

Strategic Plan

Department of Chemistry
University of North Texas

May 10, 2005

Executive Summary

This document is the outline of a strategic plan for the Department of Chemistry at the University of North Texas for the next five years, 2005-2010. The major goals of the Department of Chemistry over the next five years are (1) to raise the research image of the Department within the national and international science communities, (2) to expand the amount of externally funded research conducted within the Department, (3) to increase the number of undergraduate chemistry majors within the Department, and (4) to change the department's image locally so that it is the first choice for chemistry education for students at multiple levels (undergraduate, graduate, and returning students) within the Dallas-Fort Worth metroplex.

To achieve these goals, the Department will need to correct severe deficiencies in departmental instrumentation, will need to increase the quantity and quality of graduate students, will need to identify and nurture programs that differentiate the Department from its competition (most notably computational chemistry, materials/catalysis research, chemistry education), will need to create or modify selected academic programs (*e.g.* forensics chemistry), will need to integrate these new research and academic programs into the Department rather than allowing them to develop as loosely affiliated separate entities, and will need to increase extramural funding from multiple sources.

This strategic plan includes a number of specific actions to meet these goals. Although it is expected that the Department's resources will be targeted strategically on these actions, it is impossible to anticipate every new opportunity or challenge. Nor is it possible to list every possible action that would contribute to the goals. Therefore, the document was written with the assumption that the goals, challenges, and opportunities collectively provide the guiding principles for decisions on future actions, whether the actions are listed or not. This strategic plan should be viewed as a guide for decisions and actions over the next five years, but subject to constant review and updates. Finally, this document is not inclusive of all activities within the Department. The Department will continue to carry out a large number of other activities to meet the educational needs of both chemistry majors and the many other students that take chemistry courses.

Chemistry Department Mission Statement

The mission of the Chemistry Department is to provide quality education in science and the scientific method to both undergraduate and graduate students using chemistry as the medium and to expand scientific knowledge through the diverse research activities of its faculty, research associates, and students in fundamental, applied and interdisciplinary areas of the chemical sciences.

A significant aspect of this mission is the training of the future chemists and materials scientists in the graduate program. This training is accomplished through high quality research programs that produce new knowledge and understanding of basic and applied areas of chemistry.

The department strives to increase scientific literacy in the general populace through its service courses and service activities.

The products of these activities, namely informed citizens, scientists, and knowledge, benefit the north Texas region, the State, and the Nation.

Five-Year Vision for the Department of Chemistry

The vision for the Chemistry Department in five years is a department that continues to provide quality educational experiences for students at all academic levels and continues to value quality instruction, but is a department with a greater research image nationally and internationally than at present. Within the north Texas area, the Department will meet the needs of a broad range of student populations and be viewed as the first choice for chemistry among students at all levels (undergraduate, graduate, and returning professionals). By that time, several areas within the Department will have gained a significant national and international reputation for research excellence.

The vision for graduate education for the UNT Department of Chemistry is to improve the quality of graduate education and graduate research so as to bring each of the five sub-disciplines of chemistry within the department (analytical, inorganic, organic, physical chemistry, and chemistry education) to a critical mass of graduate students, to a critical mass of research groups and to a minimum coverage of departmental research equipment to meet basic educational and research needs. Different modes of instructional delivery or courses offered at different times will be available to meet the needs of various student populations. In addition to bringing all of these areas to at least a minimum level, emerging areas of chemistry that cut across the sub-disciplines and are targeted areas of emphasis, such as computational chemistry and materials chemistry/catalysis, will have progressed such as to have each achieved an international reputation for excellence and be competing with the top established programs for graduate students, faculty, and grantsmanship.

The vision for the undergraduate program is to increase the number of undergraduate chemistry majors at all grade levels within five years so as to assure at least minimum required enrollment for all required courses and to enable a broader range of elective options for chemistry majors. Within five years, additional special concentration options for undergraduates (including forensic chemistry and chemistry education) will be in place, will be accredited and will have sufficient enrollment to ensure the long term viability of each of these programs.

Introduction to Strategic Plan

Brief History The Department of Chemistry was one of the original three science departments at UNT, along with Biology and Physics, and will celebrate its centennial year in 2010. It is one of the long-standing core departments within the College of Arts and Sciences. It has long provided science classes for students from a variety of majors as well as for students majoring in chemistry. It was among the early departments in the university to offer the doctoral degree and its first PhD recipient was the first to receive such a degree at UNT. More recently, the department has broadened its educational offerings. It is among the few departments nationally to offer three linked degrees in chemistry education, including a newly accredited bachelor's degree with concentration in chemistry education. It is the first department in the College of Arts and Sciences to offer a Masters Program completely online.

The history and culture of the department is probably best characterized by four things:

- (1) The Department of Chemistry values teaching. The department continues to be known for the friendliness and openness of its faculty to students. Returning alumni typically speak warmly of their relationship with faculty members. Current graduating students almost universally point to the accessibility of the faculty as a strength of the department during exit interviews.
- (2) Much of the Department's activities center around externally funded research. The Department of Chemistry was the first department on campus to conduct externally funded research. This has evolved into a department where most faculty maintain active research programs and many faculty are well-known and highly respected nationally and internationally. Research expertise has tended to be from groups of faculty working in related but complementary areas. Most recent research strengths have focused on materials chemistry/surface science and computational chemistry.
- (3) The UNT Department of Chemistry has been and continues to be an incubator for successful programs. Biochemistry faculty originally hired in Chemistry eventually formed what is now the biochemistry group in the Department of Biological Sciences and the Biochemistry Department at the UNT Health Science Center Fort Worth. Applied analytical chemistry faculty formed the Institute of Applied Sciences. Multiple chemistry faculty with interest in materials chemistry joined with faculty from Physics to form the Department of Materials Science. This tradition continues with relatively new programs in computational chemistry and chemistry education, although the goal now is to retain these and other emerging programs within the Department.
- (4) The faculty in the UNT Department of Chemistry are increasingly focused on interdisciplinary research and interdisciplinary educational activities. Chemistry as a discipline is often referred to as the *central science*, with natural links to many other disciplines. Consequently, chemistry faculty have naturally pursued a variety of joint ventures with faculty from many colleges and departments. These include joint proposals, joint research projects or sharing of major research equipment, joint degree programs and educational initiatives, and even joint direction of graduate students. The new emerging areas of forensics science (with Biological Sciences and Criminal Justice) and catalysis (with Materials Science, Physics, and possibly Biology) continue this trend.

Current Snapshot of the Department. The Department of Chemistry at the University of North Texas offers degrees at the bachelors, masters, and doctoral levels. The Department currently consists of 18 tenured or tenure-track faculty, one associated faculty member, 1.5 continuing lecturers, and one research professor. Of the 18 tenured or tenure-track faculty, 15 maintain active research programs. Thirteen of those research programs are supported by external funding.

The Department is currently spread over three buildings (Masters Hall, Science Research Building, and the Chemistry Building), but will soon move most of the research labs and all of the teaching and administrative functions into a new 105,000 square foot chemistry building that is currently under construction.

The Department has approximately 100 declared undergraduate chemistry majors. The Department offers the traditional sequence of undergraduate chemistry courses with relatively few undergraduate electives. The majority of students in the freshmen and sophomore level courses are majors in other departments (primarily Biology) or in the TAMS program. The American Chemical Society accredited B.S. in Chemistry degree is designed primarily for students planning to attend graduate school or preparing for work as a professional chemist. Three tracks are available for the B.A. in Chemistry, including preparation for graduate studies in chemistry, preparation for medical school and allied health fields, or preparation for an industrial chemistry position. The ACS recently approved the Department's new bachelors degree with a concentration in chemistry education. A new B.S. degree with certification in forensic science was recently added. The Department has begun enrolling students in the forensics program to begin next fall.

There are currently about 95 graduate students in the Department pursuing degrees in traditional chemical disciplines and emerging cross- and inter-disciplinary fields. This total includes full and part-time students, masters and doctoral students. Approximately 60% of the total are U.S. citizens. Foreign students come primarily from India and China, although the number from China has dropped significantly in the past several years. A wide variety of other regions are represented among the international students, including Mexico and eastern Europe.

The Department offers a research-based Masters degree (requiring thesis) with emphasis in any of the four traditional areas of chemistry (analytical, inorganic, organic, and physical chemistry). The Department also offers a non-thesis Masters Degrees with specialization in Industrial Chemistry and three different Masters Degree options with specialization in Chemistry Education. The degrees in Industrial Chemistry and in Chemistry Education are available completely online.

Students may pursue doctoral work in any of five areas (analytical, inorganic, organic, physical chemistry, and chemistry education). A special strength of the department is the ability for students to pursue research projects that are multi-disciplinary in nature, depending upon the research project and the research advisor. Current particular research strengths include materials chemistry/surface science and computational chemistry.

Planning Process

This strategic plan was compiled by the Department Chair from a variety of sources that already existed within the Department and from conversations with the chairs of the standing committees within the Department. Feedback was first sought from the standing committee chairs, which was incorporated into the document. The document was then circulated to the entire faculty for consideration and further comment. The final document was discussed and approved as amended at a departmental faculty meeting on May 2, 2005.

Challenges, Opportunities, Weaknesses, Strengths

Weakness: Departmental chemical instrumentation does not meet minimum standards for educational or research needs. The Department of Chemistry's research instrumentation is woefully lacking in multiple areas. Even where instrumentation exists, the equipment is often severely outdated. This was mentioned specifically in the report of the American Chemical Society on accreditation of the Department's ACS accredited BS Degree. It is a severe problem for ongoing research of existing researchers in the Department, as well as for the laboratory training of advanced majors. It is also a severe impediment to hiring appropriate new faculty, either at the junior or senior levels.

Weakness: Research image of the Department as a whole. The research of many individual faculty members is widely known and highly respected. Unfortunately, the research image of the Department, at least among the average chemist or the average prospective chemistry graduate student, is not nearly as great as that of many of these individual faculty members. This seems to be more a matter of ignorance ("Do you have a doctoral program?") than a low opinion of existing programs. However, existing weaknesses in the program are real (e.g. a very small organic research program). These deficiencies contribute to the problem. The image problem has a negative impact in multiple ways, from recruiting students to hiring faculty.

Weakness: Deficiencies in the undergraduate curriculum. The recent accreditation report of the B.S. degree by the American Chemical Society noted several deficiencies in the undergraduate curriculum. There are relatively few upper level electives for students. The number of laboratory contact hours is unusually low and only meets accreditation standards if research hours are included. Much of the instrumentation being used by the students is woefully out of date. A major contributing factor to the number of courses offered is the small number of majors taking advanced courses.

Challenge: Identification and development of programs in demand by undergraduate majors. The Chemistry Department has had many highly qualified undergraduate majors in recent years. Many have performed exceedingly well at UNT, have won multiple national awards, and have done well in graduate school, medical school, or in industrial positions. However, the number of undergraduate majors was so low several years ago that there were not enough students in some required courses for those classes to be offered without being granted an exception for the small class size. At least one of those years, the Department of Chemistry had the fewest number of graduating undergraduates of any department in the university that granted undergraduate degrees. Declining undergraduate majors is not atypical for many chemistry departments nationwide. UNT's Chemistry Department has the additional problem of not being able to take advantage of having majors in one of the currently most popular areas in chemistry, biochemistry. The challenge is to find students interested in the current undergraduate programs or to develop new programs that better fit the desires of current students.

Challenge: New challenges in local competition for graduate students. UT Dallas and UT Arlington both recently changed their Doctor of Science degrees in Chemistry to regular PhD degrees. In addition, Southern Methodist University recently added a new PhD program in Chemistry. UNT is now one of five departments in the DFW area (UT Dallas, UT Arlington, SMU, TCU, and UNT) to offer a PhD in Chemistry. There is more graduate chemistry education capacity

than is needed in this relatively small area. Moreover, UNT is at a disadvantage geographically compared to the other schools for many local students, due to the commute to Denton.

Challenge: Increasingly intense competition for international graduate students. The Chemistry Department has depended heavily in recent years on obtaining graduate students from China, India, and other Asian countries. Although the number of Asian students seeking science and engineering degrees is predicted to increase due to the growing Asian job market, almost all projections agree that the number of such students earning their degrees in the U.S. will decrease dramatically as educational opportunities expand and schools become accredited within Asia. This drop off in students from Asia has been accelerated by actions since September 11. Real and perceived difficulties in obtaining student visas has decreased the number of Asian students taking the GRE and applying for graduate study in the United States, while the number of Asian students studying in Europe has gone up dramatically. Although there is hope that some of the short-term problems with visa problems are being addressed, the overall problem is not likely to disappear quickly. It is still likely that there will be a long-term trend away from Asian students studying in the U.S. The competition for the remaining students will be more intense.

Challenge: Non-competitive teaching assistant salaries and benefits. Among all graduate students, domestic and international, the Department remains at a disadvantage due to the size of its graduate stipend, and other endemic issues like the lack of a tuition waiver - both in-state and out-of-state portions - which is a staple at most graduate programs in the nation. While the stipend is competitive with that of smaller departments in the region (those typically with an NRC ranking of 3rd quartile), it does not permit the UNT Chemistry Department to compete with chemistry departments in the flagship institutions in Texas (UT Austin and Texas A&M) or major institutions in other regions of the country with chemistry departments with NRC rankings in the 1st or 2nd quartile. Those are the institutions with which the Department can and must compete for students if they are to achieve the national and international reputation commensurate with the quality of the research.

Challenge: Maintaining and increasing the quality of instruction. The Department has a long history of valuing quality instruction. Quality instruction is expected of all Departmental faculty. However, with so much emphasis on funded research projected for the future, it will be all too easy for quality instruction and quality instructors to become less valued. A major challenge for the Department is to maintain and increase the quality of instruction in the Department, while expanding the role of research.

Challenge: Replacement of retiring faculty. There will be at least four faculty members reaching retirement age within the next five years. Only one of their replacements has not been included specifically in this plan, since it is not clear if the others will retire within the five-year window. Whenever they retire, the challenge will be to find replacement faculty that meet both the interdisciplinary research goals of the Department and divisional teaching needs. These retirements also will put a strain on the quantity of teaching, since most of the retiring faculty are carrying heavier teaching loads than their anticipated replacements. Finally, the large number of new faculty hires will present challenges in finding appropriate resources, primarily start-up funds and space.

Opportunity: Faculty retirements. Although the replacement of retiring faculty present significant challenges, they also provide opportunities to increase the number of research-active faculty in the department and to rebuild each sub-discipline of the department to at least a minimal critical mass of research groups and graduate students. Most of those hires were not specifically included in this strategic plan due to the uncertainty of the timing of the retirements. However, the areas of research of the replacement faculty should be such as to meet the goal of rebuilding the sub-disciplines while simultaneously meeting the interdisciplinary research goals of the department.

Opportunity: Opportunity for senior hires to improve research image of department and expand research capabilities. Anecdotal evidence suggests that the research image of the Department has already improved significantly with the recent addition of the new Welch Chair in Chemistry. There is an opportunity for significant and rapid further enhancement, with the senior hires approved as part of the cluster hires in catalysis and forensics.

Opportunity: Opportunities for UNT Chemistry to differentiate itself from other departments regionally and nationally. UNT's chemistry program is older, more established, and (with recent and expected new hires) is again larger than other programs in the north Texas region. UNT is no longer at a disadvantage compared to the Doctor of Science degrees and the implied "guaranteed job" in industry at the end of the degree. These provide some new opportunities locally for the Department. UNT's greatest opportunity both locally and nationally is to differentiate itself from other programs based on its special strengths and special programs, such as computational chemistry, materials science/surface science, and chemistry education, as well as with new concentrations and new programs, such as catalysis and forensics.

Opportunity: Chemistry education program positioned to meet new demands for teacher education. As with most locations within the U.S., there is a shortage of qualified science teachers in grades K-12 in Texas. That includes qualified chemistry teachers. The situation will soon be much worse because of a change in required courses at the secondary level. Many more students will be required to take chemistry, meaning an even greater need for chemistry teachers. This is an opportunity for the Chemistry Department. UNT Chemistry is one of the few chemistry departments with multiple possible degrees (bachelors, masters, and Ph.D.) for students interested in chemistry education. The Masters in Chemistry Education is also available totally online. These degree programs should fill a special niche in the north Texas area and the region in general. Not only should it serve to create more qualified chemistry teachers, but these teachers, having been educated at UNT, will likely send more of their students to UNT.

Opportunity: Potential for UNT's computational chemistry group to become a national center of excellence. Currently seven faculty in the Department, including a new Welch Chair, use computational chemistry either exclusively or in conjunction with experimental research to address a broad range of important chemical problems. The computational chemistry group at UNT is the most comprehensive group of computational chemists at any university within the southwest U.S. They are already doing very significant research and making a name for themselves nationally and internationally. The UNT computational chemistry program has grown tremendously in the last five years and, with judicious investment of resources, has the potential to become a major national center of excellence for computational chemistry education and research in the next five years, bringing national prominence to the Department.

Opportunity: Potential for forensic chemistry to further differentiate the department from other schools and to increase undergraduate enrollment. Forensic chemistry has grown in stature and attracted more interest, particularly from undergraduate majors. Additional emphasis on homeland security and related issues also provides opportunities for research and major federal research funding. Very few schools maintain a focus in this area. In a manner similar to computational chemistry or chemical education, forensic chemistry represents an area whereby the Department can differentiate itself from the competition and build national prominence, while filling already demonstrated needs within the traditional areas of analytical and organic chemistry within the department.

Additional recent developments have made the development of a forensics program at UNT even more attractive. With the guidance of a forensics science advisory committee, the university has begun efforts to establish an undergraduate forensic science program. This would include degrees in either Chemistry or Biology. There is significant demand for such a program among students, but a lack of such programs in the region. Such a program would take advantage of the university's already nationally recognized work in forensic anthropology and would be in collaboration with the Departments of Chemistry, Biology, and Criminal Justice. It would have an especially strong emphasis on the sciences compared to many other programs in the country. Such a program would help with recruiting of undergraduate majors. Chemistry faculty hired to fill positions in forensic chemistry would direct graduate students seeking existing graduate degrees within the department. The addition of such faculty would potentially fill the need for research in separations science in the analytical division and would mesh well with the backgrounds and interests of several of the existing analytical chemistry faculty. There is also a strong possibility for collaborations between such a program and a possible new Denton County medical examiner's office. The unusual combination of multiple positive aspects of this position has the potential for making this position particularly attractive for the proposed new hires in this area.

Opportunity: Potential to build on existing departmental strengths to develop center of excellence in catalysis. Industry estimates place the importance of catalysis to the U.S. economy in the trillions of dollars, approaching one-fifth to one-quarter of the GDP. This fact, combined with the large chemical industry presence in Texas, is a tremendous incentive locally and nationally to pursue issues related to catalysis. The need for less energy-intensive processes, made possible by improved catalysts, will only increase as energy costs increase. UNT Chemistry is particularly well positioned to build a center of excellence in catalysis research. The Department already has a significant core of very active research groups in various areas of materials chemistry and surface science. Moreover, there is considerable ongoing collaboration with faculty in Materials Science and Physics and potential for considerably more such interactions. Strategic hires and targeted acquisitions of key pieces of instrumentation provide considerable potential for developing a center of excellence with a national reputation in catalysis research.

Opportunity/Strength: New Chemistry Building. The new 105,000 square foot chemistry building will be a major asset to the Department and will help alleviate many of the short-term quality of space problems. New capabilities within the building will significantly aid both research and teaching functions. The larger lecture halls and larger teaching labs should help with enrollment growth, particularly at the lower levels. The new building should also indirectly help in recruiting students and faculty. There are also multiple potential fund-raising activities that can focus on the new building and some of its features, such as the Major Donor Wall and the Donor Periodic Table.

Opportunity/Strength: Loyal alumni base. Although small in size, the Department's alumni base is loyal to the Department and often eager to help in multiple ways. Activities over the last decade to reach out to the alumni have helped to reconnect many of them to the Department. Opportunities for such connections are enhanced by the fact that a significant number of alumni live within the north Texas region. Alumni assist the Department in many different ways (talks to REU summer students, assistance with placement of students for temporary or permanent employment, donation of used equipment, service on various types of advisory committees, assistance with fund-raising, etc.). The potential of this body of individuals remains largely unrealized and represents a significant opportunity for further development.

Opportunity: Upcoming centennial of the Department. The Department will be 100 years old in 2010. Coupled with the loyal alumni base and naming opportunities in the new building, this should provide the opportunity for a major capital fund-raising campaign for the Department.

Goals and Action Items

Note: Neither the goals nor the action items are in priority order.

Academic Goal 1 Increase the Regional, National, and International Research Stature of the Department, Including an Increase in Externally Funded Research

This goal is central to the Department's development. It also goes to the heart of much of UNT's Academic Plan. In particular, this goal targets resources to key graduate programs [1.1, 1.2, 1.3], fosters "partnerships with surrounding communities" through the chemistry education program [1.4] and the forensic science program [1.3], "targets resources toward increasing the amount of federal dollars that support research at UNT" [all action items for goal 1], and takes specific action to "advance and support the research capacity of... tenure and tenure-track faculty" [1.5, 1.6]¹

Action Item 1.1 Build the computational chemistry program to national prominence

- 1.1a Create a Center for Computational Chemistry with support for computational chemistry faculty, including a part-time secretary
- 1.1b Seek funding to maintain and operate the center
- 1.1c Create an endowed lectureship in Computational Chemistry
- 1.1d Create and equip a departmental Computational Chemistry Instructional Teaching Lab (CCIL)
- 1.1e Create a graduate fellowship in computational chemistry
- 1.1f As part of the catalysis cluster of hires in the department (see 1.2 below), hire a computational chemist with expertise in materials, surface sciences, catalysis

Action Item 1.2 Assemble multiple research faculty doing catalysis-related research

- 1.2a Hire a senior organic/catalysis chemist (targeted to begin Fall 2005 or Spring 2006)
- 1.2b Hire a senior catalysis chemist (targeted to begin Fall 2006) – Area of research is open, but the research area should be related to or complement catalysis at surfaces.
- 1.2c Hire a junior catalysis chemist (targeted to begin Fall 2006) – Area of research is open, but must mesh with the other catalysis hires and existing faculty.
- 1.2d Take advantage of mutual interests in catalysis-related research to submit joint research proposals, to pursue joint projects, and to assemble shared research capabilities with the Department of Materials Science and Engineering

Action Item 1.3 Assemble multiple research faculty doing research in forensics chemistry and, in cooperation with the Departments of Biological Sciences and Criminal Justice, establish a forensic chemistry program

- 1.3a Implement the forensic science degree as recommended by the university's forensic chemistry advisory committee
- 1.3b Hire an analytical/forensic chemist (targeted to start Fall, 2005, or Spring, 2006)
- 1.3c Hire a medicinal or pharmaceutical/forensic chemist conducting research suitable for the Department's organic division (targeted to start Fall, 2006)

Action Item 1.4 Raise the regional and national reputation of the chemistry education program

- 1.4a Host the Association of Chemistry Teachers in Texas (ACT2) biennial meeting in 2005
- 1.4b Host a Flinn Foundation Workshop in 2005
- 1.4c Host ChemEd07, the international meeting of chemistry educators, in 2007

Action Item 1.5 Rearrange staff responsibilities within the department to provide additional support, both pre- and post-award, for externally funded research faculty

- 1.5a Add a part-time payroll clerk to assume some of the responsibilities of the current administrative assistant in charge of payroll
- 1.5b With the time available from the shift in payroll responsibilities to the part-time payroll clerk, expand and upgrade the administrative assistant's role to provide more support for externally funded research faculty

Action Item 1.6 Provide additional support for faculty seeking to expand their research programs and to write major research proposals

- 1.6a Write reduced teaching loads for one semester into contracts for new junior faculty and possibly new senior faculty
- 1.6b Provide funds on a competitive basis for an adjunct to allow existing faculty working on major research proposals to have a reduced teaching load for a semester
- 1.6c Provide additional travel funds and other resources for faculty writing multi-institution proposals
- 1.6d Actively encourage faculty to pursue Faculty Development Leaves

Academic Goal 2 Upgrade Departmental Instrumentation

This goal is a necessary step both to improve the educational experiences for students and to advance funded research. In the short-term, achieving this goal is the most critical of all of those included in this strategic plan. The lack of key pieces of instrumentation or the poor condition of existing instrumentation is a major impediment to current researchers, is hindering the hiring of new researchers, and is threatening the ability of the Department to maintain accreditation of its undergraduate program.

This goal fits into the UNT Academic Plan. It will enhance research that will increase “the amount of federal dollars that support research at UNT” both through the grants for instrumentation [2.2] and for the research that the improved instrumentation will make possible [all action items].

Action Item 2.1 Regularly review and prioritize instrument needs within the department.

Action Item 2.2 Regularly submit proposals to external funding agencies such as NSF for large equipment purchases, consistent with the instrument committee’s priority of needs.

Action Item 2.3 Seek funds from other sources, such as private foundations, for classroom instrumentation or equipment needed for selected programs of interest to potential donors.

Action Item 2.4 Provide university space for instrument manufacturer’s demonstration labs.

Action Item 2.5 Work with UNT administrators to find additional sources of funds.

Action Item 2.6 Add part-time (graduate student) and full-time staff to operate and maintain departmental instrumentation.

Academic Goal 3 Increase the quality of chemistry graduate students

A necessary component to increasing the research stature of the Department and the amount of funded research is to increase the quality the graduate students.

Action Item 3.1 Increase TA salaries, benefits, and/or provide tuition reimbursement for graduate students to remain competitive with other chemistry graduate programs in the region. The Department's inability to provide tuition reimbursements while other competing schools provide such reimbursements is the biggest hurdle to recruiting and retaining quality graduate students.

Action Item 3.2 More prominently publicize current departmental first year graduate student scholarships or otherwise reconstitute these departmental graduate scholarships to better serve the students and the department

Action Item 3.3 Apply for renewal of NSF-REU program

Action Item 3.4 Expand and improve recruiting materials, including more online and multi-media options, and specialized materials for each of multiple selected programs within the department

Action Item 3.5 Update departmental webpage

Academic Goal 4 Increase the number of chemistry graduate students

The only ways to increase the number of chemistry graduate students are to find additional sources of funds to support more full time graduate students, usually as teaching assistants or research assistants, or to increase the number of part-time students that do not require additional support. Most of the action items are ways of increasing the number of students by increasing the amount of funding.

Action Item 4.1 Return to a full complement of teaching assistants by returning to the more normal (and more competitive in today's graduate student recruiting market) workload of two labs per TA rather than the current three labs per TA workload established for some students.

Action Item 4.2 Add teaching assistants for online courses, where enrollment permits.

Action Item 4.3 Apply to national funding agencies to establish graduate fellowships

Action Item 4.4 Hire additional faculty with current or potential funding for additional graduate students

Action Item 4.5 Continue and expand alternate means of instruction (primarily online web presentation) to maximize participation by qualified part-time students

Academic Goal 5 Increase the Number of Undergraduate Chemistry Majors

Action 5.2 coincides with the UNT Academic Plan's goal of "increasing undergraduate research", while action 5.6 parallels the Academic Plan's call for "learning assessments, course design, and instructional development." Students working in research laboratories and students in the new Forensic Chemistry Program [5.3] will certainly have opportunities to function in environments that "allow them to learn beyond the basic classroom content".

Action Item 5.1 Actively recruit undergraduate students in freshmen and sophomore chemistry courses

Action Item 5.2 Expand the number of undergraduates involved in undergraduate research

Action Item 5.3 Implement Forensic Chemistry Program and apply for accreditation

5.3a Establish an office, with part-time staff, for the forensic science program

5.3b Apply for accreditation for the forensic science degrees from the American Academy of Forensic Science

5.3c Hire forensic chemist (see 1.3b above) capable of teaching instrumental analysis and capable of directing the forensic science program.

5.3d Equip an expanded instrumental analysis lab

5.3c Add an advanced instrumental analysis laboratory course to meet both the requirements for the accreditation of the forensic program and also to solve the low number of laboratory hours as pointed out by the American Chemical Society

Action Item 5.4 Publicize opportunities for teacher certification in chemistry education.

Action Item 5.5 Use the Department's existing freshmen chemistry scholarship and the solicitations associated with the application process to recruit potential entering freshmen chemistry majors.

Action Item 5.6 Review and update undergraduate course offerings to better meet the demands of students.

Additional students are likely to pursue chemistry as a major if they perceive the course of study is relevant to their needs. The Undergraduate Affairs Committee will review the course offerings and make recommendations as applicable. This will also allow the department to correct deficiencies in the program (too few upper level elective courses and too few laboratory contact hours without the research option) that were pointed out during the most recent accreditation process.

Academic Goal 6 Use Naming Opportunities within the new Chemistry Building and the Department's Centennial in 2010 as the basis for a major new fund-raising effort

This goal is perhaps misnamed as an academic goal, but it will be central to raising the funds necessary to meet the other academic goals listed above.

Action Item 6.1 Sell additional elements on Donor Periodic Table.

Action Item 6.2 Plan and execute a major capital campaign to fund instrumentation and endowed graduate scholarships.

Action Item 6.3 Reactivate the Departmental newsletter.

¹Material in quotes is from the UNT Academic Plan