student divisional breakdown (270 Students)</th>
<th>Figure 7. 2005 Student divisional breakdown (235 Students)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Graph" /></td>
<td><img src="image2.png" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Primary Division by Research Group</strong></td>
<td><strong>Primary Division by Research Group</strong></td>
</tr>
<tr>
<td>Analytical: 30%</td>
<td>Analytical: 25%</td>
</tr>
<tr>
<td>Biological: 20%</td>
<td>Biological: 15%</td>
</tr>
<tr>
<td>Inorganic: 25%</td>
<td>Inorganic: 20%</td>
</tr>
<tr>
<td>Organic: 15%</td>
<td>Organic: 15%</td>
</tr>
<tr>
<td>Physical: 10%</td>
<td>Physical: 10%</td>
</tr>
</tbody>
</table>
Research Group Size

Of the 270 students currently enrolled in our graduate program 154 are associated with research groups that are housed within the Department of Chemistry. The remaining students have research advisors whose administrative appointments are in outside departments such as Atmospheric Sciences, Biochemistry and Biophysics, and Physics. The histogram in Figure 8 shows the current number of students per research group for the 40 research groups in the Department of Chemistry. Of these groups 10% are considered large groups (>10 graduate students) and 32% are considered small (<5 graduate students). A majority of graduate students are therefore in groups consisting of 5-10 graduate students. By comparison in 2005 41% of the research groups were considered small, 10% were considered large and a majority (smaller than that of 2012) of the research groups consisted of 5-10 graduate students. It should be noted that the group size distributions represented here includes only graduate students. The undergraduates, postdocs or graduate students from other departments who also populate many of the research groups in the Department of Chemistry have not been included.

C. Degree Programs

All incoming graduate students are enrolled in the 5-year Ph.D. program. Master’s degrees are typically granted to students in three different categories: (1) those who choose to leave the program early for personal reasons, (2) those who fail to pass one of the Ph.D. milestones, and (3) those who fail to show adequate progress in research. All M.S. degrees that are conferred include theses and a defense of the completed research. The academic milestones towards the Ph.D. degree, numbers of degrees conferred annually and attrition rates are discussed in the sections below.

Academic Milestones

The academic milestones towards a Ph.D. in chemistry are diagrammed and described in Figure 9.
Research Advisor Selection: Research advisors are assigned halfway through the first semester that a student is enrolled. Incoming students interview 5 potential advisors and rank their top three choices. The Graduate Advisor facilitates the advisor selection process by matching faculty members and students according to their stated preferences. Students who begin research the summer before their first semester have the option to select a research advisor early. All students who wish to remain in the program are required to find a research advisor by the end of the first semester.

Degree Plan: The degree plan outlines the coursework to be completed for the Ph.D. and is completed at the end of the first year of study. Degree plans include a total of 96 hours of coursework. All Ph.D. committee members are required to approve the degree plan. Committee members are therefore typically chosen at the end of the first year of study just before the degree plan is submitted. Ph.D. committees consist of 4 members: the advisor, two faculty members from the department and one outside faculty member.

681 Seminar: All second year students present a literature seminar. The seminars are attended by committee members and first year students. Committees may require that students retake the seminar course if a seminar presentation does not meet the required standards.

Cumulative Exams: Cumulative exams test basic undergraduate chemical knowledge, graduate chemical knowledge and knowledge of the chemical literature. Students have 20 opportunities to take cumulative exams. They are allowed to attempt 15 exams and must pass 5 before the end of the second year of study. The cumulative exams may serve as a substitute for the written part of the preliminary exam.

Frontiers Seminars: Second year students are enrolled in CHEM 695: Frontiers in Chemical Research. This course is centered on the “Frontiers in Chemical Research” lecture series. Frontiers speakers are recognized leaders in their particular fields of chemistry. Each speaker
gives a series of three lectures and engages in discussions with groups of students while visiting the department. Second year students are required to attend all Frontiers lectures and write a term paper focused on the research of a particular speaker during both the spring and fall semesters.

**Preliminary Exams:** The preliminary exam, prepared by and presided over by the 4 committee members, tests a student’s readiness to advance to PhD candidacy. Preliminary exams consist of written and oral parts. Committees may choose to substitute the cumulative exams for the written part of the preliminary exam. The preliminary exam is one of two requirements for advancement to Ph.D. candidacy.

**Research Proposals:** The doctoral research proposal is approved by committee members and is the second requirement for advancement to Ph.D. candidacy. Research proposals describe preliminary results and outline the direction of dissertation research.

**Teaching:** All graduate students are required to teach a minimum of four laboratory sections spread over two semesters. A majority of first year graduate students teach three sections of laboratory in either the General Chemistry or Organic Chemistry programs. Approximately 24 undergraduate students are enrolled in each laboratory section. Graduate teaching assistants attend weekly training sessions and are evaluated by both staff and undergraduate students. All incoming students are required to attend teaching workshops during graduate orientation. All first time teaching assistants enroll in CHEM 697: Methods in Teaching.

**Course Work:** Graduate students enroll for 9 credit hours during the spring and fall semesters and 6 credit hours during the summer semester. The Ph.D. degree requires a total of 96 credit hours. The M.S. degree requires 32 hours. Students are required to maintain 3.0 GPR. Students who fail to maintain a GPR of 3.0 are put on probation for a maximum of one year. In addition to enrolling in CHEM 695: Chemical Research all students are required to take the following courses: i) Elective Courses (see appended list of graduate courses in Appendix A6), ii) CHEM 681: Seminar, iii) CHEM 697: Methods in Teaching, iv) CHEM 686: Ethics in Chemical Research and, v) CHEM 695: Frontiers in Chemical Research.

**Final Defense and Dissertation:** The doctoral dissertation is written and defended during the 5th year.

**D. Degrees Conferred**

Since 2007 the Department of Chemistry has graduated an average of 33 Ph.D. students annually (see Figure 10 for trends in degree awarded in the past 10 years). This represents an increase from the average of 27 Ph.D.s granted during the preceding 5-year period. The average number of M.S. degrees conferred annually between 2007 and 2011 was 6. This is a decrease as compared to the average of 10 Master’s students who graduated per year between 2002 and 2006. Of the 286 students who entered the graduate program between 2001 and 2005 66% received a Ph.D., 14% received an M.S., 18% left the program with no degree and 2% are still actively pursuing a degree. This data is presented in Figure 11. Students who received both an
M.S. and Ph.D. in chemistry from Texas A&M, about 1.4% of the total population, are included in the Ph.D. count only. Attrition rates are discussed in detail in the next section of this report.

The average time to graduation with a Ph.D. for students entering the program between 2001 and 2005 was 5.5 years with a standard deviation of 1.1 years. This number is slightly higher than the 5.2 years that was calculated as the average time to graduation for students graduating between 2002 and 2005. The time to graduation data represented in the histogram (Figure 12) reveals that approximately 41% of the students graduated in less than 5 years and 72% graduated in less than 6 years. Calculating the actual time spent by students in our Ph.D. program is difficult due to several factors. Approximately 20% of our incoming students begin their projects the summer before they officially enroll as students, increasing their time in the program by 2-3 months. On the other hand many students choose to leave immediately following their defense, 2-6 months prior to their graduation date. The average time to the final defense for the same group of students is 5.2 years. A more realistic estimate of time to Ph.D. could be given as 5.3 years. By comparison the 2008 national average is 5.1 years.
**Attrition Rates**

Approximately one third (32%) of the students who entered the Ph.D. program between 2001 and 2005 did not receive a doctorate degree. Of the students who didn’t receive a Ph.D. less than half (44%) received M.S. degrees. The attrition rate data for this time period is presented in Figure 13 and Figure 14. The Ph.D. attrition rate for domestic students (38%) is significantly higher than the attrition rate for international students (23%). The attrition rate for female students (40%) is higher than that of male students (27%). The most significant difference can be seen between the attrition rates for male and female international students. The attrition rate for international female students (38%) is more than double that of international male students (17%). When considering attrition rates for students who exit the program with no degree the international female students (25%) and the domestic male students (22%) have the highest attrition rates.

![Figure 13. Attrition rate (no PhD) for students entering the graduate program in 2001-2005](image1)

![Figure 14. Attrition rate (no degree) for students entering the graduate program in 2001-2005](image2)

**E. Admissions and Recruiting**

Over the past 5 years the size of the incoming graduate class has fluctuated from a low of 38 in 2011 to a high of 75 in 2009 (Figure 15). During the 2012 recruiting season a total of 316 students applied (147 domestic, 169 international) and 141 offers were extended (76 domestic and 65 international). The offer acceptance rates were 36% for domestic students and 43% for international students.

The average GRE quantitative score for this time period was 720 (757 international, 690 domestic). The average verbal score was 491 (497 international, 487 domestic). While the average international quantitative scores have risen slightly, the domestic quantitative, domestic verbal and international verbal scores have not changed significantly over the past 5 years.

![Figure 15. Incoming graduate classes 2007-2011](image3)
The pie chart in Figure 16 shows the geographic regions from which our domestic students were recruited between 2007 and 2011. The geographic regions are defined below the chart. Approximately half (49%) of our domestic students are recruited from undergraduate institutions in the south (AR, LA, MS, NM, OK, TX). Close to one third (29%) of our domestic graduate students come from undergraduate institutions within the state of Texas. The western, northeastern and northwestern regions are not very well represented amongst the graduate population.

**F. Graduate Student Support**

The department supports graduate students primarily with a combination of GAT (teaching) and GAR (research positions). At any time approximately 60% of the students are supported by either GAR positions or Fellowships. The department currently has a policy requiring faculty to provide GAR positions to at least 50% of the graduate students in their research group.

The department has been proactive in increasing graduate stipends to stay competitive with peer institutions. However, these efforts have not been supported at the university level. The internal university-level support of TA stipends has been fixed at $1500 for more than 20 years. Since the departmental stipend for both GAT and GAR positions are equivalent, any increase in the stipend (22% since 2002, see Figure 17) imposes a large financial burden on the department to cover the GAT budget. Over the past 10 years the cost of graduate tuition has risen 89% while student fees have increased over 216%.

All departmental graduate students, both domestic and international, now have identical health insurance coverage available to them. In addition, tuition and mandatory fees are paid for all doctoral graduate students through their 5th year of study. Students who switch to a MS option are not guaranteed tuition and fee support.
The department has issued a family/leave policy. Female graduate students will receive 6-weeks of leave time following childbirth. Salary and benefit payment will continue throughout this time period. The parent of a newborn or adopted child will also receive short term leave as typically associated with vacation leave days.

G. Professional Development

Each year, the Chemistry Department hosts a representative (Dr. Jim Burke) from the ACS Career Services Division to present the "Managing an Effective Job Search" seminar. The Department provides pizza and drinks prior to the 3 hour evening seminar. The following morning, the representative meets with students to individually critique their resumes. The department also manages on-site recruiting efforts which take place in interview rooms which are used exclusively for company recruiters. All arrangements are coordinated by the graduate office and tailored to meet the recruiters' exact specifications, including hotel reservations, tours, lunch arrangements, meeting with selected faculty, arrangements for informational meetings, and a schedule of interviews based on the needs and time constraints of both the recruiters and interviewees. The position descriptions are posted and updated resumes are collected and sent to the recruiter well in advance of the visit. Application forms and other documents are collected for the recruiter if desired before the interview.

Multiple programs exist to support graduate student travel to national and international conferences. The department awards A.E. Martell Travel Awards and Martin Corera Travel Awards twice each year, and recent support from Eastman Chemicals has increased the number of travel awards. GSAC currently administers the student invited seminar speakers program which involves 1 speaker for each division. There are several local societies in which chemistry graduate students are active. The Society for Plastics Engineers (SPE) is an interdisciplinary student organization that exists to promote scientific and engineering knowledge relating to polymers. This is accomplished through seminars, conferences, and visits to plastic companies.
**Job Placement**

The graduate office has started comprehensive tracking of our graduate students following completion of their doctorate. Of particular interest is the nature of both the initial positions of our student and their permanent positions. Our preliminary analysis indicates that the majority of students find permanent positions in the chemical/pharmaceutical industry.

**Student Groups**

A Faculty/Graduate Student Working Group was established in 2005 with two principal Missions: 1) To provide a forum for all graduate students to voice their concerns and opinions and 2) To provide a direct conduit for information flow from the chemistry department administration to the graduate students. The group meets each semester and is chaired by the graduate advisor. There are several student organizations which provide professional development opportunities and social events, and coordinate outreach programs. These include the Graduate Student Association in Chemistry (GSAC), Phi Lambda Upsilon (PLU), National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChe), Society for Advancement of Chicanos and Native Americans in Science (SACNAS), and the Society of Plastics Engineers (SPE).

**H. Survey Results**

A recent survey of current graduate students yielded 177 responses (66%) on various aspects of the graduate program and the department in general. Several of the questions on the survey echoed questions on the faculty survey. The respondents were a representative sample of the population in terms of male/female, domestic/international, and divisional breakdown. There were many thoughtful and constructive written comments, sometimes in excess of 100 comments for several of the questions. Overall, the responses were positive for every aspect of the program and the department. There are a few points of note:

1) There is some dissatisfaction with the current stipend amount and the health insurance plan.

2) There is some dissatisfaction with the amount of teaching which constitutes full support. “Other departments (ex. Biochemistry) have their GAT3’s teach 2 classes”

3) In terms of space and facilities students ranked the current ‘gathering spaces’ as lowest. A similar level of dissatisfaction was found in the faculty survey.

4) 54 students (73 were unable to assess) felt that the department was deficient in emerging research areas. Nanotechnology and material science were identified by a large number of these students as deficient areas.

5) Although students feel prepared for careers at research Universities they want better professional development for jobs at smaller, teaching, colleges and in industry. A number of students feel that the degree of preparation is “very dependent of the specific research group” and felt that a more generalized approach is warranted.

A similar survey will be administered every 3 years by the graduate office in order to track changing student attitudes.
I. Academic Papers Published by Graduate Students

One measure of the productivity of a PhD student is the number of first author peer reviewed articles published by the student whilst in graduate school. The average number of first author publications written by the 69 PhD students graduating in 2010 and 2011 is 2.28. The average number of publications on which a student’s name appears as an author is 4.37. Over 40% of the graduates in these two classes published three or more first author papers. Approximately 15% did not publish a single first author paper. There is little discrepancy between the average number of first author publications written by domestic (2.24) and international (2.33) students. However, there is a more significant difference between the average number of first author papers written by male (2.64) and female (1.69) PhD students. This difference cannot be attributed to the length of PhD study as the average time to degree for male and female students in these two classes was comparable. The indicated lower publication rate of female students warrants further investigation.

J. Supplemental Data

Graduate Course List: Appendix A6.
Student Survey Questions: Appendix A15.
V. Undergraduate Program – Chemistry Majors
(provided by Holly Gaede)

A. Student Demographics

Incoming Students

First time in college

From Fall 2005 to Fall 2011, 623 entering freshman matriculated as chemistry majors. The majority of these students were white (387, 62%), with Hispanic students making up the second largest cohort (122, 20%). Asian Americans (69, 11%) and African Americans (26, 4%) contributed significantly to our incoming population. The remainder of the students were multiracial (14, 2%), Native American (2, 0.3%), unknown (2, 0.3%), or international (1, 0.2%). Slightly more women (329, 53%) than men (294, 47%) enrolled. These students had an average SAT Verbal score of 590, an average SAT Math score of 628, an average SAT Total score of 1216 (median 1210), with a range of 800 to 1600. The incoming students average high school class percentile is 87.5.

Transfer Students

Between Fall 2005 and Fall 2009, 30 students transferred to TAMU as chemistry majors. Students transferred from a variety of two-year and four-year institutions, with Blinn College accounting for 7 of the 30 transfer students. Most students did not have an Associates Degree. Of all these students, 18 (60%) graduated with TAMU degrees by Spring 2012, 6 with BA CHEM degrees, 9 with BS CHEM degrees and 3 with TAMU degrees in other disciplines. There are 3 students (10%) still enrolled at TAMU and on track to graduate. Overall, 21 of the 30 transfer students (70%) should earn degree from TAMU. Of the 18 students who have earned TAMU degrees, 10 graduated within 2 years of enrollment, 6 graduated within 3 years of enrollment and 2 took 3+ years to graduate.

Graduating Students

Since Fall 2005, 353 students have graduated with undergraduate degrees in chemistry, 141 with BS and 212 with BA degrees. Of these students, 164 began as first-year chemistry students at Texas A&M. The remaining students were internal transfers from other departments within Texas A&M University (148) or transfer students from other colleges and universities (41).

The historical trend in the number of graduates produced, as well as the division between BS and BA graduates, is shown in Figure 1.
Table 1 gives shows the number of entering students from Fall 2000 – Fall 2011, the number of total chemistry undergraduates on the 12th class day of each Fall semester, and the number of graduates from August to May. The same information is displayed in Figure 2.

Table 1. Number of entering students from Fall 2000 – Fall 2011, the number of total chemistry undergraduates on the 12th class day of each Fall semester, and the number of graduates from August to May

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Incoming First-Year Students</th>
<th>Total Chemistry Majors on 12th Class Day</th>
<th>Total Chemistry BA/BS Graduates from August – May</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>56</td>
<td>203</td>
<td>42</td>
</tr>
<tr>
<td>2001</td>
<td>53</td>
<td>185</td>
<td>34</td>
</tr>
<tr>
<td>2002</td>
<td>58</td>
<td>197</td>
<td>37</td>
</tr>
<tr>
<td>2003</td>
<td>60</td>
<td>222</td>
<td>39</td>
</tr>
<tr>
<td>2004</td>
<td>84</td>
<td>244</td>
<td>46</td>
</tr>
<tr>
<td>2005</td>
<td>81</td>
<td>269</td>
<td>45</td>
</tr>
<tr>
<td>2006</td>
<td>77</td>
<td>272</td>
<td>49</td>
</tr>
<tr>
<td>2007</td>
<td>92</td>
<td>274</td>
<td>50</td>
</tr>
<tr>
<td>2008</td>
<td>82</td>
<td>270</td>
<td>68</td>
</tr>
<tr>
<td>2009</td>
<td>90</td>
<td>254</td>
<td>51</td>
</tr>
<tr>
<td>2010</td>
<td>77</td>
<td>252</td>
<td>51</td>
</tr>
</tbody>
</table>
The breakdown by sex and race/ethnicity of chemistry major graduates from Fall 2005-Spring 2012 is given in the Table 2.

Table 2. Sex and Race/Ethnicity of BS/BA graduates from Fall 2005-Spring 2012

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>White</td>
<td>131</td>
<td>37.11</td>
<td>132</td>
</tr>
<tr>
<td>Hispanic</td>
<td>14</td>
<td>3.97</td>
<td>29</td>
</tr>
<tr>
<td>African American</td>
<td>5</td>
<td>1.42</td>
<td>11</td>
</tr>
<tr>
<td>Asian American</td>
<td>13</td>
<td>3.68</td>
<td>9</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>0.28</td>
<td>1</td>
</tr>
<tr>
<td>International</td>
<td>2</td>
<td>0.57</td>
<td>2</td>
</tr>
<tr>
<td>Multiracial</td>
<td>1</td>
<td>0.28</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>0</td>
<td>0.00</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>167</td>
<td></td>
<td>186</td>
</tr>
</tbody>
</table>
Graduating chemistry majors from Fall 2005 through Spring 2012 had an average SAT Verbal score of 606, and average SAT Math score of 650, an average SAT Total score of 1254 (median 1250). The graduating chemistry majors average high school class percentile was 90.7.

**B. Retention**

Table 3 shows students who enter the university as chemistry majors as their first time in college and are still chemistry majors a year later.

<table>
<thead>
<tr>
<th>Entering Fall</th>
<th>Entering First Year Students</th>
<th>Number Retained a Year Later</th>
<th>% Retained a Year Later</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>81</td>
<td>49</td>
<td>60.5</td>
</tr>
<tr>
<td>2006</td>
<td>77</td>
<td>34</td>
<td>55.8</td>
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<tr>
<td>2007</td>
<td>92</td>
<td>48</td>
<td>47.8</td>
</tr>
<tr>
<td>2008</td>
<td>82</td>
<td>40</td>
<td>48.8</td>
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<tr>
<td>2009</td>
<td>90</td>
<td>39</td>
<td>43.3</td>
</tr>
<tr>
<td>2010</td>
<td>77</td>
<td>39</td>
<td>50.6</td>
</tr>
<tr>
<td>2011</td>
<td>124</td>
<td>84</td>
<td>67.7</td>
</tr>
</tbody>
</table>

Part of our attrition is compensated for by internal transfers from other departments at the University. The 148 graduates who changed their majors into chemistry came from 34 different majors, with the largest number coming from general studies, chemical engineering, and biology.

**C. Graduation**

A low percentage of students enter as chemistry majors graduate with chemistry degrees in four years (Only 27% of students who entered from Fall 2005 – Fall 2008 had graduated with a chemistry degree by Spring 2012.) This trend is not very different from the College of Science as a whole, in which 34% of incoming science majors are retained in science majors after four years. For entering classes of Fall 2005- 2008 the graduation rate with a chemistry degree is actually highest for African American students (38%), though the total numbers are small (5/13). The graduation percentage for white students is 31% (71/228), and for Asian American students is 24% (8/33). The graduation rate for entering Hispanic chemistry majors is low, only 14% (7/51).

Most of the students who do not graduate with chemistry degrees do graduate from Texas A&M, but with other degrees. Students who have changed their majors out of chemistry during this time period have transferred into almost 50 different majors, in every undergraduate college. 42% of the incoming chemistry students from Fall 2005-Fall 2008 had graduated with another degree by Spring 2012. 30% of students who entered from Fall 2005-Fall 2008 had not yet graduated from TAMU with an undergraduate degree, but this relatively large percentage is skewed by the large number from the entering class of 2008 (41) whose graduation may be somewhat delayed by their change of major. The graduation rate for matriculating chemistry majors is shown in Table 4 with a comparison to all TAMU matriculates. Again, the number of
entering chemistry majors who ultimately graduate with a chemistry degree is small, but the overall four year graduation rate compares favorably to the university as a whole.

**Table 4. Graduation Rates for Incoming Chemistry Majors versus all TAMU Matriculates**

<table>
<thead>
<tr>
<th>Matriculation Year</th>
<th>% Graduated within 4 years</th>
<th>% Graduated within 5 years</th>
<th>% Graduated within 6 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All TAMU chemists, from TAMU</td>
<td>All TAMU chemists, with chem degree</td>
<td>All TAMU chemists, from TAMU</td>
</tr>
<tr>
<td>2005</td>
<td>49.8</td>
<td>61.6</td>
<td>24.4</td>
</tr>
<tr>
<td>2006</td>
<td>48.7</td>
<td>61.6</td>
<td>25.6</td>
</tr>
<tr>
<td>2007</td>
<td>50.9</td>
<td>60.6</td>
<td>20.2</td>
</tr>
</tbody>
</table>

The average years to degree for chemistry majors who graduated between Fall 2005 and Spring 2012 are shown in blue in Figure 3, where 3.66 years corresponds to an “on time” graduation. The data is also separated to show the time to degree for students who entered as chemistry majors versus those who transferred into chemistry from another department on campus. Most retained chemistry majors graduate on time, but a significant percentage of internal transfers have a delayed graduation. The overall average graduation time is 3.90 years, with retained chemistry majors having an average of 3.72 and internal transfers having an average of 4.10 years.

**Years to Degree Graduating Chemistry Majors Fall 2005 - Spring 2012**

![Figure 3](image-url)

Figure 3. Time to degree for chemistry majors graduating between Fall 2005 and Spring 2012, where 3.66 corresponds to “on time” May graduation for students who matriculate in August.


**D. Program Graduates**

Since 2008, a graduating senior survey has been distributed. The total number of surveys distributed has been 217, with a response received from 197 students (91%). The data below is compiled from the responses of the 157 students who responded to a question about post-graduation plans on the graduating senior survey distributed by the Undergraduate Advising Office in the years 2008 to 2012.

Medical School: 21  
Pharmacy School: 15  
Dental School: 7  
Law School: 3  
Allied health programs (physician assistant, optometry, chiropractic, nursing school): 6  
Graduate School in chemistry: 29  
Graduate School in some other scientific discipline: 9  
Graduate School non-scientific, such as MBA: 6  
Industrial or government chemistry-related employment: 33  
Other employment: 3  
Military: 6  
Teaching (for example, high school chemistry): 17

This distribution probably underrepresents the number of students who find chemical employment, because many do not begin an active job search until after graduation, when the survey is administered. Additionally, every year several students apply (or reapply) for medical or pharmacy school in the year following graduation, so more students ultimately end up in these pursuits. This distribution certainly underrepresents students who do not pursue careers directly related to their chemistry degrees, since they are less likely to respond to surveys and requests for information. With this caveat, Figure 4 is a reasonable representation of the post-graduate pursuits of our students.

![Academic/professional pursuits post-graduation](chart.png)

Figure 4. Post-graduate pursuits (percentages of respondents) of recent chemistry graduates
Graduate programs in chemistry and other STEM fields that our students have attended in this time period include; California Institute of Technology; KTH Royal Institute of Technology; Northwestern University; Princeton University; Purdue University; Rice University; Texas A&M University; Texas Women’s University; University of California-Berkeley; University of California-Irvine; University of California-Santa Barbara; University of Florida; Universite Laval; University of Michigan; University of North Texas; University of Southern Mississippi; University of Texas; University of Texas-Dallas; University of Texas-San Antonio; University of Wisconsin; and Washington University- Saint Louis.

Recent employers of our students include Alcoa; Alcon Laboratories; Baker Hughes Petrolite; Cerilliant; Chevron Phillips; ExxonMobil; GT Products; Halliburton; INEOS; Kaneka Nutrients; Lockheed Martin; Lubrizol; Lynntech, Merichem; Memorial Hermann Hospital; Neos Theraupeutics; OI Analytical; Shell Westhollow Technology Center; TechSpray; Texas A&M University Qatar; Texas Children’s Hospital; Thomas Analytical; Union Pacific Railroad; Univation Technologies; and US Oncology.

E. The Chemistry Undergraduate Curriculum

The degree plans for B. S. or B. A. degrees in chemistry are included below. The curricula are fairly standard, with General Chemistry in the first year, Organic in the second, Physical in the third. The BS degree includes more chemistry (including laboratories), research, and more mathematics than the B.A. degree. This degree is ACS certified, provided the students choose biochemistry as an advanced chemistry elective.

The B.A. degree has fewer hours of required courses, allowing greater flexibility for pursuing other interest or fulfilling professional school prerequisites. These students must choose a minor or a “track,” which is a concentration in a particular area of chemistry. Tracks available for B.A. students are biological chemistry, chemical education, or environmental chemistry. The track in biological chemistry is especially popular among pre-medical or pre-pharmacy students, as it includes introductory, biology, microbiology, genetics and anatomy and physiology. The chemical education track allows students to become certified to teach high school chemistry in Texas with no addition credit hours or time to degree.

Major changes in recent years include major revision of physical chemistry. The lecture sequence now starts with the microscopic view in the first semester, focusing on quantum chemistry and spectroscopy. The subsequent course includes thermodynamics and kinetics. The physical chemistry laboratory sequence has also been revised substantially. Formerly, B.A. and B.S. students enrolled in the same first-semester one credit physical chemistry laboratory and B.S. students took a two-credit second semester physical semester laboratory, while B.A. students took a different, one-credit second-semester laboratory. Now, both B.A. and B.S. students take two one-credit laboratories in physical chemistry. The multi-week experiments utilize more modern equipment and focus mostly on areas of modern physical chemistry research.

Previously, BS students were required to take a 400-level inorganic chemistry, CHEM462, which they mostly took as seniors. To introduce students to the discipline earlier, a 300-level inorganic chemistry course has been developed. CHEM462 is now considered an advanced elective. CHEM362, Descriptive Inorganic Chemistry, has blossomed and become a popular course for chemistry minors as well as majors. However, the enrollment in CHEM462 has declined.
The writing intensive courses required by the University graduation requirements have also been revised. CHEM481, the senior seminar, has been raised from one credit to two, to allow more time for writing instruction, in-class writing activities, and student presentations. The second-semester organic laboratory for majors has been approved as our second writing-intensive course.

In addition to these changes, some new advanced electives have been developed. CHEM483, Green Chemistry, has become popular, not only with our majors, but also with chemical engineers. In addition, CHEM456, Chemical Biology, is a new course with a growing enrollment.

Curricular changes are planned for analytical chemistry in response both to external factors (changes in requirements of other majors), and the sentiment of our analytical faculty.

1. **Bachelor of Arts in Chemistry, 2012-13 Catalog #135**

The Bachelor of Arts program (see details on following page), through the availability of a generous number of electives, gives the student a firm and broadly based foundation in chemistry, with the option of pursuing other educational objectives involving specialization in at least one other field in depth. This objective is accomplished by means of the B.A. program flexibility and by the inclusion of a minor area of study in another discipline or completion of a track as outlined above. Additional elective hours allow further diversification.

The B.A. degree offers somewhat more flexibility than the B.S. program, in terms of tailoring a program of study which combines chemistry with an interest in subject areas such as biochemistry, biology, business, computer science, education, forensics, medicine or physics. Although the B.A. program may in any specific case turn out to be a somewhat less technical curriculum, it meets the needs of many students who plan to use chemistry as a springboard to a career in chemical sales, marketing, law, technical writing, teaching at a pre-college level, science journalism, etc., to name only a few possibilities.

A B.A. degree in Chemistry coupled with a minor in Biology, or completion of a biological chemistry track, is excellent preparation for a variety of careers in the health-related disciplines. In particular, a B.A. degree in Chemistry is excellent and proven preparation for medical and dental schools, and affords the superior student the opportunity to maintain flexibility for a broad spectrum of medical or dental careers.

Although not required for the B.A. program, abundant research opportunities are available to students. The B.A. program also permits and encourages non-technical elective courses.
**FRESHMAN YEAR (Bachelor of Arts in Chemistry)**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>(Th-Pr)</th>
<th>Cr</th>
<th>Second Semester</th>
<th>(Th-Pr)</th>
<th>Cr</th>
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<tr>
<td>CHEM 100 Horizons in Chemistry</td>
<td>(1-0)</td>
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<td>CHEM 102 Fund. of Chem. II</td>
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<td>CHEM 101 Fund. of Chem.</td>
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<td>and</td>
<td></td>
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<tr>
<td>and</td>
<td></td>
<td></td>
<td>CHEM 112 Fund. of Chem. Laboratory(0-3)</td>
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<td>or</td>
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<td>CHEM 103 Structure and Bonding</td>
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<td>and</td>
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<td>CHEM 104 Chemistry of the elements</td>
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<td>MATH 151 Eng. Math I</td>
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<td>MATH 171 Analytic Geom. and Calculus</td>
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**SOPHOMORE YEAR (Bachelor of Arts in Chemistry)**

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<th>Second Semester</th>
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<tr>
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<td>CHEM 231 Tech. of Organic Chemistry</td>
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<td>CHEM 234 Org. Synt. and Anly. IV⁴(1-6)</td>
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<td>PHYS 201 College Physics</td>
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<td>PHYS 208 Electricity and Magnetism</td>
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<td>PHYS 218 Mechanics</td>
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<td>POLS 206 American Natl. Govt</td>
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**JUNIOR YEAR (Bachelor of Arts in Chemistry)**

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<tr>
<th>First Semester</th>
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**SENIOR YEAR (Bachelor of Arts in Chemistry)**

<table>
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<tr>
<th>First Semester</th>
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<th>Cr</th>
<th>Second Semester</th>
<th>(Th-Pr)</th>
<th>Cr</th>
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</thead>
<tbody>
<tr>
<td>CHEM 326 Physical Chemistry Lab II</td>
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<td>Advanced Chemistry Elective³</td>
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<td>CHEM 481 Seminar⁵</td>
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</tbody>
</table>

**Notes:**

1. Students may substitute any 6 hours of American history courses approved by the Department of History to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106. 2. These electives must include 12 hours which meet the humanities (3 hours), visual and performing arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to the previous 12 hours of University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Additional elective hours must be used to complete a required minor approved by the granting department or students must satisfy the requirements of one of the approved chemistry track programs. B.A. chemistry majors may take CHEM 485 or 491 as elective courses. The total hours of CHEM 485 and 491 taken on a graded (A-F) basis may not exceed 9. Additional hours of these courses may be taken on an S/U basis. A maximum of 6 hours of these courses may be included on the degree plan. Electives should be chosen in consultation with the chemistry advisor, and should be selected to meet the residency requirement (36 hours at 300-400-level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered. 3. This is a special section of the course for chemistry majors. 4. The advanced chemistry electives must be selected from CHEM 317 and 320, 362, 440, 441 or PHYS 309. Students wishing to complete an American Chemical Society certified degree program must take at least one semester of biochemistry (i.e. BICH 410 or 440). 5. This is a designated W-course.
2. Bachelor of Science in Chemistry, 2012-13 Catalog # 135

The B.S. program in Chemistry is arranged so that a student obtains a comprehensive, solid foundation in all of the major branches of chemistry, combined with a suitable measure of individual flexibility (see details on following page). The latter objective is met in part by a strong emphasis on involving the undergraduate B.S. chemistry major in exciting, innovative, state-of-the-art research programs. Most students in the B.S. program become involved in research during their junior year, and continue this until graduation. Students frequently receive research scholarships and fellowships which include opportunities for summer research programs. It is not uncommon for an undergraduate chemistry major to be a coauthor of scientific publications in major research journals before graduation.

Undergraduate chemistry research activities involve substantial use of modern scientific equipment, including major instrumentation. The student involved in this activity also gains considerable insight into the profession by means of substantial individual contact with chemistry department faculty.

The B.S. degree in Chemistry is the appropriate program for students planning advanced degree programs in chemistry, biochemistry, forensics, chemical physics, and other fields. Students planning careers in chemical industry should also choose the B.S. degree in Chemistry. Students may wish to choose electives suggested in the biological or environmental chemistry tracks. This degree program satisfies fully the accreditation requirements of the American Chemical Society.5
### FRESHMAN YEAR (Bachelor of Science in Chemistry)

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### SENIOR YEAR (Bachelor of Science in Chemistry)

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Notes:
1. Students may substitute any 6 hours of American history courses approved by the Department of History to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106. 2. These electives must include 12 hours which meet the humanities (3 hours), visual and performing arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum. In addition, 6 hours of courses must be in the area of international and cultural diversity. These may be in addition to the previous 12 hours of University Core Curriculum courses, or if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Electives should be chosen in consultation with the chemistry advisor, and should be selected to meet the residency requirement (36 hours at 300-400-level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered. 3. This is a special section of the course for chemistry majors. 4. Students should choose MATH 304, 308, STAT 211 or another MATH or STAT course approved by the chemistry advisor. 5. The advanced chemistry electives must be selected from CHEM 446, 456, 462, 464, 466, 470, 483, 489 and BICH 410, 411, 440, 441 or PHYS 309. Students wishing to complete an American Chemical Society certified degree program must take at least one semester of biochemistry (i.e. BICH 410 or 440). Graduate-level courses are encouraged for qualified students. 6. The total hours of CHEM 485 and 491 taken by B.S. chemistry majors on a graded (A-F) basis may not exceed 15. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis. 7. This is a designated W-course.
F. Undergraduate Research

Undergraduate research is an essential component of the undergraduate curriculum. The B.S. chemistry majors are required to take at least 6 credits of undergraduate research to complete their degree. In a regular semester, the student is expected to work in the faculty mentor’s laboratory an average of 3 hours per week to receive 1 credit. (The per week expectation is raised for a 10-week summer term to keep the total hours constant.) The students are expected to give a presentation of the results to the research group and submit a research report to the Undergraduate Office. Strong students are encouraged to participate in a University thesis program. Although undergraduate research is not required for B.A. chemistry majors it is strongly encouraged and many participate in undergraduate research, though not always in chemistry, and not always for credit.

Our undergraduates have appeared as co-authors on 115 peer-reviewed publications over the time period 2005-2012, and have made 62 presentations at regional, national, or international scientific meetings. During this time 372 students have enrolled in CHEM491 for a total of 1471 credit hours. The average enrollment in undergraduate research per semester consisted of 19 B.S. students, 4 B.A. students, and 4 students from outside the department. These numbers underestimate research participation because it does not include students working as volunteers, for a stipend, in other departments, or off campus. In an average semester, 18 faculty are supervising undergraduates in CHEM491, and since 2005 48 different chemistry faculty have participated. Since the last self-study, standard expectations for research have been established and are communicated with the students through the undergraduate advising office and website. The freshman chemistry seminar now includes a discussion about the importance of research and how to find in both local and external research opportunities.

G. Issues for Consideration

1. We have not substantially revised our curriculum since the ACS changed their certification requirements. Several local issues suggest that this would be a good time to revise our curriculum.
   a. Statewide core curriculum changes will be implemented Fall 2013. Our entry level courses will have to be recertified as meeting the learning objectives for the Science Core Curricula.
   b. Biochemistry recently dropped analytical chemistry and physical chemistry from their degree requirements. However, other programs such as Nutrition and Forensic and Investigative Sciences have added more analytical chemistry.
   c. Although we advertise the BA as a degree for students not interested in pursuing a career in chemistry, many of these students do so with limited laboratory skills and research experience. Should we consider developing additional tracks or changing requirements?

2. The growing enrollment has created a back log for enrollment in some of the laboratories, particularly CHEM234, our second-semester organic laboratory for chemistry majors. Many students are unable to take the advanced laboratories in the semester planned, including both semesters of physical chemistry laboratory, advanced analytical laboratory, and inorganic laboratory.

3. We are beginning to see pressures in our lecture courses as well. With priority for scheduling in only five classrooms in the chemistry building, we do not have the flexibility to easily accommodate class sizes between 36 and 80, which is the current demand for most of our advanced undergraduate courses.
VI. Chemistry Service Courses (provided by Tim Hughbanks)

A. First Year Program

1. Recent changes

Partly in response to the 2004 Lichter Report (see Appendix A5) and partly in response to personnel changes in the department that would have occurred anyway, the chemistry First Year Program (FYP) underwent a number of changes when Prof. Eric Simanek assumed the position of FYP Director in the Fall of 2005. Some of these changes have been extended and consolidated under the directorship of Prof. Timothy Hughbanks, who assumed the FYP Director position in July of 2009. A summary of the changes and comments that will also illuminate the current status and organizational structure of the chemistry FYP are as follows:

a. Lecture and laboratory courses

The lecture and laboratory courses and personnel are now distinct and operate largely independently. On matters of laboratory management, operation, and student concerns, the Technical Laboratory Coordinators (TLCs - positions currently held by Drs. Amber Schaefer and Tak Wai (Tom) Leung and their supporting staff oversee day-to-day events. A laboratory Technician (currently Terry Junek) runs the FYP chemical stockroom and oversees student workers in that capacity. In contrast with the de-facto situation that obtained prior to 2005, the Lecturers who perform classroom instruction have only nominal laboratory supervisory roles and do not supervise FYP staff. Lecturers and selected tenure-track faculty do conduct safety tours of respectively designated labs throughout the academic year. The independent operation of the lab and lecture courses has been for the most part a positive development, but the tendency for the lecture and lab course calendars to diverge in response to lab scheduling pressures is a continuing concern and we are working to resist further lecture/lab calendar divergences when practically feasible.

b. Laboratory Manuals

The laboratory manuals for the two major lab courses, Chem 111/112, and Chem 117 (the one-semester Engineering lab course) are produced entirely ‘in-house’ and printed by Hayden-McNeil publishing. The third edition of the 111/112 manual and the first edition of the 117 manual debuted in the Fall 2012 semester (the latter manual is a thoroughly revised version of the manual developed by Dr. Larry Brown in 1996 that had undergone only minor year-to-year revisions.) Royalties from 111/112 manual sales have been used to build an endowed Directors fund for the use of the chemistry FYP. They total about $50,000 annually, a sum that will increase to roughly $65,000 annually beginning in the 2013-14 academic year as the Chem 117 manual contributions are added in. Hayden McNeil provided two $10,000 contributions for salaries to individuals involved in lab manual upgrades. In the summer of 2010, Hayden-McNeil funds provided half of the summer stipends for Drs. Joanna Pellois and Joe Mawk – who did most of the work in producing the second edition of the Chem 111/112 manual. The second
$10,000 contribution was used to provide summer teaching assistantship support to graduate students who are developing and testing new experiments for the 111/112 and 117 lab manuals.

c. Textbooks
We have negotiated favorable cost options for student textbooks. For Chem 101/102, the most attractive option offers the student a full text (full color loose-leaf) copy, OWL homework/eBook system (24 mos.) for net $99.00 for both semesters. This is only $9.00 more than the previous (Simanek era) price and now includes the loose-leaf paper version of the text as part of the package. This compares to a hardcover retail price of $257.00 for the same. This translates to a course-wide cost saving for Chem 101/102 students of roughly $500,000 per year for 3500 students. For the ~2000 or so Chem 107 students, the $70 price per student for a full text (full color loose-leaf) copy, OWL homework/eBook system (6 months) is offered, translating into a savings approaching $200,000.

d. Quizzes
An on-line quiz system was brought into use in the Fall 2011 semester. The pedagogical motivation for the system was to induce students to better prepare for the lab experiments by having them take a quiz covering questions in both safety and chemistry before they can enter the laboratory; i.e., successful completion of the quiz will constitute their ‘ticket’ into the lab. This new approach seems to have been moderately successful; more students seem to be giving their labs at least a cursory reading before they actually arrive. The time devoted to doing the experiments has been moderately shortened. The elimination of paper quizzes has the incidental benefits of reducing our copying page count by more than 50,000 per semester and TA grading loads have been reduced as well.

e. Lecture series
The FYP has sponsored an evening program of seminars intended for general audiences for which the combined annual attendance is roughly 5200. The program receives some support from the College of Science and has been sponsored in recent years by Cengage publishing at a rate of $7500 per year. The seminar topics comprise a blend of chemistry and more general interest science and science-related areas; the seminars are available on-line at http://www.chem.tamu.edu/academics/fyp/lecture_series/

2. Teaching personnel involved and class sizes
Most of the classroom instruction in the chemistry FYP is assumed by non-tenure-track Lecturers and Senior Lecturers; participation by tenure-track faculty at any given time amounts to instruction of between 10 to 20% of the students enrolled. In the first years of his directorship, Eric Simanek made an effort to decrease the average class sizes, and section enrollments decreased from ~290 students in the 2005-7 period to ~255 students in the 2007-8 to 2010-11 academic year period. Rising enrollment and concomitant budget reductions have forced these numbers back up to 275 per section in the 2011-12 academic year and they seem destined to rise further in upcoming years. (It should be noted that our lecture rooms have a capacity of 316 students. That capacity is now routinely reached in Spring Chem 107 lectures. For the present, 316 is the upper limit on FYP lecture course enrollments since budgets and competition for lecture room space with other service courses precludes the addition of more sections.
Total enrollment for the past 7 years

Figure 1: Lab and lecture enrollments, 2005-12

Laboratory and lecture hall occupancy

Figure 2: Room occupancies, 2005-12
3. **Teaching assistants**

Graduate students being fully supported as teaching assistants (TAs) are responsible for three lab sections (GAT-3) – a workload that seems to be on the high side in comparison with that in peer institutions. The number of GAT-1 equivalents expended by the FYP on duties other than lab supervision has been reduced in the past two years from greater than 50 to just over 30. The functions carried out by individuals in these positions fall into four categories: Instructional Assistants dedicated to laboratory work (lab-IAs), Instructional Assistants dedicated to lecture-related tasks (lec-IAs), graders, and make-up lab TAs. Post-1st-year graduate students who are simultaneously working as GAT-1’s or GAT-2’s hold virtually all the IA positions. IAs provide ‘logistical support’ in running a large teaching system. The lab-IAs help to pass on their knowledge and experience to 1st-year TAs and also help the TLCs manage the labs and serve as a conduit of information useful in identifying lab problems and debugging new experiments. The lec-IAs assist Lecturers in managing their large classes and are used by lecturers in various ways. They are useful in handling technical problems in on-line homework, ‘clickers’, and scheduling of make-up exams. They can supplement or temporarily fill in at office hours. They may put in some time at the chemistry Helpdesk. Lec-IAs are quite useful to tenure-track faculty who are rotating through the FYP for a few years and need help in keeping up with changes in classroom technology. Many instructors have labored to keep at least part of their exams on something other than a multiple-choice basis. Obviously, this requires a commitment to institutional support of graders. The FYP has employed as many as 15 GAT-1’s as graders, but as budgets have tightened this has been reduced to roughly 10 GAT-1 positions. These positions are filled almost entirely by international graduate students whose rudimentary English-language skills preclude their employment as TAs in any case.

**Figure 3: FYP lab distributions for 2005-12**
4. **Special laboratory sections**

Several FYP lab sections are currently designated for the first-year lab for chemistry majors (Chem 111, 112 and 231). These are *in addition* to labs conducted in the main chemistry building for honors students (Chem 111H/112H) and other chemistry majors (Chem 113/114). Each lab section of up to 24 students has a teaching assistant with a full-time TA (designated as GAT-3) assigned 3 sections.

5. **Teaching assistant training and safety**

All Teaching Assistants coming into the FYP program for the first time are required to undergo site-specific safety training and to take a 1-credit hour course (Chemistry 697) in which they receive experiment-specific training (including conducting at least a major portion of the experiment). This course is taught each semester covering the large-enrollment class for that semester. Thursday night training sessions are held every week in preparation for the labs in the subsequent week; TAs teaching any of the lab course for the first time are required to perform the appropriate experiments before they teach them. The TLCs supervise these activities.
B. Organic Chemistry Service Courses

The large courses involved here are Organic Chemistry I (Chem 227) and Organic Chemistry II (Chem 228) and their corresponding lab courses (Chem 237 and Chem 238). Organic and Biological Chemistry (Chem 222) and its lab course (Chem 242), currently a teaching responsibility of the Biological Chemistry Division, impact the organic lab courses because Chem 242 is currently taught in the organic chemistry lab rooms.

1. Lecture Courses:

The lecture courses are separate courses from the lab courses although the labs attempt to parallel the coverage of the lecture courses. Total Enrollments in the two lecture courses (See Figure 5) during Fall Semesters increased from just over 1500 in Fall 2005 to just above 1700 in Fall 2007 followed by a drop to level off at just above 1600 for the last 4 years. (Fall 2011 was slightly below 1600 perhaps because of reductions in number of sections as a result of budget reductions.) Spring semester totals are lower than Fall semester primarily by students not continuing into the 2nd semester course. Over the past seven years, the Fall 227 enrollment as a percentage of the Spring 102 enrollment (prerequisite course) has trended down from 82% to about 76% (See Figure 6). This may indicate that the recent growth in Chem 102 enrollments (1623 in Spring 2008 to 1806 in Spring 2011) has involved students in majors that do not require chemistry beyond General Chemistry.

<table>
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<tr>
<th>Total organic enrollments (lecture and labs)</th>
<th>Fall 237 enrollment as % of spring 102 enrollment</th>
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Organic lecture class sizes (See Figure 7) have been maintained at averages generally below 100 students/section as a result of two factors – the lack of suitable classrooms in or near the chemistry building with seating above 105 students (one less desirable classroom seats a maximum of 129 and is used for a limited number of sections) and a desire to maintain some faculty-student interactions outside of classroom. The average size was reduced to the low 80’s during 2009 and 2010 by increasing the number of sections (and # of faculty teaching organic) in conjunction with a slight decrease in enrollments until the budget reduction in Fall 2011 resulted in an immediate reduction in the number of organic lecturers. We have recovered a bit this Fall even with the slight increase in enrollment. Section sizes in the off-sequence course are often less than the larger-enrollment on-sequence course. Therefore, class sizes in individual courses have averaged above 100/section five times over the past seven years and individual sections have hit or exceeded 105 numerous times.
Of the 15 – 19 sections of organic chemistry being taught per semester, the vast majority are taught by Lecturers and Senior Lecturers. Tenure-track faculty teach a chemistry major’s section and an honors section – neither of which is considered in the numbers compiled here. Of the service course sections, there is usually between zero (most frequent) and two sections covered by tenure-track faculty. In general, the number of different faculty teaching these service sections ranges between 7 and 9. The multiple lectures are coordinated to the extent that all faculty cover the exact same chapters during Org. Chem. I (with some flexibility between sections at the end of Org. Chem. II) and all sections use OWL on-line homework coordinated with the textbook. Individual instructors assign grades for their sections, but meet to consider proposed grade distributions prior to final grade assignments.

A full-time lecturer teaches 3 lecture sections, although some lecturers may have an assignment that includes instructional responsibilities for one section of our chemistry major’s intensive lab course (Chem 234) instead of a lecture section. Lecturers are responsible for handling all aspects of their sections with minimal clerical assistance since there is no central organic staff as in the First Year Program. Each lecture section is provided about one GAT-1 equivalent (1/3 of a full-time TA assignment) of grading assistance. All exam preparation, handling of student questions, selecting on-line homework questions and setting assignment dates, exam reviews, administration of make-up exams, and compilation of grades are the responsibility of individual instructors. Tenure-track faculty members have some departmentally funded clerical assistance that help with these responsibilities. Each full-time non-tenure-track lecturer is normally assigned about 3 Chem 237 periods as lab supervisor. Duties as 237 lab supervisor are minimal as described below.

Students in the Chemistry 227/228 sequence are required to purchase access to an on-line bundle that includes on-line versions of the McMurry 8th Edition Organic textbook and the corresponding Study Guide and Solutions Manual and Cengage On-line Web-based Learning (OWL) on-line homework for the McMurry text. Students can purchase 24-month access to these resources for a cost of $130. The cost for on-line access plus a loose-leaf full-color version of the textbook costs $149 direct from Cengage Learning. The bundle with the textbook is sold by local bookstores for about $185. The ‘discounted’ on-line price from the publisher is $242.99 for a bound textbook alone and $415.48 for the textbook and a paperback Study Guide.
Amazon.com lists the combination for $325.19 new and $289.79 used. Savings to students are substantial, and students who start the course when a new edition is released will pay no more than students who start the course when used textbooks are available. Large numbers of students credit the on-line homework system as instrumental in their success in these courses. This will be particularly important in the future since the university has decided to provide Supplemental Instructors to chemistry courses without prohibitive contributions from the department. Only a fraction of students availed themselves of supplemental instruction while all students can take advantage of the learning opportunities provided by the high-quality on-line system.

The one-semester 3-credit hour survey of organic chemistry course (Chem 222) has been offered as one section each semester with total enrollments ranging between 291 and 430 over the past seven years with an average enrollment of 342/year. The enrollment trend appears to be increasing slightly over the last 4 years. (Figure 8) This course is taken as a terminal organic course by a variety of majors primarily in the College of Agriculture. Only a fraction (< 25%) of these students take the corresponding lab course (Chem 242). Because of space requirements, this lab course can now be offered only during the Spring semester (and Summer semester if funds are available). This appears to have led to Spring semester enrollments in 222 being significantly larger than Fall semester (not true from 2005 – 2007 when labs were offered both semesters).

2. Lab Courses:

Chemistry 237 and Chemistry 238 are 1-credit hour lab courses. These courses are conducted over 18 different 3-hour time periods during the week with four sections meeting at a time. There is a short computerized Powerpoint presentation followed by a pre-lab quiz (generated for each section from a databank of questions) at the beginning of the time period in a lecture room. Students then move to the lab rooms to conduct the experimental assignments. Sections of the lab course have no formal connection to specific lecture courses.

Although the First Year Program does not make use of their laboratory rooms after 6PM, the Organic Laboratory Program for many years has had to conduct night labs from 6:30 – 9:30 PM three nights a week (with one additional night reserved for make-up labs)! For Fall 2011, sixteen of our 68 Chem 227/228 lab sections (25%) are night labs. We are able to conduct night labs by staffing our stockroom with experienced chemically proficient student workers during
these lab periods. These student workers also have to clean up after the night labs and get the labs prepped for 8AM labs the next morning (sometimes for a different course). Although we have space available for 72 lab sections during the 18 time periods we conduct labs (four sections running concurrently in our 4 available lab rooms), four of those lab sections are currently designated for the first-semester organic chemistry lab for chemistry majors (Chem 231). For Fall 2012, the remaining 68 lab sections are projected to be over 95% of full capacity (1560 students out of 1632 possible) prior to final preregistration. The trend for organic lab enrollments is shown above in Figure 5.

Each lab section of up to 24 students has a teaching assistant with a full-time TA (designated as GAT-3) assigned 3 sections. In addition to assignments to official lab sections, a Teaching Assistant assignment may include 1-section as TA for Thursday night make-up sections (up to 3 GAT-1 assignments), one TA as a GAT-1 assignment for the TA training course (Chem 697), or a GAT-1 equivalent as grader for instructors in the lecture courses (approx. 14 GAT-1 assignments in Spring semester; Fall semester grading assignments come primarily from International Students ineligible to act as teaching assistants because of language deficiencies).

All Teaching Assistants coming into the organic program for the first time are required to undergo site-specific safety training and to take a 1-credit hour course (Chemistry 697) in which they receive experiment-specific training (including conducting at least a major portion of the experiment). This course is taught each semester covering the large-enrollment class for that semester.

An organic faculty member (normally a lecturer) is assigned to each 4-section lab period. They are responsible for starting the computerized Powerpoint presentation over the experiment to be conducted and collecting the scantrons from the pre-lab quizzes. They are also expected to make at least one pass through the lab rooms checking for safety compliance and detecting issues that students may be having. They are also expected to be in the building throughout the lab period in case of an emergency – particularly important for the night labs.

### Numbers of organic TA position

![Graph showing numbers of organic TA position](image)

**Figure 9**

The number of TA positions (as GAT-1 equivalents) used in the Organic Lab Program (Chem 237 and Chem 238) is shown in Figure 9. (A full-time Teaching Assistant is considered a
GAT-3 and covers three sections; a GAT-1 would normally cover one service laboratory section.) This graph excludes the 3-5 GAT-1 positions used for Chem 242 lab since that course was taught in General Chemistry labs for some of the time over the last seven years. In addition to assignments to lab sections, there are 4 GAT-1 positions for make-up labs and to serve as teaching assistants for the TA training course. Since Fall 2009, very few GAT-1 positions are used in the Fall semester because the International students that have not passed English Language Proficiency Exams and cannot be Teaching Assistants fill most of the grading positions for organic chemistry lecturers.

C. Challenges and Goals of the Service Courses

In the short- and medium-term, budgetary and/or space constraints limit the scope of changes that might be made to improve the operation of the service courses or to do much that is ‘adventurous’ in adopting different models for achieving the goals of the program. TAMU’s financial allotment for TAs is now badly out-of-line with their stipends, and the stipends have been stagnant for several years. Before a modest cost of living increase in the 2012-13 year period, salaries for most FYP and Organic faculty have also not increased for several years. At the same time, enrollments have risen by about 15% in FYP lecture courses over the past four years. Laboratory enrollment increases have been more modest, but the number of GAT-1 positions has declined by ~10%. Simply put, fewer people are bearing a greater workload.

These difficulties notwithstanding, both the First-Year and Organic service programs have done well in continuously modifying curricula and facilities/equipment to continually provide a high-quality experience for the students we serve. In lecture rooms, audio-visual equipment has been continually upgraded. Technology upgrades in the labs have also been brought on-line on a continuous basis.

This section concludes with some areas where we believe there is some room for innovation in the teaching of our service courses:

(1) Effective ways to improve/modernize laboratories.
   If we can get support for new lab experiment testing by graduate students, support needed for faculty in course development can be quite modest. In the FYP, for example, the introduction of new labs in polypyrrole and nanoparticle synthesis were evaluated, tested, and debugged quite smoothly by use of this model.

(2) Improve student performance.
   There is increasing pressure at TAMU (and elsewhere) to improve graduation rates and accelerate graduation times. While we continue to try to make improvements, overall we feel we are doing a good job with the students as we get them. We can exert little direct control on the quality of our incoming students. Therefore, we are looking at ways we can better prepare our weakest students and remediate their deficiencies. To this end, we are now evaluating the use of diagnostic proficiency exams and considering options whereby remedial instruction might be provided to students entering the chemistry FYP.
Abbreviated *curricula vitae* of all faculty members are found in section XIII of this document. Over the past seven years (2005-2012), the 42 tenure-track and 14 non-tenure-track faculty whose primary appointment is in the Department of Chemistry have educated >96,100 students through teaching *ca.* 1550 sections of courses, and have published *ca.* 1800 published articles and delivered *ca.* 2200 lecture presentations. They have mentored *ca.* 320 postdoctoral research associates, 580 Ph.D. students and 390 undergraduate research students. In order to carry out these multiple missions, the department has an annual instructional budget of *ca.* $10M and the faculty has attracted significant external research support, totaling over $18M. Additionally, there are 5 faculty members who have primary appointments in other departments with joint appointments in chemistry. The following sections provide details on the profile and productivity of the faculty, currently and with trends over the past 20 years.

**A. Listings of the Faculty**

1. **Tenure-track faculty members, listed according to divisions***

<table>
<thead>
<tr>
<th>Analytical Chemistry Faculty</th>
<th>Inorganic Chemistry Faculty</th>
<th>Physical/Nuclear Chemistry Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteas, James D.</td>
<td>Barondeau, David P.</td>
<td>Batteas, James D.</td>
</tr>
<tr>
<td>Hilty, Christian</td>
<td>Blumel, Janet</td>
<td>Bevan, John W.</td>
</tr>
<tr>
<td>Macfarlane, Ronald D.</td>
<td>Clearfield, Abraham</td>
<td>Herschbach, Dudley R. (Physics)</td>
</tr>
<tr>
<td>North, Simon W.</td>
<td>Daresbourg, Donald J.</td>
<td>Hilty, Christian</td>
</tr>
<tr>
<td>Russell, David H.</td>
<td>Daresbourg, Marcetta Y.</td>
<td>Laane, Jaan</td>
</tr>
<tr>
<td>Schweikert, Emile A.</td>
<td>Dunbar, Kim R.</td>
<td>Lucchese, Robert R.</td>
</tr>
<tr>
<td>Son, Dong He</td>
<td>Gabbai, Francois P.</td>
<td>Natowitz, Joseph B.</td>
</tr>
<tr>
<td>Soriaga, Manuel P.</td>
<td>Gladysz, John A.</td>
<td>North, Simon W.</td>
</tr>
<tr>
<td>Vigh, Gyula</td>
<td>Hall, Michael B.</td>
<td>Rosyne, Michael P.</td>
</tr>
<tr>
<td>Zhang, Renyi (Atmospheric Sciences)</td>
<td>Hughbanks, Timothy R.</td>
<td>Scully, Marlan (Physics)</td>
</tr>
<tr>
<td></td>
<td>Ozarov, Oleg V.</td>
<td>Son, Dong He</td>
</tr>
<tr>
<td></td>
<td>Zhou, Hongcai (Joe)</td>
<td>Wheeler, Steven E.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yeager, Danny L.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yennello, Sherry J.</td>
</tr>
<tr>
<td><strong>Biological Chemistry Faculty</strong></td>
<td></td>
<td>Zhang, Renyi (Atmospheric Sciences)</td>
</tr>
<tr>
<td>Barondeau, David P.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Begley, Tadhg P.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daresbourg, Marcetta Y.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hilty, Christian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnson, Arthur (Biochemistry &amp; Biophysics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lindahl, Paul A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liu, Wenshe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macfarlane, Ronald D.</td>
<td></td>
<td></td>
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<tr>
<td>Rauschel, Frank M.</td>
<td></td>
<td></td>
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<tr>
<td>Romo, Daniel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sacchettini, James C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Biochemistry &amp; Biophysics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scully, Marlan (Physics)</td>
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<td></td>
</tr>
<tr>
<td>Watanabe, Coran M. H.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yang, Jiong</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organic Chemistry Faculty</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barondeau, David P.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Begley, Tadhg P.</td>
<td></td>
<td></td>
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<tr>
<td>Burgess, Kevin</td>
<td></td>
<td></td>
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<tr>
<td>Gabbai, Francois P.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gladysz, John A.</td>
<td></td>
<td></td>
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<tr>
<td>Harding, Kenneth E.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liu, Wenshe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ozarov, Oleg V.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rauschel, Frank M.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romo, Daniel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singleton, Daniel A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watanabe, Coran M. H.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheeler, Steven E.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wooley, Karen L.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yang, Jiong</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Several faculty are cross-listed in more than one division, with their names in bold font in their primary division; joint faculty (joint department) are shaded*
2. Non-tenure-track faculty members

Brown, Lawrence S.
Gaede, Holly C., Chief Undergraduate Advisor
Goodey-Pellois, Joanna, Associate Graduate Advisor
Hildreth, Robert A.
Keeney-Kennicut, Wendy, Associate Director of the First Year Chemistry Program
Mawk, Elmo J., Associate Undergraduate Advisor
Mullen, Christine A.
Pennington, James D.
Ponnampерuma, Krishan
Santander, Patricio
Soriaga, Elizabeth
Tiner, Tammy H.
Williamson, Vickie M.

B. Profile of the Faculty: Numbers

1. Current numbers and trends over the past ca. 20 years

The Department of Chemistry at Texas A&M University currently consists of 56 faculty members, comprising 42 tenure-track and 14 non-tenure-track faculty members. Of the tenure-track faculty members, there are 3 Assistant Professors, 4 Associate Professors and 35 Full Professors, 11 of whom are University Distinguished Professors. There are also 2 University Distinguished Professors Emeritus, and we have 5 joint appointees, 3 of whom are University Distinguished Professors. The 14 non-tenure-track faculty members include 4 Instructional Assistant Professors, 8 Senior Lecturers, 1 Lecturer and Technical Coordinator, and 1 Lecturer.

![Numbers of Faculty Members vs. Academic Years](image)

Figure 1. Numbers of tenure-track, non-tenure track and combined total faculty members holding positions in the Department of Chemistry over the past 20 academic years.
The number of faculty members in the Department of Chemistry has fluctuated over the past twenty years, reaching a maximum of 73 in 2009-2010, and declining significantly over the past 3 years to the current status of having 56 total members. This decline in faculty numbers has occurred while the numbers of Ph.D. and undergraduate students have risen steadily (see Graduate and Undergraduate Program Overview sections). The tenure-track and non-tenure-track faculty serve distinctive purposes in providing education, training, scholarship, service, mentoring and outreach at the post-graduate, graduate and undergraduate levels, therefore, it is important to maintain strong numbers of quality personnel on each track. The economic downturn over the past few years has caused budget cuts and hiring freezes. There have been no additions of faculty since 2010, and with normal attrition and losses due to budget cuts, the 40 tenure-track faculty are reduced by 7 members, relative to the average of 47 over the past 20 years. The 14 non-tenure-track faculty are reduced by 1 member, relative to the 20-year average; however, they have lost the enhanced growth that had been occurring over the past ca. 10-15 years, having been cut nearly in half from their maximum of 25 members, just three years ago.

2. Growth and attrition of tenure-track faculty

Over the past 18 years, the department has undergone dynamic changes in the tenure-track faculty, with 27 hires, yet 37 departures. Of the Assistant Professor hires, 10 have been promoted, 7 of whom remain on the faculty, 4 were denied tenure and 3 are currently at the Assistant Professor level, with 2 of those undergoing tenure reviews currently. There have been 7 senior faculty hires since 1999, with all 7 remaining at TAMU. In addition to the 4 negative tenure cases, attrition has included 12 faculty moves to other institutions, 14 retirements and 6 deaths. Clearly, our faculty is “top heavy” and there is a serious need to hire aggressively at the Assistant Professor level. There is also a need to replace the leadership and expertise of senior faculty members who have passed (Goodman) or have left the institution (Cremer and Simanek) recently. With the increasing student populations and diversity of chemistry research, the Department tenure-track faculty numbers cannot continue to remain at a level (40) that is 15% below our average number of faculty (47) and ca. 25% below our high of nearly twenty years ago (54).
Table 1. Tenure-track faculty members who have joined the department since 1994.

<table>
<thead>
<tr>
<th>Faculty member</th>
<th>Year joined department</th>
<th>Current position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Standeart</td>
<td>1995</td>
<td>--</td>
</tr>
<tr>
<td>Victoria DeRose</td>
<td>1995</td>
<td>--</td>
</tr>
<tr>
<td>Simon North</td>
<td>1997</td>
<td>Professor</td>
</tr>
<tr>
<td>Paul Cremer</td>
<td>1998</td>
<td>--</td>
</tr>
<tr>
<td>Francois Gabbiai</td>
<td>1999</td>
<td>Professor, Davidson Chair</td>
</tr>
<tr>
<td>Aaron Harper</td>
<td>1998</td>
<td>--</td>
</tr>
<tr>
<td>Eric Simanek</td>
<td>1998</td>
<td>--</td>
</tr>
<tr>
<td>Kim Dunbar</td>
<td>1999</td>
<td>University Distinguished Professor, Davidson Chair</td>
</tr>
<tr>
<td>Steve Miller</td>
<td>2000</td>
<td>--</td>
</tr>
<tr>
<td>Coran Wantanabe</td>
<td>2001</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Raymond Schaak</td>
<td>2003</td>
<td>--</td>
</tr>
<tr>
<td>Yi Qin Gao</td>
<td>2004</td>
<td>--</td>
</tr>
<tr>
<td>Eva Sevick</td>
<td>2004</td>
<td>--</td>
</tr>
<tr>
<td>James Batteas</td>
<td>2005</td>
<td>Professor</td>
</tr>
<tr>
<td>Brian Connell</td>
<td>2005</td>
<td>--</td>
</tr>
<tr>
<td>Dong Hee Son</td>
<td>2005</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>David Barondeau</td>
<td>2006</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Christian Hilty</td>
<td>2006</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Janet Blümel</td>
<td>2007</td>
<td>Professor</td>
</tr>
<tr>
<td>John Gladysz</td>
<td>2007</td>
<td>University Distinguished Professor, Dow Chair in Chemical Invention</td>
</tr>
<tr>
<td>Wenshe Liu</td>
<td>2007</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Jiong Yang</td>
<td>2007</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Hongcai Zhou</td>
<td>2008</td>
<td>Professor</td>
</tr>
<tr>
<td>Tadhg Begley</td>
<td>2009</td>
<td>University Distinguished Professor, D. H. R. Barton and Robert A. Welch Chair</td>
</tr>
<tr>
<td>Oleg Ozerov</td>
<td>2009</td>
<td>Professor</td>
</tr>
<tr>
<td>Karen Wooley</td>
<td>2009</td>
<td>University Distinguished Professor, W. T. Doherty-Welch Chair</td>
</tr>
<tr>
<td>Steven Wheeler</td>
<td>2010</td>
<td>Assistant Professor</td>
</tr>
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</table>
Table 2. Tenure-track faculty members who have left the department since 1994.

<table>
<thead>
<tr>
<th>Faculty member</th>
<th>Year departing department</th>
<th>Reason for departure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emory Adams</td>
<td>1995</td>
<td>Retired</td>
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<tr>
<td>Edward Meyers</td>
<td>1995</td>
<td>Retired</td>
</tr>
<tr>
<td>Ralph Zingaro</td>
<td>1995</td>
<td>Retired</td>
</tr>
<tr>
<td>William McMullin</td>
<td>1996</td>
<td>Denied tenure</td>
</tr>
<tr>
<td>Alan Rodgers</td>
<td>1996</td>
<td>Retired</td>
</tr>
<tr>
<td>Donald Sawyer</td>
<td>1996</td>
<td>Retired</td>
</tr>
<tr>
<td>John Bockris</td>
<td>1997</td>
<td>Retired</td>
</tr>
<tr>
<td>Jeffery Kelly</td>
<td>1997</td>
<td>Left TAMU (Scripps)</td>
</tr>
<tr>
<td>Daniel O’Brien</td>
<td>1997</td>
<td>Retired</td>
</tr>
<tr>
<td>Yi-Noo Tang</td>
<td>1997</td>
<td>Retired</td>
</tr>
<tr>
<td>Kevin Wolf</td>
<td>1997</td>
<td>Deceased</td>
</tr>
<tr>
<td>Derek Barton</td>
<td>1998</td>
<td>Deceased</td>
</tr>
<tr>
<td>James Haw</td>
<td>1998</td>
<td>Left TAMU (USC)</td>
</tr>
<tr>
<td>Karl Gingrich</td>
<td>1999</td>
<td>Retired</td>
</tr>
<tr>
<td>Aaron Harper</td>
<td>2000</td>
<td>Left TAMU (USC)</td>
</tr>
<tr>
<td>Jack Lunsford</td>
<td>2000</td>
<td>Retired</td>
</tr>
<tr>
<td>Robert Standaert</td>
<td>2001</td>
<td>Denied tenure</td>
</tr>
<tr>
<td>Arthur Martell</td>
<td>2002</td>
<td>Retired</td>
</tr>
<tr>
<td>Gary Sulikowski</td>
<td>2004</td>
<td>Left TAMU (Vanderbilt)</td>
</tr>
<tr>
<td>Richard Crooks</td>
<td>2005</td>
<td>Left TAMU (UT-Austin)</td>
</tr>
<tr>
<td>Richard Schmitt</td>
<td>2005</td>
<td>Retired</td>
</tr>
<tr>
<td>Eva Sevick</td>
<td>2005</td>
<td>Left TAMU (UT-HSC-Houston)</td>
</tr>
<tr>
<td>Dwight Conway</td>
<td>2006</td>
<td>Retired</td>
</tr>
<tr>
<td>Victoria DeRose</td>
<td>2006</td>
<td>Left TAMU (UOregon)</td>
</tr>
<tr>
<td>Marvin Rowe</td>
<td>2006</td>
<td>Went to TAMU-Qatar</td>
</tr>
<tr>
<td>F. Albert Cotton</td>
<td>2007</td>
<td>Deceased</td>
</tr>
<tr>
<td>Steve Miller</td>
<td>2007</td>
<td>Denied tenure (UFlorida)</td>
</tr>
<tr>
<td>Raymond Schaak</td>
<td>2007</td>
<td>Left TAMU (Penn State)</td>
</tr>
<tr>
<td>A. Ian Scott</td>
<td>2007</td>
<td>Deceased</td>
</tr>
<tr>
<td>John Fackler</td>
<td>2008</td>
<td>Retired</td>
</tr>
<tr>
<td>John Hogg</td>
<td>2008</td>
<td>Deceased</td>
</tr>
<tr>
<td>Eric Simanek</td>
<td>2010</td>
<td>Left TAMU (TCU)</td>
</tr>
<tr>
<td>Yi Qin Gao</td>
<td>2010</td>
<td>Left TAMU (Changjiang, China)</td>
</tr>
<tr>
<td>Rand Watson</td>
<td>2010</td>
<td>Retired</td>
</tr>
<tr>
<td>Brian Connell</td>
<td>2012</td>
<td>Denied tenure</td>
</tr>
<tr>
<td>Paul Cremer</td>
<td>2012</td>
<td>Left TAMU (Penn State)</td>
</tr>
<tr>
<td>Wayne Goodman</td>
<td>2012</td>
<td>Deceased</td>
</tr>
</tbody>
</table>
C. Profile of the Faculty: Ranks

The faculty members of the Department of Chemistry have achieved high quality scholarship in research and teaching, and they hold leadership positions throughout the university and the broader scientific community. The tenure-track faculty are weighted heavily toward Full Professors (35, 83%), with minority numbers at the Associate (4, 10%) and Assistant (3, 7%) Professor levels. The 35 Full Professors hold 15 of the 40 Chairs in the College of Science, and 11 are University Distinguished Professors. There are also 2 University Distinguished Professors Emeritus. Of our 5 joint appointees, 3 are University Distinguished Professors and all but one hold Chaired positions; the one having a half-time appointment but also a Nobel Prize (1986, Chemistry). The 14 non-tenure-track faculty members are also highly experienced, with 4 having been promoted to Instructional Assistant Professors and 8 to Senior Lecturer positions. However, this situation of strength is tenuous for the future, without continued promotion and immediate aggressive hiring at all levels, especially at the junior level.

Table 3. Chairs and professorships held by Department of Chemistry faculty in 2012.

<table>
<thead>
<tr>
<th>Chair/Professorship</th>
<th>Holder</th>
<th>Year Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. E. Martell Endowed Chair&lt;br&gt;Applied Biosystems/MDS Sciex Instruments Professorship in Mass Spectrometry in Chemistry&lt;br&gt;Cyclotron Institute Bright Chair in Nuclear Science&lt;br&gt;Davidson Chair in Science&lt;br&gt;Dow Chair in Chemical Invention&lt;br&gt;Gradipore Chair in Separation Science in Chemistry&lt;br&gt;Harold J. Haynes Chair in Geosciences&lt;br&gt;Hershel E. Burgess Chair in Physics (Non-High Energy Physics), and Distinguished Research Chair (TEES)&lt;br&gt;Presidential Professor for Teaching Excellence&lt;br&gt;Rachal Chair in Chemistry&lt;br&gt;Robert A. Welch Foundation Chair and Derek Barton Professor in Chemistry&lt;br&gt;W. T. Doherty-Welch Foundation Chair in Chemistry&lt;br&gt;E. L. Wehner-Welch Chair in Chemistry&lt;br&gt;Wolfe-Welch Chair in Science&lt;br&gt;University Distinguished Professor</td>
<td>Cremer, Paul&lt;br&gt;Russell, David&lt;br&gt;Natowitz, Joseph&lt;br&gt;Bevan, John&lt;br&gt;Dunbar, Kim&lt;br&gt;Gabbai, Francois&lt;br&gt;Hall, Michael&lt;br&gt;Raushel, Frank&lt;br&gt;Singleton, Daniel&lt;br&gt;Gladysz, John&lt;br&gt;Vigh, Gyula&lt;br&gt;Zhang, Renny*&lt;br&gt;Scully, Marlan*&lt;br&gt;Bergbreiter, David&lt;br&gt;Burgess, Kevin&lt;br&gt;Begley, Tadhg&lt;br&gt;Wooley, Karen&lt;br&gt;Johnson, Arthur*&lt;br&gt;Sacchettini, James*&lt;br&gt;Begley, Tadhg&lt;br&gt;Clearfield, Abraham</td>
<td>2007 (leaving TAMU 2012)&lt;br&gt;2002&lt;br&gt;2002&lt;br&gt;2005&lt;br&gt;2004&lt;br&gt;2008&lt;br&gt;2004&lt;br&gt;2004&lt;br&gt;2005&lt;br&gt;2007&lt;br&gt;2001&lt;br&gt;1997 and 2000&lt;br&gt;2006&lt;br&gt;2004&lt;br&gt;2009&lt;br&gt;2009&lt;br&gt;1994&lt;br&gt;1996&lt;br&gt;2011&lt;br&gt;2007</td>
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### Chair/Professorship

<table>
<thead>
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<th>Chair/Professorship</th>
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<th>Year Awarded</th>
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<td>Cremer, Paul</td>
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<td>Darensbourg, Donald</td>
<td>2010</td>
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<td>Darensbourg, Marcetta</td>
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<td>Dunbar, Kim</td>
<td>2007</td>
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<tr>
<td>Fackler, John**</td>
<td>2012</td>
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<td>Gladysz, John</td>
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<tr>
<td>Herschbach, Dudley*</td>
<td>2011</td>
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<tr>
<td>Johnson, Arthur*</td>
<td>2002</td>
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<tr>
<td>Lunsford, Jack**</td>
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<td>Macfarlane, Ronald</td>
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<td>Natowitz, Joseph</td>
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<td>Raushel, Frank</td>
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<td>Scully, Marlan*</td>
<td>1996</td>
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<tr>
<td>Wooley, Karen</td>
<td>2011</td>
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</tr>
</tbody>
</table>

* Joint appointees
** Emeritus faculty

### D. Profile of the Faculty: Diversity

#### 1. Academic age diversity

The Department’s average “academic age”, which is measured as the average number of years since the Department’s faculty members have completed their Ph.D. degrees, has been rising. The average number of years past the Ph.D. in 1994 was 24 years. Following the external review in 1994, the department hired new faculty and the average years since Ph.D. dropped to 23 years in 1999. The current average number of years since the Ph.D. has grown to its highest level, 28 years. The average years from Ph.D. for non-tenure-track faculty members is 22 in 2012. Including our joint appointees, 82% of the tenure-track faculty and 79% of the non-tenure-track faculty are more than 15 years beyond having completed their Ph.D. degree. Nonetheless, there are faculty members across all “academic ages”, and there have been additions of faculty at the senior level, so that new research areas and fresh perspectives have been added. The average of faculty careers at TAMU is 21 years for tenure-track and 16 for non-tenure track faculty members. Many of those external hires were promoted to University Distinguished Professorships, and internal promotions have also been pursued aggressively, to increase the proportion of Distinguished Professors vs. Professors, while maintaining a relatively low proportion of Associate and Assistant Professors.

### Table 4. Average and median numbers of years since completion of Ph.D. degrees (“academic age”) of tenure-track faculty in the Department, calculated for the years of 1994, 1999, 2004 and 2012.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>average</td>
<td>24</td>
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<td>27</td>
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<tr>
<td>median</td>
<td>24</td>
<td>24</td>
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<td>29</td>
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</tbody>
</table>

Faculty age distribution: years since Ph.D.
Figure 2. Numbers of years that have passed since the current (2012) tenure-track faculty members (including joint appointees) have completed their Ph.D. degrees.

Figure 3. Numbers of years that the current (2012) tenure-track faculty members have spent on the faculty in the Department of Chemistry at TAMU vs. the numbers of years that have passed since they completed their Ph.D. degrees.
Table 5. Distributions of tenure-track faculty members in the Department of Chemistry by rank in 1994, 1999, 2004 and 2012.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Assistant Professor</td>
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<td>7</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Associate Professor</td>
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<td>4</td>
<td>4</td>
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<tr>
<td>Professor</td>
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<td>29</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>Distinguished Professor</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>11</td>
</tr>
</tbody>
</table>

2. Gender diversity

The Department of Chemistry promotes gender equality and creates an atmosphere in which our faculty has thrived, regardless of gender. Currently, there are 6 female tenure-track faculty (15% of the primary faculty, 13% including joint appointees) and 7 non-tenure-track female faculty members (50%). All of the tenure-track female faculty members have been awarded tenure: 3 are University Distinguished Professors, 2 are Full Professors, and 1 is an Associate Professor. The productivity and impact of the research being conducted by our female faculty are outstanding, in fact, the average h-index for the female faculty is slightly higher than that for the males (38 vs. 37). All of the non-tenure-track female faculty members have also been promoted: 3 to the title of Instructional Assistant Professor and 4 to Senior Lecturer positions. Since the number of student credit hours that are taught by the non-tenure-track faculty is large, the representation of women in this group enhances the interactions of the general student body that take our service courses. However, the large fraction of the female faculty in the non-tenure track ranks is somewhat problematic in the message it sends to our graduate students. This is, of course, an issue that is broader than TAMU. There is conscientious effort to consider all faculty hires fairly, with attention to increasing equality in the numbers of faculty of each gender, and to adding faculty members from underrepresented groups.

3. Cultural diversity

The Department is home to a number of faculty members who originated and studied in countries outside the U.S., including China, England, Estonia, France, Germany, Hungary, Ireland, Korea, the Philippines, Russia, and Switzerland. The non-tenure track faculty enrich this further by contributing the cultures of India and Costa Rica. While this international diversity is beneficial to our department, increased representation of U.S.-born ethnic minorities is a priority as less than 10% of our faculty belong to underrepresented groups. This is especially important for Texas being a minority majority state.

E. Profile of the Faculty: Salaries

Although state and local economic issues have led to budget cuts and limited salary raises over the past couple of years, there is a general trend of increasing salaries for faculty across all ranks. Calculations performed for only the start- vs. end-point years of 2004 vs. 2012 indicate increased annual average salaries of 9, 30, 2, 12, 20 and 10% for the ranks of Distinguished Professor, Professor, Associate Professor, Assistant Professor, Senior Lecturer, and Lecturer, respectively. The newly awarded positions of Instructional Assistant Professors received salaries that are 28% higher in 2012 than was the average Senior Lecturer salary of 2004. There are some complications, however, with comparisons between and, even, within ranks, due to salaries
for different faculty members varying from 9-12 months without uniformity, depending on additional factors, including committee service and other duties.

---

**Salary vs. Fiscal Year by Rank**

![Graph](image)

Figure 4. Fiscal year average salaries for faculty members from 2004 to 2012, according to rank.

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**F. Productivity of the Faculty: Teaching**

The tenure-track and non-tenure-track faculty members have uniformly demonstrated strong commitments to education, including the development of educational innovations and outreach activities (please see abbreviated details in the bio-sketches provided in section XIII). The minimum workload required for a faculty member is 9 teaching credits. For most faculty members, this educational effort is met with a combination of classroom/laboratory teaching credits and equivalent teaching credits. The equivalent teaching credits (e.g., undergraduate research, graduate research and seminar course credits administered by an advisor) allow for the reality that most tenure-track faculty members spend a significant portion of their time on the research-based education and training of future scientists. Taking into account only the classroom/laboratory teaching activities over the last 7 years (2005-2012), the tenure-track faculty taught 14,900 students (an average of 54 students/yr/tenure-track faculty member), primarily in graduate courses, upper-level undergraduate coursework or honors and majors sections of undergraduate courses. Much of the classroom teaching load of the department is placed on non-tenure track faculty, who taught 81,200 students (an average of 830 students/yr/non-tenure-track faculty member) over the same period of time. Many of the tenure-track and non-tenure track faculty are outstanding educators and have been recognized with both College-level and University – level teaching awards.

**G. Productivity of the Faculty: Mentoring**

Most of the Department’s tenure-track faculty members operate active research programs, with training and mentorship of undergraduate students, graduate students and postdoctoral associates (please see abbreviated details in the bio-sketches provided in section XIII). The research group sizes range from the faculty member alone to the largest group of 27,
and there is currently an average of 11 members per group. From 2005-2012, the tenure-track faculty has provided research training to 390 undergraduate students, 580 Ph.D. students and 320 postdoctoral associates. Those students/postdocs have received many awards and have generated a significant body of scholarly research advances. Our students progress to further academic pursuits and are actively recruited by companies.

**H. Productivity of the Faculty: Scholarly publications and presentations**

Research productivity and dissemination in the form of written publications and presentations has remained high, as tracked over the past nearly 20 years, without an obvious correlation to the numbers of tenure-track faculty members. Over the past 12 years (2005-2012), Department research has generated *ca. 1790* publications (5.8 papers/tenure track faculty / year) and a similar number of faculty member-delivered talks. As determined on October 31, 2012, the average h-index of the Department’s faculty (including jt. appointees) was 37, with a high of 72 and a low of 10. Comparison of the h-index vs. years since completion of the Ph.D. degree indicates that there is a range of impact levels (as measured by h-index, an admittedly imperfect parameter, but a measure nonetheless) of the publications by the Department’s faculty members across their breadth of “academic ages”. The data suggest a decrease in impact for the “35+ years since PhD” group.

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**Figure 5. Total publications per year generated from research conducted in the Department of Chemistry.*

*ISI results for ad=(texas a&m and station and chemistry) and au=(cotton f* or barondeau d* or batteas j* or begley t* or bergbreiter d* or bevan j* or bluemel j* or brown l* or burgess k* or clearfield a* or connell h* or conway d* or cremer p* or crooks r* or dairesbourg m* or dairesbourg d* or dorese v* or dunbar k* or facker j* or gabbai P* or gaede h* or gladysz j* or goodye-pellois j* or goodman w* or gopalakrishnan g* or hall m* or harding k* or harper a* or soh d* or herschbach d* or hildreth r* or hilty c* or hogg j* or hughbanks t* or scott a* or johnson a* or keeney-kenmicut w* or laane j* or lindahl p* or liu w* or lucchese t* or macfarlane t* or martell a* or maw e* or miller s* or mullen c* or natowitz j* or north s* or ozarov o* or pennington j* or ponnamperuma k* or gao y* or rausel f* or romo d* or rosnyak m* or rowe m* or russell d* or sacchettiini j* or santander p* or schaak t* or schmitt r* or schweikert e* or scully m* or sevick e* or simtrak e* or singleton d* or soriaga c* or standweart r* or sulikowski g* or tiner t* or vigh g* or wantanabe c* or watson r* or wheeler s* or wheelser s* or wilsonarson v* or woolley k* or yang j* or yeager d* or yennello s* or zhang r* or zhou h* or wells rd or fitzpatrick p* or lunsford j*) refined by: document types=( article or proceedings paper or letter or review )
Figure 6. Average numbers of publications per faculty member generated each year from research conducted in the Department of Chemistry.

Figure 7. H-index vs. “academic age” of the tenure-track faculty members (including joint appointees). This graph shows the distribution in impact with the data points within the rectangle representing the natural average.
I. Productivity of the Faculty: Awards

Our tenure-track and non-tenure track faculty members have been awarded many prestigious honors for their scholarly research and educational activities. Many of the recent awards can be found in the bio-sketches provided in section XIII or in the the tabulated listings below for years 2006-2010 (captured from Department annual reports).

### Honors & Awards Received by Faculty, 2012

<table>
<thead>
<tr>
<th>Name</th>
<th>Award</th>
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</thead>
<tbody>
<tr>
<td>James Batteas</td>
<td>Fellow of the Royal Society of Chemistry</td>
</tr>
<tr>
<td>David Bergbreiter</td>
<td>Eppright University Professorship for Undergraduate Teaching Excellence</td>
</tr>
<tr>
<td>Marcetta Darensbourg</td>
<td>TAMU Association of Former Students Graduate Mentoring Award</td>
</tr>
<tr>
<td>Kim Dunbar</td>
<td>TAMU Women Former Students’ Network Eminent Scholar Award (inaugural)</td>
</tr>
<tr>
<td>Wenshe Liu</td>
<td>NSF CAREER Award</td>
</tr>
<tr>
<td>Oleg Ozerov</td>
<td>ACS Award in Pure Chemistry, Welch Foundation Norman Hackerman Award in Chemical Research</td>
</tr>
<tr>
<td>Daniel Romo</td>
<td>TAMU Academy of Distinguished Former Students Inductee</td>
</tr>
<tr>
<td>Jiong Yang</td>
<td>NSF CAREER Award</td>
</tr>
<tr>
<td>Sherry Yennello</td>
<td>TAMU Association of Former Students Distinguished Teaching Award</td>
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### Honors & Awards Received by Faculty, 2011

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>David Bergbreiter</td>
<td>Fellow of the American Chemical Society</td>
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<tr>
<td></td>
<td>Wells Fargo Award for Teaching Excellence, Texas A&amp;M University</td>
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<tr>
<td>Lawrence Brown</td>
<td>TAMUS Teaching Excellence Award</td>
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<tr>
<td>P. Cremer</td>
<td>Excellence in Innovation Award, Texas A&amp;M University</td>
</tr>
<tr>
<td></td>
<td>Fellow, American Association for the Advancement of Science</td>
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<tr>
<td>Marcetta Darensbourg</td>
<td>Fellow of the American Academy of Arts &amp; Sciences</td>
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<td></td>
<td>Distinguished Scientist Award, Sigma Xi</td>
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<tr>
<td>Kim Dunbar</td>
<td>Fellow of the American Chemical Society</td>
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<tr>
<td>François Gabbaï</td>
<td>Fellow of the American Chemical Society</td>
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<tr>
<td>Holly Gaede</td>
<td>TAMU Association of Former Students College Level Teaching Award</td>
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<tr>
<td>O. Ozerov</td>
<td>ACS Award in Pure Chemistry, American Chemical Society</td>
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<tr>
<td>D. Romo</td>
<td>Distinguished Achievement Award - Research, The Association of Former Students</td>
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<tr>
<td>G. Vigh</td>
<td>Halász Medal Award, Hungarian Society for Separation Sciences</td>
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<tr>
<td>S. Yennello</td>
<td>Fellow, American Physical Society</td>
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### Honors & Awards Received by Faculty, 2010

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<tr>
<td>K. Burgess</td>
<td>Distinguished Achievement Award - Research, The Association of Former Students</td>
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<tr>
<td>P. Cremer</td>
<td>Edith and Peter O’Donnell Award, The Academy of Medicine, Engineering and Science of Texas Fellow, American Association for the Advancement of Science</td>
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<tr>
<td>D. Daresbourg</td>
<td>Award in Inorganic Chemistry, American Chemical Society</td>
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<tr>
<td>D. Goodman</td>
<td>Southwest Regional Science Award, American Chemical Society</td>
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<tr>
<td>K. Harding</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
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<tr>
<td>R. Hildreth</td>
<td>Outstanding Staff Achievement Award, College of Science</td>
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<tr>
<td>W. Keeney-Kennicutt</td>
<td>Piper Professor Award, Minnie Stevens Piper Foundation</td>
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<td></td>
<td>Student Led Award - Teaching Excellence, Texas A&amp;M University</td>
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<tr>
<td>S. North</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
</tr>
<tr>
<td>K. Wooley</td>
<td>Polymer Chemistry Division, Founding POLY Fellow, American Chemical Society</td>
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<tr>
<td>S. Yennello</td>
<td>Outstanding Mentoring Award, Women’s Faculty Network</td>
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### Honors & Awards Received by Faculty, 2009

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<tbody>
<tr>
<td>D. Bergbreiter</td>
<td>Student Led Award - Teaching Excellence, Texas A&amp;M University</td>
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<tr>
<td>J. Fackler</td>
<td>Fellow, American Chemical Society</td>
</tr>
<tr>
<td>F. Gabbaï</td>
<td>Dalton Lecturer in Inorganic Chemistry</td>
</tr>
<tr>
<td>J. Gladysz</td>
<td>Fellow, American Chemical Society</td>
</tr>
<tr>
<td>D. Goodman</td>
<td>Fellow, Royal Society of Chemistry</td>
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<td></td>
<td>Fellow, American Chemical Society</td>
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<td>W. Keeney-Kennicutt</td>
<td>Chemistry Lecturer of the Year, Texas A&amp;M University from the Brazos Valley Elks Club</td>
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<td>Outstanding Professor, Pi Beta Phi</td>
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<td>Presidential Professor - Teaching Excellence Award, Texas A&amp;M University</td>
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<td></td>
<td>Presidential Professor of Teaching Excellence, Texas A&amp;M University</td>
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<tr>
<td>J. Laane</td>
<td>Humboldt Research Award, Alexander von Humboldt-Stiftung/Foundation</td>
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<td>S. North</td>
<td>Distinguished Achievement Award - Teaching, Association of Former Students</td>
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<tr>
<td>F. Raushel</td>
<td>Repligen Award in Chemistry of Biological Processes, ACS Division of Biological Chemistry</td>
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<td>D. Romo</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
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<td>Method to Extend Research in Time (MERIT) Award, National Institutes of Health</td>
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<td>Special Creativity Extension, National Science Foundation</td>
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<td>R. Zhang</td>
<td>Bush Excellence Award for Faculty in International Research, George</td>
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<td>Bush Presidential Library Foundation</td>
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### Honors & Awards Received by Faculty, 2008

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<tbody>
<tr>
<td>D. Bergbreiter</td>
<td>Distinguished Achievement Award - Research, The Association of Former</td>
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<td>Students</td>
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<td>Southwest Regional Award, American Chemical Society</td>
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<td>A. Clearfield</td>
<td>Gallery of Success Award, Temple University</td>
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<td>National Northeast ACS Division Award - Excellence in Academic</td>
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<td>Research, American Chemical Society</td>
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<td>D. Goodman</td>
<td>JoAnn Treat Research Excellence Award, Texas A&amp;M Research Foundation</td>
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<td>D. Russell</td>
<td>ALA Innovation Award, LabAutomation</td>
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<td>J. Sacchettini</td>
<td>Distinguished Achievement Award, Association of Former Students</td>
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<td>Patent and Innovation Award, Texas A&amp;M University</td>
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<td>D. Singleton</td>
<td>Arthur C. Cope Scholar Award, American Chemical Society</td>
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<td>Distinguished Achievement Award - Teaching, The Association of Former</td>
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<td>C. Watanabe</td>
<td>Dreyfus Lectureship Award, American Chemical Society</td>
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<td>Distinguished Achievement Award - Teaching, The Association of Former</td>
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<td>J. Fackler</td>
<td>Distinguished Achievement Award – Research, The Association of Former Students</td>
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<tr>
<td>J. Gladysz</td>
<td>International society of Fluorous Technology, University of Pittsburgh</td>
</tr>
<tr>
<td>J. Hogg</td>
<td>Presidential Professor for Teaching Excellence, Texas A&amp;M University</td>
</tr>
<tr>
<td>W. Keeney-Kennicutt</td>
<td>Excellence in Quality Enhancement Award, 7th Annual Texas A&amp;M Assessment Conference</td>
</tr>
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<td>J. Pennington</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students</td>
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<td>M. Rosynec</td>
<td>Distinguished Achievement Award – Teaching, The Association of Former Students</td>
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<tr>
<td>M. Tichy</td>
<td>Teaching Award, Corps of Cadets</td>
</tr>
<tr>
<td>G. Vigh</td>
<td>Distinguished Achievement Award – Teaching, The Association of Former Students</td>
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<tr>
<td>S. Yennello</td>
<td>Regents Professor Award, Texas A&amp;M University System</td>
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<tr>
<td>R. Zheng</td>
<td>Outstanding Overseas Young Research Award, China National Science Foundation</td>
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<tr>
<td>Name</td>
<td>Award</td>
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<tr>
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<tr>
<td>D. Bergbreiter</td>
<td>Presidential Professor for Teaching Excellence, Texas A&amp;M University&lt;br&gt;Wells Fargo Honors Faculty Mentor Award, Texas A&amp;M University</td>
</tr>
<tr>
<td>F. Cotton</td>
<td>Distinguished Achievement Award - Research, The Association of Former students&lt;br&gt;George C. Pimentel Award in Chemical Education, Dow Chemical&lt;br&gt;Honorary Doctorate, Lanzhou University&lt;br&gt;Honorary Professorship, Sun-Yat Sen University (Quangzhou)&lt;br&gt;Honorary Professorship, Renmin University (Beijing)&lt;br&gt;Kuivila Lecturer, SUNY- Albany</td>
</tr>
<tr>
<td>P. Cremer</td>
<td>Faculty Early Career Development (CAREER), National Science Foundation&lt;br&gt;Norman Hackerman Award in Chemical Research, The Welch Foundation&lt;br&gt;Pittsburgh Conference Achievement Award, The Pittsburgh Conference &amp; Exposition on Analytical Chemistry &amp; Applied Spectroscopy&lt;br&gt;Southwest Regional Young Investigator Award, Sigma Xi</td>
</tr>
<tr>
<td>M. Daresbourg</td>
<td>Distinguished Achievement Award - Teaching, The Association of Former Students&lt;br&gt;Outstanding Alumnus of Kentucky, University of Kentucky</td>
</tr>
<tr>
<td>K. Dunbar</td>
<td>Distinguished Achievement Award - Graduate Mentoring, The Association of Former Students</td>
</tr>
<tr>
<td>J. Fackler</td>
<td>Visiting Lecturer, Chemistry Research Promotion Center, R.O.C., Taiwan</td>
</tr>
<tr>
<td>Y. Gao</td>
<td>Searle Scholar Award, The Chicago Community Trust</td>
</tr>
<tr>
<td>C. Hilty</td>
<td>Camille Dreyfus New Faculty Award, Camille and Henry Dreyfus Foundation</td>
</tr>
<tr>
<td>A. Johnson</td>
<td>JoAnn Treat Research Excellence Award, Texas A&amp;M University</td>
</tr>
<tr>
<td>R. Lucchese</td>
<td>Fellowship, Japan Society for the Promotion of Science</td>
</tr>
<tr>
<td>S. Miller</td>
<td>Faculty Early Career Development (CAREER), National Science Foundation</td>
</tr>
<tr>
<td>C. Murillo</td>
<td>Fellow, American Association for the Advancement of Science</td>
</tr>
<tr>
<td>J. Pennington</td>
<td>Fish Camp Namesake, Texas A&amp;M University</td>
</tr>
<tr>
<td>R. Schaak</td>
<td>Beckman Young Investigator Award, Arnold and Mabel Beckman Foundation&lt;br&gt;DuPont Young Professor Grant, DuPont Fellows Forum&lt;br&gt;Faculty Early Career Development (CAREER), National Science Foundation</td>
</tr>
<tr>
<td>V. Williamson</td>
<td>Best Practices Course, College Board Advanced Placement</td>
</tr>
</tbody>
</table>
J. Productivity of the Faculty: External research support

The total external funding for research has been consistently higher during the past six years, relative to the prior decade. The majority of the support is from federal sources, with private/non-profit organizations being the second largest contribution and additional amounts provided by state, industrial, university and other organizations.

![Figure 8. Annual total external research funding for the Department.](image1)

![Figure 9. Annual total external research funding for the Department, including individual categories of sources for funds.](image2)
K. Productivity of the Faculty: Service

The Department faculty is active in service throughout the Department, TAMU and the national and international scientific communities, holding important advisory board positions and serving leadership roles on committees. For instance, Tadhg Begley serves on the Dean’s Committee on Promotions and Tenure, Dave Bergbreiter is a member of the ACS Joint Board/Council Committee on Publications, Holly Gaede directs our NSF-REU program, John Gladysz serves as Chair of the Executive Committee of the University Distinguished Professors, Joanna Goodey-Pellois and Wendy Keeney-Kennicutt served as Coordinators for the recent Chemistry Open House with activities provided by large numbers of our students and faculty and attendance by ca. 1000 local residents, Jaan Laane is a member of the Board of Directors and Co-Chair of the Alumni Council, American Friends of the Alexander von Humboldt Foundation and serves on the Scientific Advisory Board for the European Congress on Molecular Spectroscopy, Jim Pennington is the Coordinator for the TAMU Chemistry Road Show, and Karen Wooley is Chair of the NIH NANO study section and an International Scientific Advisory Board member for the Dutch BioMedical Materials program. We also have on our faculty ca. 10 editors of chemistry-related journals and our faculty members serve on the Editorial Advisory Boards of a large number of journals (http://www.chem.tamu.edu/faculty/journals/). To reserve the length of section XIII, committee service information was not requested, although some of the more prestigious roles are given.

L. Faculty Review


M. State of the Faculty

A key characteristic of any university is change: expansion in knowledge, generated through scholarship; matriculation and graduation of students, through the educational process; and the hiring, promotion and loss of faculty. The Department has been a leader in the advancement of chemistry through research, with high productivity as measured by publications, presentations and financial support. It has also exhibited a strong commitment to the education, training and mentorship of our students. However, with the decline in faculty member numbers and the increase in faculty “academic age”, one of the grandest challenges facing the Department of Chemistry is the recruitment and retention of our faculty. TAMU began a significant effort in 2002, with the goal to hire 447 new tenure-track faculty members over a six year period of time, for which 14 of those positions were allocated to Chemistry. Seventeen faculty members have been added (Table 1) since 2002, with 9 of those being senior hires. The senior hires have added research area diversity and were recruited as a combination of rising stars and established scholars. With those hires came significant resources, which has improved the Department as a whole, but has also led in many cases to inequalities of research space and resources. Therefore, attention must be paid toward improving the facilities for faculty members who have dedicated their careers to TAMU. As an important aid in this directive, Janet Bluemel and John Gladysz have generously dedicated provisions in their estate plan to establish two future chairs for the Department—one to provide resources for internal faculty retention and the other for external faculty recruitment (http://www.science.tamu.edu/articles/959). The Department has also been active in promoting its faculty from Associate to Full Professor and further to the level of University Distinguished Professor. Of the 17 junior appointments that have been made since
1994, 10 have been promoted with tenure, and 4 have not. As this report was being finalized, the Department vote on the 2 faculty members undergoing tenure review was made, as 1 approved and 1 declined. The eminent loss of that faculty member is disconcerting at a personal level and also for the Department, as the most recent 2 tenure denials were for faculty members in the Organic Division, and another senior-level Organic faculty member left for another institution in 2010. The Physical/Analytical Divisions have also experienced significant losses, with the departure and death of two members in the past year. Therefore, the greatest needs of the Department faculty are the addition of members to the Organic and Physical/Analytical Divisions, the addition of junior faculty members and the improvement of conditions to retain our current faculty strengths.
VIII. The Departmental Staff (provided by James Batteas)

The department maintains a significant support staff including a business administration office, a number of administrative assistants to the faculty, and technical support staff for our research and teaching functions. This last category includes support staff for the first year chemistry program, organic chemistry teaching labs and our graduate program. Without these individuals, the department would not be able to function. The staff interfaces with the department through an elected Staff Advisory Committee. The present Staff Advisory Committee includes: Mr. Julian Coleman, Mr. Cutis Lee, Ms. Sandy Manning, Dr. Bill Russell, Ms. Julie Zercher, and is presently chaired by Mr. Derek Pitts. This staff committee was formed to provide a mechanism for the department head to communicate information with the staff and to represent the staff in the governance of the department. The Staff Advisory Committee also functions to help build a sense of ownership among Staff and improve efficiency, morale, and equity within the Department.

In preparation for this external review a staff survey was developed in conjunction with the Staff Advisory Committee to aid in identifying areas for improvement in the staffing of the department as well as to collect the staff’s input on the structure and operations of the department. The detailed results of the staff survey can be found in Appendix A14.

A. Survey of the Staff and Key Findings from the Survey

Here we summarize these results and address key points raised by the survey. In the survey 48 total responses were collected, split among three main categories (academic, administration and technical support staff). The majority of the respondents have been employed by the department for 6 years or more.

1. Working an Overload

An immediate finding is that the staff workload has increased over the last three years. This increase can be likely tied to increasing demands on the department while being faced with diminishing support from the university. The budget cuts of the recent years have hampered our ability to hire and promote staff in an appropriate fashion, resulting in significant increases in workload for our existing staff. This has in many cases created a mismatch between job titles and the tasks staff are currently undertaking. This is a challenge as it limits the flexibility of the department to organize staff into more suitable positions and to hire additional staff to address emerging needs. For example, as faculty are granted tenure and their groups continue to increase in size and complexity there is an increased need for administrative support. A challenge here has been effective communication between the faculty, staff and business administration office as to how these needs of the faculty can be met. Often decisions are made and communicated after the fact, especially in cases of assignments of administrative support staff.

The overload has led to the general feeling that the staff is not valued by the department and recognition for their efforts in light of the increased workload has not been forthcoming. Again here, the department has focused on recognition in terms of monetary compensation,
which in light of the budget shortfalls and cuts has made this virtually impossible to do. This is clearly noted by more than half of the staff indicating that they are not fairly compensated for their work. The department should develop a more consistent set of measures to reward and recognize the efforts of the staff in other ways. Also, the general lack of transparency and communication to the staff of the financial challenges that face the department has been a general complaint. A potential solution would be to add the chair of the Staff Advisory Committee to the Academic Operation Council in order to provide an additional route of communication between the head’s office and the faculty with the staff.

It is worth noting that, despite these challenges 80% of the staff surveyed report feeling loyalty toward the department.

2. Training and Resources

An integral part of job satisfaction is the matching of skill sets, resources and training to the tasks being undertaken. The majority of the staff (67%) feels that their professional and technical skills are being properly utilized and more than 80% have the needed resources. In general the staff feels that their immediate supervisors are encouraging them to pursue professional growth through enhanced training. However, 61% of staff do not feel encouraged to pursue professional growth by the department. A possible solution is for the department to develop professional training guidelines that encourage skills advancement by recognizing and rewarding staff.

A common issue among newly hired staff is that it takes too long to learn assigned responsibilities and what is required to accomplish tasks. As an enhancement to existing training and resources, a well-defined and maintained handbook of resources, FAQs and Standard Operating Procedures would increase efficiency in staff, especially newly hired administrative support staff.

3. Communication

Effective communication between the department head’s office, the business administration office, the faculty and the staff is of course key and essential. The overall response to the survey with regards to communication is generally neutral to positive. However, approximately 25% of the responses indicate poor communication, showing there is room for improvement. A potential solution would be to have staff representation on the Academic Operation Council.

4. Conflict Resolution

When considering the response to the survey with regard to raising concerns, nearly half of those surveyed indicated that they felt the need to raise a concern. These concerns were raised within the department’s administrative structure 79% of the time, outside the department 14% of the time and not raised 7% of the time. Overall, the majority of respondents who raised a concern were dissatisfied with how it was handled. A possible solution would be to implement a process in which complaints/conflicts are documented and required to be resolved within a reasonable time period. Communicating the status and actions resulting from the process would be an important part of this protocol.

5. Outcomes of the survey

It was clearly noted in the survey that the majority of the staff do not feel that this survey will lead to any significant changes within the department. As such, the department should seek to address these concerns in conjunction with the Staff Advisory Committee. Including the Staff Advisory Committee early in the governance process will help to change this perception.
B. Summary of challenges and recommendations

While the Staff Committee has been officially recognized in the Departmental By-laws and on the list of official committees, a more effective means of communication between the department head, business office and faculty with the staff needs to be implemented. As suggested in the July 24, 2008 meeting between the Department Head and the Staff Advisory Committee, the department should integrate the participation of staff into other functional committees such as the Academic Operations Council. Through these interactions, the Staff Advisory Committee should be included in discussions related to budgetary impacts on the department. This is especially of concern to the staff as budgetary fluctuations impact the mechanisms by which they can be rewarded for their hard work and exemplary performance and on how workload and tasks can be assigned. Further, methods should be developed to recognize staff in non-monetary ways. Conflict resolution should be addressed by the implementation of a formal process in which complaints/conflicts are documented and resolved. The department should develop training guidelines and a handbook of resources, FAQs and Standard Operating Procedures.
IX. Infrastructure, Support Staff and Facilities
(provided by James Batteas)

A. Scientific and Administrative Support Staff

Key to the functioning of the department is the support and expertise offered by a talented group of support and research staff. Their contributions to the department play an invaluable role in the research and educational missions of the department. A listing of Scientific and Administrative staff is given in Table 1. The Scientific and Administrative staff interfaces with the department administration through an elected Staff Committee. The details of the overall governance of the department as related to scientific and administrative staff support is covered in detail in section II of this self-study report. Here, we highlight the internal and external research facilities that support the department. The facilities associated with the teaching of the First Year Program (FYP) in chemistry are also discussed in a separate section.

Table 1. Research and Support Staff

<table>
<thead>
<tr>
<th>INSTRUMENTATION SPECIALISTS</th>
<th>SERVICE STAFF</th>
<th>DEPARTMENT BUSINESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silber, Steven (Facility Manager, NMR Lab)</td>
<td>Pitts, Derek (Senior IT Manager, Computer Network Support)</td>
<td>Carter, Ronald (Assistant Department Head)</td>
</tr>
<tr>
<td>Bakhmoutov, Vladimir (Staff Spectroscopist, NMR Lab)</td>
<td>Wen, Weihong (Software Applications Developer)</td>
<td>Kosh, Mary (Finance/Accounting)</td>
</tr>
<tr>
<td>Sarathy, K. Partha (Staff Spectroscopist, NMR Lab)</td>
<td>Miller, Mark (Senior Systems Analyst)</td>
<td>Zercher, Julie (Graduate Student Accounting)</td>
</tr>
<tr>
<td>Russell, William (Associate Director, Biological Mass Spectrometry Lab)</td>
<td>Green, Michael (Systems Analyst)</td>
<td>Harnden, Sandra (Purchasing Specialist)</td>
</tr>
<tr>
<td>Rezenom, Yohannes (Service Lab Manager, Mass Spectrometry Lab)</td>
<td>Coleman, Julian (Systems Analyst)</td>
<td>Lee, Curtis (Facilities Coordinator)</td>
</tr>
<tr>
<td>Pai, Pei-Jing, (Postdoctoral Research Assistant, Mass Spectrometry Lab)</td>
<td>Pehl, Timothy (Electronics Shop)</td>
<td>Ludwig, Judy (Personnel Services Supervisor, Budgets)</td>
</tr>
<tr>
<td>Santiago, Vanessa, (Assistant Research Scientist, Mass Spectrometry Lab)</td>
<td>Merka, William (Glass Shop)</td>
<td>Morgan, Mary (Monthly Payroll)</td>
</tr>
<tr>
<td>Reibenspies, Joseph (Associate Director, X-Ray Diffraction Lab)</td>
<td>Seward, William (Machine Shop)</td>
<td>Victorick, Janice (Biweekly Payroll)</td>
</tr>
<tr>
<td>Bhuvanesh, Nattamai (Lab Manager, X-Ray Diffraction Lab)</td>
<td>Page, Ronald (Master Instrument Maker)</td>
<td>Medina, Angie (Personnel)</td>
</tr>
<tr>
<td>Hall, Michael, Director, Molecular Simulation Lab</td>
<td>Wymola, Phillip (Stockroom)</td>
<td>Stickley, Angie (Research &amp; Gift Appropriations)</td>
</tr>
<tr>
<td>Perez, Lisa (Manager Molecular Simulation Lab)</td>
<td>Williams, Melvin (Stockroom)</td>
<td>Richards, Susan (Welch &amp; Research Grants)</td>
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<tr>
<td></td>
<td></td>
<td>King, Crystal (Record Reconciliation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Williams, Lindsey (Fixed Assets Inventory Control)</td>
</tr>
</tbody>
</table>
B. Summary of Overall Infrastructure – Availability and Quality of Research Space

The department is housed in five primary buildings in the main complex, teaching facilities for our First Year Chemistry Program (FYP) in Heldenfels and assigned research space in Reed McDonald Hall and the Interdisciplinary Life Sciences Building.

Map of Chemistry Facilities: 1. Chemistry Main Complex; 2. Reed McDonald; 3. Interdisciplinary Life Sciences Building; 4. Heldenfels

While the research of the faculty continues to be top rate, the facilities overall have diminished in quality since the last external review due to the general lack of upkeep by the university administration through its policies of deferred maintenance. We feel that this presents a significant barrier to hiring new faculty and attracting top notch graduate students into our department, as programs of comparable standing have in recent years made additions of new buildings or substantial renovations to create modern research facilities. As noted in the faculty survey with regards to space and facilities, while most faculty are in general satisfied with the amount and quality of their spaces, notable exceptions can be found. For example in one case a single group was flooded 7 times in the span of six months due to failing infrastructure. This particular problem has been known but has gone un-rectified for more than a decade. To improve the research facilities the department has taken the course of piecemeal renovations, with renovated space predominately being provided only in conjunction with new hires or as components of retention packages. A more proactive renovation plan should be put into place to ensure the continued functioning of the department as a top research and educational program. This should also include plans for improvements in teaching space to accommodate larger class sizes and more advanced laboratory instruction.

The department maintains a broad range of in house research facilities which have seen good growth and support since the last external review. These include Shop Facilities (glass, electronics and machining), Research Facilities (NMR, chemical analysis and mass spectrometry, EPR, X-ray, computational) and Information Technologies Services. These
facilities are augmented by administrative support for the day to day operations within the department and faculty member laboratories.

**C. Shops, Stockroom, and Information Technology Facilities**

The departmental shops, which include the machine shop, the electronics shop, and the glass shop play a crucial role in maintaining a broad range of research programs. In 2008, a Shops Committee was formed to oversee the operation of the shops and to evaluate the expenditures and needs of these facilities. These services are essential for assisting new faculty members in the early years of their careers. The machine shop and electronics shop, in particular, are critical to the success of groups in Analytical and Physical Chemistry which depend on novel instrument development and fabrication and to the training of graduate students in instrumental design. While there was a small decrease in the number of full-time staff in these facilities since 1994, the department has maintained the number of staff since the last external review.

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2012</th>
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<tr>
<td>Glass Shop</td>
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<td>1</td>
</tr>
<tr>
<td>Electronics Shop</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Machine Shop</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

1. **Machine Shop**

   The department maintains a fully functioning machine shop. A major improvement has been seen since the last external review through a complete revamping of the chemistry machine shop. In 2008, with support from the College of Science totaling $250,000, the machine shop updated all of its equipment to modern CNC equipment and hired two new machinists. One of the machinists is an instrument design specialist. This has significantly improved the capabilities of the shops in terms of supporting the research activities of the department and has led to a marked decrease in the needs of faculty to find specialized machining outside of the department.

2. **Glass Shop**

   The glass shop is also a vital resource to the department and provides services to numerous outside users within the University. It is currently the only glass blowing facility on campus. While the glass shop continues to provide exceptional service to the department, a key challenge for the future will be to identify and hire additional staff to take over the glass shop when our current glass blower decides to retire.

3. **Electronics Shop**

   The department also maintains an electronics shop that performs routine instrumentation maintenance and repair, supporting both research and teaching laboratories. At present the shop is staffed by a single lead technician with student worker support. The shop also assists in supporting the audio-visual needs in all of the classrooms.

4. **Stockroom**

   The department maintains a fully staffed stockroom (two fulltime staff members along with student workers) which provides students with immediate access to chemicals, glassware, specialty gases and basic laboratory instrumentation and safety equipment. The stockroom is open M-F 8 AM – 5 PM. In addition to providing these above listed services, the stockroom
staff also handles shipping and receiving for the department providing routine express mail services and the handling of incoming packages and instrumentation.

5. Information & Communications Technology

The Department of Chemistry has formed the Information and Communications Technology (ICT) Group and the Information and Communications Technology Committee which is comprised of IT Staff, Faculty, and Research Staff. The ICT Committee serves as an advisory panel to formulate the departmental policies on information and communications technology and to provide long term planning and vision for the ICT Group. The ICT Group is comprised of five full time employees (Senior IT Manager, Senior Systems Analyst, two Systems Analysts, Software Applications Developer) and seven student workers.

The ICT Group handles all aspects of IT within the Department of Chemistry. The ICT Group is responsible for infrastructure, security, business operations, research computing, communications, teaching support, and other services. Infrastructure managed by the ICT Group includes networking in the Main Chemistry Complex, server rooms, server virtualization technologies, and server backups. Security practices include enforcement of computing ethics policies, server hardening and patch management, password audits, Social Security Number scanning. Centrally managed antivirus software is provided by the ICT Group. Communications managed by the ICT Group include email, calendar, collaboration, web applications, and web servers. Research computing supported by the ICT Group includes departmental supercomputers, grid computing, and individual research group servers. Business operations supported by the ICT Group consist of database management, business applications, and application development. Services provided by the ICT Group include web application development, Helpdesk, and IT consulting. Teaching operations supported by the ICT Group include classroom technology, laboratory computing support, and online learning applications.

The ICT Group is currently implementing a file syncing service, a department wide backup solution, and a departmental firewall and intrusion prevention system. The departmental web server is currently being transitioned to a content management system to allow users to manage their own content more effectively. Long term planned services include the implementation of private cloud technology and the implementation of departmental single sign on. Additional resources for research computing are needed to update and expand our current offerings and to stay competitive with other universities.

D. Research Facilities

The department continues to maintain exceptional research facilities. The annual reports of these facilities from 2011 are given in Appendix A2. We briefly describe each here below.

1. Center for Chemical Characterization and Analysis

The Center for Chemical Characterization and Analysis at Texas A&M University is a component of the Department of Chemistry. The Center is a research support facility partially funded by the Office of the Vice President for Research and Associate Provost for Graduate Studies which provides state-of-the-art capabilities for organic and inorganic analysis and structural characterization. Four specialized laboratories each address a specific area of interest. Those areas and laboratories are: Elemental Analysis, X-ray Crystallography and Molecular Structure, Nuclear Magnetic Resonance, and Mass Spectrometry.
The Elemental Analysis Laboratory (EAL) is a component of the Center for Chemical Characterization and Analysis (CCCA) housed in the Teague Building on the University’s main campus. The Laboratory represents a continuance of Texas A&M University’s efforts in the area of nuclear analytical method development which now spans over 50 years. The Activation Analysis Research Laboratory, from which our laboratory is descended, was established in 1958 and played a significant role in the early developments of the field. In fact, just this last spring (March 13-18, 2011), we celebrated the 50th anniversary of the major conference series in activation analysis and radiochemistry by hosting the 13th International Conference on Modern Trends in Activation Analysis (MTAA-13). The significance of Texas A&M University’s selection as the hosting institution is related to the fact that the first two conferences in the series (MTAA-1 and MTAA-2) were also held here in College Station in 1961 and 1965. So this most recent conference represented a homecoming, in which we enjoyed participation of some 174 scientists from 29 countries.

The stature of Texas A&M University in this community is related not only to this long history, but continues based on our current activities in nuclear techniques and is enhanced through our expansion into related and alternative methods for trace and ultra-trace elemental analysis methods. Currently, the Laboratory boasts unique capabilities in reactor-based thermal instrumental neutron activation analysis (INAA), accelerator-based high-energy (fast) neutron activation analysis (FNAA), energy dispersive x-ray fluorescence spectroscopy (EDXRF) and inductively coupled plasma emission-mass spectrometry (ICP-MS).

The NAA efforts are aided by a wide variety of gamma spectroscopy equipment including high-resolution germanium spectrometers (HPGe) for INAA work, new (November, 2010) bismuth germinate (BGO) scintillators for high efficiency FNAA applications and a 12 inch sodium iodide (NaI(Tl)) annular Compton suppression system for enhancement of peak extraction from complicated spectra. In addition, the Laboratory operates a heavily-shielded large-volume germanium crystal incased in a special low-level cryostat for detection and quantification of minute quantities of natural radioisotopes. The combination of thermal and fast neutron facilities at Texas A&M are not duplicated anywhere else in Texas or the United States.

Our ICP-MS spectrometer is enhanced with sample introduction “front end” devices such as a laser ablation system for studying solid samples and surfaces and a high pressure liquid chromatography system for speciation studies. These result in functional instrumentation for the “hyphenated” techniques of LA-ICP-MS and HPLC-ICP-MS. The ICP-MS facility is a user operated instrument which directly supports research groups throughout the University community. A new Perkin Elmer NexION 300D ICP-MS was placed on order to update our facilities during July, 2011.

The purpose of the laboratory is three-fold: 1) Primary research in the development and application of analytical methodologies; 2) Support of TAMU research across all academic fields; and 3) Service analyses for entities outside the University. A great deal of the University-based work is performed in collaborative efforts, which span these program components. Most of these efforts include the hands-on utilization of the instrumentation by TAMU students which supports our emphasis on training. The focus of our efforts is to provide analytical facilities to TAMU researchers which are of such a scope or which requires such expertise that they are not otherwise available on our campus. While the primary purpose of the laboratory is to support TAMU research, the unique capabilities we have in radioanalytical methods makes the laboratory an important resource for service analysis for other universities, government agencies
and industrial users. Therefore the Laboratory offers NAA services to outside entities on either a collaborative basis or fee for service.

g. NMR facilities (http://nmr.tamu.edu/)

The NMR Facility consists of ten superconducting magnet systems. Six of the systems are broadband, permitting observation of a wide variety of magnetically active nuclei at several different field strengths. All of these spectrometers are UNIX based systems, with eight system running Varian's VnmrJ 3.1 software and two operating with the Bruker TopSpin software. Systems range from 300 to 500 MHz. There are 3 systems using proton/carbon switchable probes, 3 systems using proton/fluorine/carbon/phosphorus quad probes, 2 systems using broadband multinuclear probes, 1 system with a proton/carbon/nitrogen cryoprobe, and 1 solid state multinuclear system.

There are three full time staff positions and one half time position in the facility, providing service spectra, help planning and interpreting experiments, repair and maintenance of the equipment, hardware and software modification for special experiments, and instruction for users.

Researchers making extensive use of NMR in their research are encouraged to become checked out on the equipment so that they can obtain their own data. Instruments are available to authorized users 24 hours a day, 7 days a week.

h. X-Ray Diffraction Laboratory (http://xray.tamu.edu)

The X-ray Diffraction Laboratory is a full service facility dedicated to serving the needs of the Texas A&M University system for determining the three dimensional structure of molecules and solids from single crystal samples and performing high resolution X-ray powder diffraction. Services to outside users on a collaborative basis are also offered. The facility has two full-time crystallographers, one of whom is the manager, for the powder and single crystal needs.


Services: single crystal diffractometry, wide angle diffractometry high resolution diffractometry, 2D powder diffractometry, structure solution of single crystal and powder materials, qualitative and quantitative phase analysis, micro powder diffraction, crystallinity measurement, residual stress analysis, line broadening analysis, thin film analysis, and pole figure analysis.

The users may opt to submit their samples to the facility for structural analysis or to have students and postdocs trained to use the equipment if frequent use is expected. The hands-on aspect of the laboratory is one of the hallmarks of our PhD education, as many research groups depend on X-ray crystallography for the main method of characterization.
2. Laboratory for Biological Mass Spectrometry (http://mass-spec.tamu.edu/)

The Laboratory for Biological Mass Spectrometry (LBMS) was established in 1994, with operational goals focused on the developmental mass spectrometry (MS) and MS-based biological collaborations, primarily in the area broadly defined as “proteomics”. Since its establishment, the application of mass spectrometry in general, and at TAMU specifically, has expanded in ways not imagined in 1994. This has to do primarily with concurrent changes in the research environment of TAMU and the needs for high performance mass spectrometers and hyphenated MS techniques to address the high level research of interdisciplinary collaborations. The LBMS provides key expertise and instrumentation that promote new research directions for a diverse group led by faculty in chemistry, biology, biochemistry, biophysics, engineering, medicine, agriculture, and materials research. In addition, the research capabilities are accessible to non-TAMU users, both academic and industrial, either through collaborations or service-for-fee. The LBMS is now housed in two different buildings; the Chemistry building houses the service-for-fee facility and the facility in the Interdisciplinary life sciences building is focused on facilitating faculty with state-of-the-art MS instrumentation and methods. The current locations will foster interdisciplinary research and partnership with various PI’s from different departments and colleges.

Currently, the LBMS serves the TAMU research communities with expertise in mass spectrometry methodology, instrumentation, and increasingly, informatics. Compounds analyzed range from small organic molecules to macromolecules including proteins, oligonucleotides, polymers and dendrimers. Services provided include molecular-level research in various ‘omics’ related researches, i.e., petroleomics, proteomics, metabolomics, lipidomics, glycomics, etc., which represent growing research areas in the fields of the physical and life sciences, health sciences, agriculture, veterinary medicine and engineering. Thus, the LBMS serves diversified disciplines of TAMU and other institutions with cutting-edge experimental design, method development, new applications which are designed to meet the rapidly expanding needs of researchers. In order to meet with the fast evolving applications of mass spectrometry and the exponential increase in usage of mass spectrometry by the TAMU research groups, the LBMS regularly attempts to upgrade the instrumentation inventory through federal grants to maintain a complete state-of-the-art inventory of mass spectrometers and related analytical instrumentation. The LBMS is currently equipped with high mass accuracy and high resolution mass spectrometers with newly incorporated mass spectrometry techniques such as ion-mobility coupled to a tandem mass spectrometer and ultra-high resolution Fourier-transform ion cyclotron resonance (FTICR) for applications such as top-down proteomics, petroleomics, metabolomics, and drug discovery. In addition to major equipment inventory, the LBMS research scientists are actively involved in the development of new analysis methods and development of next-generation instrumentation for analysis and sample handling. Hence, the activities within the LBMS are divided into four categories: (a) service-for-fee, routine analysis (applications), (b) core research, (c) collaboration and (d) training and dissemination.

Concerns: Some of our mass spectrometers are a decade old, and are no longer supported by the manufacturer for parts and services. In order to meet the challenges of current research and the growing demand of TAMU research groups for MS analysis, upgrades of these instruments are absolutely necessary. In addition, currently the LBMS is understaffed despite the newly added equipments and increased demand in mass spectrometry analysis from TAMU
research groups and outside researchers. Similar programs at other universities have two to three times more personnel in comparison to LBMS. This will adversely affect the progress of LBMS.

3. **Laboratory for Molecular Simulation** ([http://lms.chem.tamu.edu/](http://lms.chem.tamu.edu/))

The Laboratory for Molecular Simulation brings molecular modeling and computational chemistry closer to the experimental scientist by offering advanced training and assistance to those who already use these tools in their research, and beginning training to those who have not yet used them. Advanced modeling software is available to use mathematical methods to calculate the properties of individual molecules, solids, and liquids. The LMS computer lab is available for use by professors who wish to include molecular modelling in their course material. The LMS will provide the hardware, software, and training necessary for the students and professor. The LMS offers, free of charge, three types of workshops throughout the year: 1) UNIX, 2) Molecular Modeling, and 3) Quantum Mechanics Short Course. Most of the programs available through the LMS are only available on unix based SGI machines, therefore, the Unix workshop is a pre-requisite for all other workshops. The facility is overseen by Professor Michael Hall and managed by a PhD scientist (Dr. Lisa Perez) who is responsible for training as well as helping users from various research groups perform specific calculations.

4. **The Center of Atmospheric Chemistry and the Environment** ([http://cace.tamu.edu/cace-home](http://cace.tamu.edu/cace-home))

CACE, TAMU was established by The Texas A&M Board of Regents at their meeting in March 2003. Startup support for CACE was provided by participating Departments, Colleges, and the Office of the Vice President for Research over a three-year period following an initial proposal. Currently, Dr. Renyi Zhang is the director, and Dr. Simon North is the associate director. The Internal Advisory Board consists of Dr. Jeffrey R. Seemann, V.P. for Research, Chair; Dr. Kate C. Miller, Dean, College of Geosciences; Dr. Joe Newton, Dean, College of Science; Dr. Arnold Vedlitz, Director of the Institute for Science, Technology and Public Policy, Bush School; Dr. G. Kemble Bennett, Associate Dean of College of Engineering. The External Advisory Board consists of Dr. Peter H. McMurry, Department of Mechanical Engineering, University of Minnesota; A.R. Ravishankara, Director, NOAA; and Robert Harriss, President and CEO, Houston Advanced Research Center.

One of the most important objectives of the Center is to provide the highest quality information based on laboratory, field and calculation relevant to sustaining our environment and maintaining air quality. The latter is particularly concerned with the ability to provide the basis with which to accurately predict the formation, transportation and mitigation of air pollution from the molecular to regional scale using state-of-the-art modeling capabilities and to predict their effect on climate.

The Center, by the nature of its participant membership, has been multidisciplinary from the start, and it is intended that with the initial infrastructure investment and the synergistic activities of the participating faculty, it will provide a positive contribution to solving societal problems associated with atmospheric pollution and the environment. The Center is always interested in improving its infrastructure and enhancing its capabilities, including through collaborations with universities, industrial interactions and participation with other institutions.
E. Faculty Maintained Shared Instruments in the Department

1. SQUID Magnetometer

The MPMS Quantum Design SQUID magnetometer uses Superconducting Quantum Interference Device (SQUID) technology to provide exquisite sensitivity over the temperature range of 1.8 - 400 K and up to a maximum field of 7 Tesla. Both DC and AC capabilities are available. Applications to sensitive magnetic measurements in key areas such as high-temperature superconductivity, biochemistry, and magnetic recording media as well as molecular magnets are common. The modular MPMS design integrates a SQUID detection system, a precision temperature control unit residing in the bore of a high-field superconducting magnet, and a sophisticated computer operating system. Proprietary software runs in a MS Windows environment with full automation of all system parameters while controlling measurements and collecting data.

The SQUID instrument in the chemistry department has no formal oversight from the Department and no Staff Members so it is not really a Facility per se. It was purchased in 1999 with funds from the NSF after a proposal was written when Kim Dunbar requested a SQUID as part of her hiring package. The proposal was funded although there was no money for items like the sensitive balance in the SQUID room which was purchased by Dunbar and no plan for the operation of the SQUID was put into place. The faculty who were on the NSF proposal are Tim Hughbanks, F.A. Cotton, Abe Clearfield and Kim Dunbar from Chemistry and Don Naugle and Joe Ross from the Physics Department. Since Dunbar’s arrival, she has been managing the SQUID by paying a postdoc and/or student from her group to oversee the daily maintenance of filling the liquid Helium and Nitrogen tanks, training users and to run samples for users if needed. In earlier years, the Department provided GAR2 support and there was some partial funding of a post-doc salary a few times over the course of his 10 years in the Dunbar group. The Department no longer provides support or subsidizes liquid helium use. A fee structure was implemented in October of 2009 and the rates have been increased several times including in July 2012. When the instrument experiences problems with the computer, vacuum equipment, temperature control or if someone breaks a sample rod or drops a sample into the chamber, the Dunbar group fixes it.

2. EPR Facility

The departmental EPR facility is located in room 1135. It consists of a Bruker EMX X-band spectrometer with an Oxford Instruments ER910A liquid helium cryostat. The instrument is capable of operation between ca. 3 K and 100 K, and also at room temperature. The instrument is operated and maintained by Dr. Paul Lindahl and his research group. A number of groups use the instrument including Drs. Barondeau, Begley, Clearfield, Cremer, M. Daresbourg, Dunbar, Gabbai, Hilty, Ozerov, Raushel, and probably others. There is currently no Departmental or University support of the facility and no formal schedule for users fees sign-up times etc. Until a few years ago, the Department provided GAR2 support and there was some partial funding of a post-doc salary a few times over the course of his 10 years in the Dunbar group. The Department no longer provides support or subsidizes liquid helium use. A fee structure was implemented in October of 2009 and the rates have been increased several times including in July 2012. When the instrument experiences problems with the computer, vacuum equipment, temperature control or if someone breaks a sample rod or drops a sample into the chamber, the Dunbar group fixes it.
often they use the instrument. Dr. Lindahl is offering “EPR training” as part of his Chem 628 class this semester, which will include detailed instructions on setting up, operating and disassembling the instrument. The EPR users group meets irregularly. Meeting are announced by email, and all are invited to attend. The last meeting was in May/June, 2012; it was attended by Drs. Lindahl, Darenbourg and Dunbar. It is fair to say that there has been substantial dissatisfaction with the facility in terms of the degree of ‘service” offered. Faculty expect Dr. Lindahl and his group to maintain, operate and repair the instrument for them, and to train their students to use the instrument without compensation. Dr. Lindahl feels that this arrangement is unfair. He also feels that allowing any student to simply use the instrument on demand would quickly lead to damage to the facility because the instrument is delicate, susceptible to breaking, and costly to repair. He is unwilling to relinquish control of the instrument since it is a critical tool for his research program. Other users would like control to be relinquished to an “EPR manager” who would maintain the facility for all to use. This would require a new salary-line which the Department head is hesitant to fund, given the limited funds available.

F. External Facilities

1. The TAMU Materials Characterization Facility (http://mcf.tamu.edu/)

Previously the department lead the Center for Integrated Microchemical Systems (CIMS) The Center for Integrated Microchemical Systems (CIMS) that was formed in 2000 under Dr. Richard Crooks. Upon moving to The University of Texas at Austin, the facility management was transferred to Chemical Engineering under the direction of Dr. Dan Shantz, under the sole auspicious of the Materials Characterization Facility. The facility presently lacks a permanent director, but maintains a full staff of 4 PhD scientists as well as a business manager. This facility provides a broad range of research infrastructure in support of research activities in the areas of materials science and engineering across campus.

The MCF houses a Kratos imaging XPS, a Dimension Icon AFM system, Hysitron Nanoindenter, two Leica confocal fluorescence microscopes (one with spinning disk), a Nanoink dip-pen nanolithography system, a Raman microspectroscopy system, a Cameca ion probe, an imaging ellipsometer, an FE-SEM and a 350 sq. ft. class 1000 clean room. The clean room contains: a Quintel mask aligner, SCS spin-coater, Dektek profilometer, BOC Edwards metal evaporation chamber and other components essential for preparing >2 µm features for fluidics systems. There is a manager of the facility and four full-time staff research assistants. The facility also houses basic spectroscopy facilities for UV-Vis and near IR absorbance spectroscopy as well as fluorescence spectroscopy with lifetime measurement capabilities.

This facility has seen significant investments from the College of Engineering and VPR’s office over the past several years with an influx of new equipment and staffing. With the impending formation of the new Materials Science and Engineering Department, it is anticipated that this facility will be maintained by the new department.

2. The TAMU Microscopy Center (http://microscopy.tamu.edu/)

The Microscopy Center, directed by Dr. Andreas Holzenburg, and staffed by 6 staff research scientists, provides state-of-the art high resolution electron microscopy for the TAMU research community. This includes training courses in electron microscopy that range for basic imaging techniques, instrument operation training and a full course in electron microscopy. The facility, housed in the Interdisciplinary Life Sciences Building, maintains numerous electron microscopes and ancillary facilities for sample preparation. These include SEMs: a JEOL JSM-
6400 and an FEI Quanta 600-FE-SEM, and TEMs: an two FEI Tecnai G2 F20 FE-TEMs (with one dedicated to materials), a JEOL 122 EX TEM and a JEOL JEM 2010 TEM.

3. **Cyclotron Institute (http://cycnt.tamu.edu/)**

The Texas A&M University Cyclotron Institute is a major technical and educational resource for the State of Texas and the nation. The major functions of the Institute, which as a Department of Energy Supported University Center of Excellence is primarily funded by DOE and the state, are to conduct basic research, to educate students in nuclear science and technology, and to provide accelerator capabilities for a wide variety of applications in materials science, nuclear medicine, space science, and analytical procedures. The Institute is one of only two super-conducting cyclotron facilities in the country and one of only four in the world. Internationally recognized for its research contributions, this interdisciplinary Institute is the primary experimental facility for the University’s graduate research programs in nuclear chemistry and nuclear physics. Research group leaders in the Institute are faculty members in Chemistry and Physics holding joint appointments in the Institute. Approximately 10% of the tenure track faculty members in the Chemistry and Physics Departments are group leaders in the Institute. (Though not formally required, directorship of the Institute has regularly alternated between Nuclear Chemists and Nuclear Physicists.) Many of the Institute research programs involve participation of scientists from other laboratories in Italy, France, Belgium, Japan, Russia, Ukraine, The Czech Republic, Poland and Mexico. The Institute also serves as a support and staging area for collaborative experiments carried out at other major national and international facilities. In addition a wide variety of other organizations (e.g., NASA, Boeing, Motorola, Jet Propulsion Laboratory, St. Jude’s Hospital, Harris Computer etc.) use the accelerator for a broad range of applied studies. Institute research programs are regularly reviewed by external scientific committees appointed by the DOE. In the most recent of these reviews, September 2010, the Institute programs received uniformly strong reviews and received a new three-year grant with an increase in funding. The Institute is in the final stages of a $5 million dollar upgrade of its accelerator facilities, jointly funded by DOE, The Robert A. Welch Foundation and The State of Texas. Current Institute Personnel include 12 faculty members, 23 PhD level research scientists and post docs, 24 graduate students, 6 undergraduate students and 36 technical staff members.

Since its creation in 1964 the Institute has been very successful in obtaining significant external grant funds. The Nuclear Chemistry research program has been continuously funded for 45 years. Currently the Institute’s operations and research program is funded by approximately 6.8M in external funds (DOE, the NSF, the Robert A. Welch Foundation, and beam time sales for applied uses) and 0.9M in State appropriated and local funds. The present Nuclear Chemistry faculty members are University Distinguished Professor J.B. Natowitz, Regents’ Professor S. Yennello and Assistant Professor of Nuclear Chemistry C.M. Folden. Together their external research funding is over 2 million dollars/yr. In fiscal reports the funding of Drs. Natowitz and Yennello is credited to the Chemistry department which last year accounted for over 9% of the Department’s external funding. At the time of the last review the Chemistry Department had committed to two new Nuclear Chemistry faculty positions in connection with the facility upgrade. The new Chemistry faculty members would have returned the Nuclear Chemistry faculty to its previous strength of 5. Although these hires were not made the College of Science, has hired Dr. Charles M Folden as an Assistant Professor of Nuclear Chemistry. There are two ongoing faculty searches for Radiochemists as part of the Nuclear Solutions Institute. It is possible that these individuals will have some affiliation with the Department of Chemistry.
G. New and Upcoming Facilities and Laboratories Led by Chemistry Faculty

1. The Natural Products LINCHPIN Laboratory (http://linchpin.tamu.edu/)

Led by Daniel Romo, The Natural Products LINCHPIN Laboratory at Texas A&M University serves as a Central Collaboration and Idea Incubation Center for interdisciplinary researchers in Texas and worldwide that require the chemical synthesis, selective microscale derivatization (microscale), purification, and structural characterization of bioactive small organic molecules including natural products and derivatives with potential for human disease intervention. Initial data generated from these collaborations will become important and often essential Preliminary Results for submission of major grants to support significant, cutting edge interdisciplinary, human health related-research. The LINCHPIN brings together diverse researchers with common interests in bioactive small molecules and derivatives, proteomics, and genomics serving as a collaboration center and providing the necessary synergy, established track record (co-publications), and preliminary studies to ultimately develop funded collaborative research projects focused on small molecules-based approaches to human disease. Thus the LINCHPIN, building on the very definition of its acronym, will ‘serve to hold together parts or elements that exist or function as a unit’ (e.g. Basic Science in Chemical Biology→LINCHPIN→Translational Research/Drug Discovery).’ The LINCHPIN consists of a Co-Director (Dr. Jing Li, formerly at Eisai) with 5 years of pharmaceutical industry experience and several post-doctoral research scientists to support collaborative projects.

Professor Romo serves as the LINCHPIN Director along with the current consultants, Profs. Tadhg Begley, Dave Bergbreiter and Jim Sacchettini. Thus, the Director, co-Director, and pertinent faculty members will be available for consultation and project development in discussions with interested LINCHPIN collaborators. The facility specializes in chemo- and site selective derivatization of complex small molecules (including natural products) and derivatives on microscale for SAR studies; the design, chemical synthesis and scale up of simplified, equipotent derivatives of initial lead compounds; the isolation, purification and structure elucidation of bioactive small molecules and derivatives; the synthesis of cellular probes to address cellular localization and cellular target/off-target identification; the isolation of putative cellular receptors for bioactive small molecules; and early preclinical studies.

2. Laboratory for Synthetic-Biologic Interactions

Led by Karen Wooley, with the emphasis on establishing a Laboratory having capabilities to perform rigorous, multi-disciplinary studies of synthetic-biologic interactions, significant resources were dedicated to acquire instrumentation and to hire two personnel having expertise in physical chemistry and biological systems, to serve as co-Assistant Directors of the LSBI. Two offices and two laboratories on the ground floor of the ’72 wing of the chemistry complex have been assigned for occupation by the LSBI. Using start-up funds provided with Wooley’s relocation to TAMU and including items brought from Washington University, the following instrumentation and equipment capabilities were purchased or requisitioned, constituting more than $1.5M in additional research infrastructure for the College: atomic force microscopy; laser scanning confocal microscopy; fluorescence lifetime confocal microscopy; fluorescence lifetime spectrometry; microscopic and solution phase anisotropy lifetime spectroscopy; 2D steady state spectrophotometry; steady state 2D anisotropy spectrophotometry; 10 portable digital microscopes with polarization and fluorescence capabilities; portable Raman spectroscopy; micro-Raman spectroscopy; temperature controlled kinetic viscometry; dry and
submersion dynamic mechanical analysis; dry and submersion linear mechanical analysis; microplate based fluorescence, absorbance, luminescence and anisotropy spectroscopy; vertical and horizontal gel electrophoresis systems and ChemiDoc XRS lab imager, ultrasonic homogenizer, and Bio-plex 200 system with HTF and Pro II Wash station for multi-plex-based assay of proteins, cytokines and antibodies.

In addition, two biosafety-level-2 laboratories have been established with full capabilities of materials and equipment, such as refrigerators, freezers, incubating shakers, centrifuges, microscopes, liquid nitrogen cell-storage tank, biological safety cabinets, CO₂-incubators with ultraviolet- and hydrogen peroxide-decontamination capabilities, and all other necessary infrastructure and materials required to run a biological laboratory. One of the two bio-laboratories has been already approved by the Institutional Biosafety Committee (IBC) of Texas A&M University for the storage, manipulation and research of several pathogenic cell lines. The approval of the second laboratory is in progress. Furthermore, several assays have been developed by the personnel of the LSBI for materials characterization, spectroscopic, microscopic and biological analyses.

3. **Protein expression facility**

   Lead by Tadhg Begley a protein expression facility is being set-up in the ILSB with an anticipated start date early in 2013. This facility will provide TAMU researchers with bacterial overexpression plasmids for genes of interest. The facility will also provide technical advice on protein purification and characterization as well as basic molecular biology techniques.
A. Space

The breakdown of departmental space, as currently allocated for various purposes, is summarized below in units of square feet.

- Research Laboratories: 132,894 ft²
- Teaching Laboratories: 29,313 ft²
- Offices - Faculty: 13,717 ft²
- Offices - Staff: 13,092 ft²
- Offices - Students: 22,318 ft²
- Office - Administrative: 4,542 ft²
- Shops, Stockrooms, Storage: 20,886 ft²
- Conference Rooms: 3,767 ft²
- Miscellaneous: 7,004 ft²
- Total: 247,533 ft²

The above compilation includes all space assigned to the Department of Chemistry in the Chemistry Building, as well as in Heldenfels, the Old State Chemistry Building, Reed McDonald, ILSB and Teague Buildings, but does not include space occupied by departmental faculty in the Cyclotron Institute. A list of space allocations to individual faculty can be found on page 105.

Since the last external review panel convened seven years ago, the Department has experienced a number of noteworthy changes. Positive changes include the creation of new space in the Life Science Building, the construction of which was completed in 2009. The new space allocated to chemistry includes: 16,179 ft² of lab space and 7,334 ft² of office space. This new space is currently occupied by the groups of Barondeau, Begley, Burgess, Cremer, Russell and Burgess. We have also acquired new space in the Reed Mac Donald building where two floors were renovated up to modern standard in 2008. This space, which includes 10,144 ft² of lab space and 4,676 ft² of office space, is currently occupied by Bluemel, Gladysz and Singleton. Parts of our building have also been renovated to modern standards. These renovations concern: the fourth floor of the 1972 wing which was completed in 2010 for the group of Wooley (6120 ft² of lab space and 2642 ft² of office space); the basement & first floor of 1986 wing which was completed 2006 for the group of James Batteas (2910 ft² of lab space and 1358 ft² of office space); basement floor, first floor and third floor of the 1986 wing which was completed in 2005 for the group of Dong-Hee Son (2475 ft² of lab space and 1358 ft² of office space); and the third floor of the 1972 wing where 3,000 ft² of lab space and 1,500 ft² are being renovated for the
Gabbaï group. Other changes include the installation of a fire protection system (sprinkler system) in all existing wings as well as a renovation of the restroom that now meet the ADA standard. Despite these improvements, space quality remains an issue in most of the chemistry complex. These deficiencies are captured in the 2006 report completed by the architectural firm of Pierce Goodwin Alexander & Linville (PGAL) who was commissioned to prepare an analysis of existing conditions in the Chemistry Building complex and to provide recommendations for future development of departmental physical facilities. Their report may be summarized as follows:

Major deficiencies were found by the A/E throughout the building and were identified in virtually all areas of inspection and in all five wings of the complex. The most significant inadequacies with the existing physical facilities include the following:

1. Emergency and UPS power availabilities are insufficient throughout the complex.
2. Several areas of the building complex do not meet current city and/or ADA code requirements.
3. Most building systems (e.g., HVAC, water pumps, etc.) and architectural finishes have already exceeded or will soon reach their expected lifetimes.
4. Environmental hazards (e.g., asbestos, mold) were identified throughout the complex.
5. Air quality in many instructional and research laboratories is poor to average, at best.
6. Fume hood locations in many laboratories are not in compliance with current design standards, resulting in compromised exhaust performance and decreased laboratory air quality.
7. Construction during the last several years of high-rise buildings around the Chemistry Building complex may have adversely affected the performance of fume hood exhaust stacks on the roofs of the five wings, preventing the proper removal of exhaust fumes from the area.

**B. Space satisfaction survey**

Since the last external review panel convened seven years ago, the Department has experienced increased pressure on space for research laboratories, particularly with respect to the quality of available space. The expansion of groups, addition of new faculty members with synthetic needs, and the need to house more instrumentation have contributed to this situation. In order to get a fair perspective of the faculty, the internal review committee asked the faculty what space changes or improvements would enhance their research program. The answers are provided below:

- The most pressing need is more office space. I will have 8 graduate students, 2 incoming graduate students, 2 REU students, and 2 undergraduates in my lab this summer. I need another room (office) with 4-5 desks to accommodate these students. I may also require additional bench or instrumentation space if my group maintains this size or increases.

- Half of one of my student/postdocs offices is unusable because of repeated water leaks, and a very dangerous, precariously hung, plastic shield. I need to keep my own office...
draped in plastic for the same reason. This does not present a good image of the Department when I meet visitors or interview prospective faculty. The LMS needs to have a larger and more appropriately arranged computer classroom. The current arrangement is too small for many activities that faculty want to do in the space. The current arrangement maximizes the number of computer that can be in the space, but does not allow appropriate projection or classroom teaching activities to happen simultaneously with student at their computers.

- My labs were substandard for synthetic space since I assumed them when I moved here in 1998 and they have only gotten worse. The fume hoods sweat in the summer and blow cold air in the winter. We have no natural lighting and the noise from the air handling with no ceiling tiles to absorb sound is bad for morale and work ethic suffers when students don't like their working conditions. We had a serious dust problem that has not been ameliorated by the dust cleaning in December 2011. In spite of being here for 13 years, I have not moved up in the queue to have my labs renovated. New priorities are set when someone negotiates an outside offer and there are no plans- just stop gap measures. I need better hoods, benches, air handling, temperature control and dust protection.

- My space is satisfactory. Reed McDonald suffers by not having conference room space that can accommodate 20-24 people. In general the department is short here.

- Our fume hoods in lab have not been functioning properly for years. We have very limited access to fume hoods for wet chemistry etc. We have not had adequate office space for students or postdocs. Our space in labs needs to be remodeled to serve our purposes better. Walls need to be removed and rooms reconstructed. The quality of the space we have could be better. We are also in need of additional electrical power. We have recently discovered a new spectroscopic technique that will require additional instrumentation development and further 3 phase power we do not currently have. Some additional storage space is under construction but we will need more. We could always do with more or better space as our equipment is jam packed into our current available space. I would obviously like my office to be adjacent to research space but this is a pipe dream.

- I would like to see better chemical storage facilities. I would like to have someone doing similar research near my laboratories. That would provide some synergy for students. Maybe I should have requested a move to the ILSB.

- I have received the additional space and feel very fortunate to have at my disposal excellent research space that is fully adequate for my needs.

- New fume hoods student office space chemical storage space.

- Uninterruptible power, reliable chilled water, better fume hoods.

- The biggest issues with the current office space for my students and postdocs is the repeated floods that occur, the noise coming from the adjoining lecture hall, and the temperature control. Improvements would include windows for the student offices, and a better break space including a sink.

- The 201A/201B labs adjoin hallway that is considered public space but that is space that is not used by anyone other than students in my group. It has an exit on the west and east side and could easily be changed to offices with windows into the laboratories - a modest modification that would remove student desks from the lab. The same features exist on the 1st and 3rd floors of the '28 wing. Organic laboratories like mine that involve significant synthesis with organic solvents should not have vinyl floors. Like a paint
shop, the floors should be changed to an inert material. The hoods in the laboratory are old. The sashes work if pulled evenly downward but can jam if the sash is pulled down without some modest care. This is not much of an issue in day-to-day work but represents a poor design if one were faced with an emergency where struggling with a jammed hood would be a really problem.

- I would like a little more space near my current space, which I have previously requested. My laboratory space is adequate. The office space/conference space for my group is fine. I would like a window in my office before I die.

- We very much need a conference room and more office space. We currently do not have our own or a nearby public conference room. Our offices are packed as much as possible, and to the brim. We need more and/or larger fume hoods. Currently 11 small (4.5 ft length) hoods in our space.

- The floors are in horrible shape (in desperate need of replacement), better fume hoods, lab benches very old and in bad shape (so bad that I spent $750 of my own personal funds trying to repaint and resin coat some of the bench tops). My attempt to fix the bench tops was moderately successful and I ended up only resurfacing those in the worst shape. Having subpar lab space makes it so much more difficult to recruit students. In recent years, I have tried to avoid showing new students the labs. Often times that doesn't work. 72 Wing is primarily occupied by very young faculty. The condition of the building puts the department at risk of losing these people to outside offers.

- Repairing leaking ceiling to prevent water damage to instruments repair or replace rusted types in wetlab

- We need a conference room. We've been having phone conference weekly with our collaborators in LBNL, SWRI, RTI, APS, and GM. My office can accommodate not even a half of my research group. It's been a struggle.
### C. Space allocation to individuals

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<th>Professor</th>
<th>Grad Students</th>
<th>Post-Docs &amp; Res Scientists</th>
<th>Total</th>
<th>Total Survey</th>
<th>Laboratory Space (ft²)</th>
<th>Office Space (ft²)</th>
<th>Total Space (ft²)</th>
<th>Hoods</th>
<th>Direct from 2010</th>
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D. Devised Guidelines for Space Allocation

Because of widely different space needs among the various instructional and research programs in the department, it is not practical to adopt a policy for space allocation that is inflexible or overly detailed. Nevertheless, it is important to establish departmental guidelines for research space assignments that are reasonable and equitable. The following guidelines will govern assignment and re-assignment of space in the Department of Chemistry:

1.) Primary responsibility for ensuring optimum space utilization for the Department’s programs rests with the Department Head. The standing departmental Space Committee should advise the Department Head, as appropriate, regarding departmental space needs and the mechanisms needed to optimize utilization of available space.

2.) First priority should be given to ensuring that the laboratories, offices, and support facilities of research-active faculty are located in the main Chemistry Building, whenever possible, and are best suited to the needs of the individual programs. To achieve this goal, it may be necessary to re-locate instructional laboratories, faculty who are research inactive, and certain departmental support services, such as administrative offices, service shops, stockrooms, etc., to spaces in other buildings, if available.

3.) Newly hired faculty members, particularly at the junior level, should be given the highest priority for allocation of research space in the main Chemistry Building.

4.) When allocating research space to faculty, every effort should be made to ensure that all of the space assigned to an individual faculty member be contiguous and, when possible, be located in close proximity to that of other research groups in related areas.

5.) Review of all departmental space needs and allocations should be carried out on a continuing basis by the departmental Space Committee. Based upon the information thus obtained, the Committee should advise the Department Head on space allocation by addressing considerations such as the following:

   a.) Current and projected space requirements for the Department’s instructional and research programs

   b.) Effects of non-contiguous space assignments that may have developed because of research group expansions

   c.) Sustained increases or decreases in research group size for certain faculty members that may justify re-allocation of space

   d.) Re-location of certain research groups to achieve improved efficiency of space utilization, desired proximity to research groups in related areas, etc. The possible
benefits that may be achieved by re-locating one or more research groups should be weighed against the possible detrimental effects on other groups.

E. Administrative Assistants to Faculty

The department does not have a written policy for allocation of administrative support for faculty. The clerical and office support needs of each faculty member are addressed on an individual basis. Currently, 7 faculty members have a full-time Administrative Assistant. All of these faculty are Full Professors, and all but three have large and continuously funded research programs with a substantial number of graduate students and post-docs. The three exceptions are non-research-active faculty who administer major teaching service programs and/or academic administrative activities.

An additional 14 faculty members share 50% of a full-time Administrative Assistant with a second faculty member. All but one of these are also Full Professors, and all are research-active.

The administrative needs of the remaining 21 tenure-track faculty members are fulfilled by a combination of student-worker assignments and available hours from the shared full-time Administrative Assistants. Non-recurring special needs, such as symposia preparation, large proposal preparation, etc., are fulfilled by temporary assignments from among existing staff members.

Office support needs of the 14 non-tenure-track Lecturers and Senior Lecturers are met on a continuous basis by assignment of submitted tasks to clerical staff members.

F. Departmental support of individual research groups

The department continues to support selected research groups by providing financial subsidies. A breakdown of these subsidies is provided hereafter:

1. Summer salary provided by the department

   In FY12, 17 faculty received summer support paid by the department:
   
   - $247,615  Administration (8)
   - $62,882  Course Development (2)
   - $8,245  Outreach (1)
   - $90,786  Summer Support (6)
   - $409,528  Total

2. Postdoctoral fellow support provided by the department to individual groups

   In FY12, 4 faculty received departmental funding for postdoctoral fellow:
   
   - $65,618  Research (3)
   - $18,000  Administration (1)
   - $83,618  Total
3. **Graduate student support provided by the department to individual groups**

In FY12, 15 graduate student positions were funded by the department:

- $68,400 Core Facilities (2)
- $234,694 New Faculty Commitment (4)
- $30,058 Journal and Administration (2)

**$333,152 Total**

4. **Chair dollar matching program**

Three chair holders have their chair dollars matched 1:1 by the department when these chair dollars are used to support graduate student. This represents almost 15 graduate student positions:

**$300,000 Total**
Our chemistry department takes an active role in community outreach in an effort to positively shape the future of chemistry education and research. Every year, we host our feature event - the Chemistry Open House that reaches to local K-12 students, teachers and parents. Throughout the year, the Chemistry Road Show, a transportable set of demonstration experiments, is presented to schools throughout Texas and at other public events with the aim to both entertain and educate students. Our National Science Foundation-supported Research Experiences for Undergraduates (NSF-REU) program provides an opportunity for college students of diverse backgrounds to experience a summer of laboratory research. The Department of Chemistry also actively participates in a number of College of Science and Texas A&M University's outreach programs.

A. Chemistry Open House & Science Exploration Gallery

Every year, the Department of Chemistry, the TAMU local ACS section and the College of Science hosts our award-winning Chemistry Open House & Science Exploration Gallery to celebrate National Chemistry Week. Inst. Prof. Wendy Keeney-Kennicutt has been coordinating this annual event. It is free and open to the public and is advertised on radio, local and cable TV and in the local paper. Last year, this event attracted over 3000 youngsters, teachers and parents as visitors to the Department. 2012 was our 25th year for this event and had as its highlight three presentations of the popular Chemistry Road Show. We handed out 1000 science "goodie bags" and over 180 door prizes. The Science Exploration Gallery is full of hands-on and computer activities, guided lab tours, demonstrations and science talks. Our Chemistry 116 (Molecular Science for Citizens Lab) syllabus includes the opportunity for the students to do demonstrations at the Science Exploration Gallery. Several research groups hosted "booths" with hands-on experiments for the visitors. Graduate and undergraduate students organized these “booths” and gained organizational and presentation skills through this opportunity. In addition to the Department of Chemistry, the Departments of Physics and Biology and engineering disciplines are represented. Several of our departmental graduates work in the neighboring high schools and community college. They return with their students to run additional hands-on activities.

B. Texas A&M Chemistry Road Show

The Texas A&M Chemistry Road Show is one of the premier outreach programs of the Texas A&M Chemistry Department and the Texas A&M College of Science. Inst. Prof. James Pennington is the current coordinator and presenter. The road show is intended to be an entertaining, motivating and educational experience of chemistry for the students involved. Over the course of each 70-minute presentation, 25-30 demonstrations are performed and the science and applicability to each demonstration is briefly explained. The Chemistry Road Show is presented 50 to 60 per year, both locally and around the State of Texas. These presentations reach between 9000 and 10000 K-12 students per year. Many of the Road Shows are presented at rural and small town schools as well as Summer Reading Programs at various public libraries. Financial support for this program is provided by the Texas A&M Chemistry Department, the
Texas A&M College of Science, and grants from Dow Chemical Company and Shell Oil Company. Because we are able to provide the Road Show at no cost to the host institution, we are frequently scheduled to present Road Shows for schools and public libraries that serve underprivileged and underrepresented groups of students.

In addition to encouraging many K-12 students to pursue careers in science, the Chemistry Road Show also offers opportunities for current Aggie undergraduates and graduate students. In the past three years, 45 students (43 undergraduate and 2 graduates) acted as assistant demonstrators for the Chemistry Road Show. Of those, 26 were women, and 10 were minority students. These volunteers gain valuable organizational and presentation skills through this service learning opportunity.

Over the past several years, we have consciously worked to expand the influence of the program by actively contacting school districts and education service centers for Texas educational regions. We began with Region 6, and then expanded to include Regions 3, 4, 5, 7, 12 and 13 as well. We travel to areas of Texas outside these regions, but this allows us to actively solicit requests from schools within about a 4-hour drive from Bryan-College Station.

C. Transportable Lab Kits for High School Students

An extension of the Chemistry Road Show we are in the process of implementing is to prepare boxed “Lab Kits” that can be loaned to high schools, and perhaps middle schools. Prof. Christian Hilty originally proposed this idea. He, Prof. Wenshe Liu, Prof. Dong Hee Son and Inst. Prof. James Pennington have begun preparations to implement this program. The financial support of the program is from the chemistry department and National Science Foundation CAREER awards to Dr. Hilty and Dr. Liu. The basic concept is that interested faculty would develop experiment kits related to their research and/or Chemistry Road Show demonstrations. These kits could be delivered to schools in conjunction with the Chemistry Road Show. The kits would include the equipment needed for a class of 25 students to perform a lab related to, or inspired by the presentation they have seen. The labs would be coordinated with NSTA and TEKS learning standards to make implementation easier and more attractive to teachers. The Road Show Van would allow us to deliver these kits to schools. The schools would then mail them back to us after they have been used. The kits would be maintained by the research group of the faculty member that developed it. This type of a program will allow students to move from the demonstrations that were presented to hands-on experience that will help them to further understand and retain what they have learned. These “Lab Kits” will be especially valuable for schools in low-income and rural areas that may not have access to excellent laboratory resources. This program has been discussed with several high school teachers, and they are considering incorporating them in their classes in the coming academic year.

D. NSF REU Program

The Department of Chemistry has had an NSF-REU program for more than two decades now. The objective of our REU program is to provide meaningful research experiences for about 15 undergraduate students per summer in the areas of biological, environmental, and materials chemistry. We target undergraduates from primarily the Southwest and Southeast regions (including Puerto Rico), though our recruiting is national in scope. Many participants of our REU program are students from small colleges with little or no active chemical research. The ten-week program spans the summer session at Texas A&M University and culminates with student oral, written, and poster presentations in the final week. Immersion in research is the
heart of our REU program. In addition to their exposure to research through hands-on experiments in their projects, students are also introduced to research culture intentionally through a weekly Career Development seminar series hosted by department faculty. The highlight of this series is a Career Day in which outside speakers talk about their own research and/or career evolution. Most students find the program to be a useful way to explore the graduate school experience at a top Chemistry program. This helps them in deciding whether they want to pursue a career in chemistry research. Our faculty has an outstanding record of providing students rewarding summer research experiences, usually resulting in co-authorship on publications and/or presentations. Each spring, a large percentage of our REU students present a poster at the Spring ACS meeting. We have been very successful in attracting students of this program to pursue Ph.D. in chemistry in our department. This year, out of 55 incoming first year graduate students 9 were students of our NSF-REU program. The university has been long committed to the success of the program. Six out of the fifteen students are supported with university funds to further diversify the program by the inclusion of international students.

**E. Outreach to Minorities**

We have been aiming to promote diversity both at the university level and at the department level. In order to encourage minority students to apply our graduate programs, faculty members in the department have served recruiting tours to universities such as Albany State University in Georgia - a historically black university, University of Texas - Pan American - a Hispanic serving institution, Xavier University of Louisiana - a historically black Roman Catholic institution, etc. Our previous graduate recruiting coordinator, Prof. James Batteas presented our program several times in annual conferences of NOBCCHE - National Organization for the Professional Advancement of Black Chemists and Chemical Engineers. Now we have our own chapter in NOCCHE. The department also encourages minority students to present their research in national and international meetings with providing travel awards. One of our REU goals is for our REU participants to reflect the “face of Texas,” with a 50% minority population, primarily composed of Hispanic/Latino students (The Texas population in 2005 was 49% non-Hispanic White, 35% Hispanic, 12% Black; and 3% Asian). In addition, our students from under-represented minorities are encouraged to participate in “The Summer Scholars Program”, sponsored by the Associate Dean for Diversity in the College of Science as a supplement to the REU programs across campus.

**F. Miscellaneous**

The Department of Chemistry also actively participates in a number of College of Science and University’s outreach programs. As a part of Summer Institutes for High School Advanced Placement (AP) Teachers, the Department of Chemistry hosts summer workshops for high school teachers that provide continuing education for teachers from locations throughout the state. The AP Chemistry Teachers workshop has been held each summer for the past 25 years and has averaged 16 - 32 teachers each summer. Our faculty and graduate students also serve as judges and volunteers for junior and senior regional Science Bowls and are Event coordinators for Texas Science Olympiad organized by College of Science. In addition, our department is involved and sets up a week of experiments for K-12 students in the Young Adventure Program organized by the university.
XII. Critical Issues (prepared by Daniel Romo with input from the self-study committee)

A. Space

Current Situation

Research Laboratories: The research laboratories of many faculty members are in very poor condition and far below standards for a major research university. In particular, the synthesis laboratories in the 1928, 1959, 1972, and 1986 wings, are generally antiquated making it difficult to maintain current safety standards. These inconvenient and unattractive laboratories put the Department at a major disadvantage, relative to our peers, for the recruitment of new faculty and the retention of our outstanding colleagues. The state of the research laboratories also impacts negatively on our ability to recruit the best graduate students. When these students visit, many are turned off by the impression conveyed by run down research laboratories and decide to pursue graduate studies elsewhere. Renovations in the '72 wing (5th floor only) and additional acquired space in the Reed McDonald Building and the Interdisciplinary Life Sciences Building (ILSB) have adequately addressed these issues for a small number of our faculty. However, this has also scattered the chemistry faculty across campus, fragmented the Departmental sense of community, and created a sentiment of inequality among faculty of equal talent - without substantially solving our space problem.

Teaching/Laboratories: Most of our teaching laboratories are also outdated. For example, the organic laboratories, for the chemistry majors, are in extremely poor condition for a major university with a strong commitment to undergraduate education. Since the number of chemistry majors is expected to double in the coming years our needs for modern teaching laboratory space are urgent.

Gathering space: The current layout of the chemistry complex provides no common space that can be used for events such as poster sessions or more generally to promote interactions among faculty, students and research staff. With the chemistry faculty now spread across campus, the need for common space in the chemistry complex has greatly increased.

Going Forward

The Chemistry Department needs a new building with modern space for research and teaching. This need is the highest priority of the faculty. Modern research and teaching space is a prerequisite to maintaining an excellent Chemistry Department and is crucial for faculty retention and for attracting the new faculty and graduate students that we must have to remain competitive with our peer institutions. The chemistry department must be more aggressive in securing funds from the administration for a new building.
B. Faculty Hiring: Aggressive Junior Hiring Needed

Current Situation

The faculty is heavily weighted towards senior professors with only one assistant professor as of next year. The current rate of hiring, including that projected for the coming years, will result in an ineluctable reduction of our faculty size and research program, raising legitimate concerns about the continued strength and vibrancy of our program.

Going Forward

We must initiate an aggressive hiring strategy directed toward junior faculty. To keep pace with retirements, we should be hiring 2-3 junior faculty/year for the next 3-4 years. A long-range commitment from the administration to this rate of hiring is essential. This commitment should also include the flexibility to make more offers than available positions in a given year to ensure hiring with a historical ~50% success rate. Senior hiring should also remain a priority but it should be implemented independently as to not interfere or delay junior recruiting.

C. Budget

Current Situation

The Chemistry annual budget showed an increase between 2006 ($10.2 M) and 2010 (12.1 M). In the last two years, however, notable cuts brought us back to the 2007 level (See Table below). Because salary and operational costs have remained constant or even increased, the reduction of our annual budget has had a major impact on the funds available for graduate student teaching assistantships (TAs). Our annual TA budget shortfall is about $1.2 M, a sum that we must go request from the upper administration at the end of each fiscal year. The uncertainties that this situation brings are unacceptable because they impact our ability to offer a competitive graduate student stipend (no increase in five years, see Graduate Student Support section on page 40). This situation is aggravated by growing numbers in our undergraduate enrollment (service courses, majors) making the creation of more TA positions an imperative.

Table showing the evolution of the Chemistry annual budget since 2006

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<td>Total annual budget allocation from the College of Science</td>
<td>10,176,444</td>
<td>10,670,342</td>
<td>11,129,003</td>
<td>11,427,791</td>
<td>12,080,466</td>
<td>11,868,923</td>
</tr>
<tr>
<td>Department of Chemistry salary and operational costs</td>
<td>8,475,230</td>
<td>8,967,820</td>
<td>9,441,492</td>
<td>9,770,281</td>
<td>10,422,955</td>
<td>10,466,208</td>
</tr>
<tr>
<td>Funds available for graduate students’ teaching assistantships</td>
<td>1,701,214</td>
<td>1,702,522</td>
<td>1,687,511</td>
<td>1,657,510</td>
<td>1,657,511</td>
<td>1,402,715</td>
</tr>
</tbody>
</table>

Going Forward

The new department head will have to firmly negotiate these budgets upward, without compromise. An annual budget allocation of $13.5 M should be considered, with $2.5 M going toward the graduate student TA budget.
D. Teaching: Importance of Teaching, Teaching Assignments, and Undergraduate Curriculum

Current Situation

A general perception, as witnessed by one of the few highly negative responses to the faculty survey, is that the Department is not heading in directions that enhance teaching capabilities/excellence. The responsibilities in the first and 2nd year “service” courses are admirably fulfilled by a dedicated instructor staff. However, for majors and graduate courses the department is locked into traditional courses, inflexibility in teaching assignments, gross restrictions in the use of graduate teaching assistants for instructor assistance in higher level courses that might enhance their career goals, and discouragement of innovative approaches to advanced courses. Faculty are requiring fewer and fewer courses of their graduate students. A department-wide, transparent system for assigning teaching is absent. Many special ‘teaching arrangements’ exist and a system for increasing teaching loads for research inactive faculty is lacking. Our current undergraduate curriculum does not do enough to provide courses to undergraduates who are increasingly interdisciplinary-oriented. At the graduate level, the current limitation of five graduate courses per division is severely limiting breadth of courses available to our students.

Going Forward

Steps should be taken within the Department to establish a culture of excellence in teaching. We need to modernize our curriculum to address student needs at the chemistry/biology and chemistry/material science interface. Clear guidelines for the granting of teaching relief are needed because inequalities in teaching responsibilities reduce the perceived value of teaching and impact faculty morale. A possible transition to larger lecture halls (i.e. ~300 students in organic chemistry) should also be considered to accommodate the rapidly increasing numbers of undergraduates in our major and service courses. At the graduate level, the current limitation of five graduate courses per division should also be re-evaluated and a departmental rather than a divisional perspective on our graduate curriculum needs to be developed.

E. Sense of optimism among the faculty and factors affecting productivity

Current Situation

The stress from reduced federal support for chemistry coupled with several local factors are leading to a lowering of faculty morale. In addition to the space and teaching issues mentioned above, chaired positions and professorships are not re-evaluated as mandated in departmental by-laws. This can destabilize the faculty because outstanding young colleagues may feel underappreciated in the absence of timely formal internal recognition. Post-tenure review is not performed in a meaningful way to address faculty’s research and teaching strengths and deficiencies. Laboratories and Centers are not evaluated on a regular basis impacting equitable distribution of departmental/College resources and faculty morale. Administrative support has recently been decreased significantly due to budget constraints. A systematic method for assigning and contracting space for individual faculty when warranted is lacking. The number
of non-science tasks (training, paperwork) has increased significantly in recent years impacting faculty productivity.

**Going Forward**

We need to identify creative methods to encourage both teaching and research excellence. A well-defined, transparent system that accounts for research and service efforts should be considered for assigning teaching. We request that administration find ways to minimize and even eliminate arduous tasks for faculty (*e.g.* repetitive online ‘training’ courses, approving time sheets, etc.). Greater transparency is needed about ‘special arrangements’ involving teaching relief or financial subsidies. Arrangements that have been in place for many years should also be re-evaluated. Transparency could be achieved by disclosing and justifying both new and existing arrangements. Departmental guidelines for re-evaluation of space are needed with a means to effect ‘lab contraction’ when warranted.

**F. Leadership/Governance**

**Current Situation**

The use of the Executive Committee for advice to the head appears to be relatively regular and useful whereas the Academic Operations Council is less active or interactive. Communication between the Department and the Dean of the College of Science is limited to two annual appearances by the Dean at faculty meetings. The frequency and format of these meetings are not conducive to discussions. A lack of informal discussion among the faculty is also noteworthy as it affects our ability to develop a departmental vision. For example, the department head needs to be replaced in 18 months and as of now, a plan is lacking for how a search will be conducted.

**Going Forward**

The development of cohesiveness and collegiality should be a priority, facilitated by informal mechanisms such as lunches and coffee breaks in common gathering spaces that we are currently lacking. A plan for selecting our next department head must be put in place. The new head should be selected for his/her ability to address the major issues noted in this report. At the departmental level, existing structures such as the Executive Committee and the Academic Operational Committee need to be more fully used as a means toward shared governance and transparency.

**G. Infrastructure**

**Current Situation**

Our research infrastructure is currently in good standing. However, some of our instrumentation is aging and some of the senior technical staff running our critical research facilities, in particular NMR, will retire in the next few years. There is also some discontent with access and/or support of several departmental instruments including the SQUID magnetometer and the EPR spectrometer.
Going Forward

To maintain our crucial research infrastructure, the department and faculty will have to seek funds for the purchase and operation of new instrumentation. The timely re-staffing of any vacant position will also be indispensable and is a very urgent need for the NMR facility. Finally, the creation of new facilities that integrate orphan instruments should also be considered.
XIII. Faculty Biographical Sketches
**NAME**
David P. Barondeau, Ph.D.

**POSITION TITLE**
Assistant Professor of Chemistry

eRA COMMONS USER NAME:
dbaron

**EDUCATION/TRAINING**

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>YEAR(s)</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Utah State College, Cedar City, Utah</td>
<td>B.A.</td>
<td>1989</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Texas A&amp;M University, College Station, Texas</td>
<td>Ph.D.</td>
<td>1996</td>
<td>Chemistry</td>
</tr>
</tbody>
</table>

**A. Personal Statement:**
David P. Barondeau is trained in bioinorganic chemistry and structural biology and is a leader in the investigation of the mechanism of iron-sulfur cluster biosynthesis. He is active in reviewing manuscripts, synchrotron proposals, plus private and federal grants. His group is currently focused on understanding clinical defects for proteins involved in human iron-sulfur cluster formation and in designing and testing therapeutics to treat the associated neurodegenerative and cardiovascular disease.

**B. Positions and Honors**

<table>
<thead>
<tr>
<th>Positions and Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2002 Postdoctoral Research Associate, The Scripps Research Institute</td>
</tr>
<tr>
<td>2002-2005 Senior Research Associate, The Scripps Research Institute</td>
</tr>
<tr>
<td>2006-2012 Assistant Professor, Chemistry Department Texas A&amp;M University</td>
</tr>
<tr>
<td>2012- Associate Professor, Chemistry Department Texas A&amp;M University</td>
</tr>
</tbody>
</table>

**Honors**

<table>
<thead>
<tr>
<th>Year</th>
<th>Honor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-2001</td>
<td>National Institutes of Health Postdoctoral Fellowship</td>
</tr>
<tr>
<td>1997-1998</td>
<td>La Jolla Interfaces in Science Postdoctoral Fellowship</td>
</tr>
</tbody>
</table>

**C. Selected publications**

Tsai, C. L., Barondeau, D. P. “Human frataxin is an allosteric switch that activates the Fe-S cluster biosynthetic complex” Biochemistry 2010 49:9132-9139


Tsai, C., Bridwell-Rabb, J., and Barondeau, D.P. “Friedreich’s ataxia variants I154F and W155R diminish frataxin-based activation of the iron-sulfur cluster assembly complex” Biochemistry 2011 50: 6478-6487


**D. Research Support**

**Ongoing Research Support**

Robert A. Welch Foundation ($160,000 total)
A-1647, period: 2010-2013
"Structure and chemistry of DNA repair enzyme spore photoproduct lyase"
Role: Principal Investigator
In this project, we aim to characterize the spectroscopic and catalytic properties of putative spore photoproduct lyase enzymes and initiate structure-function studies.

American Heart Association ($140,000 total)
11BGIA5710009, period: Jan 2011 to Dec 2012
"Deciphering normal and aberrant function for clinical variants associated with Fe-S assembly and heart disease"
Role: Principal Investigator
In this project, we aim to determine how specific mutations identified in Friedreich’s ataxia are functionally compromised.

National Institute of Health R01 ($993,828 total)
Scored a 1.0% with an impact/priority score of 11
Role: Principal Investigator
In this project, we aim to define protein-protein interactions and conformational changes associated with Fe-S assembly by the 4 component human Fe-S assembly complex. In addition, we aim to define intermediates and contribute to the understanding of the mechanism of Fe-S cluster biosynthesis by this complex.

**E. Contributions in Research Training and Mentoring**

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>12</td>
<td>17</td>
<td>0</td>
<td>2 (1 anticipated in Oct 2012)</td>
<td>0 (1 anticipated in Oct 2012)</td>
</tr>
</tbody>
</table>

**F. Contributions in Classroom Education**

**Courses taught (Aug 2006 – present)**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry</td>
<td>Chem 101</td>
<td>3</td>
<td>511</td>
</tr>
<tr>
<td>Principles of Biological Chemistry</td>
<td>Chem 627</td>
<td>3</td>
<td>59</td>
</tr>
<tr>
<td>Coordination and Bioinorganic Chemistry</td>
<td>Chem 628</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>Physical Methods in Biological Chemistry</td>
<td>Chem 670</td>
<td>4</td>
<td>41</td>
</tr>
</tbody>
</table>

**G. Evidence of Scholarship**

- 23 publications in refereed journals
- ISI Citation Report
  - Sum of the Times Cited: 621
  - Sum of Times Cited without self-citation: 592
  - Citing Articles: 489
  - Citing Articles without self-citation: 478
  - Average Citations per Item: 27
  - h-index: 13
- 16 invited lectures (Aug 2006 – present)
Biosketches 2
8/1/2012–7/31/2015; $330,000 (TC for project period)
National Science Foundation (NSF)

Research Support

Active

Charge Transport in Confinited Molecular Assemblies
8/1/2012–7/31/2015; $330,000 (TC for project period)
National Science Foundation (NSF)

Studies of Friction and Adhesion in Nanoscale Asperity-Asperity Contacts

A. Personal Statement

James Batteas is a Professor of Chemistry and Materials Science and Engineering at Texas A&M University. Following a postdoctoral appointment at Harvard University, he joined the faculty at The City University of New York where he developed several projects in the area of nanoscale materials and devices. He later moved to the Surface and Microanalysis Science Division at NIST in Gaithersburg, MD as a Staff Scientist and joined the faculty at Texas A&M University in 2005. Dr. Batteas is an expert in surface science, with a focus on scanning probe microscopes, and his research activities cover a broad range of fundamental surface and interfacial phenomena of nanomaterials. Research projects in his group include investigations of charge transport in organic molecules on surfaces, optical and electronic properties of semiconducting nanomaterials, tribological properties of surfaces, self-organizing nanoscale materials for device applications, protein-surface interactions, plant biopolymers, and nanofabrication approaches for the development of optoelectronic and sensing architectures. Since 2011, Batteas has been an Associate Editor for RSC Advances, handling papers in materials chemistry. He is also presently an Editorial Board Member of ISRN Nanotechnology. At TAMU, he is Co-PI for our NSF-REU Program in Biological, Environmental and Materials Chemistry. Within the chemistry department, he became chair of the Analytical Chemistry Division in 2011.

A.  Personal Statement

1. Professor of Chemistry, Texas A&M University, TX
2. Associate Professor, Department of Chemistry, Texas A&M University, TX
3. Research Chemist, National Institute of Standards and Technology, MD
4. Associate Professor of Chemistry, The City University of New York, College of Staten Island and The Graduate Center, NY
5. Assistant Professor of Chemistry, The City University of New York, College of Staten Island and The Graduate Center, NY

B. Positions and Honors

Professional Positions:

- 2012: Professor, Department of Chemistry, Texas A&M University, TX
- 2005-2012: Associate Professor, Department of Chemistry, Texas A&M University, TX
- 2002-2005: Research Chemist, National Institute of Standards and Technology, MD
- 2002-2002: Associate Professor of Chemistry, The City University of New York, College of Staten Island and The Graduate Center, NY
- 1996-2002: Assistant Professor of Chemistry, The City University of New York, College of Staten Island and The Graduate Center, NY

Honors (select, since 1994):

- 2012: Fellow of the Royal Society of Chemistry
- 2001: Netzsch Instruments Frank Giblin Memorial Award in Polymer Analysis
- 2001: Society for Plastics Engineers—Polymer Analysis Division
- 1998: Fellowship Corporation Research Innovation Award
- 1997: CSI Junior Faculty Summer Research Fellowship

C. Selected Peer-reviewed Publications (5 most recent)


D. Research Support

UNITED STATES

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Texas at Austin, TX</td>
<td>B.S.</td>
<td>1990</td>
<td>Chemistry</td>
</tr>
<tr>
<td>University of California at Berkeley, CA</td>
<td>Ph.D.</td>
<td>1995</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Harvard University</td>
<td>1995-96</td>
<td>Post-doctoral Fellow</td>
<td></td>
</tr>
</tbody>
</table>

E. Contributions in Research Training and Mentoring

Graduate Students: 19
Undergraduate Students: 24
Research Associates: 10
Ph.D.’s Awarded: 5
M.S.’s Awarded: 2

F. Contributions in Classroom Education

Courses taught (TAMU only 2007–present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytical Chemistry II</td>
<td>CHEM 602</td>
<td>6</td>
<td>57</td>
</tr>
<tr>
<td>Analytical Chemistry</td>
<td>CHEM 415</td>
<td>3</td>
<td>95</td>
</tr>
<tr>
<td>Quantitative Analysis I</td>
<td>CHEM 315</td>
<td>4</td>
<td>130</td>
</tr>
<tr>
<td>Physical Chemistry Lab</td>
<td>CHEM 325</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>General Chemistry for Engineers</td>
<td>CHEM 107</td>
<td>1</td>
<td>272</td>
</tr>
</tbody>
</table>

Classroom Innovations

As part of a multi-faculty team, we have completely redesigned our undergraduate physical chemistry lab curriculum. Physical chemistry is renowned for being one of the more challenging courses for chemistry majors. One of the obstacles in engaging students in the physical chemistry laboratory courses difficulty is lack of direct visualization of key fundamental principles and the incorporation of modern instrumentation. Our redevelopment of the laboratory courses includes adopting experiments which better reflect the current state

Biosketches 2

9/1/2011–8/31/2014; $309,517 (TC for project period)
National Science Foundation (NSF)

REU Site: Biological, Environmental and Materials Chemistry Research at Texas A&M
4/1/2011–3/31/2014; $300,071 (TC for project period)
(Pi: Holly Gaede, Co-PI: Batteas)
National Science Foundation (NSF)

Solvation Studies of Responsive Polymers in Solution and at Surfaces
9/1/2009–1/31/2013; $420,000 (TC for project, $186,868, TC to Batteas lab)
(Pi: Bergbreiter, Co-PI: Batteas)
National Science Foundation (NSF)

Collaborative Research: Conduction in Confined Molecular Assemblies
7/1/2009–1/31/2013; $350,500 (TC for project period)
National Science Foundation (NSF)

Probing the Role of Surface Defects and Disorder on the Tribology of Nanoscopic Contacts
7/1/2008–6/30/2012; $217,075 (TC for project period)
National Science Foundation (NSF)

Emerging Methodologies for Molecular Structure Determination of Biological Solids
3/2008–2/28/2013; $512,137
(Pi: Ruth Stark, Senior Personnel: Batteas, Cowburn & Stokes)
National Science Foundation (NSF)

*Note: This is an NSF Research Coordination Network project funded out of CCNY. My role in this project is to coordinate research seminars and promote research on biomaterials using AFM. See: http://www.sci.ccny.cuny.edu/rcn/.


A.  Personal Statement

James Batteas is a Professor of Chemistry and Materials Science and Engineering at Texas A&M University. Following a postdoctoral appointment at Harvard University, he joined the faculty at The City University of New York where he developed several projects in the area of nanoscale materials and devices. He later moved to the Surface and Microanalysis Science Division at NIST in Gaithersburg, MD as a Staff Scientist and joined the faculty at Texas A&M University in 2005. Dr. Batteas is an expert in surface science, with a focus on scanning probe microscopes, and his research activities cover a broad range of fundamental surface and interfacial phenomena of nanomaterials. Research projects in his group include investigations of charge transport in organic molecules on surfaces, optical and electronic properties of semiconducting nanomaterials, tribological properties of surfaces, self-organizing nanoscale materials for device applications, protein-surface interactions, plant biopolymers, and nanofabrication approaches for the development of optoelectronic and sensing architectures. Since 2011, Batteas has been an Associate Editor for RSC Advances, handling papers in materials chemistry. He is also presently an Editorial Board Member of ISRN Nanotechnology. At TAMU, he is Co-PI for our NSF-REU Program in Biological, Environmental and Materials Chemistry. Within the chemistry department, he became chair of the Analytical Chemistry Division in 2011.
of physical chemistry research. This involves the utilization of modern techniques and instrumentation and the application to problems in material science, biological chemistry, environmental chemistry and other areas of current interest. To enhance the research based feel of the experiments, we have also moved to multi-week application to problems in material science, biological chemistry, environmental chemistry and other areas of physical chemistry research. This involves the utilization of modern techniques and instrumentation and the application to problems in material science, biological chemistry, environmental chemistry and other areas of current interest. As a component of this lab development, I introduced a 3-week module on imaging of surfaces: Visualization of Atoms and Molecules Using Scanning Tunneling Microscopy. This lab provides an introduction to the basic methodology of a scanning probe microscope and the utilization the technique to explore the structure and electronic properties of materials. Topics include imaging of graphite, metal, and semi-conductor surfaces, and charge transport through molecules on surfaces. Students examine tunneling distance dependence in air and through molecules with varying chain length. Also, modeled on our recent work on tunneling in porphyrins on surfaces (J. Phys. Chem. C 2008, 1110-1118), students measure the tunneling decay constant of single molecules.

G. Evidence of Scholarship
- 65 publications in refereed journals
- 54 presentations (1 Jan 2007–present)

ISI Citation Report:

<table>
<thead>
<tr>
<th>Sum of the Times Cited</th>
<th>1888</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of Times Cited without self-citation</td>
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</tr>
<tr>
<td>Citing Articles</td>
<td>1620</td>
</tr>
<tr>
<td>Citing Articles without self-citation</td>
<td>1588</td>
</tr>
<tr>
<td>Average Citations per Item</td>
<td>29.05</td>
</tr>
<tr>
<td>h-index</td>
<td>25</td>
</tr>
</tbody>
</table>

A. PERSONAL STATEMENT
My group is interested in the mechanistic enzymology of vitamin biosynthesis. Over the past 20 years, we have focused primarily on the biosynthesis and metabolism of thiamin, pyridoxal, B12 (axial ligand), NAD, coenzyme A, deazaflavin, and menaquinone.

B. POSITIONS AND HONORS
1986 – 1999 Assistant/Associate Professor of Chemistry, Cornell University.
1993 - Jan-July Visiting Scientist, Scripps Research Institute (Professor Peter Wright)
1994 July Visiting Professor, National University of Ireland.
2001 Jan-Feb Visiting scientist Hoffmann-La Roche
2001 May-August Visiting Professor, University of Paris.
2008 April-May Visiting Scientist Pasteur Institute
2008 Frontiers Lecture Series, Texas A&M University
2008 Calvin lecturer, UC Berkeley
2009 Merck Lecturer, Stanford
2009 Green Lecture in Enzyme Chemistry, University of Wisconsin Madison
2009 Barton Professor of Chemistry, Texas A&M University
2009-2019 NIH MERIT Award, Mechanistic Studies on Thiamin Biosynthesis
2010 – present Chair, Division of Biological Chemistry Texas A&M University
2010 Elected AAAS Fellow
2010 Honorary D.Sc. National University of Ireland.
2011 Distinguished Professor, Texas A&M University
2011 Enzyme Mechanisms Conference, organizing committee

C. SELECTED RECENT RESEARCH PUBLICATIONS (87 since 2005, h-index = 13)
Chatterjee, Abhishek; Abeydeera, N. Dinuka; Bale, Shridhar; Pai, Pei-Jing; Dorrestein, Pieter C.; Russell, David H.; Ealick, Steven E.; Begley, Tadgh P. Saccharomyces cerevisiae TH4p is a suicide thiamine thiazole synthase Nature (2011), 478(7370), 542-546.
Hanes, Jeremiah W.; Chatterjee, Debashree; Soriano, Erika V.; Ealick, Steven E.; Begley, Tadgh P. Construction of a thiamin sensor from the periplasmic thiamin binding protein Chemical Communications (2011), 47(8), 2273-2275.
Krishnamoorthy, Kalyanaraman; Begley, Tadgh P. Reagent for the Detection of Protein Thiocarboxylates in the Bacterial Proteome: Lissamine Rhodamine B Sulfonyl Azide. Journal of the American
Chatterjee, A.; Li, Y.; Zhang, Y.; Abdelwahed, Sameh; Ealick, Steven E.; Begley, Tadgh P. Catalysis of a flavoenzyme-mediated amide hydrolysis. Journal of the American Chemical Society (2010), 132(33), 11608-11612.

Mukherjee, Tathagata; Zhang, Yang; Abdelwahed, Sameh; Ealick, Steven E.; Begley, Tadgh P. Catalysis of a flavoenzyme-mediated amide hydrolysis. Journal of the American Chemical Society (2010), 132(33), 11608-11612.


D. RESEARCH SUPPORT

ACTIVE

DK44083 (Begley, MERIT Award) 12/01/09 - 4/30/13 25%, 2.0 Calendar

Mechanistic enzymology of thiamin biosynthesis. Direct costs current year: $235,000

Mechanistic studies on the biosynthesis of thiamin thiazole in B. subtilis and in S. cerevisiae. 2U13GM070824 (Begley and Leese) Mentoring workshop 5/1/2010 - 4/1/2015, 0.5 Calendar Direct costs current year: $40,000

PENDING

18F-Thiamin for early detection of tumors by PET imaging (Begley and Lenox) Total Costs: $190,000 Cancer Prevention and Research Institute of Texas

E. CONTRIBUTIONS IN RESEARCH TRAINING AND MENTORING (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>0</td>
<td>6</td>
<td>4 (2011)</td>
<td>1 (2011)</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>4</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

F. CONTRIBUTIONS IN CLASSROOM EDUCATION (since starting at TAMU, Fall 2009 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Products Biosynthesis (Fall 2009)</td>
<td>Chem 689</td>
<td>1</td>
<td>9</td>
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<tr>
<td>Natural Products Biosynthesis (Fall 2010)</td>
<td>Chem 689</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Natural Products Biosynthesis (Fall 2011)</td>
<td>Chem 689</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>The organic chemistry of biological pathways (Fall 2012)</td>
<td>Chem 456</td>
<td>1</td>
<td>30</td>
</tr>
</tbody>
</table>

G. EVIDENCE OF SCHOLARSHIP (SINCE 2005)

- 87 publications (overall h-index = 40)
- 92 invited lectures
- Escherichia Coli and Salmonella typhimurium: Editor of the cofactor metabolism section

NAME

David E. Bergbreiter, Ph.D.

POSITION TITLE

Professor of Chemistry

eRA COMMONS USER NAME : N/A

EDUCATION/TRAINING

INSTITUTION AND LOCATION | DEGREE | MM/YY | FIELD OF STUDY
--------------------------|--------|-------|-----------------
Michigan State University, East Lansing, MI | B.S. | 1970 | Chemistry
MIT, Cambridge, MA | Ph.D. | 1974 | Chemistry

A. PERSONAL STATEMENT

David E. Bergbreiter has a nearly 40-year record combining excellence in research, teaching and service. While his original successes were in physical organic chemistry studies of enolates, his research broadened to include extensive studies in polymer surface chemistry and in the development of green chemistry approaches to catalysis. That work included significant discoveries involving responsive materials and ‘smart’ catalysts – research that has had continuous NSF funding for several decades. These efforts are continuing with recent successes that include the use of soluble polymers as ligands for homogeneous catalyst/product separations, work that is not expanding to include the development of new classes of alternative, nontoxic, nonvolatile polymer solvents as alternatives to conventional solvents. His success in these efforts is evidenced by the over 60 Ph.D.’s he has trained, his success introducing undergraduates to research (over 60 students as coauthors on peer-reviewed papers), and his ca. 250 published papers and in his ca. 600 presentations in industry, academia and at international conferences. He has received both University level awards for research, recognition as an ACS Fellow, and the Southwest ACS Regional award. At Texas A&M he has won every teaching award he has been eligible for. He holds the lifetime designation as Presidential Professor for Teaching Excellence and is presently an Eppright Professor of Undergraduate Teaching Excellence.

B. POSITIONS AND HONORS

Professional Positions:

1974-1981 Assistant Professor, Department of Chemistry, Texas A&M University, College Station, TX
1981-1984 Professor, Department of Chemistry, Texas A&M University, College Station, TX
1984- Professor, Department of Chemistry, Texas A&M University, College Station, TX

Honors (since 2000):

2012-2014 Eppright University Professorship for Undergraduate Teaching Excellence
2011 Elected Fellow, American Chemical Society
2011 SLATE award for teaching excellence
2011 Wells Fargo Honors Faculty Mentor
2009 Fish Camp Namesake
2009 SLATE award for teaching excellence
2008 American Chemical Society Southwest Regional Awardee
2008 SLATE award for teaching excellence
2008 Distinguished University Achievement Award for Research
2006 Presidential Professor for Teaching Excellence (a lifetime appointment)
2005 Wells Fargo Honors Faculty Mentor
2002-2007 Eppright University Professorship for Undergraduate Teaching Excellence
2002 Elected Fellow, American Association for the Advancement of Science
2002 Secretary General, Catalysis and Surface Science Secretariat, American Chemical Society, 2000

C. SELECTED PEER-REVIEWED PUBLICATIONS (5, SELECTED FROM 252 TOTAL PAPERS)

- "Using Soluble Polymer Supports to Facilitate Catalysis," David E. Bergbreiter, Jianhua Tian, and Chayanant Hongfa. Chem. Rev. 2009, 109, 530-582. This article appeared in a special issue of Chemical Reviews that I guest edited.
D. Research Support

**ACTIVE**

DMR-0907233 (Bergbreiter) 09/01/09-08/31/12, 16.67% calendar
National Science Foundation $514,649 (this is joint with Professor Batteas, my share of this grant is ca. 60% of the total costs)
Solvation Studies of Responsive Polymers in Solution and at Surfaces
The main goal of this research is the examination of the effect of polymer microstructure, solvent additives and solution components on lower critical solution temperature (LCST) phenomena in solution and at surfaces.

CHE-0952134 (Bergbreiter) 06/15/10-05/31/13, 33.33% calendar
National Science Foundation $420,000 (TC for project period)
Biphasic Catalysis Using Soluble Polymer Supports
The main goal is to show that polymeric ligands could both be designed to recover catalysts and to stabilize catalysts toward adventitious degradation after a catalytic reaction was complete.

A-0639 (Bergbreiter) 06/01/12-05/31/14, 5.56% calendar
Robert A. Welch Foundation $120,000 with an additional $10,000 supplement for the year Beginning 6/1/2010.
Thermally Responsive Multiphase Catalyst Systems
The main goal of this research is to study the behavior of thermally responsive functional soluble polymers in various types of solvents or solvent mixtures.

NPRP4-081-1-016 (Bergbreiter) 01/15/12-12/31/14, 16.67% calendar
QNRF $329,045 (TC for project period)
Phase Separable Polymerization Catalysts
The goal is to show that polymer supports can be used to prepare practical separable, recyclable catalysts for important types of polymerizations using ring opening metathesis polymerization, ring opening polyester synthesis, and polycarbonate synthesis as select examples.

G. Evidence of Scholarship

- 46 publications in refereed journals (1 Jan 2005 – present)
- 5 patents or invention disclosures (1 Jan 2005 – present)
- 153 presentations (1 Jan 2005 – present)

ISI Citation Report

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E. Contributions in Research Training and Mentoring

(1 Jan 2005 – present)

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<th>Graduate Students</th>
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<th>Research Associates</th>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

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<td>99</td>
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<tr>
<td>Organic Chemistry II</td>
<td>CHEM 226H</td>
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<td>Organic Chem. Lab.</td>
<td>CHEM 231</td>
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<td>CHEM 446</td>
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<td>Organic Reactions</td>
<td>CHEM 610</td>
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<tr>
<td>Frontiers in Chemical Research</td>
<td>CHEM 695</td>
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Classroom innovations

- An experiment demonstrating the importance of ∆S in the Gibbs equation using poly(N-isopropyl-acrylamide) temperature responsive solubility and a melting point apparatus was developed for the sophomore majors laboratory and subsequently published in *J. Chem. Educ.*
Lucchese, concerted semi-empirical morphing methodologies have been developed for accurate prediction of comprehensive characterization of non-covalent interactions. In collaboration with Professor Robert Lucchese, Bevan has recently developed compound-model morphing (CMM-RS) methodologies for the generation of vibrationally-complete semi-empirical potential such as in the case of OC-HF which is capable of predicting the properties of hydrogen-bonded interactions to nearly the accuracy of rotational spectroscopy. This methodology is now being generalized for the treatment of larger interactions with greater vibrational dimensionality. Bevan is one of the joint-holders of the Davidson Chair in Science at Texas A&M University and the co-holder of one patent for the development of travelling-wave surface wave discharge methods in abatement of global warming particles particularly associated with semi-conductor manufacture. He received the Semiconductor Research Council/Semiconductor Safety Association/ SEMATECH International Research Excellence Award for this work in 1999. A company, RF Systems Inc was established based on this technology. His research team and collaborators are also actively engaged in designing and constructing submillimeter/THz devices for molecular detection and monitoring and other commercial applications. He has, furthermore, recently designed quantum cascade laser spectrometers for applications of Faraday rotation spectroscopy and saturated absorption spectroscopies.

B. Positions and Honors

Professional Positions:
- 1978-1984 Assistant Professor, Department of Chemistry, Texas A&M University
- 1984-1988 Associate Professor, Department of Chemistry, Texas A&M University
- 1988-present Professor, Department of Chemistry, Texas A&M University
- 2003-2007 Director, Center for Atmospheric Chemistry and the Environment, Texas A&M University
- 2005-present Joint-holder Davidson Chair in Science, Texas A&M University
- 2006-present Director, Laboratory for Submillimeter/Terahertz Science and Technology, TAMU

Honors (select, since 1974):
- 1974 Ramsay Memorial Medal
- 1987-1987 Senior National Research Council Fellow, Jet Propulsion Laboratories, Pasadena, CA
- 1992-1992 Royal Society Research Fellow, Chemistry Department, University of Exeter, England
- 2000-2001 Guest Researcher: National Institute of Standards and Technology, Gaithersburg, Md.

C. Selected Peer-reviewed Publications (5, selected from 2010-2012)


D. Research Support

ACTIVE
CHE-0911695 (Bevan/Lucchese) 09/01/09 – 08/31/12, 0.48 calendar
NSF: $233,325 (TC for project period)
Spectroscopic and Computational Characterization of Non-Covalent Interactions.
This research project involves application of submillimeter/THz spectroscopy to the characterization of prototypical hydrogen bonded complexes and the development of compound model morphing methodologies capable of predicting the properties of these systems to accuracies orders of magnitude better than ab-initio and other less accurate methods.
A-747 (Bevan) 06/01/12 – 05/31/13, 0.00 calendar
R.A. Welch Foundation: $100,000 (TC for project period)
Structure and Dynamics of Prototypical Foundation Hydrogen Bonded, Halogen bonded and Related Interactions.
This project involves application of a quantum cascade laser spectrometer and the spectroscopic methods to The characterization of hydrogen bonded and halogen bonded complexes to permit detailed comparison of their molecular dynamics and clarification of their cooperative and competitive characteristics.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

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<th>Course Name</th>
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<td>Phys. Chem.</td>
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<tr>
<td>Fresh. Chemistry</td>
<td>Chem 111,112,117</td>
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G. Evidence of Scholarship

- 15 publications in refereed journals (1 Jan 2005 – present)

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Janet Bluemel, Ph.D.

**EducaTion/Training**

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<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
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<th>FIELD OF STUDY</th>
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<td>Diploma</td>
<td>1986</td>
<td>Inorganic/Organometallic Chemistry</td>
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<tr>
<td>Technical University of Munich, Germany</td>
<td>Ph.D.</td>
<td>1989</td>
<td>Microscopy Inorganic/Organometallic Chemistry</td>
</tr>
<tr>
<td>University of California, Berkeley</td>
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<td>1989-90</td>
<td>Organic/Organometallic Chemistry</td>
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**Professional Positions:**

- 1991-1996: Assistant Professor, Department of Chemistry, Technical University of Munich, Germany
- 1996-1998: Privatdozentin (no US equivalent), Department of Chemistry, Technical University of Munich, Germany
- 1998-2001: Associate Professor, Department of Chemistry, University of Heidelberg, Germany
- 2000-2002: Studiendekan (no US equivalent), University of Heidelberg, Germany
- 2007-present: Professor, Texas A&M University
- 2009-present: Chair and Elected Member of the College of Science Faculty Advisory Council
- 2009-present: Chair of the Department of Chemistry
- 2012-present: Chair of the Inorganic Division of the Department of Chemistry
- 2012-present: Chair and Member of the Department of Chemistry Seminars Committee

**B. Positions and Honors Professional Positions:**

**Honors (select, since 1982):**

- 1982-1986: BayBFG Fellowship for excellent Bavarian students
- 1989-1990: NATO Postdoctoral Fellowship
- 1990-1992: Liebig Habilitation Fellowship
- 2005 Guest Professor, University of Insubria, Como, Italy

**C. Selected Peer-reviewed Publications (5, selected from 2010-2012):**


**D. Research Support**

**ACTIVE**

(a) The Robert A. Welch Foundation

Source of Support: The Robert A. Welch Foundation
Grant No. (Agency) A-1706
Title: "The Sonogashira Catalyst System for C-C Coupling Reactions: New Mechanistic Insights and Improved Recyclability"
PI and co-PI: Janet Bluemel (PI), no co-PIs
Total Award Period Covered: 06/01/12 - 05/31/14
Total Award Amount: $120,000

(b) Industrial Cooperation (APPEAL Consortium)

T. Brenner (Hoeriberg), H.-J. Sue, C. Schwartz (both Department of Mechanical Engineering) and J. Bluemel established an industrial consortium for Advancing Performance Polymers in Energy Applications (APPEAL). Within the consortium each PI is awarded an individual grant.
Grant No. (Agency): TEES account No. 0832519-1516BB
Title: "Characterization of PAEK (polyaryletherketone) Polymers by Solid-State NMR Spectroscopy"
PI and co-PIs: T. Brenner, H.-J. Sue and J. Bluemel, C. Schwartz
Starting - Ending Date: 12/01/2010 - 11/30/2013
Total Award Amount (J. Bluemel): $180,000

(c) National Science Foundation (NSF)

Grant No. (Agency) CHE-0911207
Title: "Rigid Biphenyl and Tetraphenylethylene Linker Scaffolds for Superior Immobilized Catalysis"
PI and co-PIs: J. Bluemel (PI), no co-PIs
Starting - Ending Date: 07/01/09 - 06/30/13
Total Award Amount: $390,000

(d) National Science Foundation (NSF): Multi-PI Block Grant for Major Research Instrumentation

Grant No. (Agency) CHE-0840464
Title: "Acquisition of a Cryoprobe for a NMR Spectrometer"
PI and co-PIs: D. Russell and J. Bluemel, C. Hilty, D. A. Singleton
Starting - Ending Date: 02/01/10 - 01/31/13
Total Award Amount: $601,178

**E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)**

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**F. Contributions in Classroom Education**

Courses taught (1 Jan 2005 – present)

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<th>Course Name</th>
<th>Course Number</th>
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<th>Number of Students</th>
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<tr>
<td>Organic Spectroscopy</td>
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<td>16</td>
</tr>
<tr>
<td>NMR Spectroscopy</td>
<td>Chem 618</td>
<td>3</td>
<td>24 (6+ audits)</td>
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<tr>
<td>Solid-State NMR Spectroscopy</td>
<td>Chem 689</td>
<td>1</td>
<td>5 (1 audit)</td>
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<tr>
<td>Inorganic Chemistry</td>
<td>Chem 462</td>
<td>5</td>
<td>78 (3 audits)</td>
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</table>

Classroom innovations:
- A course combining all spectroscopic techniques relevant for Inorganic and Organic Chemistry has been designed to include demonstrations and hands-on experiences in the instrument facilities.
An Inorganic Chemistry course where the students participate actively and present lectures on selected topics has been developed to train a diverse group of students with vastly different backgrounds.

A popular instrument demonstration has been designed to show the principles of solid-state NMR spectroscopy to the public at departmental Chemistry Open House days.

G. Evidence of Scholarship

- 20 publications in refereed journals (1 Jan 2005 – present)
- 1 patent (1 Jan 2005 – present)
- 60 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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A. Personal Statement

Lawrence S. Brown is widely recognized as an outstanding teacher of chemistry. He has won an array of teaching awards at TAMU, and has been a frequent contributor to and organizer of national symposia in chemical education. He is also the lead author for a successful general chemistry textbook designed specifically for courses aimed at engineering students.

B. Positions and Honors

Professional Positions:
1988-1994 Assistant Professor, Department of Chemistry, Texas A&M University
1994-2011 Senior Lecturer, Department of Chemistry, Texas A&M University
2001-2004 Program Officer for Education and Interdisciplinary Research, Physics Division, National Science Foundation
2011- Instructional Assistant Professor, Texas A&M University

Honors:
1998 TAMU Association of Former Students College Level Teaching Award
2000 TAMU Association of Former Students University Level Teaching Award
2011 Teaching Excellence Award, Texas A&M University System

C. Selected Peer-reviewed Publications


D. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

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<td>Chem 334</td>
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<td>Methods in Teaching Chemistry Laboratory</td>
<td>Chem 697</td>
<td>6</td>
<td>41</td>
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Classroom innovations: Developed CHEM 107 course and original accompanying labs. Developed and taught a “telecourse” version of CHEM 107 in which lectures were broadcast on local PBS station. Early adopter of various instructional technologies including electronic homework (since the early 90s) and classroom “clickers.”

E. Evidence of Scholarship

- Lead author for market-leading textbook for the one semester general chemistry course for engineering students. Third edition of textbook is currently in early stages of production.
Kevin Burgess has 20 years of experience working on syntheses and design of small molecules that bind to proteins and has published extensively in the area. His work now centers on protein-protein interactions, and Dr. Burgess also has 30 years of experience working on catalysis in organic chemistry, and about a decade of experience in the hydrogenation field. Besides the hydrogenations, my research involves combinatorial chemistry, small molecules that mimic or disrupt protein-protein interactions, and observation of protein-protein interactions using fluorescent dyes.

The major goals of this project are to use asymmetric hydrogenations of largely unfunctionalized alkenes in (1) use “cassettes” (as explained later) to avoid cross-talk for activation and imaging in STED, while facilitating multiplexing; (2) use “cassettes” to enable reversible quenching and multiplexing in PALM/STORM using different excitation energies to selectively provide different emission wavelengths; or, (3) facilitate reversible quenching and multiplexing in PALM/STORM via dynamic exchange processes in single dyes then in “cassettes.”

The major goals of this project illustrate how to develop small molecules that perturb protein-protein interactions for these three targets.

The major goals of this project is to explore the hypothesis that a particular small molecule type can be used as a probe, or even a pharmaceutical candidate, for the serpinopathy that is most closely related to stroke. This hypothesis is based on scanning of protein structures via a novel computational searching procedure.

The major goals of this project is to develop small molecules that bind to proteins and has published extensively in the area. Dr. Burgess also has 30 years of experience working on catalysis in organic chemistry, and about a decade of experience in the hydrogenation field.
A. Personal Statement
Abraham (Alie) Clearfield is an internationally known inorganic chemist. He gained experience in government and industrial research laboratories before settling on an academic career. Professor Clearfield has published 575 scientific papers in peer reviewed journals, has edited five books and holds 16 patents. He served as Associate Dean for Research of the College of Science at Texas A&M University and was responsible for initiating the Materials Research Program. He discovered the four major layered group four and fourteen phosphates and extensively examined their structures and ion exchange, proton conduction and catalytic properties. There are now more than six thousand papers worldwide on these materials. Prof. Clearfield extensively developed the field of metal phosphate chemistry. He is among the 5% most highly cited American Chemists.

B. Position and Honors

Professional Positions
1954-63 National Lead Co., TAM Division, Niagara Falls, New York Associate Chemist to Senior Scientist
1963-76 Ohio University Department of Chemistry, Assistant Professor to Professor
1974-75 Associate Program Director for Thermodynamics - NSF, Wash., D.C.
1976-present Professor - Texas A&M University, College Station, Texas
1980-84 Chairman, Inorganic Division, Department of Chemistry, Texas A&M University
1994-98 Chairman, Inorganic Division, Department of Chemistry, Texas A&M University
1982-86 Director, Industry-University Cooperative Chemistry Program
1985-91 Associate Dean for Research, College of Science, Texas A&M University
1986-2000 Director, Texas A&M University Materials Science and Engineering Program
2008 Promoted to Distinguished Professor

Honors
1. Elected University Professor for Excellence in Teaching, 1971-1972 Academic Year by students. This award carried a $1,000 honorarium.
2. Elected Research Institute Fellow by Dean’s Council, Ohio University for Excellence in Research 1972. Award carried a $1,500 stipend.
4. Associate Editor of Ion Exchange and Solvent Extraction.
8. Texas A&M University Association of Former Students Distinguished Achievement Award, March 18, 1998.
9. Elected Vice President of the American Crystallographic Association 1998 with automatic promotion to President in 1999.
10. Elected Chairman of the Faculty of Materials Science and Engineering.
15. Appointed to the International Board to Establish the University of Oviedo, Spain as a University of Excellence, 2010.
17. Named Distinguished Alumnus, Temple University, 2009

C. Selected Recent Publications

D. Research Support

ACTIVE
Research Grants 2009-2012
National Science Foundation: Pillared Layered Compounds: Their Synthesis, Structures and Properties, 5/15/07 – 4/30/11, $450,000
Department of Energy, Office of Basic Research: The Synthesis, Structures and Chemical Properties of Macrocyclic Legnds Covalently Bonded into Layered Arrays, 11/14/09 – 11/15/12, $360,000
R.A. Welch Foundation: Metal Phosphonates as Crystal Engineered Solids 6-1-09 – 5/31/12, $205,000
Savannah River National Laboratory: Separation of Actinides from Lanthanides and Americium from Curium 8/1/09 – 7/31/12, $165,000
National Science Foundation – Summer Supplement for Undergraduate Research 2010, 2011, $12,000 for each summer.
In my x-ray course we included an optional laboratory to gain skill in running and interpreting powder patterns. Classroom Innovations

In Chem 106 I tried to show how chemistry explains the workings of nature. I introduced the Big Bang Theory, the age of the earth and debunked myths about aliens from outer space. In this latter effort I had the students calculate how long it would take to reach a planet in the nearest next solar system if we had a space ship that could fly at 100,000 miles per hour. They struggled with that one.

In my x-ray course we included an optional laboratory to gain skill in running and interpreting powder patterns and solving single crystal structures.

I introduced a course in materials science then team taught it with Ray Schaak.

G. Evidence of Scholarship

- 124 publications in refereed journals (1 Jan 2005 – present)
- Citations are averaging ~1000 per year
- Five Texas A&M Professors are collaborating with me on a number of projects which I initiated. In one other major project I am assisting an Assistant Professor.

ISI Citation Report

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A. Personal Statement

Paul S. Cremer, TAMU University Distinguished Professor and holder of the Arthur E. Martell Chair of Chemistry, joined the Texas A&M faculty in 1998. He was an American Chemical Society Sigal Postdoctoral Fellow at Stanford University. Cremer has a national and international reputation in the field of biological surface science, which is considered to be one of the broadest, most interdisciplinary, and fundamentally important fields of chemistry and biology. His work is key to unraveling the mysteries of why water is essential to making biology and life possible. He has been honored with numerous awards, including the O’Donnell Award from The Academy of Medicine, Engineering, and Science of Texas and The Robert A. Welch Foundation Norman Hackerman Award in Chemical Research. He is a Fellow of the American Chemical Society and the American Association for the Advancement of Science. Research in the Cremer laboratory is at the crossroads of biological interfaces, nanomaterials, spectroscopy, and microfluidics. Biophysical studies are tied together through the employment of novel lab-on-a-chip platforms. To date, he has authored 108 scholarly publications in peer-reviewed journals and holds 4 patents. In addition to his novel contributions in research, Cremer is one of the youngest chemists to serve as an editor for the Journal of the American Chemical Society. He is also an associate editor of the Annual Review of Physical Chemistry journal. He is serving as a member of the NIH Instrumentation and Systems Development study section (2012-2018).

B. Positions and Honors

<table>
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<th>Professional Positions:</th>
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<tr>
<td>2012-present Professor of Chemistry (major appointment), Penn State University, State College, PA</td>
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<tr>
<td>2012-present Professor of Biochemistry and Molecular Biology (minor appointment), Penn State University, State College, PA</td>
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<tr>
<td>2012 Distinguished Professor of Chemistry, Texas A&amp;M University, College Station, TX</td>
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<td>2004-2012 Professor of Chemistry, Texas A&amp;M University, College Station, TX</td>
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<tr>
<td>2002-2004 Associate Professor of Chemistry, Texas A&amp;M University, College Station, TX</td>
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<tr>
<td>1998-2002 Assistant Professor of Chemistry, Texas A&amp;M University, College Station, TX</td>
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Honors and Awards:

| 2012 Named J. Lloyd Huck Chair in Natural Sciences, Penn State University |
| 2012 27th Lu Jiaxi Lectureship Award, Xiamen University |
| 2011 Texas A&M University System, Excellent in Innovation Award |
| 2010 Fellow of the American Association for the Advancement of Science |
| 2010 Peter and Edith O’Donnell Award, The Academy of Medicine, Engineering, and Science of Texas |
| 2009 Fellow of the American Chemical Society |
| 2007 17th Frederic LeRoy Conover Lecturer, Vanderbilt University |
| 2007 Named A.E. Martell Chair in Chemistry |
| 2006 Sigma Xi, Southwest Regional Young Investigator Award |
| 2006 Robert A. Welch Foundation, Norman Hackerman Award in Chemical Research |
| 2006 Pittsburgh Conference Achievement Award |
| 2003 Camille Dreyfus Teacher-Scholar Award |
| 2002 Alfred P. Sloan Research Fellow |
| 2001 Beckman Young Investigator Award |
| 2001 NSF CAREER Award |
| 2001, 2000 3M Nontenured Faculty Award |
| 2000 Office of Naval Research Young Investigator Award |
| 1999 Research Corporation, Research Innovation Award |

Service:

Associate Editor, J. Am. Chem. Soc., 2008-present

B. Selected recent peer-reviewed publications from a total of 109:

Single Plasmonic Nanoparticle Tracking Studies of Solid Supported Bilayers with Ganglioside Lipids
Laura B. Sagle, Laura Ruvuna, Julia Bingham, Chunming Liu, Paul S. Cremer, and Richard P. VanDuyne
The Molecular Mechanisms of Ion-Specific Effects on Proteins
Kelvin B. Rembert, Jana Peterova, Jan Heyda, Christian Hilty, Pavel Jungwirth, and Paul S. Cremer

Monitoring Protein, Small Molecule, and Ion Binding by Local pH Modulation
Da Huang, Aaron D. Robison, Yiquan Liu, and Paul S. Cremer
Phosphatidylserine Reversibly Binds Cu²⁺ with Extremely High Affinity
Christopher F. Monson, Xiao Cong, Aaron Robison, Hudson P. Pace, Chunming Liu, Matthew F. Poyton, and Paul S. Cremer

The Methy Groups of Trimethylamine N-Oxide (TMAO) Orient Away from Hydrophobic Interfaces
Laura B. Sagle, Katherine Cimatu, Vladislav A. Litosh, Yi Liu, Sarah C. Flores, Xin Chen, Bin Yu, and Paul S. Cremer

Protein Separation by Electrophoretic-Electroosmotic Focusing on Supported Lipid Bilayers
Chunming Liu, Christopher F. Monson, Tinglu Yang, Hudson Pace, and Paul S. Cremer
Anal. Chem., 83 (2011) 7876-7880

Supported Bilayer Electrophoresis under Controlled Buffer Conditions
Christopher F. Monson, Hudson P. Pace, Chunming Liu, and Paul S. Cremer

Chemistry of Hofmeister Anions and Osmolytes
Yanjie Zhang and Paul S. Cremer

Hydrogen Bonding of [I-Turn Structure is Stabilized in D₂O
Younhee Cho, Laura B. Sagle, Satoshi Iimura, Yanjie Zhang, Jaibir Khreb, Ashutosh Chilkoti, J. Martin Scholtz, and Paul S. Cremer

The Inverse and Direct Hofmeister Series for Lysozyme
Yanjie Zhang and Paul S. Cremer
PNAS 106 (2009) 15249-15253

Multivalent Ligand-Receptor Binding on Supported Lipid Bilayers
Hyunsook Jung, Aaron D. Robison, and Paul S. Cremer

Investigating the Hydrogen Bonding Model of Urea Denaturation
Laura B. Sagle, Yanjie Zhang, Vladislav A. Litosh, Xin Chen, Younhee Cho, and Paul S. Cremer

Detecting Protein-Ligand Binding on Supported Bilayers by Local pH Modulation
Hyunsook Jung, Aaron D. Robison, and Paul S. Cremer

Silver Nanoparticles as Selective Ionization Probes for Analysis of Olefins by Mass Spectrometry
Stacy D. Sherrod, Araldo W. Diaz, William K. Russell, Paul S. Cremer and David H. Russell
Anal. Chem. 80 (2008) 6796-6799

Impact of Hapten Presentation on Antibody Binding at Lipid Membrane Interfaces
Hyunsook Jung, Tinglu Yang, Mauricio D. Lasagna, Jinjun Shi, Gregory D. Reinhart, and Paul S. Cremer
Biophys. J. 94 (2008) 3094-3103

C. Ongoing Research Support
01-Jun-1999 to 31-May-2013
Current grant period 6/1/2012 – 5/31/2013, $100,000

National Institutes of Health, (GM070622) “Creating Platforms for the Proteomics of Membrane Proteins”
01-Dec-2008 to 30-Nov-2012, $1,158,297

Office of Naval Research, (N00014-08-1-0467) “Developing Label-Free Assays for Ligand-Receptor Binding at Biointerfaces”
01-Apr-2011 to 31-Mar-2014, $450,000

Norman Hackerman Advanced Research Project: “Patterning Nanoscale Arrays for Evaporative Templating”
01-Jul-2010 to 31-May-2013, $196,460

D. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

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<th>Course Name</th>
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<tr>
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<td>Analytical Chemistry II</td>
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E. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

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<th>Number of Sections</th>
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<tr>
<td>Analytical Chemistry II</td>
<td>Chem 602</td>
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<td>35</td>
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F. Evidence of Scholarship
- publications in refereed journals (1 Jan 2005 – present)
- 2 patents (1 Jan 2005 – present)
- ~150 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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</table>
NAME
Donald J. Darensbourg, Ph.D.
eRA COMMONS USER NAME: N/A

EDUCATION/TRAINING
INSTITUTION AND LOCATION
California State University at Los Angeles
Ph.D. 1968
Chemistry
University of Illinois, Urbana
B.S. 1964
Inorganic Chemistry

DEGREE MM/YY FIELD OF STUDY

A. Personal Statement
Donald J. Darensbourg is known for his contributions to mechanorganic/inorganic chemistry, with an emphasis on catalytic processes. His research group has investigated the organometallic chemistry of carbon dioxide, and for the last decade has focused on the synthesis of polymeric materials from carbon dioxide and cyclic ethers, as well as from various renewable resources such as lactides. He has published over 350 peer-reviewed articles, including numerous well-received comprehensive reviews and book chapters. In addition to Texas A&M University teaching and research awards, he received the ACS Award in Inorganic Chemistry in 2010. He has served on numerous NSF Committees and Advisory Boards. Currently, he is a Distinguished Professor at Texas A&M University where he has been tenured for over 30 years.

B. Positions and Honors
Professional Positions:
1964 - 1968 Teaching/Research Assistant in the Department of Chemistry at the University of Illinois
1967 - 1968 NIH Fellowship recipient
1969 - 1973 Assistant Professor of Chemistry, State University of New York at Buffalo
1973 - 1982 Assistant-Full Professor of Chemistry, Tulane University
1982 - 2010 Professor of Chemistry, Texas A&M University
2010 - Distinguished Professor of Chemistry, Texas A&M University

Honors (select, since 1994):
1988-1997; Member, Editorial Advisory Board of Inorganic Chemistry
2001-2003 Member, International Scientific Committee Carbon Dioxide Utilization
2003-Member, Editorial Advisory Board of Advanced Inorganic Chemistry
2006-2009 Member, Editorial Advisory Board of Organometallics
2009 Panelist, NSF Center for Chemical Innovation
2009-Panelist, NSF Graduate Research Fellowship Program
2010 American Chemical Society Award in Inorganic Chemistry
2011-Member, Editorial Board of Journal of Coordination Chemistry

C. Selected Peer-reviewed Publications (5, selected from 2012)

D. Research Support
ACTIVE
- A-0923 (D. J. Darensbourg) 06/01/2012 – 05/31/2014, 0.10 calendar
  Robert A. Welch Foundation, $150,000 (TC for project period)
  Design and Reactivity Studies of Metal Catalysts for the Production of Polycarbonates from Novel Oxiranes and Carbon Dioxide
  The overall goal of this research work is to examine metal catalysts specifically designed to better copolymerize carbon dioxide and novel oxiranes, e.g., indene oxide.

- CHE-1057743 (Darensbourg), 09/15/2011 – 08/31/2014, 0.5 summer
  National Science Foundation, $537,061 (TC for project period)
  Catalytic Studies of the Production of Biodegradable Polymeric Materials from Carbon Dioxide and Renewable Resources
  The major component of this research addresses many of the kinetic and mechanistic details of known single-site catalysts and the development of new catalysts for the preparation of various biodegradable polymers and biomaterials, in part from renewable resources, for use in various important applications.
  NPRP 09-157-1-024 (Bengali) 12/1/2010-11/30/2013, 0.06 calendar
  Qatar National Research Fund, $1,050,000 ($122,500/yr DC to Darensbourg)
  Detection and Reaction Dynamics of Intermediates in Ruthenium Catalyzed Processes
  This collaborative research is centered on identifying and studying the reactivity of key resting states and intermediates in several reactions using ruthenium centered catalysts, employing a variety of time-resolved infrared techniques to obtain important information about the mechanisms of the proposed reactions.

F. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.'s Awarded</th>
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<table>
<thead>
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<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure and Bonding</td>
<td>Chem 103</td>
<td>5</td>
<td>126</td>
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<tr>
<td>Descriptive Inorganic Chemistry</td>
<td>Chem 362</td>
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<td>40</td>
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<td>Green Chemistry</td>
<td>Chem 489/483</td>
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<td>Mechanistic Inorg. Chem.</td>
<td>Chem 636</td>
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<td>Organomet. &amp; Homogeneous Catalysis</td>
<td>Chem 642</td>
<td>2</td>
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Classroom innovations
- Three years ago, I developed and began teaching a course in Green Chemistry to advance undergraduate Chemistry and Chemical Engineering students. The course covers the principle of green chemistry with an emphasis on catalytic processes. A particular focus of the course is the synthesis of polymers from renewable resources, at the same time always addressing the differences between renewable and sustainable. The course has been taught to class sizes of 50-100 students, and makes extensive use of the internet for the most up-to-date resources and developments in this area of chemistry. Included in the course are PowerPoint presentations and written research reports by all students on topical areas in green chemistry and green processing.

G. Evidence of Scholarship
- 76 publications in refereed journals (1 Jan 2005 – present)
- 48 invited lectures (1 Jan 2005 – present)

Isi Citation Report

Sum of the Times Cited : 11750
Sum of Times Cited without self-citation : 10000
Citing Articles : 6117
Citing Articles without self-citation : 5829
Average Citations per Item : 26.90
h-index : 57
NAME
Marcetta Y. Daresbourg, Ph.D.

EDUCATION/TRAINING
INSTITUTION AND LOCATION
Union College, Barbourville, KY
University of Illinois, Urbana, KY

DEGREE
B.S.
Ph.D.

FIELD OF STUDY
Chemistry
Inorganic Chemistry

1969-1971 Visiting Assistant Professor, State University of New York, Buffalo
1971-1982 Assistant, Associate and Professor, Tulane University

Honors (select, since 1994):
1999 Visiting Professor, Harvard University
2005 Co-organizer, Coordination Chemistry: Designed Ligands and Binding Constants, ACS National Meeting – New Orleans
2006 Texas A&M Association of Former Students Faculty Distinguished Achievement Awards in Teaching (College level)
2007-2008 The Robert A. Welch Lectureship Program
2007 Organizer, 8th International Conference on Hydrogenation International Conference, Breckenridge, CO
2008- Advisory Board: Chemical Bonding Center for Solar Fuels, CalTech, Pasadena, CA
2008 National Academy of Sciences Review of Department of Energy Basic Sciences Catalysis Program
2009 American Chemical Society Fellow
2009 National Science Foundation Chemical Synthesis Panel
2010- Distinguished Professor, Texas A&M University
2011-2012 Advisory Board: Petroleum Research Fund, American Chemical Society
2012 Advisory Board: Chemical Bonding Center for Solar Fuels, CalTech, Pasadena, CA
2012 Encyclopedia of Inorganic and Bioinorganic Chemistry Advisory Board
2012 National Academy of Sciences Review of Department of Energy Basic Sciences Catalysis Program
2013-2017 PENDING
2013-2017 National Science Foundation: $810,000 (TC for project period)

D. Research Support

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

C. Selected Peer-reviewed Publications


For Chem 362 - configured this course with emphasis on Descriptive Inorganic Chemistry appropriate to Bioinorganic Chemistry.

For Chem 636 - developed new methods for presenting the classic mechanisms of Inorganic Chemistry, and its applications to Organometallic chemistry and catalysis as well as Metalloenzyme catalysis.
G. Evidence of Scholarship

- 63 publications in refereed journals (1 Jan 2005 – present)
- 67 invited lectures (1 Jan 2005 – present)

I continue to develop projects for classroom and outside classroom activity. I strive to discern the correct balance of traditional lecturing vs student projects for optimal learning experience.

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
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<tr>
<td>Westminster College, New Wilmington, PA</td>
<td>B.S.</td>
<td>1980</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Purdue University, West Lafayette, IN</td>
<td>Ph.D.</td>
<td>1984</td>
<td>Inorganic Chemistry</td>
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<tr>
<td>Texas A&amp;M University, College Station, TX</td>
<td>Postdoctoral Fellowship</td>
<td>1984-86</td>
<td>Inorganic Chemistry</td>
</tr>
</tbody>
</table>

A. Personal Statement

Kim Dunbar is an international leader in synthetic and structural inorganic chemistry with projects that span diverse areas of coordination chemistry. Her experimental and theoretical work directed at understanding physical and chemical phenomena in several important areas have redirected and focused the work of researchers in her areas of expertise; examples include work in the areas of inorganic/organic hybrid materials, molecular magnets, anion-π interactions and dirhodium compounds as anticancer drugs, particularly those that are activated by light. A unifying theme of her research is to use coordination chemistry to establish structure/bonding/properties relationships in homologous series of compounds. Her research has been funded by the National Science Foundation, the Department of Energy, the American Chemical Society-Petroleum Research Fund and the Robert A. Welch Foundation. Professional honors include an Alfred P. Sloan Foundation Fellowship, a Camille and Henry Dreyfus Teacher-Scholar Award, and Fellowships in the American Association for the Advancement of Science, the American Institute of Chemists and the American Chemical Society. She has been honored with Distinguished Alumna Awards from Purdue University Department of Chemistry (2004) and from Westminster College (2000). She received an honorary degree from Westminster College, ranked first in nation as "Best College for Women in Science, Technology, Engineering and Math" STEM fields, 2012 - Forbes.com. She serves her profession as Associate Editor of Inorganic Chemistry and is past Secretary and Chair of the American Chemical Society's Division of Inorganic Chemistry. Recognized as an excellent teacher as well as a researcher, Kim received the inaugural Graduate Mentoring Award from The Association of Former Students at Texas A&M University in 2006 and the Research Award in 2012. She holds the Davidson Chair of Science and is a Distinguished University Professor. She was named a Wilsmore Fellow at University of Melbourne in Australia (2011) and served as a Visiting Professor at the Institut Le Bel, Université de Strasbourg, France (2011). Kim is the author of over 320 publications including nineteen reviews or book chapters.

B. Positions and Honors

**Professional Positions:**
- 1987-1990 Assistant Professor, Michigan State University
- 1991-1992 Associate Professor, Michigan State University
- 1993-1998 Professor, Michigan State University
- 1998-1999 University Distinguished Professor, Michigan State University
- 1999-2006 Professor, Texas A&M University
- 2004-present Davidson Professor of Science Chair, Texas A&M University
- 2007-present Distinguished Professor of Chemistry, Texas A&M University
- 2011 Wilsmore Fellow, University of Melbourne, Australia
- 2011 Visiting Professor, Institut Le Bel, Université de Strasbourg, France

**Honors (Select since 1990):**
- 2012 Texas A&M University Women Former Students' Network Eminent Scholar Award (Inaugural)
- 2012 Association of Former Students, Texas A&M, Distinguished Achievement Award Research
- 2011 Wilsmore Fellow, University of Melbourne
- 2011 Visiting Professor, Institut Le Bel, Université de Strasbourg
- 2011 Fellow, American Chemical Society
- 2011 Featured Editorial in Angewandte Chemie, Women in Chemistry
- 2010 Featured Author in Angewandte Chemie, Author Profile Series
- 2006 Association of Former Students Inaugural Distinguished Achievement Award Graduate Mentoring
- 2004 Purdue University Department of Chemistry Distinguished Alumna Award
- 2004 Fellow, American Association for the Advancement of Science
- 1995 NSF Creativity Extension Awards
- 2002 NSF Creativity Extension Awards
- 2000 Distinguished Alumna Award, Westminster College
- 1998 Distinguished Faculty Award, Michigan State University
- 1998 Plenary Lecturer XXXIII ICC Conference, Florence, Italy
- 1998 Sigma Xi Research Award, Michigan State University

**EDUCATION/TRAINING**

<table>
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<th>NAME</th>
<th>POSITION TITLE</th>
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<tr>
<td>Kim R. Dunbar, Ph.D.</td>
<td>University Distinguished Professor; Davidson Chair of Science</td>
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<table>
<thead>
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<th>NAME</th>
<th>POSITION TITLE</th>
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</thead>
<tbody>
<tr>
<td>Kim R. Dunbar, Ph.D.</td>
<td>University Distinguished Professor; Davidson Chair of Science</td>
</tr>
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**eRA COMMONS USER NAME:** N/A
1992 Fellow of the Alfred P. Sloan Foundation
1991 Camille and Henry Dreyfus Teacher-Scholar Award
1990 University Teaching Award, Michigan State University

C. Selected Peer-reviewed Publications (5, selected from 2011-2012)

D. Research Support
ACTIVE
The Robert A. Welch Foundation (Dunbar,PI) "Magnetic and Electronic Properties of Molecular Materials: Investigation of Factors that Effect Bistability" $200,000,06/01/12-05/31/14
National Science Foundation (Dunbar, PI) "Magnetism, Conductivity and the Interplay between these Properties in d, p and f Block Materials with Organocyanide Ligands" $450,000, 4/01/10-3/31/13
Department of Energy (Dunbar, PI) "Molecular Magnets Based on a Modular Approach: Investigation of Coupling, Anisotropy and Electronic Factors on Bistability" $720,000, 9/1/11-8/31/14
National Science Foundation (subcontract from Ohio State University (co-PIs C. Turro and R. Thummel) "Tuning the Excited States of New Ru(II) Complexes for Potential Photodynamic Therapy Applications" $184,599 (TAMU portion), 9/1/12-8/31/15

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
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<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

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<td>(3 audits)</td>
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<td>Advanced Inorganic Chemistry Laboratory (UG)</td>
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<tr>
<td>Advanced Inorganic Chemistry Laboratory (UG)</td>
<td>Chem 433</td>
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</table>
This project is concerned with the synthesis of Lewis acidic main group compounds as receptors for azide, cyanide and fluoride anions.

A-1423 Gabbaï (PI) 06/01/2008-05/31/2012
Robert A. Welch Foundation $65,000
Cationic gold-antimony complexes Lewis acidic and catalytic properties.
This project is concerned with the synthesis and catalytic properties of novel coordination complexes containing gold and antimony.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
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<th>Current group</th>
<th>Graduate Students</th>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

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G. Evidence of Scholarship

- 149 publications in refereed journals
- 102 invited lectures (1 Jan 2005 – present)

Citation Report

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</table>

C. Selected peer-reviewed Publications (5 selected from 2012)


D. Research Support

ACTIVE
CHE0952912 Gabbaï (PI) 03/01/2010-02/28/2013
National Science Foundation $140,000
Cationic Lewis acids as anion receptors
A. Personal Statement
Holly C. Gaede focuses on undergraduate education and mentoring. Teaching communication skills is one of her specialties; she has presented nationally and internationally on the topic. She has developed two courses at Texas A&M University that have been approved as writing-intensive courses, and served on the University Writing Committee for four years. She promotes undergraduate research, and has directed the REU program in the Department of Chemistry at TAMU since 2007, writing two successful NSF proposals to obtain funding for the program. In summer 2012, the summer research program expanded to include 10 locally-funded TAMU students. Since 2008, she has served on the Chemistry REU leadership group (a select group of REU PIs who advocate for the REU program and interface between the PIs and the NSF), this year serving as chair. Having mentored over two dozen undergraduate researchers herself, she served in the TAMU Office of Undergraduate Research (since merged with the Honors Office), where she developed the Undergraduate Research Scholars Program, a University-wide thesis program. She has also been active in curricular development at TAMU, working with a team of other chemists to revitalize the physical chemistry laboratory program. She serves as chair of the Undergraduate Curriculum Committee in chemistry and is chemistry’s representative on the Undergraduate Program Committee in the College of Science. She serves as an undergraduate advisor in the department, overseeing the undergraduate degree programs in chemistry and their students. With the assistance of an Associate Undergraduate Advisor, she serves as an academic and career counselor for 350 chemistry majors. In this role, she is also responsible for enrollment management, degree evaluations and substitutions, prospective student meetings and events, and program assessment. She serves on the ACS Exams Institute Diagnostic Undergraduate Chemistry Knowledge Exam. She chairs the Undergraduate Awards Committee, responsible for administering departmental awards and scholarships. She has served on the Faculty Senate and several of its committees since 2008, most recently chairing the Workplace Climate and Diversity Committee. She has served on the Faculty Advisory Boards for both the Center for Teaching Excellence (2008-11) and for the Vice President of Student Affairs (2011-12).

B. Positions and Honors
Professional Positions:
Department of Chemistry; Ursinus College; Collegeville, PA
1995 - 2001 Assistant Professor
2001 - 2004 Associate Professor
NMR Section, Laboratory of Membrane Biochemistry and Biophysics, National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health; Rockville, MD
2002 - 2004 Chemist, on leave from Ursinus College through Intergovernmental Personnel Act
2004 - 2005 Chemist, on contract from MedData Resarch, Inc. Walkersville, MD
Texas A&M University; College Station, TX
2005 - 2010 Senior Lecturer in Chemistry
2011 – present Instructional Assistant Professor
2008 – present Undergraduate Advisor
2005 - 2008 Assistant Associate Dean for Undergraduate Research
Honors:
Association of Former Students College Level Teaching Award, 2011
National Science Foundation Graduate Research Fellowship in Chemistry, 1991-94
Student Travel Stipend, Experimental NMR Conference, 1995
Elizabeth Dyer Scholarship, University of Delaware, 1991
Hullihen Award for Service, University of Delaware, 1991
Phi Beta Kappa, 1990
American Chemical Society Award, University of Delaware, 1990
American Microchemical Society Award, University of Delaware, 1990
Wallace H. Carothers Scholarship, University of Delaware, 1989

C. Selected Peer-reviewed Publications (5)


D. Research Support
Purchase of iPad tablet computers for use in CHEM481, a writing-intensive course in Chemistry.
Agency: Competitive Grant Proposal for Computer Access/Instructional Technology Fee (Internal Grant) (PIs: H. C. Gaede; J. Pellois)
Awarde: 12/9/12
Total Award Amount: $18,000
Grant No. CHE-1062840
REU: Biological, Environmental, and Materials Chemistry Research Experiences for Undergraduates at Texas A&M University
Agency: National Science Foundation (PI: H. C. Gaede; co-PI: J.D. Batteas)
Award Period: 4/1/11 – 3/31/14
Total Award Amount: $300,941
Location: Texas A&M University
Award Period: 4/1/11 – 2/28/14
Awardee Institution: Texas A&M University
Grant No. CHE-0755207
REU: Biological, Environmental, and Materials Chemistry Research Experiences for Undergraduates at Texas A&M University
Agency: National Science Foundation (PI: H. C. Gaede; co-PI: J.D. Batteas)
Total Award Amount: $272,635
Location: Texas A&M University
Award Period: 3/1/08 – 2/28/11
Awardee Institution: Texas A&M University

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
<tbody>
<tr>
<td>Total</td>
<td>26</td>
<td></td>
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</tr>
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</table>

Current group: N/A

F. Contributions in Classroom Education
Courses taught (TAMU: Fall 2005-Fall 2012)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>CHEM481</td>
<td>16</td>
<td>209</td>
</tr>
<tr>
<td>Horizons in Chemistry</td>
<td>CHEM100</td>
<td>1</td>
<td>157</td>
</tr>
<tr>
<td>Molecular Science for Citizens</td>
<td>CHEM106</td>
<td>3</td>
<td>180</td>
</tr>
<tr>
<td>Physical Chemistry Laboratory I</td>
<td>CHEM325</td>
<td>3</td>
<td>64</td>
</tr>
<tr>
<td>Physical Chemistry Laboratory II</td>
<td>CHEM326</td>
<td>11</td>
<td>151</td>
</tr>
<tr>
<td>Special Topics</td>
<td>CHEM485</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Classroom innovations (TAMU)
- Developing the first writing-intensive course in the department, CHEM481W. Presently integrating iPads into course for the teaching and learning of communication skills, along with Joanna Pellois.
- Part of the team that revamped physical chemistry laboratories. Developed a solid-state NMR experiment for the physical chemistry laboratory. Developed policies for evaluating students, including a team rating system, that have been adopted course-wide.
- Developed undergraduate thesis writing course for the Office of Undergraduate Research, approved campus-wide as a writing intensive course.

G. Evidence of Scholarship
17 publications
John A. Gladysz, Ph.D.

Professional Positions:
- 1974-1982 Assistant Professor, University of California, Los Angeles
- 1982-1998 Associate Professor/Professor, University of Utah
- 1998-2007 Professor Ordinarius, Friedrich-Alexander-Universität Erlangen-Nürnberg
- 2008-2010 Distinguished Professor, Texas A&M University

A. Personal Statement

John A. Gladysz has authored over 400 papers and patents, and his research spans a wide range of problems in the general areas of synthetic organic organometallic chemistry, and catalysis. He has made seminal contributions to syntheses of reactive C1 ligands playing key roles in metal-catalyzed CO reduction (formyli, hydroxymethyl, methyldiene, etc.). He pioneered the development of chiral-metal complexes, and demonstrated geometric isomerism about metal-carbon double bonds. Like their organic counterparts, these are applicable to enantioselective syntheses (e.g., chiral methyl groups -CHDT) and mechanistic investigations, one of which showed that metals can migrate from one face of an alkyne to the other without dissociation. Gladysz developed chiral metal Lewis acids exhibiting high enantioface binding selectivities for aldehydes and alkenes, and formulated a general theory for such chiral recognition. The three and two-dimensional carbon allotropes diamond (sp3) and graphite (sp2) have been known since antiquity, but the one-dimensional sp material re- mains a missing link. To model its properties, Gladysz synthesized an extensive series of carbon-chain complexes MCAm with even- and odd-carbon bridges as long as C50. These can exist in a variety of delocalized valence, reno, and spin states, and constitute one of the most fundamental types of molecular wires. Gladysz went on to develop a self-assembly processes that "insulates" the sp chain with two double-helical sp carbon chains, akin to household wire. Gladysz has used alkane metathesis in syntheses of molecules that model the symmetry, connectivity, and rotational properties of toy gyroscopes, and developed new strategies for recycling catalysts using perfluoroalkyl substituents to create high affinities for perfluoroalkane phases. Such materials have strong temperature-dependent solubilities, allowing homogeneous reactions at elevated temperatures and facile catalyst recovery at lower temperatures. In addition to the honors itemized below, Gladysz served as the Associate Editor of Chemical Reviews from June 1984 until July 2010. He then succeeded Dietmar Seyferth as the Editor in Chief of Organometallics. He has been a consultant for G.D. Searle, Proctor & Gamble, Monsanto, Union Camp, Exxon, Kimberly Clark, 3M, Rhodia, Total, and Terrabon. He has served as a member of the NIH medicinal chemistry study section (1995-1999), chaired the Organometallic Gordon Conference (1996), and organized many NSF workshops.

B. Positions and Honors

Professional Positions:
1974-1982 Assistant Professor, University of California, Los Angeles
1982-1998 Associate Professor/Professor, University of Utah
1998-2007 Professor Ordinarius, Friedrich-Alexander-Universität Erlangen-Nürnberg
(chair, organic chemistry) (Germany)
2008- Distinguished Professor, Texas A&M University
Doug Chair in Chemical Invention

Honors:
1980-1984 Alfred P. Sloan Foundation Fellow
1980-1985 Camille and Henry Dreyfus Teacher-Scholar Grant
1988 Arthur C. Cope Scholar Award
1992 University of Utah Distinguished Research Award
1994 American Chemical Society Award in Organometallic Chemistry
1995-1996 von Humboldt Foundation Research Award for Senior Scientists
2004 Fellow, American Association for the Advancement of Science
2007 International Flouorous Technologies Award
2009- Fellow of the American Chemical Society (inaugural 2009 class)

C. Selected Peer-reviewed Publications (5 from 2011-2012)


D. Research Support

ACTIVE
- Qatar National Research Fund (QNRF) $268,000
  *Phase Transfer Activation Of Catalysts For Olefin Metathesis And Polymerization*

- Welch Foundation,06/10 – 05/12
  *Selective Methane Oxidations in Fluorous Media* $100,000

- National Science Foundation,$648,849
  *Wire-Like And Gyroscope-Like Organometallic Complexes*
  5-845-1-142, 10/12 – 09/15, .04 calendar
  *New Approaches to the Selective Oxidation of Methane*
  5-945-1-158, 10/12 – 09/15 .04 calendar

- Qatar National Research Fund (QNRF) $333,835
  *Phase Transfer Activation Of Catalysts For Olefin Metathesis And Polymerization* (renewal, first grant)

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

F. Contributions in Classroom Education

Courses taught (01 January 2005 – present)

G. Evidence of Scholarship

A popular lecture/demonstration involving molecular and macroscopic gyroscopes has been presented at the annual chemistry department outreach day.

H. Evidence of Scholarship

- 58 publications in refereed journals (01 Jan 2005 – present)
- 1 book or meeting reviews, encyclopedia contributions, checked procedures, etc. (01 Jan 2005 – present)
- 4 patents or patent applications (01 Jan 2005 – present)
Joanna Goodey Pellois, Ph.D.  
Senior Lecturer, Associate Graduate Advisor

**EDUCATION/TRAINING**

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of William and Mary, Williamsburg, VA</td>
<td>B.S.</td>
<td>1996</td>
<td>Chemistry</td>
</tr>
<tr>
<td>University of Houston, Houston, TX</td>
<td>Ph.D.</td>
<td>2001</td>
<td>Inorganic/Solid State Chemistry</td>
</tr>
</tbody>
</table>

**A. Personal Statement**

Joanna Goodey Pellois is currently a Senior Lecturer and the Associate Graduate Advisor in the Department of Chemistry at Texas A&M. As a member of the First Year Chemistry Program faculty she teaches general chemistry to science and engineering students. In addition to teaching in the classroom she has developed the second semester general chemistry laboratory curriculum that focuses on the chemistry of the Texas environment. Joanna also teaches a senior undergraduate writing seminar that focuses on effectively communicating scientific results and a graduate course that focuses on ethics in scientific research. As the Associate Graduate Advisor Joanna helps to coordinate activities associated with recruiting new graduate students, advises the current graduate students and manages the department’s Graduate Office. Her research interests are related to solid state chemistry. In the past she has studied materials with interesting magnetic, electronic and optical properties.

**B. Positions and Honors**

- **2001-2002**  
  Post Doctoral Research Assistant, Department of Chemistry University of Houston

- **2002-2006**  
  Visiting Assistant Professor, Department of Chemistry, Barnard College, Columbia University

- **2006-**  
  Senior Lecturer, Department of Chemistry, Texas A&M University

- **2010-**  
  Associate Graduate Advisor, Department of Chemistry, Texas A&M University

**C. Selected Peer-Reviewed Publications**

- **Mao, J.G.; Goodey, J.; Guloy, A. M. Synthesis and structure of Ca_{18}Li_{5}In_{25.07}: A novel intergrowth of Li-centered In-12 icosahedral clusters and electron-precise Zintl layers Inorganic Chemistry 2004, 43, 282-289.**

- **Goodey, J.; Ok, K.M.; Brousard, J.; Hofmann, C.; Escobedo, F.V.; Halasyamani, P. S. Syntheses, structures, and second-harmonic generating properties in new quaternary tellurites: A_{2}Te_{2}O_{12} (A = K, Rb, or Cs) Journal of Solid State Chemistry 2003, 175, 3-12.**

- **Goodey, J.; Brousard, J.; Halasyamani, P. S. Ti Synthesis, structure, and characterization of a new second-harmonic-generating tellurite: Na_{2}Te_{2}O_{12} Chemistry of Materials 2002, 14, 3174-3180.**

- **Mao, J.G.; Goodey, J.; Guloy, A. M. Ti SrInGe and EuInGe: New Zintl phases with an unusual anionic network derived from the ThSi_{2} structure Inorganic Chemistry 2002, 41, 931-937.**

- **Goodey, J.; Mao, J. G.; Guloy, A. M.Ti Ba_{3}NiSi_{2}: A one-dimensional solid-state metallocene analog Journal of the American Chemical Society 2000, 122, 10478-10479.**

**D. Contributions in Classroom Education**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry I</td>
<td>CHEM 101</td>
<td>3</td>
<td>900</td>
</tr>
<tr>
<td>General Chemistry II</td>
<td>CHEM 102</td>
<td>2</td>
<td>500</td>
</tr>
<tr>
<td>Gen. Chem. for Eng.</td>
<td>CHEM 107</td>
<td>6</td>
<td>1650</td>
</tr>
<tr>
<td>Fund. of Chem. II Lab</td>
<td>CHEM 112</td>
<td>150</td>
<td>3600</td>
</tr>
<tr>
<td>Chemistry and Society</td>
<td>CHEM 481 W</td>
<td>12</td>
<td>150</td>
</tr>
<tr>
<td>Ethics in Chem. Res.</td>
<td>CHEM 686</td>
<td>2</td>
<td>90</td>
</tr>
</tbody>
</table>
Classroom innovations

- Developed curriculum including lab manuals and teaching materials for Fundamentals of Chemistry II (CHEM 112) laboratory course. This curriculum impacts approximately 2000 students each year and focuses on the role that chemistry and environmental issues in the state of Texas.
- Received a competitive institutional grant to buy a class set of iPads for the senior writing seminar, CHEM 481 W.
- Restructured CHEM 686, Ethics in Chemical Research, course to include a series of speakers from across campus.

E. Evidence of Scholarship


A. Personal Statement

I am currently involved in teaching organic chemistry (CHEM 227 & CHEM 228) to about 300 students and supervising 3 or 4 Organic Chemistry Laboratory courses (CHEM 237 & CHEM 238) each semester. These courses serve the students from a variety of academic majors that include agriculture, biochemistry, biology, biomedical sciences, chemical engineering, nutrition, pre-medical, and pre-veterinary medicine. I also taught organic chemistry each summer to students in the "Bridge to Medicine" program at College of Medicine for 15 years and students in the "Bridge to Veterinary Medicine" program at College of Veterinary Medicine for 5 years. I was involved in organizing the Brazos Valley Regional Engineering and Science Fair for 15 years and the "Joy of Chemistry in Summer" for Junior High School students for 5 years. I love teaching and enjoy every minute of it.

My service to the Department of Chemistry and Texas A&M University includes:

- 2002-2005: Member, Chemistry Department Advisory committee
- 1998- present: Faculty Advisor to Sigma Alpha Lambda, Texas A&M Chapter
- 2000-present: Faculty Advisor to Chi Psi Beta, Texas A&M Chapter

B. Positions and Honors

Professional Positions:

- Assistant Professor, Department of Chemistry, Presidency College, Madras, 1966-1973
- Professor, Department of Chemistry, Presidency College, Madras, 1974-1980
- Research Associate, Department of Chemistry, Texas A&M University, 1980-1981
- Lecturer, Department of Chemistry, Texas A&M University, 1981-1984
- Visiting Assistant Professor, Department of Chemistry, Texas A&M University, 1984-1987
- Senior Lecturer, Department of Chemistry, Texas A&M University, 1995-

Honors:

- Student Led Award for Teaching Excellence, Texas A&M University, 2009
- Student Led Award for Teaching Excellence, Texas A&M University, 2008
- Partners in Learning Award of Excellence, Texas A&M University, 2004
- Outstanding Panhellenic Professor, Collegiate Panhellenic Council, Texas A&M University, 2004
- Appreciation Award, The Corps of Cadets, Texas A&M University, 1999
- Piper Professor Award, Minnie Stevens Pipper Foundation, 1998
- Faculty Distinguished Achievement Award in Teaching, Texas A&M University, 1998
- Distinguished Teaching Award, College of Science, 1994
- Award of Merit for Teaching, Gamma Sigma Delta Honor Society of Agriculture, 1984
- Award of Merit for Teaching, Gamma Sigma Delta Honor Society of Agriculture, 1984

C. Selected Peer-reviewed Publications


D. Contributions in Classroom Education

Courses taught (in each year 1981- present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Chemistry I</td>
<td>CHEM 227</td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>Organic Chemistry II</td>
<td>CHEM 228</td>
<td>4</td>
<td>400</td>
</tr>
<tr>
<td>Organic &amp; Biological Chemistry (2000-2009)</td>
<td>CHEM 222</td>
<td>1</td>
<td>100</td>
</tr>
</tbody>
</table>

E. Evidence of Scholarship

Author of the following undergraduate Chemistry books in Tamil (a classical and ancient language of India), published by Tamil Nadu Text Book Society.

1. Thermodynamics (1975)
2. Physical Chemistry (1972)
3. Inorganic Chemistry (1977)
4. Acids and Bases (1973)
5. Atomic Structure and Chemical Bonding (1973)

In addition served as a member of:

1. Three person committee which drafted the Science Text Books for 6th-10th grades in India.
2. Four person committee which drafted the Chemistry text Books for 11th-12th grades in India.

Michael B. Hall is an international leader in the computational chemistry. He has published over 300 peer-reviewed articles in the field. In recognition of his outstanding contributions to our understanding of the electronic structure and bonding in transition metal complexes he was named Davidson Professor of Science in 2004. Professor Hall has served on the External Advisory Board of ‘computational catalysis’, an Energy Frontier Research Center at the Pacific Northwest National Laboratory since 2009. In 2012 he was named Distinguished Visiting Scientist at Juniata College. His research is mainly focused on determining the reaction mechanisms for transition metal reactions especially those related to catalysis. He is especially well known for his mechanistic studies of carbon-hydrogen activation and hydrogen production and utilization by the hydrogenase enzymes and related model complexes.

A. Personal Statement

Michael B. Hall is an international leader in the computational chemistry. He has published over 300 peer-reviewed articles in the field. In recognition of his outstanding contributions to our understanding of the electronic structure and bonding in transition metal complexes he was named Davidson Professor of Science in 2004. Professor Hall has served on the External Advisory Board of ‘computational catalysis’, an Energy Frontier Research Center at the Pacific Northwest National Laboratory since 2009. In 2012 he was named Distinguished Visiting Scientist at Juniata College. His research is mainly focused on determining the reaction mechanisms for transition metal reactions especially those related to catalysis. He is especially well known for his mechanistic studies of carbon-hydrogen activation and hydrogen production and utilization by the hydrogenase enzymes and related model complexes.

B. Positions and Honors

Professional Positions:

Davidson Professor of Science, College of Science (Chemistry), 2004-present
Associate Dean, College of Science, 2002-present

Positions and Honors:

1. Thermodynamics (1975)
2. Physical Chemistry (1972)
3. Inorganic Chemistry (1977)
4. Acids and Bases (1973)
5. Atomic Structure and Chemical Bonding (1973)

In addition served as a member of:

1. Three person committee which drafted the Science Text Books for 6th-10th grades in India.
2. Four person committee which drafted the Chemistry text Books for 11th-12th grades in India.

D. Research Support
National Science Foundation - $426,000, September 1, 2009, to August 31, 2013, Theoretical Studies of Inorganic, Organometallic and Bioinorganic Systems, (CHE-0910552)
Qatar National Research Fund - $258,122, July 1, 2009 to June 30, 2013, Computational Investigation of the Reactions of Olefins with Nickel Dithiolenes
The Welch Foundation – $150,000, June 1, 2012 to May 31, 2014, Computational Chemistry of Transition Metal System, (A-0648)
Qatar National Research Fund - $326,682, September 1, 2012 to August 31, 2015, A Theoretical Investigation of Olefin Purification Via Bidentate Metal Complexes

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)


F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)


Classroom innovations
- Course development; innovations in teaching methods and materials (include goals for next year): Chem 641 continues to evolve as new problems are added and computer simulations are improved.

G. Evidence of Scholarship
- 47 invited lectures (1 Jan 2005 – present)

ISI Citation Report:

Sum of the Times Cited : 9793
Sum of Times Cited without self-citation : 9099
Citing Articles : 6826
Citing Articles without self-citation : 6588
Average Citations per Item : 26.98
h-index : 51

E. Evidence of Scholarship
ISI Citation Report

Sum of the Times Cited : 982
h-index : 19
A. Personal Statement:
Robert Hildreth is an experienced educator, laboratory manager, technical problem solver, and technical manager. He has 21+ years of experience as an Air Force officer in basic research, applied research, and as a faculty member in chemistry at the USAF Academy. His research has included development of new energetic materials for use as explosives and rocket propellant ingredients. He also has experience as a technical manager of high-power laser weapons research and with development of specialty materials for use with/as lasers.

Dr Hildreth also has 12 years of experience in technical management of the large undergraduate organic chemistry laboratory program at Texas A&M University. In addition, he has been a popular lecturer of organic chemistry for 11+ years at TAMU.

B. Professional Positions & Recognition:
Lecturer of organic chemistry and Technical Coordinator, Organic Chemistry Lab Program, Department of Chemistry, Texas A&M University, fall 2000 – present.
Visiting Associate Professor of Chemistry at Colorado College, Colorado Springs, CO, spring 1998


Associate Professor of Chemistry, Chemistry Department, US Air Force Academy, Colorado, 1995 – 1997


Instructor, Assistant Professor, Associate Professor of Chemistry, Chemistry Department, US Air Force Academy, Colorado, 1984 – 1988

Instructor (part-time), Chemistry Department, US Air Force Academy, Colorado, 1978 – 1979


AWARDS and RECOGNITIONS


Selected as a key Senior Manager for Science and Technology for the Air Force, 1991

His Materials Research Team set the research productivity record for the Frank J. Seiler Research laboratory, US Air Force Academy, Colorado. Team members received a national level Technology Transfer Award.

Received various military awards including the Air Force Meritorious Service Medal with 5 Oak Leaf Clusters.

Received Outstanding Staff Achievement Award at Texas A&M University in the College of Science in 2010.

C. Peer-reviewed Publications & Technical Reports:


D. Contributions in Research Training and Mentoring:
Not currently working in a research environment. Numerous military examples from my 21 year Air Force career both in teaching cadets (USAF Academy, CO) and in basic and applied research in energetic materials, laser weapons, and specialty materials for use with/as lasers.

E. Contributions in Classroom Education:

Courses taught

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry I</td>
<td>Chem 101 equiv</td>
<td>10+</td>
<td>&gt;300</td>
</tr>
<tr>
<td>General Chemistry II</td>
<td>Chem 102 equiv</td>
<td>10+</td>
<td>&gt;300</td>
</tr>
<tr>
<td>Organic Chemistry I</td>
<td>Chem 227</td>
<td>14</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Organic Chemistry II</td>
<td>Chem 228</td>
<td>6</td>
<td>&gt;400</td>
</tr>
<tr>
<td>Org. Chem. Lab I</td>
<td>Chem 237/equiv</td>
<td>&gt;60</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Org. Chem. Lab II</td>
<td>Chem 236/equiv</td>
<td>&gt;60</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Organic/Biological Chem</td>
<td>Chem 222</td>
<td>4</td>
<td>&gt;450</td>
</tr>
</tbody>
</table>

Classroom innovations
- Extensive use and demonstration of large organic molecular models to illustrate chirality, electrophiles vs. nucleophiles, and stereochemical relationships.
- Promotes student learning using two student learning teams with switchable roles as faculty and student. Stresses the use of: standing, speaking, writing, & explaining to maximize learning by students.

F. Evidence of Scholarship: see various items above.
The Welch Foundation, $150,000
Molecular basis for autotransporter function
The goal of this project is to identify structural features of molecular interactions that arise in the assembly of helical membrane proteins.

0846402 Hilty (PI): 02/01/09-01/31/14
National Science Foundation, $550,003
CAREER: Reaction mechanisms by real-time, hyperpolarization enhanced nuclear magnetic resonance
This award was given for the development of methods to exploit hyperpolarization for the study of enzyme catalysis and protein folding.

0840464 Russell (PI): 08/01/09-07/31/2012
National Science Foundation, $247,238
CRIF:MU: Acquisition of a cryoprobe for a NMR spectrometer
Role: Co-Investigator and Lead Writer (PI: Department Head per program requirement). This award was given to upgrade a departmental 500 MHz NMR spectrometer with a cryoprobe for enhanced sensitivity.

COMPLETED
Camille and Henry Dreyfus Foundation, $50,000
Structure and function of membrane proteins by NMR using DNP hyperpolarization
This award was given in support of a research program aiming to study membrane proteins by NMR, and to develop novel methods of pre-polarization for determining interactions and dynamic processes.

The Welch Foundation, $150,000
Structural perspectives on transmembrane Helix Assembly by NMR
The goal of this project was to identify structural features of molecular interactions that arise in the assembly of helical membrane proteins.

Fellowship for Prospective Researchers: 7/1/04-6/30/05
Swiss National Science Foundation, $52,402
Xenon Biosensors applied to Microlab NMR and NMR at Ultralow Magnetic Fields
This fellowship was awarded for postdoctoral training at UC Berkeley.

E. Contributions in Research Training and Mentoring (9/2006 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.'s Awarded</th>
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<tr>
<td>Current group</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total</td>
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<td>5</td>
<td>0</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
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<td>3 (non-thesis,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>from BIOT</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>program)</td>
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</table>

F. Contributions in Classroom Education (9/2006 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tr>
<td>General Chemistry for</td>
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<td>Engineering Students</td>
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<tr>
<td>Physical Chemistry Laboratory I</td>
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<td>Laboratory II</td>
<td>CHEM 326</td>
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<td>Physical Chemistry</td>
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<tr>
<td>Laboratory I</td>
<td>CHEM 327</td>
<td>4</td>
<td>198</td>
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<tr>
<td>Analytical Chemistry I</td>
<td>CHEM 601</td>
<td>5x(1/4 team taught)</td>
<td>91</td>
</tr>
<tr>
<td>Physical Methods in Biochemistry</td>
<td>CHEM 689</td>
<td>3x(1/3,1/3,0.45 team taught)</td>
<td>26</td>
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</table>

Classroom Innovations
- Constructed low-field NMR spectrometer and developed laboratory experiment for CHEM-325 (resulting in publication in J. Chem. Ed.)
- Developed quantum-first approach and lecture hall demonstration experiments for CHEM-327.
- Developed an enzyme kinetics laboratory experiment for middle/high school, which has been used twice in TAMU Youth Adventure Program, and will be distributed next semester with Chemistry
G. Evidence of Scholarship

- 41 journal articles
- Patent applications: 2
- Book chapters: 1
- Oral Presentations: 29 (since 2005)

ISI Citation reported (8/15/2012)

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<td>h-index</td>
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A. Positions and Honors

Professional Positions:
- 1997 - present: Professor, Department of Chemistry, Texas A&M University
- 1993 - 1997: Associate Professor, Department of Chemistry, Texas A&M University
- 1987 - 1993: Assistant Professor, Department of Chemistry, Texas A&M University

Honors:
- 1997 - 2000: Chair, Inorganic Division, Texas A&M University
- 1998: Reilly Lecturer, University of Notre Dame
- 1997 - present: Member, Materials Research Society
- 1997 - 1999: Member, Editorial Board of Inorganic Chemistry
- 1997: President, Texas A&M University Local Chapter of the American Chemical Society
- 1995 – present: Member, Editorial Board of High Temperature and Materials Science
- 1993 – present: Monthly Contributor to Chemistry in Industry (Highlights in Inorganic Chemistry)
- 1988-93: NSF Presidential Young Investigator Award
- 1987: Sigma Xi, Iowa State Chapter, 1987

B. Selected Peer-reviewed Publications (5)


C. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
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<tr>
<td>Current group</td>
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D. Contributions in Classroom Education

Courses taught (1 Aug 2010 – present)

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<td>Direct Study</td>
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<td>Chem 634</td>
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<td>Symmetry and Group Theory in Chemistry</td>
<td>Chem 673</td>
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E. Evidence of Scholarship

Citation Report

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A. Personal Statement

Arthur E. Johnson is a physical biochemist/cell biologist who has examined several biochemical processes, including the movement of proteins through or into a membrane (protein trafficking), nascent protein folding, ER-associated degradation (ERAD) of misfolded proteins, and the creation of holes in mammalian cell membranes by cytolytic bacterial toxins. Two other processes that he examined extensively are blood coagulation and protein biosynthesis. In each of these areas, he has designed and developed innovative and unprecedented biophysical and biochemical approaches to gain mechanistic insights into the structure, function, and regulation of the molecular machinery involved, largely multi-component complexes of proteins or of proteins and nucleic acids, most of which are membrane-bound. His research and published work therefore includes studies of protein-membrane, protein-nucleic acid, protein-protein, and protein-metal ion interactions. To examine how these processes are accomplished and regulated at the molecular level, he employs a wide variety of techniques. Multiple fluorescence techniques are used to detect and characterize, both kinetically and thermodynamically, the molecular interactions and conformational changes involved in the assembly, function, and regulation of free and membrane-bound macromolecular complexes, as well as to determine their structure and topography. He also uses fluorescence resonance energy transfer (FRET), photocrosslinking, and chemical crosslinking to determine the spatial arrangement of individual components within the complexes, to identify which components or residues are adjacent to each other, and to quantify the magnitude of conformational changes in the complexes. Importantly, all of his biophysical experiments examine functional molecules in fully assembled multi-component complexes in intact membranes in aqueous solution so that he can directly correlate structure and function.

B. Positions and Honors

1964-65 to 1968-69
Milton Academy, Milton, MA; Teacher of Physics, Chemistry, etc.; academic years; head football coach. Phillips Andover Academy, Andover, MA; Teacher of Chemistry and Physics.
6/67-8/67 Columbia Univ., New York, NY; Helen Hay Whitney Postdoctoral Research Fellow. Univ. of Oklahoma, Norman, OK; Assistant, Associate, and Full Professor, Dept. of Chemistry and Biochem.
4/92-8/94 Univ. of Oklahoma, Norman, OK; Grayce B. Kerr Chair, Department of Chemistry and Biochemistry.
9/83-9/94 University of Oklahoma Health Sciences Center, Oklahoma City, OK; Department of Biochemistry and Molecular Biology; Adjunct Professor.
9/94-present Texas A&M Health Science Center, College Station, TX; Department of Molecular and Cellular Medicine (formerly Medical Biochemistry and Genetics); Wehner-Welch Chair; Distinguished Professor of Medical Biochemistry and Genetics, Texas A&M Health Science Center.

C. Selected Peer-reviewed Publications, 1/1/2005 to present (13 chosen from a total of 166 full-length papers published between 1976 and the present)


D. Current Research Support

5/80 University of Oklahoma Regents’ Award for Superior Teaching
1984-85 & 1986-87 University of Oklahoma Associates’ Distinguished Lecturer
1986 University of Oklahoma Regents’ Award for Superior Accomplishment in Research and Creative Activity
1990 Fred Jones Foundation Master Teacher Award
1990 CASE (Council for the Advancement and Support of Education, Wash., DC), Professor of the Year in Oklahoma
1992 Grayce B. Kerr Centennial Chair, Department of Chemistry and Biochemistry, University of Oklahoma
1994 Wehner-Welch Chair in Chemistry, College of Medicine, Texas A&M University
2000 Sigma Xi Distinguished Scientist, Texas A&M University
2000 Senior Investigator Excellence in Research Award, College of Medicine, Texas A&M University
2002 Health Science Center
2002 Distinguished Professor of Chemistry, Texas A&M University
2004 Distinguished Professor of Medical Biochemistry and Genetics, Texas A&M Health Science Center
2004 Elected a Fellow of AAAS, the American Association for the Advancement of Science
2006 John A. and Elizabeth Howard Research Excellence Award, Texas A&M Research Foundation.
2008 Regents Professor, Texas A&M Health Science Center
2009 University of Oregon Alumni Achievement Award in Chemistry
2011 Fritz Lippman Lectureship Award, American Society of Biochemistry and Molecular Biology

Honors:
5/60-6/62 Caltech Scholarship Award
9/62-8/64 General Motors Scholar
6/63-6/63 NSF Undergraduate Summer Research Fellowship.
9/69-11/73 Public Health Service Traineeship
2/74-2/77 Helen Hay Whitney Fellowship
1974-76 Jane Coffin Childs Fellowship, (declined to accept Whitney award)

Biosketches 27
"Pore Formation by Cholesterol-Dependent Cytolysins"

The specific aims of this project are to examine aspects of co-translational protein trafficking, especially membrane protein integration, nascent protein folding, and misfolded protein retro-translocation, at the mammalian endoplasmic reticulum (ER) using primarily fluorescent or photo-reactive probes that have been incorporated into the nascent chain to monitor these processes from the point of view of the substrate.

Role: PI

R01 AI37657 (15-19) Tweten (PI)
NHI/NIAID
4/1/11 – 3/31/16, $ 2,059,778 TC (AEJ = $ 563,380 TC, $ 384,560 direct)

Cholesterol-dependent cytolysins (CDCs) are bacterial protein toxins that form very large holes in mammalian cholesterol-containing membranes. We are examining the molecular mechanisms by which spontaneous pore FRET, and crosslinking techniques to investigate structural issues.

Role: Co-PI

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
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<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<td>2</td>
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F. Contributions in Classroom Education

I taught a Biological Membranes course (BICH 372/MBCH 372) in the spring and fall semesters of 2005, 2006, 2007, and 2008. The average number of students plus auditors was 20.

G. Evidence of Scholarship

- 49 full-length publications in refereed journals (1 Jan 2005 – present)
- 166 full-length publications from 1976 to date
- 1 patent pending (1 Jan 2005 – present)
- 23 invited talks at international meetings (1 Jan 2005 – present)
- 42 invited seminars at institutions worldwide (1 Jan 2005 – present)

ISI Citation Report

Sum of the Times Cited : 8644

Sum of Times Cited without self-citation : 7681

Citing Articles : 5074

Citing Articles without self-citation : 4936

Average Citations per Item : 57

h-index : 54

NAME: Wendy L. Keeney-Kennicutt, Ph.D.
POSITION TITLE: Assistant Instructional Professor; Associate Director, First Year Chemistry

EDUCATION/TRAINING

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<th>DEGREE</th>
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<th>FIELD OF STUDY</th>
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<td>Queen’s University, Kingston, Ontario</td>
<td>B.Sc.</td>
<td>1972</td>
<td>Chemistry</td>
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<tr>
<td>Texas A&amp;M University, College Station, TX</td>
<td>M.Sc.</td>
<td>1974</td>
<td>Analytical Chemistry</td>
</tr>
<tr>
<td>Texas A&amp;M University, College Station, TX</td>
<td>Ph.D.</td>
<td>1982</td>
<td>Chemical Oceanography</td>
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A. Personal Statement

Wendy Keeney-Kennicutt is presently the Associate Director of First Year Chemistry and master administrator of Calibrated Peer Review (CPR) for Texas A&M University (TAMU) with 35 publications. She joined the TAMU chemistry faculty in 1984 and teaches general chemistry. During this time, she spent several years managing a research lab that performed many analyses for the Exxon-Valdez oil spill. She has received numerous teaching awards, including the Presidential Professor for Teaching Excellence Award in 2009 and the Piper Professor in 2010. She had recognition for an extensive study of the effect of international TAs on student attitude and learning. This involved repeated assessment of 2500 first year chemistry students in Fall 2005 as part of TAMU Quality Enhancement Plan. In 2002, she established Calibrated Peer Review on the TAMU campus as a valuable tool for teaching peer review and “writing to learn” in chemistry. It has now been used by over 32,000 undergraduate and graduate students, in courses taught by 520 instructors in 500 courses spread over 30+ majors in 9 colleges at TAMU. As CPR administrator, she has presented over 20 talks and workshops on CPR and its effects on student learning and attitude. She is currently studying how the virtual world of Second Life affects chemistry learning and has given 18 presentations and workshops on the topic. She is a co-PI on a NSF grant proposal to study virtual chemistry labs in Second Life. As the coordinator of TAMU’s “Chemistry for Citizens” lab course, she writes new curriculum for future K-8 teachers. Wendy has organized the award winning American Chemical Society Chemistry Open House and Science Exploration Gallery at TAMU since 2000 and has been the Chemistry coordinator for the Texas Science Olympiad since 2002.

B. Positions and Honors

Professional Positions:
1982-1983 Research Associate, Department of Oceanography, Texas A&M University
1983-1989 Assistant Research Scientist, Department of Oceanography, Texas A&M University, College Station, TX
1984-1988 Lecturer, Department of Chemistry, Texas A&M University
1988-2010 Senior Lecturer, Department of Chemistry, Texas A&M University
1997-2002 Associate Director, First Year Chemistry Program, Texas A&M University
2002-2009 Master Administrator, Calibrated Peer Review, Texas A&M University
2009-2010 Presidential Professor of Teaching Excellence, Texas A&M University
2010- Assistant Instructional Professor, Department of Chemistry, Texas A&M University

Honors (select, since 1991):
1991 Texas A&M Association of Former Students Outstanding Teaching Award for the College of Science
1996-2010 Wakonse Fellow
1998 Outstanding Teacher Award from Gamma Sigma Delta, The Honor Society of Agriculture
2001 Math Review web site honored by the sclLiNKs program, a service of the National Science Teachers Association
2001 Texas A&M Association of Former Students Distinguished Achievement Award in Teaching
2004-2005 Outstanding Panhellenic Professor, TAMU
2006 ChemLuminary Award: Outstanding On-Going National Chemistry Week (NCW) Event
2007 Excellence in Quality Enhancement Award, “Enhancing the Teaching Assistant/Undergraduate Student Experience in the First Year Chemistry Program,” 2007 from the 7th Annual Texas A&M Assessment Conference
2008-2009 Member, TAMU Academic Master Plan Engagement Roadmap Committee
2008-2009 Member, TAMU Academic Master Plan Steering Committee
2009 Faculty representative, Comprehensive Program Review, Department of Disability Services
2009 Presidential Professor for Teaching Excellence Award, TAMU
2010 Student Led Award for Teaching Excellence, TAMU
2010 Piper Professor, Minnie Stevens Piper Foundation

Biosketches 28
2010-2011 Member, TAMU Faculty Senate Task Force for Academic Excellence
2010-2011 Chair, TAMU Association of Former Students Distinguished Achievement Awards for Teaching
2011 Member, TAMU Vision 2020 Faculty Imperative Study Group

C. Selected Publications (5)
W.L. Keeney-Kennicutt, A. Baris Gunersel and N. Simpson (2008) "Overcoming Student Resistance to a Teaching Innovation " International Journal for the Scholarship of Teaching and Learning, 2, 1, 1-26 (peer reviewed)

D. Research Support
ACTIVE
NSF TUES Type 1 Project (coPI) Funded: 08/01/2012 – 08/30/2014 Evaluating Students’ Learning and Attitudes in a Virtual Chemistry Laboratory

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)
Chaired undergraduate student’s research project, 2009-2010
Member of 2 Ph.D. committees in Dept. of Educational Technology: 1 graduated May, 2012 and the other will graduate in December 2012.

F. Contributions in Classroom Education
Courses taught (9 Sept 1984 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tr>
<td>General Chemistry</td>
<td>Chem 101</td>
<td>~2 per spring semester</td>
<td>~ 14,000</td>
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<td>General Chemistry</td>
<td>Chem 102</td>
<td>~2 per fall semester</td>
<td>~ 14,000</td>
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<td>Student Research (Hon.)</td>
<td>LBAR 485/CHEM 485</td>
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<tr>
<td>Student Research Project</td>
<td>CHEM 485</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

Classroom innovations
- Creating lab modules especially for elementary and middle school teachers taking Chem 116: “Molecular Science for Citizens” that they can use in the classroom.
- Using writing and peer reviewing in the chemistry classroom via Calibrated Peer Review.
- Creating and updating my public class website, which holds interesting links, class notes and videos. Learning videos are created from her personal Symposium for her students. She created a math review website for chemistry students for which she received an award and is accessed nationally.
- Involving students in outreach programs, like Chemistry Open House and Texas Science Olympiad
- Using clickers (personal response systems) in the classroom 2-4 times every class period. She has given many talks and workshops to other faculty on the pedagogy of clickers.
- Letting classroom students participate in graduate student projects. Last year, they participated in a project analyzing her innovative method of giving partial credit on a multiple choice exam.
- Having students take on-line personality and learning mode tests as quiz scores to help them figure out their best learning styles.

G. Evidence of Scholarship
- 35 publications (1 Jan 1972 – present)
  - 13 peer-reviewed in chemistry, oceanography and education journals
  - Solution manual for Whitten et. al. General Chemistry textbook for 7 editions.
  - Chapter for ACS Book on Simulations and Virtual Worlds (in preparation)
- Documentation, talks, workshops, classroom visits for faculty and students on Calibrated Peer Review at TAMU
- 153 invited presentations and workshops (1 Jan 1984 – present)
  - Primary Topics: Calibrated Peer Review, Clickers, Second Life, Outreach

Biosketches 29
A. Personal Statement

Jaan Laane is internationally recognized as a leading scientist in the field of molecular spectroscopy. He has published more than 300 journal articles and is the editor of three books, including *Frontiers in Molecular Spectroscopy* (Elsevier, 2009). He is the recipient of numerous awards including the prestigious E.R. Lippincott Award in Molecular Spectroscopy administered jointly by the Society for Applied Spectroscopy, the Optical Society, and the Coblentz Society. He is best known for his pioneering work on vibrational potential energy functions for which he has developed much of the theory, written the widely used computer programs, and produced extensive experimental results for challenging problems. His computer programs have been distributed to dozens of laboratories and their descriptions have been cited many hundreds of times. He is also known for his work on organosilicon syntheses, and half a dozen new cyclic organosilanes have been prepared for the first time in his laboratory. He has served as Editor for the *Journal of Molecular Structure* since 1994 and has served on numerous international advisory boards for spectroscopic conferences. He also served as President of the Alexander von Humboldt Foundation of America. At Texas A&M he was elected the third Speaker of the Faculty Senate (1985-6) and he was the founding President of the Faculty Club (now the University Club). While Director of the Institute for Pacific Asia, he played the leading role in establishing the Texas A&M campus in Koriyama, Japan. He also served as Associate Dean for Graduate Studies for the College of Science. He has also received an Association of Former Students Distinguished Teaching Award.

B. Positions and Honors

### Professional Positions

1964-1968 Visiting Staff Member, Los Alamos Scientific Laboratory (summers)
1967-1968 Assistant Professor, Tufts University
1979-1983 Visiting Professor, University of Bayreuth, Germany
1986 Visiting Professor, University of Ulm, Germany
2002 Visiting Professor, Stanford University
2002 Visiting Professor, University of Colorado (JILA)
1968-1975 Assistant, Associate Professor, Texas A&M University
1976-present Full Professor, Texas A&M University

### Administration:

1977-87, 1993-94 Chairman, Division of Physical and Nuclear Chemistry
1985-86 Speaker, Faculty Senate, Texas A&M University
1994-97 Associate Dean of Science (graduate studies)
1987-90 Director, Institute for Pacific Asia (Texas A&M)
1990-94 Exec. Deputy Director/Sr. Policy Advisor, Texas A&M, Japan
2004-08 Board of Directors, Alexander von Humboldt Association of America
2005-07 President-Elect, Alexander von Humboldt Association of America
2007-09 President, Alexander von Humboldt Association of America
2009-present Board of Directors, American Friends of the Alexander von Humboldt Foundation
2009-present Co-Chair, Alumni Council, Alexander von Humboldt Foundation

### Editorships:

1994-present Editor, *Journal of Molecular Structure*
2000-present Editorial Board, *Laser Chemistry*
2010-present Editorial Board, *Journal of Spectroscopy & Dynamic Biosketches 30
F. Contributions in Classroom Education

Course taught (1 Jan 2005 – present)

<table>
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<th>Course Name</th>
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<td>Gen. Chem. For Engr. Lab</td>
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<td>144</td>
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</table>

Classroom innovations: A complete set of lecture notes has been prepared and made available to the students.

G. Evidence of Scholarship

- 39 publications in refereed journals (1 Jan 2005 – present); 305 in total
- 1 book chapter, 1 book edited (1 Jan 2005 – present)
- 75 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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Biophysical Characterization of the Iron in Mitochondria from Atm1p-Depleted Saccharomyces cerevisiae


D. RESEARCH SUPPORT

CURRENT
1. Integrated Modeling and Analysis of Animal-Cell Cytokinesis
NSF: 0714896 (PI)
08/01/08-07/31/13 (no cost extension)
Specific aims of project: This computational project involves modeling mechanisms of cell growth and division, with an emphasis on modeling contractile rings into a whole-cell model.
There is no overlap with the proposed project.

2. Biophysical Probes of Iron Metabolism in Yeast Vacuoles
A-1170 (PI)
6/1/12-5/31/13
Robert A. Welch Foundation
Specific aims of project: To develop a biophysical method (involving EPR and Mössbauer spectroscopies) to determine the distribution of Fe in yeast vacuoles. There is overlap with the proposed project but only in terms of biophysical tools used (Mössbauer, EPR, ICP-MS) and a similar focus on iron in biology. There is no overlap in terms of the systems to be examined or the specific aims to be investigated. This project involves the separation of iron containing vacuoles from yeast cells and the characterization of the iron contained therein. There are no vertebrate animal studies.

3. Iron in Mitochondrial Physiology and Disease
R01 GM084266-01
09/01/2009-08/30/2013
National Institutes of Health
Specific aims of project: To use an integrative biophysical and genetic approach to evaluate the distribution of iron in mitochondria isolated from cells with different genotypes. There is overlap with the proposed project only in terms of biophysical tools used (Mössbauer, EPR, UV-vis, ICP-MS) and a similar focus on iron in cell biology. There is no overlap in terms of the systems to be examined; this project is focused on the iron in yeast and human mitochondria and involves neither animal studies nor the brain.

COMPLETED
1. Bioinorganic Chemistry of Carbon Monoxide Dehydrogenase
R01 GM046441-16
National Institutes of Health
Specific aims of project: To probe the catalytic mechanism of this enzyme, with special regard for the structure and reactivity properties of the novel Ni-Fe-S clusters. There is no overlap with the proposed project.

2. Probing Iron Metabolism in Mitochondria using EPR and Mössbauer Spectroscopy

A-1170 (PI)
Robert A. Welch Foundation
6/1/07-5/31/10

Specific aims of project: Goals: To develop an integrative biophysical approach to evaluate the distribution of iron in mitochondria.

E. Evidence of Scholarship

ISI Citation Report

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</table>


A. Personal Statements

The major research in the PI's group at Texas A&M Chemistry Department focuses primarily on devising new methods for the genetic incorporation of noncanonical amino acids into proteins in living cells and exploring new organic reactions for protein and nucleic acid conjugations.

B. Positions and Honors

Positions
2005-2007 Postdoctoral Fellow, The Scripps Research Institute
Research Advisor: Dr. Peter G. Schultz
2007- Assistant Professor of Chemistry, Texas A&M University

Honors
1996-2000 G. Zen Fellowship
1997-1998 Huikai Fellowship
1998-1999 Canon Fellowship
1999-2000 Outstanding Student Leader Award
2000-2004 UC Systemwide Biotechnology Research Training Fellow
2003 UC-Davis Travel Award
2004 UC-Davis Summer Research Award
2012-2017 NSF Career Award

C. Publications (with names as W. Liu and W.R. Liu)

As an independent principal investigator


Before becoming an independent investigator


Fogle, E.J., Liu, W., Keller, J. & Toney, M.D.* "Role of Q52 in the Decarboxylation and Transamination of Dialkylglycine Decarboxylase", Biochemistry 2005, 44: 16392-404,


Liu W. & Toney M.D. "Kinetic and thermodynamic analysis of the interaction of cations with dialkylglycine decarboxylase", Biochemistry 2004, 43: 4998-5010


D. Research Support

Current Support

Welch Research Grant A-1715
06/01/2009-05/30/2012, $150,000
"Synthesis and evaluation of methyltransferase-mediated alkylating agents"
Principle investigator: Wenshe Liu, Ph.D.

NIH-1R01CA161158-01
07/01/2011-04/30/2016, $1,483,085
"Phage display with two genetically incorporated noncanonical amino acids"
Principle investigator: Wenshe Liu, Ph.D.

NSF CAREER Award CHE-1148684
04/01/2012-03/31/2017, $575,000
"CAREER: Site-specific dual-labeling of a protein through two genetically incorporated noncanonical amino acids"
Principle investigator: Wenshe Liu, Ph.D.

E. Contributions in Research Training and Mentoring (Sept 2007 – present)

<table>
<thead>
<tr>
<th>Year</th>
<th>Postdocs</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (Sept 2007 – present)</td>
<td>5</td>
<td>11</td>
<td>10</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Robert R. Lucchese is an international leader in the theoretical study of molecular photoionization. He has received a number of competitive awards, including the National Science Foundation’s Presidential Young Investigator Award, an Alfred P. Sloan Research Fellowship, and the Camille and Henry Dreyfus Teacher-Scholar Award. In addition to his work on processes involving electron-molecule scattering collisions, his group has an active collaboration with Prof. John Bevan that combines high-resolution spectroscopy with theoretical modeling to obtain accurate intermolecular interaction potentials.

B. Positions and Honors

Professional Positions:
- 1983-1989 Assistant Professor, Department of Chemistry, Texas A&M University
- 1989-1994 Associate Professor, Department of Chemistry, Texas A&M University
- 1994- Professor, Department of Chemistry, Texas A&M University

Honors (since 1984):
- 1984-1989 National Science Foundation Presidential Young Investigator Award
- 1986-1990 Alfred P. Sloan Research Fellow
- 1988-1993 Camille and Henry Dreyfus Teacher-Scholar Award
- 1993 Italian National Research Council Research Fellowship
- 2006 Japan Society for the Promotion of Science Fellowship

C. Selected Peer-reviewed Publications (5, selected from 2012)


D. Research Support

ACTIVE
- DE-FG02-01ER15178 (Co-PIs: Lucchese, Poliakoff (LSU) DOE: 11/01/10 – 10/31/13; 1.0 Calendar, $218,126 (TC at TAMU for project period)
- Molecular photoionization studies of nucleobases and correlated systems
- The objective of the project is to learn about coupling between the photoelectron continuum and nuclear motion through the study of vibrational branching ratios in molecular photoionization.
- CHE-0911695 (Co-PIs: Lucchese and Bevan) National Science Foundation; 08/01/09 – 07/31/12; 0.5 Calendar, $322,749 (TC for project period)
- Spectroscopic and Computational Investigations of Fundamental Characteristics in Non-covalent Interactions

The objective of the project is to combine high-resolution spectroscopy and theory to obtain accurate intermolecular potentials for dimer systems.

A-1020 (Lucchese)
- Welch Foundation, Houston, TX; 06/01/12 – 05/31/14; 1.0 Calendar, $150,000 (TC for project period)
- Reaction Dynamics Probed by Molecular-Frame Photoionization
- The objective of this project is to investigate molecular probes based on photoionization that could be used for time-resolved studies of reaction dynamics.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
<tbody>
<tr>
<td>Total</td>
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<td>3</td>
<td>4</td>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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</thead>
<tbody>
<tr>
<td>Physical Chemistry I</td>
<td>Chem 323</td>
<td>2</td>
<td>62</td>
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<tr>
<td>Physical Chemistry II</td>
<td>Chem 324</td>
<td>3</td>
<td>77</td>
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<tr>
<td>Physical Chemistry for Engineers</td>
<td>Chem 322</td>
<td>1</td>
<td>23</td>
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<tr>
<td>Physical Chemistry II</td>
<td>Chem 328</td>
<td>2</td>
<td>78</td>
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<tr>
<td>Principles of Quantum Mechanics</td>
<td>Chem 648</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>Chemical Kinetics</td>
<td>Chem 621</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Statistical Thermodynamics</td>
<td>Chem 631</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Seminar</td>
<td>Chem 681</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>First Year Chemistry</td>
<td>Laboratories</td>
<td>12</td>
<td>288</td>
</tr>
</tbody>
</table>

G. Evidence of Scholarship

- 76 publications in refereed journals (1 Jan 2005 – present)
- 31 invited lectures (1 Jan 2005 – present)

ISI Citation Report

Sum of the Times Cited : 4919
Sum of Times Cited without self-citation : 3702
Citing Articles : 2741
Citing Articles without self-citation : 2622
Average Citations per Item : 18.35
h-index : 38
Elmo J. Mawk is a Senior Lecturer with extensive experience teaching first year chemistry courses as well as non-majors instrumental analysis. He has coordinated undergraduate laboratories, spending 3 semesters coordinating General Chemistry laboratory and currently coordinating the non-majors instrumental analysis laboratory. Elmo has served on the Laboratory Assessment Examination Committee, for the ACS DivCHED Examination Institute and has volunteered for various College of Science outreach activities. He has an interest in the implementation of web and computer based technologies to enhance student learning. To that end he has written an extensive library of quiz questions in the BlackBoard Vista learning management system to quiz for credit freshman chemistry students over new concepts discussed in lecture. Additionally Elmo has worked to prepare laboratory curriculum materials, principally laboratory experiments for the freshman chemistry program as well as the non-majors instrumental analysis laboratory. Since 2008 Elmo has been advising incoming chemistry majors during the summer New Student Conferences at Texas A&M University. Beginning in Fall 2012 Elmo will be the Associate Undergraduate Advisor in the Department.

Elmo J. Mawk, Ph.D. Leader, Department of Chemistry, Texas A&M University, College Station, TX

2005- Senior Lecturer, Department of Chemistry, Texas A&M University, College Station, TX

2012 - Associate Undergraduate Advisor, Department of Chemistry, Texas A&M University, College Station, TX

Elmo J. Mawk is a Senior Lecturer with extensive experience teaching first year chemistry courses as well as non-majors instrumental analysis. He has coordinated undergraduate laboratories, spending 3 semesters coordinating General Chemistry laboratory and currently coordinating the non-majors instrumental analysis laboratory. Elmo has served on the Laboratory Assessment Examination Committee, for the ACS DivCHED Examination Institute and has volunteered for various College of Science outreach activities. He has an interest in the implementation of web and computer based technologies to enhance student learning. To that end he has written an extensive library of quiz questions in the BlackBoard Vista learning management system to quiz for credit freshman chemistry students over new concepts discussed in lecture. Additionally Elmo has worked to prepare laboratory curriculum materials, principally laboratory experiments for the freshman chemistry program as well as the non-majors instrumental analysis laboratory. Since 2008 Elmo has been advising incoming chemistry majors during the summer New Student Conferences at Texas A&M University. Beginning in Fall 2012 Elmo will be the Associate Undergraduate Advisor in the Department.

Elmo J. Mawk, Ph.D. Leader, Department of Chemistry, Texas A&M University, College Station, TX

2005- Senior Lecturer, Department of Chemistry, Texas A&M University, College Station, TX

2012 - Associate Undergraduate Advisor, Department of Chemistry, Texas A&M University, College Station, TX

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E. Evidence of Scholarship


“Using Screencasts for Examination Reviews: Student and Instructor Impressions”, Elmo J. Mawk and Vickie Williamson, 21st Biennial Conference on Chemical Education, August 1-5, 2010, University of North Texas, Denton, TX.

“Three Different Homework Systems, Three Different Approaches”, Elmo J. Mawk, 21st Biennial Conference on Chemical Education, August 1-5, 2010, University of North Texas, Denton, TX.


“Atoms first lecture: How to adapt to a textbook and laboratory that does not follow this order”, Vickie Williamson and Elmo J Mawk, 22nd Biennial Conference on Chemical Education, July 29 – August 1, 2012, The Pennsylvania State University, University Park, PA.

NAME
Christine Anne Mullen, Ph.D.

POSITION TITLE
Senior Lecturer

eRA COMMONS USER NAME
N/A

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
</tr>
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<tbody>
<tr>
<td>Texas A&amp;M University, College Station, TX</td>
<td>B.S.</td>
<td>05/94</td>
<td>Chemistry</td>
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<tr>
<td>University of California, San Diego</td>
<td>B.S.</td>
<td>05/94</td>
<td>Biochemistry</td>
</tr>
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<td>University of California, San Diego</td>
<td>M.S.</td>
<td>06/96</td>
<td>Chemistry</td>
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<td>University of California, San Diego</td>
<td>Ph.D.</td>
<td>08/00</td>
<td>Chemistry</td>
</tr>
</tbody>
</table>

A. Positions and Honors

Positions and Employment

2000-2003 Postdoctoral Teaching Fellow, University of San Diego
2003-2006 Visiting Assistant Professor, University of San Diego
2006- Senior Lecturer, Texas A&M University, College Station, TX

Professional Memberships

1994- Member, American Chemical Society

B. Peer-reviewed Publications


A. Personal Statement

University Distinguished Professor Joseph B. Natowitz, holder of the Bright Chair in Nuclear Science, has long been recognized as one of the world’s leading experts in nuclear reaction dynamics and the properties of very highly excited nuclei. His work on the statistical properties of “hot nuclei” and on the thermodynamics of nuclear matter, employs collisional excitation in heavy ion induced reactions to prepare and study the properties of nuclei excited to temperatures comparable to those in stars and supernovae, the sites of nuclear matter, employs collisional excitation in heavy ion induced reactions to prepare and study the properties of nuclei excited to temperatures comparable to those in stars and supernovae, the sites of nuclear matter. He was recognized as one of the world’s leading experts in nuclear reaction dynamics and the properties of very highly excited nuclei. His work on the statistical properties of “hot nuclei” and on the thermodynamics of nuclear matter, employs collisional excitation in heavy ion induced reactions to prepare and study the properties of nuclei excited to temperatures comparable to those in stars and supernovae, the sites of nuclear matter.

Selected Peer-reviewed Publications (5, selected)


D. Research Support

J. Natowitz

Senior Professor

University Awarded

Department of Energy

Highly Excited Nuclei

1/1/2011 12/31/2013 $ 1,060,000 $ 95,000 $ 1,155,000

R.A. Welch Foundation

6/1/2010 5/31/2013 $ 175,000

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

Course Name

Chem 466

Chem 689

Chem 257 (WU)

Chem 355 (WU)

Chem 452 (WU)

Chem 555 (WU)

Edc 6009 (WU)

136

6 (+6 audits)

224

10

32

24

16
G. Evidence of Scholarship

- 142 publications in refereed journals (1 Jan 2005 – present)
- 9 patents (1 Jan 2005 – present)
- 175 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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<th>Sum of the Times Cited</th>
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<td>Sum of Times Cited without self-citation</td>
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<td>Citing Articles</td>
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<td>Citing Articles without self-citation</td>
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<td>29.67</td>
</tr>
<tr>
<td>h-index</td>
<td>58</td>
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</table>

A. Personal Statement

Simon W. North is a recognized leader in the areas of chemical kinetics measurements and modeling, photodissociation dynamics, development of novel laser-based diagnostics, spectroscopy of transient species, trace gas detection, and flow visualization. He has published ca. 130 peer-reviewed articles in top-ranked scientific journals, and is currently the Associate Director of the Center for Atmospheric Chemistry and the Environment (CACE) and the co-Director of the National Aerothermochemistry Laboratory (NAL). He currently serves as the Graduate Advisor in the Department of Chemistry.

B. Positions and Honors

Professional Positions:
- 1997-2003 Assistant Professor, Department of Chemistry, Texas A&M University, College Station TX
- 2003-2008 Associate Professor, Department of Chemistry, Texas A&M University, College Station TX
- 2008- Professor, Department of Chemistry, Texas A&M University, College Station TX

Honors:
- 2010 Distinguished Achievement College-Level Award in Teaching
- 2009 Distinguished Achievement University-Level Award in Teaching
- 2004 Distinguished Achievement College-Level Award in Teaching
- 1994 Mahan Award, Outstanding Graduate Student Instructor, U.C.B.
- 1990 Bailey Prize, U.N.H.
- 1990 American Chemist’s Society Medal, U.N.H
- 1989 Merck Award, U.N.H.
- 1989 Marie-Langrual Scholarship, U.N.H.

C. Selected Peer-reviewed Publications (5, selected from 2011-2012)


D. Research Support

<table>
<thead>
<tr>
<th>Current Project</th>
<th>Photofragment Imaging of Atmospheric Free Radicals</th>
<th>The Robert Welch Foundation</th>
<th>$60,000</th>
<th>06/01/12-05/31/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Project</td>
<td>Integrated Theoretical, Computational, and Experimental Studies for Transition Estimation and Control (co-PI)</td>
<td>Air Force Office of Sponsored Research/NASA</td>
<td>$10,000,000</td>
<td>09/01/2009-08/31/2014</td>
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<tr>
<td>Current Project</td>
<td>Reaction Mechanisms of Tropospheric Hydrocarbon Oxidation Studied by Cavity Ringdown Spectroscopy and Mass Spectrometry (sub contract)</td>
<td>National Science Foundation</td>
<td>$102,000 (sub-contract)</td>
<td>09/01/2010-08/31/2013</td>
</tr>
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</table>
Oleg V. Ozerov, Ph.D.

**E. Contributions in Research Training and Mentoring**
(1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
<tbody>
<tr>
<td>Current group</td>
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<td>2</td>
<td>1 (terminal)</td>
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**F. Contributions in Classroom Education**
Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Kinetics</td>
<td>Chem 621</td>
<td>6</td>
<td>74</td>
</tr>
<tr>
<td>Freshman Chemistry</td>
<td>Chem 101</td>
<td>2</td>
<td>590</td>
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<tr>
<td>Physical Chemistry Lab I</td>
<td>Chem 325</td>
<td>7</td>
<td>140</td>
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<tr>
<td>Physical Chemistry Lab II</td>
<td>Chem 326</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Chemistry of Environmental Pollution</td>
<td>Chem 383</td>
<td>1</td>
<td>30</td>
</tr>
</tbody>
</table>

**G. Evidence of Scholarship**
- Involved in revitalizing the undergraduate physical chemistry laboratory
- Participation in two NSF funded K-12 outreach programs which impact underrepresented groups in the state of Texas: The Information Technology in Science (ITS) program (2002-2007) and the PCL-MAP grant.
- Authored 4 papers in the Chemical Education literature

**C. Selected Peer-reviewed Publications (selected: 10 most significant)**


**D. Research Support**

**ACTIVE**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tr>
<td>Chemistry of the Elements</td>
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<td>25</td>
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<tr>
<td>Mechanistic Inorganic Chemistry</td>
<td>CHEM 636</td>
<td>1</td>
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</tr>
<tr>
<td>Organometallic Chemistry and Homogeneous Catalysis</td>
<td>CHEM 642</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>

F. Contributions in Classroom Education Courses taught (1 Jan 2009 – present)

- National Science Foundation
- Department of Energy
- Dreyfus Foundation
- Robert A. Welch Foundation
- Weizmann Foundation

Advisors and Collaborators:
- Ph.D. advisor: Folami T. Ladipo, University of Kentucky.
- Postdoctoral advisor: Kenneth G. Caulton, Indiana University.
- "Co-PI’s in the NSF CCI ‘Powering the Planet’: B. Brunswig (Caltech), K.-S. Choi (Purdue U), C. Cummins (MIT), G. Gall (UC Davis), F. Gomez (Cal State – LA), H. Gray (Caltech), S. Hammes-Schiffer (Penn State U), T. Jaramillo (Stanford U), P. Hammond (MIT), X. Hu (EPFL, Switzerland), N. Lewis (Caltech), D. Nocera (MIT), B. Parkinson (Colorado State U), J. Peters (MIT), R. Schaak (Penn State U), S. Stahl (U Wisc), J. Shuttlefield (U Wisc – Oshkosh), E. Walker (Southern U), J. Winkler (Caltech). Other collaborators: D. Bourissou (Toulouse, France), A. Fernandez (Merrimack C), B. Foxman (Brandeis U), D. Gusev (Wilfrid Laurier U, Canada), J. Kiplinger (LANL), A. Larsen (Ithaca C), D. Milstein (Weizmann Institute of Science) D. Mindiola, (Indiana U), B. S. Williams (Claremont McKenna C). E. Contributions in Research Training and Mentoring (1 June 2009 – present)
Dow Chemical Company provided a $30,000 grant in 2011 that provided a new, specially equipped van for the Chemistry Road Show.

E. Contributions in Research Training and Mentoring (N/A)

F. Contributions in Classroom Education

Courses taught (1 Sept. 1998 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Org. Chem. I</td>
<td>Chem 227</td>
<td>3 per year</td>
<td>250-300 per year</td>
</tr>
<tr>
<td>Org. Chem. II</td>
<td>Chem 228</td>
<td>3 per year</td>
<td>250-300 per year</td>
</tr>
<tr>
<td>Chem. R. S. Service Learning (Summer 2012)</td>
<td>Chem 485</td>
<td>1</td>
<td>4</td>
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</tbody>
</table>

Classroom innovations

- Coordinating the “ChemBoxes” program. Prof. Christian Hilty and Prof. Wenshe Liu have received grants for which the “broader impact” portions are related to developing demonstrations and high-school science kits for the Chemistry Road Show. We are also collaborating on this effort with Prof. Dong Hee Sun. These kits have hands-on activities for students in high school science classes to further investigate phenomena demonstrated during the Road Show. In particular, kits related to atomic emission spectroscopy, superconductivity, kinetics and enzyme catalyzed reactions have been constructed and are available for high-school instructors to borrow. One of the long-term goals of this program is for it to become an opportunity for other research groups to plug into in order to meet broader impact objectives in their own grants.

- Arranged for special “Expert” and former student class presentation by:
  - Dr. Howard Williams (NMR specialist in Dr. Scotts group) on applications of spectroscopy that tie together spectroscopy, synthesis, biology, medicine, etc.
  - Prof. Walter Bradley (Mechanical Engineering) on polymers and their application
  - Patricio Santandar on Vitamins and Biochemistry
  - Kristyn Kimball, former student presentation of application of O-Chem in later classes such as Quant. Anal. And Biochem.
  - Amye E. Gibbs, Texas A&M Graduate, Physician’s Assistant, M Anderson Cancer Center, Lympoma & Melanoma Clinic
  - Dr. Robert Hildreth, Texas A&M Faculty, Lt. Col. USAF (Retired), Energetic Materials

- Course notes (with substantial amount to be filled in in-class) available as a course pack to minimize transcription error, increase time spent listening, thinking and solving problems in class, and optimize the use of lecture time.

- Incorporation of in-class demonstration of reactions and concepts.

- “Pet Molecule” project that has students select organic compounds that are contained in products that they use and then collect data from the literature on their compound. This exercise is intended to help students see the organic chemistry in the world around them, and begin to develop some basic literacy in finding chemical information.

- Explicit effort to create homework, quizzes and exams with heavy focus on short answer, mechanism and synthesis questions to encourage higher order thinking (analysis, application and synthesis)

- Implementation of in-class group work to facilitate learning through teaching and to allow students with different learning styles an opportunity to assimilate information and construct understanding in a variety of ways.

- Implementation of Classroom Assessment Techniques such as daily reading quizzes to encourage pre-class preparation and “Muddies Point” surveys to help students identify where they are experiencing difficulty.

G. Evidence of Scholarship

- 3 publications in refereed journals (1 Jan 2003 – present)

  ISI Citation Reported August 20, 2012

Sum of the Times Cited : 69
E. Evidence of Scholarship

- Five publications in refereed journals

NAME
Frank M. Raushel, Ph.D.

POSITION TITLE
Distinguished Professor of Chemistry

Davidson Professor of Science

EDUCATION/TRAINING

INSTITUTION AND LOCATION

DEGREE

YEAR(s)

FIELD OF STUDY

St. Thomas College

B.A.

1972

Chemistry

University of Wisconsin

Ph.D.

1976

Biochemistry

Pennsylvania State University

Postdoctoral

1976-1980

Biophysics

A. Personal Statement

B. Positions and Honors.

Professional Experience

1980-1986

Assistant Professor of Chemistry, Texas A&M University

1986-1989

Associate Professor of Chemistry, Texas A&M University

1989-2010

Professor of Chemistry and of Biochemistry & Biophysics, Texas A&M University

2010-present

Distinguished Professor of Chemistry

1992-1993

Visiting Professor, Enzyme Institute, University of Wisconsin

2004-present

Davidson Professor of Science

2006-present

Director, Center for Biological NMR Spectroscopy

2008

Visiting Professor, Regenburg University

Honors

1978-1979

NIH National Research Service Award

1982-1985

NIH New Investigator Research Award

1985-1990

NIH Research Career Development Award

1991

Co-Chair, Gordon Research Conference on Enzymes and Metabolic Pathways

1999-2003

NIH Biomedical Science Study Section – Charter Member

1999-2009

NIH Biochemistry Study Section – Charter Member

2003

Chair, 18th Enzyme Mechanisms Conference

2006

Fellow, American Association for Advancement of Science

2009

Repligen Award (American Chemical Society)

C. Selected Peer-reviewed Publications (selected from ~265 peer-reviewed publications).

Most relevant to the current application


Additional recent publications of importance to the field


The major goal of this collaborative project is the development of an integrated strategy for functional annotation of enzymes.

E. Contributions in Research Training and Mentoring (January 1, 2005 – present)

<table>
<thead>
<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
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<td>13</td>
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F. Contributions in Classroom Education (Courses taught [1 Jan 2005 – present)]

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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</thead>
<tbody>
<tr>
<td>Bioorganic Chemistry</td>
<td>Chem 672</td>
<td>7</td>
<td>126</td>
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A. Personal Statement
For the past 18 years, interests in my independent research laboratory have spanned the development of novel strategies for the synthesis of complex, bioactive natural products with a focus on anticancer agents, mechanism of action studies of these natural products including development of methods for simultaneous arming/SAR studies, biosynthetic studies of natural products, and development of synthetic methodologies with particular emphasis on β-lactones. These studies are enabled and bolstered by highly productive collaborations with laboratories specializing in cell and molecular biology, biochemistry, protein crystallography, natural product isolation and biosynthesis, and preclinical studies of anticancer agents. Our expanding collaborative studies led to establishment of the Natural Products LINCHPIN Laboratory as an idea incubation center for scientists interested in the synthesis of natural product conjugates useful for identifying their putative cellular receptors and studying their full potential as drug candidates. In one project spanning ~12 years with my long-time collaborator Prof. Jun Liu and the subject of this proposal, we have dissected the mechanism of action of patamine A and DMDAPatA at the molecular and cellular level. In numerous collaborations, we have continued to study the potential of DMDAPatA as a protein synthesis inhibitor and as a drug candidate. I have mentored and supervised 20 Ph.D. students, 7 M.S. students, 24 post-doctoral fellows, and >70 undergraduates in my research lab. My group’s research has been described in >98 peer-reviewed publications, 3 issued patents, and 3 pending patents based on research involving natural products as drug leads for cancer and other human ailments. I have served on numerous grant review boards and am a member of the American Chemical Society, American Association for Cancer Research, American Association for the Advancement of Science, and the Society for the Advancement of Chicanos and Native Americans in Science. Of particular importance to the current grant has been my involvement in the NIGMS Chemistry-Biology Interface Training Program as a joint venture between the Chemistry and Biology Departments at TAMU. I mentored one Ph.D. student who was a trainee of this Training Program, Dr. Anja S. Dilley.

B. Positions and Honors

Positions and Employment
1985-1986 University Undergraduate Fellow
Department of Chemistry and Department of Biology, Texas A&M University
1986-1991 National Science Foundation Minority Pre-doctoral Fellow
Department of Chemistry, Colorado State University
1991-1993 American Cancer Society Post-doctoral Fellow
Department of Chemistry, Harvard University
1993-1999 Assistant Professor, Department of Chemistry, Texas A&M University
1999-2003 Associate Professor, Department of Chemistry, Texas A&M University
2003-present Professor, Department of Chemistry, Texas A&M University
2010-present Director, Natural Products LINCHPIN Laboratory, Texas A&M University

Other Experience and Professional Memberships
1985-present Member, American Chemical Society Organic Division
1994-present American Association for the Advancement of Science
1995 National Institutes of Health: Small Business Innovation Research Proposals: Special Study Section
1995-present NSF CAREER and Regular Grant Reviewer
1998-2000 ACS Committee on Minority Affairs
2000 National Institutes of Health: General Medical Science Council, Ad Hoc Participant
2000 National Institutes of Health: Medicinal Chemistry A Study Section, Ad Hoc Reviewer
2001 National Academy of Sciences: Ford Foundation Pre-doctoral Fellowship Program
2002-2006 NIH Med Chem A/SBC A Study Section Regular Member
2009 Member, American Association for Cancer Research

Honors and Awards (Since 2005)
2008 Excellence in Innovation Award, TAMU Office of Technology Commercialization
2009 Assoc. of Former Students, Coll. Level Distinguished Achievement Teaching Award
2009 NIH “Method to Extend Research in Time” (MERT) Award

C. Selected Peer-reviewed Publications (out of 100 total)


D. Research Support

Ongoing Research Support
NIH/NIGMS R37 GM052964-16 (MERIT Award), Romo (PI)
4/1/09-3/31/14
Title of Project: Synthetic/Chemical Mechanisms of Bioactive Marine Agents
Goal: The chemical synthesis, mechanism of action, and biosynthetic studies of selected bioactive natural products including several anticancer agents.

Title of Project: β-Lactones: Bioactive Targets and Vehicles for Synthesis
Goal: Development and optimization of a concise strategy to the anticancer agent, salinosporamide A employing a nucleophile-catalyzed aldol-lactonization process and extension to the anticancer agent, oxazolomycin. Studies of transannular CH insertions to the scabrolides/ineleganolide/rameswaralide diterpenes.

NSF CHE-1112397, Romo (PI)
10/1/11-09/30/13
Title of Project: Novel Asymmetric Routes to 2-Oxetanones and Their Application
Goal: Development of methods for the enantioselective synthesis of β-lactones and application of the nucleophile catalyzed aldol-lactonization to the antiproliferative natural product, spongialactone.

Robert A. Welch Foundation, Romo (PI)
06/01/09-05/31/13
Title of Project (or Subproject): Bioactive Natural Product Total Synthesis and Derivitization Studies including the use of β-Lactones (3-Oxetanones).
Project Goal: The primary goal of this project continues to be the development of methods for the enantioselective synthesis of β-lactones including kinetic and dynamic kinetic resolution methods. Novel reaction manifolds of the nucleophile-catalyzed aldol-lactonization process will be investigated. Developed methods will be applied to bioactive natural product synthesis.

Completed Last 5 years
NIH/NIGMS R01 GM086307-01, Romo (PI), G. Vigh (Co-PI)
7/1/08-6/30/12 (no cost ext.)
Title: New Methods for Simultaneous Arming and SAR Studies of Natural Products
Goal: Invent new methods for the functional group and site selective derivatization of natural products (including anticancer natural products) for SAR studies and eventual synthesis of bioactive probes for cellular target isolation.

NSF CHE-0809747, Romo (PI)
07/15/08-06/30/11
Title of Project: Novel Asymmetric Routes to 2-Oxetanones and Their Application
Goal: The primary goal of this project is the development, including mechanistic studies, of methods for the enantioselective synthesis of β-lactones. Also included is the application of the nucleophile catalyzed aldol-lactonization to the β-lactone containing natural product, spongialactone.

Robert A. Welch Foundation, Romo (PI)
06/01/09-05/31/12

Biosketches 45
E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Number of Sections</th>
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<td>Organic Synthesis</td>
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<td>Chem 234</td>
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<td>Graduate Research</td>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

- Developed application of group-learning techniques to honors-level General Chemistry lecture courses.

G. Evidence of Scholarship

- 7 patents (1 Jan 2005 – present)
- 64 invited lectures (1 Jan 2005 – present)
- 59 publications in refereed journals (1 Jan 2005 – present)

ISI Citation Report

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A. Personal Statement

When previously research-active (until approximately 10 years ago), Dr. Rosynek’s fields of specialization were heterogeneous catalysis, surface chemistry, and applied spectroscopy. He made contributions in catalyst synthesis and characterization, catalytic kinetics, and electron spectroscopy of catalyst surfaces. He currently teaches General Chemistry lecture courses for honors students, as well as a senior-level course in industrial and applied chemistry. He is currently the coordinator of the department’s General Chemistry laboratory program for honors students and chemistry majors. He also serves as the Associate Head of the department, being responsible for various administrative functions, including class scheduling, teaching assignments, space allocation, safety practices, oversight of construction and renovation activities, etc.

B. Positions and Honors

Professional Positions:
- 1972-1973 Research Chemist, Mobil Research and Development Corp., Princeton, NJ
- 1973-1979 Assistant Professor, Dept. of Chemistry, Texas A&M University, College Station, TX
- 1979-1986 Associate Professor, Dept. of Chemistry, Texas A&M University, College Station, TX
- 1986-1991 Professor, Dept. of Chemistry, Texas A&M University, College Station, TX
- 1991-1997 Associate Head of Chemistry Department, Texas A&M University, College Station, TX

Honors:
- 2007 Distinguished Achievement Award in Teaching, Association of Former Students, Texas A&M University

C. Most Recent Peer-Reviewed Publications (5)


D. Contributions in Classroom Education

Courses taught (Fall 2007 – present)

- Professor of Chemistry and Associate Head of Department

INSTITUTION AND LOCATION | DEGREE | MM/YY | FIELD OF STUDY
--- | --- | --- | ---
University of Wisconsin-Milwaukee | B.S. | 1967 | Chemistry
University of Wisconsin-Milwaukee | M.S. | 1969 | Physical Chemistry
Rich University, Houston, TX | Ph.D. | 1972 | Physical Chemistry
David H. Russell, Ph.D.

Biosketches 47

David H. Russell is an internationally recognized first-rate expert in mass spectrometry and analytical chemistry. A Fellow of the American Association for the Advancement of Science, Russell is a past recipient of a National Science Foundation Foreign Travel Award as well as a Two-Year Extension for Special Creativity. In 2004, he received an Association of Former Students Distinguished Achievement Award in Research, Texas A&M’s highest recognition for excellence in that category. He has served as a co-editor for Journal of Cluster Science for more than a decade. A past member of the editorial boards for several mass spectrometry journals, he currently serves on the editorial advisory board for the Journal of Mass Spectrometry. In addition, he has authored ca. 240 scholarly publications in peer-reviewed journals and has eight patents. Russell holds the Applied Biosystems MDS Sciex Chair in Mass Spectrometry, is Director of the Laboratory for Biological Mass Spectrometry, and Head of the TAMU Department of Chemistry. As Russell has pioneered in his own fundamental and applied research, he has formed significant collaborations with colleagues in Texas A&M’s Colleges of Science, Veterinary Medicine and Biomedical Science, and Agriculture and Life Sciences as well as other institutions across the United States. His research area is best described as developmental mass spectrometry and gas-phase ion chemistry. Research in his group encompasses a broad range of fundamental and applications-oriented projects that focus on development of tandem TOF-MS (TOF-TOF) and ion mobility-mass spectrometry (IM-MS) for proteomics and biophysical/structural biology. The research has provided many contributions to mass spectrometry, but much of this has focused on development and application of novel methods and instrumentation for identification and characterization of complex biological molecules. The research has had significant impact on early developments in MS-MS, hybrid magnetic sector-TOF, large molecule FT-ICR MS, advanced TOF and TOF-TOF instruments, and ion mobility-mass spectrometry.

A. Personal Statement

David H. Russell is an internationally recognized first-rate expert in mass spectrometry and analytical chemistry. A Fellow of the American Association for the Advancement of Science, Russell is a past recipient of a National Science Foundation Foreign Travel Award as well as a Two-Year Extension for Special Creativity. In 2004, he received an Association of Former Students Distinguished Achievement Award in Research, Texas A&M’s highest recognition for excellence in that category. He has served as a co-editor for Journal of Cluster Science for more than a decade. A past member of the editorial boards for several mass spectrometry journals, he currently serves on the editorial advisory board for the Journal of Mass Spectrometry. In addition, he has authored ca. 240 scholarly publications in peer-reviewed journals and has eight patents. Russell holds the Applied Biosystems MDS Sciex Chair in Mass Spectrometry, is Director of the Laboratory for Biological Mass Spectrometry, and Head of the TAMU Department of Chemistry. As Russell has pioneered in his own fundamental and applied research, he has formed significant collaborations with colleagues in Texas A&M’s Colleges of Science, Veterinary Medicine and Biomedical Science, and Agriculture and Life Sciences as well as other institutions across the United States. His research area is best described as developmental mass spectrometry and gas-phase ion chemistry. Research in his group encompasses a broad range of fundamental and applications-oriented projects that focus on development of tandem TOF-MS (TOF-TOF) and ion mobility-mass spectrometry (IM-MS) for proteomics and biophysical/structural biology. The research has provided many contributions to mass spectrometry, but much of this has focused on development and application of novel methods and instrumentation for identification and characterization of complex biological molecules. The research has had significant impact on early developments in MS-MS, hybrid magnetic sector-TOF, large molecule FT-ICR MS, advanced TOF and TOF-TOF instruments, and ion mobility-mass spectrometry.

B. Positions and Honors

Positions and Employment

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>MM/YY</th>
<th>FIELD OF STUDY</th>
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<tr>
<td>University of Arkansas at Little Rock, AR</td>
<td>B.S.</td>
<td>1974</td>
<td>Chemistry</td>
</tr>
<tr>
<td>University of Nebraska-Lincoln, NE</td>
<td>Ph. D.</td>
<td>1978</td>
<td>Chemistry</td>
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Honors

National Science Foundation/Am. Society of Mass Spectrometry Foreign Travel Award
National Science Foundation, Two Year Extension for Special Creativity
TL Minnesota Chromatography Forum, Special Recognition
Fellow of the American Association for the Advancement of Science
2004 Texas A&M University, Association of Former Students Distinguished Achievement Award for Research

C. Selected Peer-reviewed Publications (Selected from 242 peer-reviewed publications)


“Saccharomyces cerevisiae TcH1p4 is a suicide thiamine thiolese synthase.” Chatterjee, Abhishek; Abeyleeera, N. Dinuka, Bala, Shrihar; Pai, Per-Jing; Dorostkian, Pieter C.; Russell, David H.; Ealick, Steven E.; Begley, Tadhg P. (2011). Nature, 478(7370), 542-546. PMCID: PMC22031445


D. Research Support

On-going Research Support

Robert A. Welch Foundation, (A-1176)

“Studies of the Structure Gas-Phase Peptide Ions” 06/01/10 – 05/31/12 $100,000

Department of Energy, (BES-DE-FG-04ER-15520)

“Nanoparticle Laser Desorption Ionization and IM-MS Applied Structural Mass Spectrometry” 04/01/10 – 03/31/13 $512,000

National Science Foundation (DBI-0821700)

MRI – “Development of Ion Mobility Mass Spectrometer for Protein Chemistry” 09/01/08-08/31/2012 $1,396,567

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<td>Total</td>
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<td>3</td>
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F. Contributions in Classroom Education. Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tr>
<td>Quant Analytical Chemistry</td>
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<td>ANYL CHEM/13 lectures each semester while DH</td>
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G. Evidence of Scholarship
- 95 publications in refereed journals (1 Jan 2005 – present)
- 2 patents (1 Jan 2005 – present)
- ~25 invited lectures (1 Jan 2005 – present)

ISI Citation Report

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<tr>
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<td>Average Citations per Item</td>
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NAME
Patricio J. Santander, Ph.D.

POSITION TITLE
Lecturer

eRA COMMONS USER NAME
N/A

EDUCATION/TRAINING

<table>
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<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
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<tr>
<td>Universidad de Chile, Santiago, CHILE</td>
<td>B.S.</td>
<td>1978</td>
<td>Chemistry</td>
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<tr>
<td>Texas A&amp;M University, College Station, TX</td>
<td>Ph.D.</td>
<td>1987</td>
<td>Organic Chemistry</td>
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</table>

A. Personal Statement

Patricio Santander came to Texas A&M in the early 1980's, for his graduate studies, he got involved in different aspects of the Vitamin B12 biosynthetic studies project in Professor A. Ian Scott's laboratories. He feels fortunate to have worked in a rather unique project that gave him the opportunity to use several different techniques (synthesis of stable-isotopically labeled starting materials, enzyme purification, cloning, microbiology and high field NMR analysis) and learn from expert senior colleagues in these areas. The race for unraveling the nature of the two biosynthetic pathways of this complex molecule was exciting and plenty of surprises.

Currently, as a lecturer, he teaches two sections of sophomore Organic Chemistry (CHEM 227 or CHEM 228), and one section of Organic Synthesis and Analysis IV (CHEM 234) for Chemistry majors each Fall or Spring semesters.

He enjoys all different parts of the teaching experience, in particular the "Office Hours" interactions with the students which gives him a better opportunity to relate the subjects discussed on the whiteboard with their career interests, and possibly get them in contact with research labs.

B. Positions and Honors
Professional Positions:
- Sept. 2006- Present: Department of Chemistry, Texas A&M University, College Station, Texas. Lecturer of Organic Chemistry I and Organic Chemistry II for non-Chemistry majors (two or three sections of 90 students each) and Synthesis and Analysis IV for Chemistry majors (30 students).
- Summers 2007-2009 Center for Biological NMR, Department of Chemistry, Texas A&M University, Research work in Professor A. Ian Scott Laboratories.
- April 1988-Aug. 2006 Center for Biological NMR, Department of Chemistry, Texas A&M University, College Station, Texas. Research Scientist (Professor A. Ian Scott Laboratories).
- Department of Chemistry, University of Chile, Santiago, Chile. Assistant Professor. Taught "Organic Chemistry II" to undergraduate Chemistry majors.
- 1981-1983 Department of Chemistry, Texas A&M University, College Station, Texas. Teaching Assistant, Undergraduate Freshman Chemistry.

Honors:

C. Selected Peer-reviewed Publications
D. Contributions in Classroom Education  Courses taught (31 August 2006 – present)

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<th>Semester</th>
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*CHEM227 : ORGANIC CHEMISTRY I; CHEM228 : ORGANIC CHEMISTRY II; CHEM234 : SYNTHESIS AND ANALYSIS IV FOR CHEMISTRY MAJORS

E. Evidence of Scholarship
- More than 30 publications in refereed journals

---

**A. Personal Statement**

My research interests are in microscopic surface analysis. The current frontiers are to detect and localize attomole quantities of molecules in nanoscale surface volumes. New instrumentation and methodology must be created to explore the extreme limits of molecular detection-localization. My approach involves a novel version of secondary ion mass spectrometry, SIMS. The conventional bombarding beam of atomic, polyatomic, cluster ions is replaced with bombardment with individual nanoprojectiles, specifically Au^{4+}_{400} of ~2 nm in diameter. When they are accelerated to hypervelocity, their impact causes abundant ion, electron and photon emission. The ejecta from an individual nanoprojectile arise from a surface area of 10 – 20 nm in diameter, yielding spatially refined molecular information. Localization is achieved by examining the co-emitted electrons with an electron emission microscope. The original instrumentation and methodology has been developed with a team from the Institut de Physique Nucléaire in Orsay (led by S. Della-Negra and my associates and students at Texas A&M). Current work aims to advance molecular microscopy to an unparalleled level.

---

**B. Positions and Honors**

**Positions and Employment**
- 1960-1961 Summers, Laboratory Assistant, Chemistry Laboratory, Plutonium Department, Commissariat a l'Energie Atomique, France.
- 1967-1970 Assistant Professor, Chemistry & Chemical Engineering, Texas A&M University.
- 1970-1974 Associate Professor, Chemistry & Chemical Engineering, Texas A&M University.
- 1972-1974 Chairman, Analytical-Inorganic Division, Department of Chemistry, Texas A&M University.
- 1972-Present Director, Center for Chemical Characterization & Analysis, Department of Chemistry, Texas A&M University.
- 1974-1987 Chairman, Analytical Chemistry Division, Department of Chemistry, Texas A&M University.
- 1974-Present Professor of Chemistry, Texas A&M University.
- 1994-2006 Head, Department of Chemistry, Texas A&M University.
- 2009-2011 Member, Board of Managers, TamChem LLC

**Other Experience and Professional Memberships**
- American Chemical Society

**Honors**
- 2009-Present Chairman, Nuclear Reactor Safety Board, Texas A&M University
- 2011 Co-Chair, 13th Int. Conf. on Modern Trends in Activation Analysis
- 1992 Chairman, Texas A&M Section, American Chemical Society
- 1989-2000 Member, Program Advisory Committee, Cold Neutron Research Facility, NIST
1987-1992 Member, IUPAC Working Group on Surface and Microanalysis, Commission V.2
1979-1983 Titular Member, Commission V.7, "Analytical Radiochemistry and Nuclear Materials,"
1981-1994 IUPAC, Member, Reactor Safety Board, Texas A&M University
1980-1990 Member, Technical Committee on Nuclear and Atomic Analysis, Isotopes and Radiation Division, ANS
1980-1983 Member, Panel for Analytical Chemistry, NBS
1979-1988 Member, Professional Development Council, Texas A&M University
1982-1987 Member, Comite de Direction, CNRS Cyclotron Laboratory, Orleans, France
1981-1993 Member, Board of Directors, St. Michael's Academy, Bryan, TX

American Men of Science
International Scholars Directory
Who's Who in the South and Southwest
Personalities of the South

C. Selected Peer-reviewed Publications

D. Research Support
Active
None.

Completed Research Support
National Science Foundation, Grant CHE-0750377 & CHE-0936817.

Pending
ONR Co-Invest, PI: Wooley, Nanoscale Molecular Analysis ($20,685/yr. to Schweikert).
NIEHS SRP-Center Grant, Co-PI, Phillips ($200,000/yr. to Schweikert).

F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)
(During tenure as Dept. Head, team taught CHEM 601 Anal. Chem.)

Course Name | Course Number | Number of Sections | Number of Students
--- | --- | --- | ---
Instrumental Analysis | CHEM 317 | 2 | 65
Instrumental Lab | CHEM 434 | 3 | 54
Analytical Chemistry | CHEM 601 | 2 | 30
Special Topics in Analytical Chemistry | CHEM 689 | 1 | 7
Seminar | CHEM 681 | 3 | 59
A. Personal Statement

The Singleton research group has developed original methods for the experimental measurement of kinetic isotope effects as well as original theoretical methods for the interpretation of kinetic isotope effects. This combination of experiment and theory has been used to study diverse organic, bioorganic, and bioinorganic reaction mechanisms. The Singleton group is a world leader in the measurement and mechanistic interpretation of kinetic isotope effects. Our success in this work was the reason for our winning the Cope Scholar Award from the ACS in 2008. In recent years, our mechanistic studies have led to a series of advances in the understanding of the role of dynamic effects in chemistry, and the Singleton group has become the leader in demonstrating the experimental effects of dynamics in ordinary organic reactions.

B. Positions and Honors

Professional Positions:
1981-1982 Associate Staff Chemist, General Electric, Corporate R&D, Schenectady, NY
1987-1993 Assistant Professor, Department of Chemistry, Texas A&M University
1993-1997 Associate Professor, Department of Chemistry, Texas A&M University
1997- Professor, Department of Chemistry, Texas A&M University
2005- Davidson Professor of Science, Texas A&M University
2006- Owner, Process Origins, College Station, Texas

Other Experience and Professional Memberships:
1983- Member, American Chemical Society
1999 Chair, Texas A&M Section of the American Chemical Society
1997, 2001 Temporary Member Medicinal Chemistry Study Section, NIH
2007- Editorial Advisory Board, The Open Organic Chemistry Journal

Honors:
1977 Valedictorian, Meadowbrook High School
1981-1982 Horsburgh Scholar, Case Western Reserve University
1981 Carl F. Prutton Prize in Chemistry, Case Western Reserve University
1982-1983 University of Minnesota Graduate School Fellowship
1983-1986 National Science Foundation Fellowship
1985 Lee Irvin Smith Award in Organic Chemistry, University of Minnesota
1986-1987 National Institutes of Health Postdoctoral Fellowship
1995 Distinguished Teaching Award, College of Science, Texas A&M
2001-2006 University Faculty Fellow, Texas A&M University
2008 Distinguished Achievement Award in Teaching, University Level, Texas A&M

C. Selected peer-reviewed Publications


D. Research Support

ACTIVE

GM-45617  Singleton (PI)
4/1/11 - 3/31/14, $784,000 total direct cost

National Institutes of Health

"New Concepts in Organic Selectivity and Mechanisms"
G. Evidence of Scholarship
As evidence to the quality, significance, and broad interest of the research in the Singleton group, it may be noted that the Singleton group has published 40 papers in the Journal of the American Chemical Society since Dr. Singleton joined the faculty, including 32 since 1999 and 9 since 2009. In recognition of this research, Dr. Singleton won a Cope Scholar Award from the ACS in 2008.

**ISI Citation Report**

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<td>Citing Articles without self-citation</td>
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**A. Personal Statement**
Dong Hee Son is an expert in the synthesis and fabrication of complex metallic and semiconducting nanostructures and characterization of their photophysical properties. His research aims to gain fundamental understanding on the structural correlation and control of static and dynamic photophysical properties of nanoscale inorganic materials. He published more than 30 peer-reviewed research articles (20 published or in review since A&M appointment) in major scientific journals. He received National Science Foundation CAREER award. He is serving as a reviewer for many journals and national laboratories (LBNL, LANL). He is also serving as an office of the local ACS section.

**B. Positions and Honors**

**Professional Positions:**
- 2005-2011 Assistant Professor, Dept. of Chemistry, Texas A&M University, College Station, TX
- 1999-2009 Associate Professor, Dept. of Chemistry, Texas A&M University, College Station, TX

**Honors (select, since 1994):**
- 2009 NSF CAREER award

**C. Selected Peer-reviewed Publications (5, selected from 2012)**


**D. Research Support**

**ACTIVE**
- NSF
  - 01/01/09-12/31/13, $400,000
    - Ultrafast Electronic, Magnetic and Coherent Lattice Dynamics and the Dynamic Structure-property Relationship in Nanocrystalline Transition Metal Oxides
- Welch Foundation
  - 06/01/12-05/31/14, $100,000
    - Energy transfer in doped anisotropic semiconductor nanostructures

**PENDING**
- DOE
  - $393,854
    - Structurally-correlated dynamic of energy transfer and charge carrier trapping in transition-metal doped semiconductor nanocrystal


E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
<tbody>
<tr>
<td>Current group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>3</td>
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</table>

F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

- Modernizing the physical chemistry laboratory course that reflects the current state of chemistry research and experimental methods to effectively teach fundamental concepts and experimental skills has been an issue of discussion in the department since I joined TAMU. As a part of a collective effort to address this issue, I participated in the complete redesign of our undergraduate physical chemistry laboratory curriculum involving several physical chemistry faculty. In this team effort, I designed and implemented a three-week-long experimental module introducing modern optical spectroscopic and imaging techniques for characterizing photophysical properties of semiconductor and metal nanocrystals. The experiment involves the measurements of (i) absorption and fluorescence spectra and emission quantum yield of colloidal quantum dots, (ii) plasmon scattering spectrum of gold nanocrystals and (iii) surface-enhanced Raman scattering of organic molecules adsorbed on silver nanocrystals. For this purpose, I designed and built a modular optical experimental setup capable of doing both spectroscopy and imaging on a single platform with a relatively simple modification of the setup by the students operating the instrument. The setup was composed of modular parts such as a selectable light source bank (laser and white light source), a sample stage on 2-axis translation stage, a home-built optical microscope and a switchable detector bank (two CCD spectrometers and a imaging camera). Students could modify the selection of the light source, type of detector and optical path to make a particular type of measurement. The experiments were designed to increase students direct intellectual involvement in performing the experiment with minimal step-by-step instructions.

G. Evidence of Scholarship

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytical Chemistry I</td>
<td>CHEM 601</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Special Topic (Optics and Spectroscopy)</td>
<td>CHEM 689</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>General Chemistry</td>
<td>CHEM 101</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Physical Chemistry</td>
<td>CHEM 323/328</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Physical Chemistry Lab</td>
<td>CHEM 325/326</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Classroom innovations:

- Modernizing the physical chemistry laboratory course that reflects the current state of chemistry research and experimental methods to effectively teach fundamental concepts and experimental skills has been an issue of discussion in the department since I joined TAMU. As a part of a collective effort to address this issue, I participated in the complete redesign of our undergraduate physical chemistry laboratory curriculum involving several physical chemistry faculty. In this team effort, I designed and implemented a three-week-long experimental module introducing modern optical spectroscopic and imaging techniques for characterizing photophysical properties of semiconductor and metal nanocrystals. The experiment involves the measurements of (i) absorption and fluorescence spectra and emission quantum yield of colloidal quantum dots, (ii) plasmon scattering spectrum of gold nanocrystals and (iii) surface-enhanced Raman scattering of organic molecules adsorbed on silver nanocrystals. For this purpose, I designed and built a modular optical experimental setup capable of doing both spectroscopy and imaging on a single platform with a relatively simple modification of the setup by the students operating the instrument. The setup was composed of modular parts such as a selectable light source bank (laser and white light source), a sample stage on 2-axis translation stage, a home-built optical microscope and a switchable detector bank (two CCD spectrometers and a imaging camera). Students could modify the selection of the light source, type of detector and optical path to make a particular type of measurement. The experiments were designed to increase students direct intellectual involvement in performing the experiment with minimal step-by-step instructions.

Citing Articles without self citation:

- Chelated Complexes of Ruthenium with 2-(2-Pyridyl)-1,8-naphthyridine and 5,6-Dihydrido-

*Mixed-Valence Complexes of Ruthenium and Osmium with 2,7-Bis(2-pyridyl)-1,8-naphthyridine. Tris-Chelated Complexes of Ruthenium with 2-(2-Pyridyl)-1,8-naphthyridine and 5,6-Dihydrido-
**NAME**
Manuel P. Soriaga, Ph.D.

**EDUCATION/TRAINING**

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
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<th>FIELD OF STUDY</th>
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<tr>
<td>University of San Carlos, Cebu, Philippines</td>
<td>B.S.</td>
<td>1971</td>
<td>Chemistry</td>
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<tr>
<td>University of Hawaii at Manoa</td>
<td>Ph.D.</td>
<td>1978</td>
<td>Physical Chemistry</td>
</tr>
<tr>
<td>University of California at Santa Barbara, CA</td>
<td>PDRF</td>
<td>1978</td>
<td>Electrochemistry</td>
</tr>
</tbody>
</table>

**A. Personal Statement**
Manuel P. Soriaga is Professor of Chemistry and the Director of both the Center for Electrochemical Systems and the Electrochemical Surface Science Laboratory at Texas A&M University. He earned his Ph.D. from the University of Hawaii and was a postdoctoral research fellow at the University of California at Santa Barbara before his appointment on the faculty at Texas A&M University. Dr. Soriaga has been a National Science Foundation Presidential Young Investigator and has served as National President of Phi Lambda Upsilon, the national Chemistry honors society. He has 225 publications, including a monograph and four co-edited books, in the fields of surface science, electrocatalysis and renewable energy. He is presently a Visiting Faculty at the Joint Center for Artificial Photosynthesis at the California Institute of Technology where he functions as the Project Lead of the heterogeneous catalysis group.

**B. Positions and Honors**

**Professional Positions:**
- 1985-1991 Assistant Professor, Department of Chemistry, Texas A&M University
- 1991-1997 Associate Professor, Department of Chemistry, Texas A&M University
- 1997- Professor, Department of Chemistry, Texas A&M University

**Honors:**
- 1989-1994 National Science Foundation Presidential Young Investigator Award

**C. Selected Peer-reviewed Publications (5, selected from 2012)**

**D. Research Support**

**ACTIVE**

**E. Contributions in Research Training and Mentoring**

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.'s Awarded</th>
<th>M.S.'s Awarded</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>1</td>
<td>3</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(1 high school student)</td>
<td>(1 high school student)</td>
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<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td>7</td>
<td>6</td>
<td></td>
<td>1 (2012)</td>
<td>6</td>
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| (3 high school students) | (3 high school students) |

**F. Contributions in Classroom Education**

**Course Name**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
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</thead>
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<tr>
<td>Quantitative Analysis</td>
<td>Chem 316</td>
<td>24</td>
<td>1121</td>
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<td>Instrumental Methods</td>
<td>Chem 317</td>
<td>4</td>
<td>138</td>
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<tr>
<td>Quantitative Analysis</td>
<td>Chem 318</td>
<td>55</td>
<td>1116</td>
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<tr>
<td>Physical Chemistry</td>
<td>Chem 325</td>
<td>9</td>
<td>146</td>
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<tr>
<td>Instrumental Analysis</td>
<td>Chem 434</td>
<td>5</td>
<td>81</td>
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**Biosketches 54**
Courses taught (1 Jan 2005 – present)

<table>
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<th>Number of Students</th>
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<td>Quantitative Analysis</td>
<td>Chem 315</td>
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<td>140</td>
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<tr>
<td>Instrumental Analysis</td>
<td>Chem 415</td>
<td>3</td>
<td>105</td>
</tr>
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</table>

G. Evidence of Scholarship
- 45 publications in refereed journals (1 Jan 2005 – present)
- 10 invited lectures (1 Jan 2005 – present)

A. Personal Statement
Since 1981, Tammy H. Tiner has lectured Organic Chemistry in the Department of Chemistry at Texas A&M University. Chemical Education and Academic Advising have been the focus of her career. She has authored supplemental materials for three organic chemistry textbooks and served the Department of Chemistry at TAMU as Associate Undergraduate Advisor for 17 years as academic advisor to 250-300 undergraduate chemistry majors, in addition to her organic chemistry lecture duties. Her service to the Department of Chemistry and Texas A&M University includes:

2006-present College of Science Representative to the University Scholarship Committee 2000-2005 & 2008-2009 College of Science Representative to the Executive Committee of University Advisors and Counselors
September 2002 Co-Chair, Advisor Briefing Days, University Advisors and Counselors
2004 Chair, Bylaws Revision, University Advisors and Counselors
1995-1998 Chair, Organic Division Undergraduate Curriculum Committee
1995 Chair, Department of Chemistry Course Evaluation Committee
1995-present Chemistry Department Undergraduate Awards Committee –
2005-present Member Constituent Advisory Council, Center on Disability and Development, TAMU

B. Positions and Honors
Professional Positions:
1981-1984 Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
1984-1985 Visiting Assistant Professor, Department of Chemistry, Texas A&M University, College Station, TX
1989-1991 Senior Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
1993-1995 Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
1995-2012 Assoc. Undergraduate Advisor, Department of Chemistry, Texas A&M University, College Station, TX
1995- Senior Lecturer, Department of Chemistry, Texas A&M University, College Station, TX

Honors:
1999 Association of Former Students’ College-Level Distinguished Achievement Award in Teaching

C. Selected Peer-reviewed Publications
D. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
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<tr>
<td>Organic Chemistry I</td>
<td>CHEM 227</td>
<td>12</td>
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<tr>
<td>Organic Chemistry II</td>
<td>CHEM 228</td>
<td>16</td>
<td>1450</td>
</tr>
<tr>
<td>Horizons in Chemistry</td>
<td>CHEM 100</td>
<td>7</td>
<td>677</td>
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</table>

E. Evidence of Scholarship


A. Personal Statement

Gyula Vigh is an internationally recognized expert in the field of high performance analytical and preparative-scale separation methods. He has published ca. 180 peer-reviewed articles in top-ranked scientific journals, holds several patents and has received numerous awards, including the Halasz Medal for Lifelong Achievements in Separation Science, Teaching Award of the Association Former Students of TAMU and the Spirit of Innovation Award of TAMU. He has served two terms as editor of Journal of Chromatography - Symposium Series, as member of the editorial boards of Chirality, Enantiomer, Journal of Chromatography, Journal of Separation Science, Chromatographia, Journal of Microcolumn Separations, Journal of High Resolution Separations and Electrophoresis. He serves as a member of the Permanent Scientific Committee of the International Symposia on Isotachophoresis and served on the Scientific Committee of High Performance Liquid Chromatography Symposia. Gyula Vigh holds the Gradipore Chair in Separation Science at Texas A&M University, where his research team has been engaged in the synthesis and analytical use of single-isomer charged cyclodextrin chiral resolving agents, the development of isoelectric focusing and isoelectric trapping analytical and preparative-scale separation methods and the development of families of new fluorophores for the capillary electrophoretic separation of amines, amino acids, peptides, proteins and lately, carbohydrates as well as the development of theories to describe and optimize these separations.

B. Positions

Professional Positions:

1971-1975 Instructor, Department of Analytical Chemistry, University of Veszprem, Hungary
1975-1980 Assistant Professor, Department of Analytical Chemistry, University of Veszprem, Hungary
1980-1985 Associate Professor, Department of Analytical Chemistry, University of Veszprem, Hungary
1985-2000 Associate Professor, Department of Chemistry, Texas A&M University, College Station, TX
2000-2001 Professor, Department of Chemistry, Texas A&M University, College Station, TX
2001- Graduate Professor of Separation Science, Department of Chemistry, Texas A&M University, College Station, TX

C. Selected Peer-reviewed Publications (5, selected from 2011-2012)


D. Research Support

ACTIVE
Gradipore Chair in Separation Science (PI: Vigh) 01/01/12 – 12/31/12 $50,000

The objective of this work is the development of high performance electrophoretic separation methods.
The objective of this work is the development of high performance liquid chromatographic separation methods and fluorescent derivatizing agents.

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<td>0</td>
<td>3</td>
<td>12</td>
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F. Contributions in Classroom Education

<table>
<thead>
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<th>Course Name</th>
<th>Course Number</th>
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</thead>
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<tr>
<td>Quantitative Analysis</td>
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<td>2</td>
<td>Ca. 50</td>
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<tr>
<td>Analytical Chemistry I</td>
<td>Chem 601</td>
<td>6</td>
<td>Ca. 100</td>
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<tr>
<td>Modern Chromatographic Methods</td>
<td>Chem 603</td>
<td>3</td>
<td>Ca. 40</td>
</tr>
<tr>
<td>Modern Electrophoretic Methods</td>
<td>Chem 604</td>
<td>3</td>
<td>Ca. 30 (+10 audits)</td>
</tr>
<tr>
<td>Quant. Analysis Lab</td>
<td>Chem 318</td>
<td>3</td>
<td>Ca. 60</td>
</tr>
<tr>
<td>Instrumental Analysis Lab</td>
<td>Chem 423</td>
<td>2</td>
<td>Ca. 30</td>
</tr>
</tbody>
</table>

Classroom innovations

- A Special Topics in Modern Chromatographic Methods course was further developed for conversion into a permanent graduate course, Modern Chromatographic Methods CHEM 603.
- A Special Topics in Modern Electrophoretic Methods course was further developed for conversion into a permanent graduate course, Modern Electrophoretic Methods CHEM 604.

G. Evidence of Scholarship

- 26 publications in refereed journals (1 Jan 2005 – present)
- 10 invention disclosures filed (1 Jan 2005 – present)
- Ca. 30 invited lectures (1 Jan 2005 – present)

ISI Citation Report

- Sum of the Times Cited: 170
- Sum of Times Cited without self-citation: 114
- Citing Articles: 88
- Citing Articles without self-citation: 67
- Average Citations per Item: 6.54
- h-index: 9

A. Personal Statement

Coran Watanabe is a bio-organic chemist with a programmatic emphasis in natural product biosynthesis and chemical biology. As a graduate student at Johns Hopkins University the biosynthesis of the potent mycotoxin aflatoxin B₁ by the fungus Aspergillus parasiticus was investigated. A new and highly effective method to prepare fungal cell-free extracts was developed, which not only greatly extended the lifetime of the enzymatic activities, but demonstrated complete in vitro biosynthesis of aflatoxin (approximately 17 enzymatic steps), including a pair of fatty acid synthase subunits and a polyketide synthase. The cell-free extract was exploited to probe particularly enigmatic steps of the pathway in time course and cofactor dependence experiments. HPLC was utilized for quantitative analyses. Affinity chromatography columns, employing bound substrate analogs, were created as a means to achieve selective binding and purification of the specialized yeast-like fatty acid synthase pair and polyketide synthase. Isotopic labeling studies (¹⁸O, ²H), were employed both in vivo and in vitro, to elucidate the mechanism of particularly complex structural rearrangements initiated by the organism en route to aflatoxin B₁. Incorporation patterns were determined and quantified by ¹H, ¹³C-NMR spectroscopy and mass spectrometric analyses. As a postdoctoral fellow at UC Berkeley/The Scripps Research Institute, the diverse applications of transcriptional array profiling with high-density DNA microarrays was evaluated. The technology was new at the time and was exploited to investigate the biological actions of complex herbs and natural products as well as to evaluate the molecular mechanism of complex biological processes, e.g., cardiac remodeling. These experiments utilized a variety of methods and techniques including animal studies, cell culture, biochemical assays, and transcriptional profiling.

Coran Watanabe’s laboratory is experienced with genetic knockout strategies, enzyme characterization, DNA library construction and screening, chemical synthesis, natural product structure elucidation, cell culture, transcriptional profiling, and animal studies, which have resulted in a variety of publications.

B. Positions and Honors

Professional Positions:

1998-1999 Howard Hughes Postdoctoral Fellow of the Life Sciences Foundation, The University of California Berkeley, Berkeley, CA (Research Advisor: Peter G. Schultz)
1999-2002 The Scripps Research Institute, La Jolla, CA (Research Advisor: Peter G. Schultz)
2002-2008 Assistant Professor, Department of Chemistry, Texas A&M University, College Station, TX
2008 Associate Professor, Department of Chemistry, Texas A&M University, College Station, TX

Honors:

2008 Rising Star, ACS PROGRESS/Dreyfus Lectureship Award,
2007 American Cancer Society Research Scholar
2003 Research Innovation Award, Research Corporation,
1998 Howard Hughes Research Fellow (HHM) of the Life Sciences Research Foundation,
1998 NIH Postdoctoral Fellowship Declined for HHMI
1998 Sarah and Adolph Roseman Achievement Award for Outstanding Achievement in Chemistry,
1992 Merck Award (ACS) for Outstanding Achievement in Chemistry,
1991 ACS Analytical Division Award,

Representative Professional Activities:

Organizer for C. A. Townsend 65th Birthday Symposium, Johns Hopkins University, Baltimore, MD; August 10th-12th, 2012
NIH BCMB-U Study Section, March 12-13th, 2012
American Cancer Society Study Section June 23rd-24th, 2011; have been appointed to the study section full time, a commitment of 4 years (2012-2016)
D. Research Support

ACTIVE
American Cancer Society (Brazos County Cattle Barons Ball)  04/01/12-10/31/12, $15,350 (DC)
Probing the Biosynthesis of the Anti-Tumor Agent Azinomycin B
This study aims to identify the principal building blocks of the pathway and elucidate the azinomycin biosynthetic gene cluster
RG5-07-239-01-CDD (Watanabe)
American Cancer Society  07/01/07-10/31/12, $270,000 (TC for project period)
Probing the Biosynthesis of the Anti-Tumor Agent Azinomycin B
This study aims to identify the principal building blocks of the pathway and elucidate the azinomycin biosynthetic gene cluster
NSF also funded this American Cancer Society grant. However, we accepted the ACS grant and declined the NSF grant because ACS provided an extra year of funding and the amount of funds provided per year were higher.
PAST

Biosketches 58
F. Contributions in Classroom Education
Courses taught (1 Sept 2002 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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<tbody>
<tr>
<td>Lab. Meth. in Biol. Chem.</td>
<td>Chem 640</td>
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<tr>
<td>Bio-Organic Chem.</td>
<td>Chem 669</td>
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<td>15</td>
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<td>Chemical Biology</td>
<td>Chem 456</td>
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<td>39</td>
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<td>Org. Chem. III</td>
<td>Chem 446</td>
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<td>94</td>
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<td>Org. Chem. I</td>
<td>Chem 227</td>
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<td>100</td>
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<td>Org. Chem. II, for majors</td>
<td>Chem 228</td>
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</tr>
<tr>
<td>Org. Chem. I lab, for majors</td>
<td>Chem 231</td>
<td>3</td>
<td>59</td>
</tr>
<tr>
<td>Org. Chem. II lab, for majors</td>
<td>Chem 234</td>
<td>2</td>
<td>108</td>
</tr>
</tbody>
</table>

Classroom innovations
- Developed game/problem sessions to supplement formal lecturing
- Developed organic lab experiments for Org. Chem II, for majors
- Developed biological lab methods course for first year graduate students
- Developed upper level undergraduate course in chemical biology

G. Evidence of Scholarship
- 26 publications in refereed journals (1 Sept 2002 – present)
- 1 patent (1 Sept 2002 – present)
- 60 invited lectures (1 Sept 2002 – present)

ISI Citation Report

| Sum of the Times Cited: | 496 |
| Sum of Times Cited without self-citation: | 466 |
| Citing Articles: | 440 |
| Citing Articles without self-citation: | 425 |
| Average Citations per Item: | 22.5 |
| h-index: | 16 |

H. Research Support

**ACTIVE**

- ACS PRF 50645-DN16
  1/1/11 – 8/31/13, 0.04 calendar, $100,000 (TC for project period)
  Intermolecular Non-Covalent Interactions in π-Conjugated Heterocyclic Oligomers
  The objective of this project is to quantify the impact of non-covalent π-stacking interactions on the properties of conjugated heterocyclic oligomers and polymers used in organic electronic materials.
  A-1775.
  Welch Foundation
  6/1/11 – 5/31/14, 0.04 calendar $170,000 (TC for project period)
  Non-Covalent π-Stacking Interactions in Organocatalysis
  The objective of this project is study the mechanisms of mode of stereoinduction for organocatalyzed reactions that purportedly rely on π-stacking interactions in stereocontrolling transition states.

**PENDING**

- NSF (CHE- MSN), 2/01/2013 – 1/31/2018
  CAREER: Controlling Supramolecular Self-Assembly of Planar and Curved Polycyclic Aromatic Systems
A. Personal Statement
Vickie M. Williamson interested in the development and testing of techniques to improve students’ understanding of chemistry. She has published chemical education research articles dealing with student understandings and misunderstandings of chemical concepts, the use of visualizations to increase conceptual understanding of chemistry, and the results of implementing inquiry-based, learning-cycle curriculum. Her curriculum development work has included lab manuals, interactive CD’s, textbooks and supplements for middle school to college level. Currently her inquiry-based laboratory manuals for general and non-majors chemistry are adopted nationally. Her grant activity has included infusing molecular visualization into the high school and college classroom and working with teachers to combat science phobia and to teach learning-cycles strategies. Her current grant is investigating the ways in which students use visualizations that are commonly found in chemistry textbooks. All of these activities are applied to her teaching to help her students; her teaching has been recognized by awards. She serves as the administrator for the electronic homework system for Chemistry 101, 102, 106, and 107. Her other service includes activities at the national, state, and university levels (e.g., serving as a director to the state chemistry teachers association, hosting visiting families and students in her classroom, editing the demonstration manual used by chemistry 101 and 102, advising a student service organization, chairing a Division of Chemical Education Task Force).

B. Positions and Honors
Professional Positions:
1992-1993 Visiting Assistant Professor. Department of Chemistry and Biochemistry, University of Central Oklahoma (formerly Central State University), Edmond, OK
1997-1999 Lecturer. Department of Chemistry, Texas A&M University, College Station, TX
1999-2011 Senior Lecturer, Department of Chemistry, Texas A&M University, College Station, TX
2011-present Instructional Assistant Professor, Department of Chemistry, Texas A&M University

Honors (select, since 2000):
2000 Inducted into the Texas A & M Reagents’ Initiative, Academy for Educator Development, A&M University, College Station, TX
2001 Fish Camp Namesake Winner, Freshman Orientation Camp, Texas A&M University.
2003 Distinguished Achievement College-Level Award in Teaching, College of Science. The Association of Former Students, Texas A&M University, College Station, TX
2006 College Board Advanced Placement® Best Practices Course, from a national study of general chemistry courses by the Center of Educational Policy Research on behalf of the College Board.
2009 Student-Led Award for Teaching Excellence, Texas A&M University, College Station, TX

C. Selected Peer-reviewed Publications (5, since 2008)


D. Research Support

ACTIVE


E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<tbody>
<tr>
<td>Total (1 Jan 2005–present)</td>
<td>9</td>
<td>13</td>
<td>9</td>
<td>0</td>
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</table>

F. Contributions in Classroom Education Courses taught (1 Jan 2005 – present)

- General Chemistry I
  - Chem 101
  - 12
  - 5205
- General Chemistry II
  - Chem 102
  - 12
  - 2283
- Directed Studies
  - Chem 465
  - 2
  - 13
- Internship
  - Chem 684
  - 2
  - 2
- Directed Studies
  - Chem 685
  - 8
  - 16
- Modern Applications in Chemistry
  - Chem 696
  - 1
  - 5
- Inquiry & Chemistry Concepts
  - Chem 698
  - 1
  - 5

Classroom innovations

- Implementation of screencasts for student exam reviews for Chemistry 101 and 102. Screencasts are computer video and audio captures of the solutions to practice exam problems.
- Development and testing of methods to promote both conceptual learning and problem solving
- Infusion of different presentation media in Chemistry 101 and 102 (computer technology, animations, visual aids, demonstrations, group problem solving, and conceptual problems)
- Development of questions to enhance the use of clickers with lecture.
- Promoting the use of online homework since 2001

G. Evidence of Scholarship (1 Jan 2005 – present)

- 9 Publications in refereed journals (5 have been previously listed)


- Publication of nationally adopted instructional materials


- Chaired-based Laboratories for Liberal Arts Chemistry, Belmont, CA: Brooks/Cole

- Member of committee to produce a standardized exam: (2006). ACS First and second Term General Chemistry Paired Questions Examinations Institute


- 5 Publications in non-refereed journals/newsletters

- 7 invited lectures

- Seminar speaker, Department of Chemistry, University of Michigan, Ann Arbor, MI, February 17, 2005.
- Seminar speaker, Department of Chemistry, Purdue University, West Lafayette, IN, November 15, 2006.
- Co-Presenter, Learning OWL Workshop (online homework), University of Massachusetts, Amherst, MA, Nov. 14-15, 2008.

- 41 presentations at national and regional meetings. (2011 and 2012 presentations listed)


- Served as an editor or editorial board member

  - Editorial Board Member, School Science and Mathematics Journal, 2006 to 2011.
  - Feature Editor for Chemical Education Research section of the Journal of Chemical Education, 1998 to present.
  - Reviewer for the Chemical Educator, 2007 to present.
Karen L. Wooley, Ph.D.

**Position Title:** W.T. Doherty-Welch Chair; Professor of Chemistry; Professor of Chemical Engineering

**eRA Commons User Name:** Wooley3932

**Education/Training**

<table>
<thead>
<tr>
<th>Institution and Location</th>
<th>Degree</th>
<th>MM/YY</th>
<th>Field of Study</th>
</tr>
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<tbody>
<tr>
<td>Oregon State University, Corvallis, OR</td>
<td>B.S.</td>
<td>1988</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Cornell University, Ithaca, NY</td>
<td>M.S.</td>
<td>1990</td>
<td>Organic/Polymer Chemistry</td>
</tr>
<tr>
<td>Cornell University, Ithaca, NY</td>
<td>Ph.D.</td>
<td>1993</td>
<td>Organic/Polymer Chemistry</td>
</tr>
</tbody>
</table>

A. **Personal Statement**

Karen L. Wooley is an international leader in the design, synthesis, characterization and implementation of polymers and nanostructured organic materials. She has published over 250 peer-reviewed articles in top-ranked scientific journals, holds several patents and has received numerous competitive awards, including the National Science Foundation’s National Young Investigator Award and American Competitiveness and Innovation Award, the American Chemical Society’s Arthur C. Cope Scholar and Herman F. Mark Scholar Awards, and several awards from other agencies. For seven years, she has served as Director of one of the four National Heart Lung and Blood Institute’s Programs of Excellence in Nanotechnology. She serves as an advisor to the National Institutes of Health Nanomedicine Development Centers and the Dutch Biomedical Materials Program. Among other advisory roles, she is a member of the NIH NANO study section, and is serving as Chair, 2012-2014. Karen holds the W. T. Doherty-Welch Chair in Chemistry and is a University Distinguished Professor at Texas A&M University, where her research team is actively engaged in creative approaches to materials for nanomedicine applications, degradable polymers from natural resources, coatings for marine antifouling, advanced photoresist materials for the microelectronics industry, and other projects of fundamental and applied nature.

B. **Positions and Honors**

**Professional Positions:**

- 1993-1999 Assistant Professor, Department of Chemistry, Washington University, St. Louis, Missouri
- 1999-2009 Professor, Department of Chemistry, Washington University
- 2007-2009 Professor, Department of Radiology, School of Medicine, Washington University
- 2009- Professor, Department of Chemistry, Texas A&M University, College Station, TX
- 2009- Professor, Dept. of Chemical Engineering, Texas A&M University
- 2009- W. T. Doherty-Welch Chair in Chemistry, Texas A&M University
- 2011- University Distinguished Professor, Texas A&M University

**Honors (select, since 1994):**

- 1994-1999 National Science Foundation National Young Investigator Award
- 1996-1999 DuPont Young Professor Grant
- 1996-1999 Army Research Office Young Investigator Award
- 1998-2001 Office of Naval Research Young Investigator Award
- 2000-2003 Award Programs Advisory Committee Member, Research Corporation
- 2002 Arthur C. Cope Scholar Award in Organic Chemistry
- 2002-2004 National Science Foundation, Division of Materials Research, Special Creativity Extension
- 2002 Academy of Science of Saint Louis Innovation Award
- 2004-2006 Advisory Board for the National Nanotechnology Infrastructure Network (NNIN)
- 2004-present Advisory Board for the NIH Nanomedicine Development Centers
- 2005 Co-organizer, 2005 US-Japan Polymer Chemistry Forum
- 2005 U.S. Area Coordinator for Materials Science and Nanotechnology for Pacificchem 2005
- 2005 Distinguished Faculty Award, Washington University
- 2006-2009 James S. McDonnell Distinguished University Prof. of Arts & Sciences, Washington Univ.
- 2007 Chair, 2007, Polymers (East) Gordon Research Conference
- 2007 Outstanding Faculty Mentor Award, Washington University
- 2007-present International Scientific Advisory Board, Dutch Biomedical Materials Program
- 2008-2010 National Science Foundation American Competitiveness and Innovation (ACI) Fellow
- 2008-2010 National Science Foundation, Division of Materials Research, Special Creativity Extension
The objective of this work is the development of non-toxic polymer coatings that exhibit anti-fouling characteristics.

HHSN268201000046C (Co-PIs: Brody, Gropler, Wooley)
NIH/NHLBI Programs of Excellence in Nanotechnology
08/20/10 – 08/19/15, 3.0 calendar, $17,869,644 ($635,725/yr. DC to Wooley and Sacchettini at TAMU)
Integrated Nanosystems for Diagnosis and Therapy

Four projects and two Developmental Projects are supported by three Cores to develop degradable, organic polymer-based nanomaterials with controlled size, shape, composition and surface chemistry to achieve appropriate biodistribution and targeting, controlled surface ligand distribution to optimize molecular recognition of specific biomarkers, and controlled release of payload to provide therapeutic benefits in the imaging and treatment of lung and cardiovascular diseases.

R01-DK082546-01 (Hunstadt)
NIH
08/01/10 – 07/31/14, 0.30 calendar $1,903,773 ($55,656/yr. DC to Wooley)
Adhesive-based Nanotherapeutics in Urinary Tract Infection

This project evaluates the performance of polymer nanoparticles suitable for functionalization as nanoanteriorics for urinary tract infections.

DMR 0906815 (Pochan)
National Science Foundation
07/01/09 – 06/30/13, 0.12 calendar, $138,906 ($54,781/yr. DC to Wooley)
Charged Block Copolymer Assembly of Unique Nanoscale Objects

The goal of this project is to provide graduate students at the University of Delaware and Texas A&M University with multidisciplinary knowledge and expertise, acquired through the investigation of the fundamental phenomena that define charged, amphiphilic block copolymer co-assembly with multivalent, organic counterparts in solution.

10-0855 (Wooley)
The Dow Chemical Company

American Chemical Society Division of Polymer Chem., Herman F. Mark Scholar Award
2010 American Chemical Society, Polymer Chemistry Division, Founding POLY Fellow
2010-present NIH NANO study section member, chair (2012-2014)
2011 Texas A&M University Distinguished Professor

C. Selected Peer-reviewed Publications (5, selected from 2012)

D. Research Support
ACTIVE
N00014-10-1-0527 (Wooley)
ONR
02/01/10 – 01/31/13, 0.48 calendar, $482,530 (TC for project period)
The Development of Non-toxic Anti-fouling Coatings Based Upon Nanoscopic Surface Complexities

The objective of this work is the development of non-toxic polymer coatings that exhibit anti-fouling characteristics.

06/21/10 – 05/31/13, 0.12 calendar,$238,902 (TC for project period)
Negative Active EUV Photoreists with Controlled Molecular Architecture

The overall goal of this collaborative research work is to develop negative-tone photoreiszt polymer materials that are capable of enhanced performance in EUV photoreistor technologies.

CHE-1057441 (Wooley)
National Science Foundation
08/01/11 – 07/31/14, 0.36 calendar, $388,305 (TC for project period)
Degradable Polycarbonates from Polyhydroxy Natural Products

The intellectual merit of the proposed work will include the design of synthetic strategies for the development of polymer materials that originate from renewable resources, exhibit novel combinations of strength, toughness, and hydrolytic degradability, and undergo breakdown to biologically-beneficial or benign by-products.

DMR-1105304 (Wooley)
National Science Foundation
08/15/11 – 07/31/15, 0.36 calendar, $518,741 (TC for project period)
Complex Functional Materials Accessed Uniquely through Selective Covalent and Non-covalent Macromolecular Interactions

The proposed research involves the fundamental development of synthetic methodology for the preparation of complex nanostructured polymer materials, advanced characterization studies and investigation of practical applications.

PENDING
NIH (R21) (Leonard)
09/01/2012 – 08/30/2014
Overcoming Drug Resistance in High-grade Astrocytomas Using Complex Nanoparticles

E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

Number of Sections

<table>
<thead>
<tr>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
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<td>4 (2012)</td>
<td>0</td>
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<td>(1 high school student)</td>
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<tr>
<td>22</td>
<td>4</td>
<td>43</td>
<td>(3 high school students)</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>0</td>
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<td></td>
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<tr>
<td>0</td>
<td>6</td>
<td>18</td>
<td>6 (+6 audits)</td>
<td></td>
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F. Contributions in Classroom Education
Courses taught (1 Jan 2005 – present)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
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</thead>
<tbody>
<tr>
<td>Polymer Chem.</td>
<td>Chem 466</td>
<td>2</td>
<td>136</td>
</tr>
<tr>
<td>Special Topic: Nanomedicine</td>
<td>Chem 689</td>
<td>1</td>
<td>6 (+6 audits)</td>
</tr>
<tr>
<td>Org. Chem. Lab. I</td>
<td>Chem 257 (WU)</td>
<td>1</td>
<td>224</td>
</tr>
<tr>
<td>Org. Chem. Lab. II</td>
<td>Chem 356 (WU)</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Synthetic Pol. Chem.</td>
<td>Chem 452 (WU)</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>Matter &amp; Energy: K-8 hands-on outreach</td>
<td>Educ 6009 (WU)</td>
<td>1</td>
<td>16</td>
</tr>
</tbody>
</table>

Classroom innovations
- A K-8 hands-on science course was developed on the topics of matter and energy, and taught to K-8 teachers of the St. Louis area.
- A nanomedicine course was developed and taught via distance learning to students at Texas A&M University, Washington University in St. Louis, Emory University and the University of California at Santa Barbara.
G. Evidence of Scholarship
- 142 publications in refereed journals (1 Jan 2005 – present)
- 9 patents (1 Jan 2005 – present)
- 175 invited lectures (1 Jan 2005 – present)

ISI Citation Report

<table>
<thead>
<tr>
<th>Sum of the Times Cited</th>
<th>12463</th>
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<tbody>
<tr>
<td>Sum of Times Cited without self-citation</td>
<td>11142</td>
</tr>
<tr>
<td>Citing Articles</td>
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</tr>
<tr>
<td>Citing Articles without self-citation</td>
<td>6742</td>
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<td>Average Citations per Item</td>
<td>29.67</td>
</tr>
<tr>
<td>h-index</td>
<td>58</td>
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</table>

A. Personal Statement
Jiong Yang began his independent career at Texas A&M University in 2007. He has published ca. 35 peer-reviewed articles in top-ranked scientific journals, gave ca. 25 invited seminars, and hold numerous awards, including the National Science Foundation’s Career Award, Thieme Chemistry Journal Award, Ruth L. Kirschstein National Research Service Award, etc. He is interested in developing new synthetic methods and strategies for synthesis of bioactive compounds, with a long-term goal of bringing the power of modern synthetic organic chemistry to bear on problems in biology and medicine.

B. Positions and Honors
Professional Positions:
- 2007-current Assistant Professor, Department of Chemistry, Texas A&M University, College Station, TX
- 2005-2007 NIH Postdoctoral Research Fellow, Harvard University/Broad Institute of MIT and Harvard, Cambridge, MA
- 2003-2004 Postdoctoral Research Fellow, The Scripps Research Institute, La Jolla, CA

Honors:
- 2012-2017 National Science Foundation Career Award
- 2011 Thieme Chemistry Journal Awardee
- 2005-2003 NIH Eli Lilly graduate fellowship, The Ohio State University

C. Selected Peer-reviewed Publications (from 2008)
Xue, H.; Gopal, P.; Yang, J. "Transannular Michael reaction cascade: Stereoechemical studies and application in synthesis of the ABC ring system of zoanthamines" submitted.
Yang, J. "Recent development in nitrone chemistry: Some novel transformations", invited Synpacts review, Synlett, accepted.
Huang, J.; Yang, J. "Studies toward elucidating the stereochemical structure of iriomoteolide 1a" Synlett 2012, 23, 737-740.
D. Research Support

ACTIVE

PI, Robert A. Welch Foundation, A-1700, Development of new reagents for selective enolization of carbonyl compounds, 6/1/2011–5/31/2013, direct cost: $50,000 for year one, $60,000 for year two

PI, National Science Foundation (CAREER), CHE-1150606, Synthesis of zoanthamine alkaloids by cascade reactions, 8/15/12–7/31/17, total cost: $95,000/year for 5 years

E. Contributions in Research Training and Mentoring

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
<tbody>
<tr>
<td>Current group</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

F. Contributions in Classroom Education

Courses taught

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Org. Chem. II</td>
<td>Chem 228</td>
<td>1</td>
<td>16</td>
</tr>
</tbody>
</table>

Classroom innovations

- Experiments for undergraduate laboratory courses were designed to expose students to modern synthetic organic chemistry.

G. Evidence of Scholarship

- 35 publications in refereed journals
- 25 invited lectures
Sherry J Yennello is an international leader in the study of dynamics and thermodynamics of excited nuclear systems. Her research, supported by $5.5M in grants, has been presented in over 85 invited talks and published in 160 peer-reviewed articles in top-ranked scientific journals. She has received numerous competitive awards, including the National Science Foundation’s National Young Investigator Award, the American Chemical Society’s Francis P. Garvan-John M. Olin Medal and the Sigma Xi National Young Investigator Award. She is a fellow of the American Chemical Society and the American Physical Society. She has been named both a University Faculty Fellow and a Regents’ Professor. Additionally she has been recognized with the Texas A&M Association of Former Students Distinguished Achievement Award in Teaching at both the College-Level and University-Level, the Center for Teaching Excellence’s Montague Scholar Award and the Women’s Faculty Network Outstanding Mentor Award. In addition to her teaching, nuclear research, and administrative duties, Yennello currently serves as principal investigator for four major National Science Foundation grants totaling more than $5.5 million in funding to benefit STEM (science, technology, engineering, mathematics) education and outreach.

B. Positions and Honors

Professional Positions:

2002 – present  
Associate Professor - Texas A&M University

2003 – present  
Associate Dean for Faculty Affairs - College of Science Texas A&M University

2004 – 2008  
Program Director for nuclear physics—National Science Foundation

1998 – 2002  
Associate Professor - Texas A&M University

1993 – 1998  
Assistant Professor - Texas A&M University

1991 – 1992  
Research Associate - Michigan State University/NSCL

1987 –1990  
Graduate Research Assistant - Indiana University

1986 –1987  
Associate Instructor - Indiana University

1986  
Environmental Scientist - New York Power Authority, JAF Environmental Lab

1985 –1986  
Undergraduate Research Assistant - Rensselaer Polytechnic Institute

Honors:

1994  
NSF Young Investigator Award

1995  
TAMU Center for Teaching Excellence Scholar

2000  
Sigma Xi National Young Investigator Award

2000  
University Faculty Fellow

2002  
Women’s Spirit Month Award

2005  
Fellow, American Physical Society, elected

2007  
Regents Professor

2008  
Association of Former Students Distinguished Award for Teaching – College Level

2010  
ACS Francis P Garvan - John M Olin Medal

2010  
Outstanding Mentoring Award, Women’s Faculty Network

2011  
Fellow, American Chemical Society, elected

2012  
Association of Former Students Distinguished Award for Teaching – University Level

C. Selected Peer-reviewed Publications (5 from past year) (undergraduates in BOLD)


**Sensitivity of intermediate mass fragment flows to the symmetry energy.** Z. Kohley, M. Colonna, A. Bonasera, L. W. May, S. Wueneschel, M. Di Toro, S. Galanopoulos, K. Hagel, M. Mehiman, W. B. Smith, G.


**D. Research Support**

**CURRENT**

- **Title:** Investigating the equation-of-state for a two-component nuclear system
  - **Sponsor:** Robert A. Welch Foundation
  - **Amount:** $130,000; **Period:** 6/1/11- 5/31/13
  - **PI:** Yennello

- **Title:** Cyclotron based nuclear science
  - **Sponsor:** Department of Energy
  - **Amount:** $7,232,000; **Period:** 2008-2011
  - **PI:** Tribble; co-PI: Yennello

- **Title:** Determination of the Equation of State of Asymmetric Nuclear Matter
  - **Sponsor:** DOE
  - **Total Award Amount:** $ 236,476; **Period:** 2010-2013
  - **PI:** Yennello

- **Title:** REU Site: Nuclear and Particle Science at Texas A&M University
  - **Sponsor:** NSF
  - **Total Award Amount:** $662,137; **Period:** 2010-2015
  - **PI:** Yennello

- **Title:** ADVANCE: Promoting Success of Women Faculty through a Psychologically Healthy Workplace
  - **Sponsor:** NSF
  - **Total Award Amount:** $ 3,499,980; **Period:** 05/01/10 – 04/30/15
  - **PI:** Yennello

- **Title:** Expanding Opportunities through the Science Scholars Program (S-STEM)
  - **Sponsor:** NSF
  - **Amount:** $600,000; **Period:** 2008-2012
  - **PI:** Yennello

- **Title:** Professional Skills Development Workshops for Women in Physics
  - **Sponsor:** NSF
  - **Amount:** $297,000; **Period:** 2011-2013
  - **PI:** Yennello

- **Title:** Collaborative Research: Conference for Undergraduate Women in Physics
  - **Sponsor:** NSF
  - **Amount:** $8,000; **Period:** 11/1/2012-12/31/2012
  - **PI:** Yennello

**PENDING**

- **Title:** Texas A&M University Science Scholars Program
  - **Source of Support:** National Science Foundation
  - **Total Award Amount:** $613,367; **Period Covered:** 1/1/2013-12/31/2017
  - **PI:** Yennello

**E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)**

<table>
<thead>
<tr>
<th></th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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</thead>
<tbody>
<tr>
<td>Current group</td>
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<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Total</td>
<td>12</td>
<td>17</td>
<td>8</td>
<td>5</td>
<td>1</td>
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</table>

**F. Contributions in Classroom Education**

**Courses taught (1 Jan 2005 – present)**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Science for Citizens</td>
<td>CHEM106</td>
<td>3</td>
<td>approx 160</td>
</tr>
<tr>
<td>Kitchen Chemistry</td>
<td>UGST181</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>General Chemistry II</td>
<td>CHEM104</td>
<td>1</td>
<td>approx 20</td>
</tr>
<tr>
<td>Nuclear Chemistry</td>
<td>CHEM464</td>
<td>3</td>
<td>approx 60</td>
</tr>
</tbody>
</table>

**G. Evidence of Scholarship**

- invited lectures (1 Jan 2005 – present): 54
NAME
Renyi Zhang, Ph.D.

eRA COMMONS USER NAME: N/A

EDUCATION/TRAINING

INSTITUTION AND LOCATION
NAME
Nanjing Institute of Meteorology
University of Nevada-Reno
MIT

DEGREE
B.S.
M.S.
Ph.D.

MM/YY
1989
1993

FIELD OF STUDY
Atmospheric Sciences
Physics
Atmospheric Chemistry

A. Personal Statement

Renyi Zhang’s research focuses on atmospheric chemistry. Dr. Zhang has made major contributions in aerosol chemistry, aerosol-cloud-climate interaction, and photooxidation of hydrocarbons, and his work has provided critical insights into the impacts of human activities on the environment, weather, and climate. He has published 149 papers (three in Science, one in Nature Geoscience, five in PNAS, five in Journal of the American Chemical Society, and one in Chemical reviews) with more than 4300 citations and an h-index of 41. His research made numerous national and international headlines. He serves as director of Center for Atmospheric Chemistry and Environment at TAMU, chairs American Meteorological Society’s Atmospheric Chemistry Committee, and is editor of Journal of Geophysical Research – Atmospheres and a member of International Commission on Atmospheric Chemistry and Global Pollution. He has supervised 16 Ph.D. dissertations and 9 M.S. theses and received external funding over $8 millions. His awards include honorary Professorships at Fudan University and Peking University, Outstanding International Collaboration Researcher Award by China National Science Foundation, Bush Excellence Award for Faculty in International Research at TAMU, Cheung-Kong Distinguished Scholar Award by Ministry of Education – China, distinguished achievement award for faculty research – College of Geosciences, Fellow of American Geophysical Union, and University-Level Distinguished Achievement Award – Research at TAMU.

B. Positions and Honors

Professional Positions:
2011 – present Chair, Committee on Atmospheric Chemistry, American Meteorological Society
2010 – present Member, International Commission on Atmospheric Chemistry and Global Pollution
2009 – present Editor, Journal of Geophysical Research – Atmospheres
2009 – present Chang-Jiang Professorship, Peking University
2007 – present Director, Center for Atmospheric Chemistry and Environment, Texas A&M University
2007 – present Professor, Department of Chemistry, Texas A&M University
2006 – present Adjunct Professor, Nanjing University of Information Science and Technology, China
2005 – present Professor, Department of Atmospheric Sciences, Texas A&M University
2002 – 2005 Associate Professor, Department of Atmospheric Sciences, Texas A&M University
1997 – 2002 Assistant Professor, Department of Atmospheric Sciences, Texas A&M University
1996 – 1997 Research Associate, Department of Chemistry and Department of Earth, Atmospheric, and Planetary Sciences, MIT
1993 – 1996 Post Doctoral Research Associate, Chemical Kinetics and Photochemistry Group, NASA Jet Propulsion Laboratory, California Institute of Technology

Honors:
2012 University-Level Distinguished Achievement Awards – Research, Texas A&M University and The Association of Former Students
2012 Fellow, American Geophysical Union,
2010 Holder of Harold J. Haynes Endowed Chair in Geosciences, Texas A&M University
2009 Cheung-Kong Distinguished Scholar Award, Ministry of Education - China
2009 Bush Excellence Award for Faculty in International Research, Texas A&M University
2007 Outstanding International Research Collaboration Award, China National Science Foundation
2007 Honorary Professorship, Fudan University, China
2002 Distinguished Achievement Award for Faculty Research, College of Geosciences, Texas A&M University
1999 NASA New Investigator Award

C. Selected Peer-reviewed Publications


D. Research Support

ACTIVE
2013 AMS Robert A. Duce Symposium, $10,000, 10/1/2012 – 5/31/2013, National Science Foundation (NSF), PI, Implementation of particle size magnification for analysis of sub-4 nm nanoparticles, $22,271, 7/1/2012 – 7/15/2013, Texas Air Research Center (TARC), co-PI with Alexei Khalizov
Analysis of Particulate Matter Chemistry, $150,000, 10/2012 – 12/2013, Texas Environmental Research Consortium/Houston Advanced Research Center, PI
Aerosol Growth and Chemical Compositions from Heterogeneous Processing of Organic Compounds, $597,358, National Science Foundation (NSF), 1/10 – 12/13, PI
Generation, Characterization, and Atmospheric Aging of Soot Particles from Diesel Combustion, $330,000, National Science Foundation (NSF), 9/2009 – 8/2013, PI
Investigation of Cloud and Precipitation Processes Using WRF with A Two-Moment Microphysics: Contribution to the DOE Climate Change Prediction Program (CCPP) project, $100,000, Brookhaven National Laboratory (BNL) Department of Energy (DOE), 9/09 – 8/2013, PI
Investigation of the Effects of the Asian Pollution Outflow on Winter Storms over the North Pacific, $90,000, NASA, 8/2009 – 12/2012, PI
E. Contributions in Research Training and Mentoring (1 Jan 2005 – present)

<table>
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<tr>
<th>Grad. Students</th>
<th>Undergrad. Students</th>
<th>Research Associates</th>
<th>Ph.D.’s Awarded</th>
<th>M.S.’s Awarded</th>
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<td>Current group</td>
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<tr>
<td>Total</td>
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<td>11</td>
<td>6</td>
<td>5</td>
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F. Contributions in Classroom Education

Courses taught (1 Jan 2005 – present)

- Atmospheric Chemistry
- Advanced Atmospheric Chemistry
- Thermodynamics and Atmospheric Physics
- Atmospheric Sciences Seminars
- Introduction to Atmospheric Chemistry

G. Evidence of Scholarship

- 149 publications in refereed journals (ResearcherID: A-2942-2011). Dr. Zhang has published 149 refereed journal papers, including 96 papers as the senior author (i.e., first or corresponding author) and 93 papers with his past/current graduate students as co-authors. His publications have received over 4300 literature citations with an h-index of 41 (from Web of Science).
- 1 patent (1 Jan 2005 – present)
- 49 invited lectures and chaired 3 conferences (1 Jan 2005 – present)

NAME

Hongcai J"oe" Zhou, Ph.D.

EDUCATION/TRAINING

INSTITUTION AND LOCATION | DEGREE | MM/YY | FIELD OF STUDY
--- | --- | --- | ---
Beijing Normal University, Beijing | B.S. | 1984 | Chemistry
Texas A&M University | Ph.D. | 2000 | Inorganic Chemistry

A. Personal Statement

Hong-Cai "Joe" Zhou (http://www.chem.tamu.edu/rgroup/zhou/) obtained his Ph.D. in 2000 from Texas A&M University under the supervision of F. A. Cotton. After a postdoctoral stint at Harvard University with R. H. Holm, he joined the faculty of Miami University, Oxford in 2002. He rose to the rank of full professor within six years and moved to Texas A&M University in 2008. His awards include a Research Innovation Award from Research Corporation in 2003, an NSF CAREER Award in 2005, a Cottrell Scholar Award from Research Corporation in 2005, the 2006 Miami University Distinguished Scholar - Young Investigator Award, the 2007 Faculty Excellence Award from Air Products and Chemicals, as well as the 2010 DOE Hydrogen Program Special Recognition Award as a main contributor to the Hydrogen Sorption Center of Excellence. He also spearheaded the ARISE (Advanced Research Initiative for Sustainable Energy) in Texas A&M, two ARPA-E projects and an EFRC program in the U. S. DOE. Since 2003, he has obtained more than nine million dollars externally for his research. Since 2000, he has published over 100 peer-reviewed papers with more than 6,600 citations. In 2012, he served as a guest editor for the first Chem. Rev. thematic issue in Metal-Organic Frameworks. Research in his group focuses on the discovery of new synthetic techniques to access metal-organic frameworks that can perform unique chemical transformations and exhibit desired properties for clean-energy-related applications.

B. Positions and Honors

Professional Positions:

- 1996-2000. Research Assistant, Dept. of Chem. Texas A&M University, College Station, TX
- 1994-1996. Lecturer, Dept. of Chem. Beijing Normal University, Beijing, P. R. China

Honors

- 2007 Air Products Faculty Excellence Award
- 2006 Miami University Distinguished Scholar-Young Investigator Award
- 2005 Research Corporation Cottrell Scholar Award
- 2005-2009 NSF CAREER Award
- 2003 Research Corporation Research Innovation Award

C. Selected Peer-reviewed Publications (5, selected from 2012, **undergraduate researcher**)

D. Research Support

ACTIVE

PENDING
- NSF SBIR (50,000, 2012-2014)

E. Contributions in Research Training and Mentoring (1 August 2008 – present)

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<tr>
<th>Current group</th>
<th>Graduate Students</th>
<th>Undergraduate Students</th>
<th>Research Associates</th>
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F. Contributions in Classroom Education

Courses taught (1 August 2008 – present)

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<thead>
<tr>
<th>Course Name</th>
<th>Course Number</th>
<th>Number of Sections</th>
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<tbody>
<tr>
<td>Frontiers in Chem Research</td>
<td>CHEM 695</td>
<td>4</td>
<td>239 – total</td>
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<tr>
<td>Descript. Inorg. Chemistry</td>
<td>CHEM 362</td>
<td>3</td>
<td>101 – total</td>
</tr>
<tr>
<td>Literature Seminar</td>
<td>CHEM 681</td>
<td>4</td>
<td>131 – total</td>
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Classroom innovations
- Revamped the Advanced Inorganic Chemistry Lab by the addition of the latest advancement in technology. For example, the robotic synthetic reaction platform was added to the course.
- Lab techniques such as vacuum pump repair and NaK solvent still preparation and maintenance were also added to the lab.
- Two versions of Descriptive Inorganic Chemistry, one with emphasis on elemental chemistry and the other focusing on principles of inorganic chemistry, have been developed and taught.

G. Evidence of Scholarship

- 108 publications in refereed journals
- 3 patents (1 Aug 2008 – present)
- 70 invited lectures (1 Aug 2008 – present)

ISI Citation Report

<table>
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