

**UNIVERSITY OF NORTH TEXAS**

**DEPARTMENT OF BIOLOGICAL SCIENCES**

**College of Arts and Sciences**

**STRATEGIC PLAN – 2006-2010**

**Prepared by:**

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and the  
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## **Executive Summary**

Biological Sciences has identified five academic goals that will advance the department's research, teaching, and service mission, and help the university move forward as an emerging research institution. The academic goals are:

- Establish the Research and Teaching Life Science Complex
- Expand and Enhance Graduate Education
- Advance Research and Scholarship
- Enhance Undergraduate Education
- Initiate Communication with the Departmental Alumni Base

These Academic Goals represent strategic initiatives that can only be achieved by the department through a collaborative partnership with the College of Arts and Sciences and the University.

Central to the Academic Goals addressing graduate and undergraduate education, and scholarship are the establishment of the Research and Teaching Life Science Complex, the expansion of the department's faculty base, and increasing support for graduate students. These actions are not only vital to the department's Academic Goals, they also support the strategic initiatives outlined in the university's Academic Plan to strengthen UNT's role as an emerging research institution, through expansion of both graduate and undergraduate education, research and scholarship, and extramural funding.

## **Mission Statement**

The Department of Biological Sciences promotes the discovery, advancement, and dissemination of basic and applied knowledge in the life and environmental sciences by providing quality undergraduate and graduate education; conducting traditional, multidisciplinary and interdisciplinary research; supporting science education awareness outreach activities; and providing professional expertise and service to local, state and national constituencies.

## **Vision**

The Department of Biological Sciences will achieve statewide and national leadership and international visibility in life and environmental science education and research as evidenced through scholarship excellence, graduate and undergraduate preparation and training, and development of cooperative partnerships with academia, government, and industry.

### **Achieving the Vision:**

To achieve this vision, the Department of Biological Sciences will:

- Invest in the advancement of the department's faculty, staff, students, programs, institutes, and centers which are responsible for its success;
- Establish a life science complex to facilitate integration of graduate and undergraduate education with multi- and interdisciplinary research;
- Increase and broaden the quality of our research programs which will require enhanced support from external sources including government and private sectors;
- Expand resources and promotion of graduate programs focusing on Environmental Science, Physiology/Neurobiology, and Biochemistry /Molecular Biology, develop effective recruitment and retention strategies to yield a diverse student population, and provide outstanding training opportunities in research and problem solving that prepare students for careers in academia, government, and industry;
- Enhance the undergraduate education experience of majors to allow them to develop a cumulative and integral knowledge base in one or more areas of biological sciences at a level significant to excel in graduate or professional school, secondary education, or employment, provide non-majors a broad exposure to the principles of biology to enable them to become informed citizens, and support recruitment and retention efforts that enhance the diversity of the student population;
- Support existing interdisciplinary and multidisciplinary centers and institutes, and research groups with national and international visibility; and
- Provide responsive community outreach programs that involve pre-college students, teachers of pre-college students, and the general citizenry in continuous education to contribute to the better understanding of life science, environmental, and technological issues impacting communities.

# Introduction

## **Department of Biological Sciences - Historical Perspective:**

To present an objective appraisal of our strategic plan and to assess the current status of the department it is important to understand the past history of the university, the department's role in the institution, and how their missions have been shaped by past events. The following brief summary is offered to provide a historical prospective and to show where the department is today.

The institution that is now the University of North Texas was established in Denton, Texas in 1890 as the Texas Normal College and Teacher Training Institution. In 1899, the Texas Legislature accepted the buildings and grounds of what became North Texas Normal College. Graduate work at the master's level was first offered at the University in 1935 in response to an increasing demand for teachers with post-graduate college-level education. Master's degrees were first offered in biology when the first master's degrees were conferred in 1936.

The Graduate School was established 1946 as part of a major institutional reorganization. The Board of Regents approved the first doctoral programs, an EdD in education and a PhD in music, in 1950. In 1968, the Texas College and University System Coordinating Board confirmed the University's mission to offer doctoral programs in the basic arts and sciences (including Biological Sciences), teacher education, business administration, and the fine arts, as well as cooperative doctoral programs in other fields. In further recognition of its doctoral programs and scholarly research, the Carnegie Foundation for the Advancement of Teaching classified the University in 1976 and 1987 as a Class I Doctorate-Granting Institution.

A new dimension in graduate education came in 1968 with the establishment of the Federation of North Texas Area Universities. With Texas Higher Education Coordinating Board guidance, the federation was formed from a sharing of resources of the University of North Texas, Texas Woman's University in Denton, and East Texas State University at Commerce (now Texas A&M at Commerce). Master's and doctoral degree programs were developed that permitting students at one of the three participating institutions to complete a portion of their graduate work at either/or both of the other two, although a single institution grants the degree. The Department of Biological Sciences participates in a PhD program in Molecular Biology through the Federation.

In 1975, the University became affiliated with the Texas College of Osteopathic Medicine (TCOM) in Fort Worth through an act of the Texas Legislature. The two institutions cooperated by having basic science and clinical faculty at the medical school appointed jointly to UNT departments, including Biological Sciences. Through this

mechanism, TCOM faculty members served as major professors and graduate committee members for their graduate students enrolled in masters and doctoral programs. In September 1993 TCOM was renamed the University of North Texas Health Science Center at Fort Worth (UNTHSC). The UNTHSC now has authorization to offer graduate degrees through an independent Graduate School of Biomedical Sciences. However, the PhD in Biochemistry awarded by Biological Sciences is a result of the close early relationship between the two institutions.

The recommendation by the Select Committee on Higher Education in 1985 that the University be designated "an emerging national research university" bolstered the aspirations of the faculty toward research and scholarship. Graduate education and research are two commingled parts of the same enterprise in any major academic institution. This recommendation was confirmed in 2004 when the Texas Higher Education Coordinating Board grouped UNT with several other institutions (including Texas Tech University and the University of Houston) as emerging research institutions. Today the Carnegie Foundation for the Advancement of Teaching classifies UNT as a Doctoral / Research-Extensive Institution.

### **Department of Biological Sciences – Current Status:**

The Department of Biological Sciences is one of 17 academic departments in the College of Arts and Sciences. According to its Charter, "The faculty of the Department of Biological Sciences is a community of scholars dedicated to teaching and research in life and environmental sciences."

### **Degrees:**

The department offers undergraduate degrees in Biology (BA, BS), Biochemistry (BA, BS), Cytotechnology (BS), and Medical Technology (BS). Graduate studies in Biological Sciences provides students the option of selecting a research track leading to the Master of Science (MS) or Doctor of Philosophy (PhD) in biology, biochemistry, molecular biology or environmental sciences; or non-research tracks leading to the Master of Arts (MA) in biology or MS in environmental science. Students interested in obtaining both a masters degree and certification to teach life sciences at the secondary level may select the non-research Master of Science in Biology: Teaching in the Life Sciences. Students pursuing a research degree have the opportunity to conduct research in a variety of concentrations, including aquatic biology, aquatic toxicology, biochemistry, ecology, forensic biology, genetics, limnology, microbiology, molecular biology, neurobiology, physiology, and plant science.

### **Faculty:**

The department is home to 27 (26 beginning in the fall of 2005) tenured or tenure/track faculty (three are currently serving in administrative positions with the University), 2.5 FTE lecturers, and three part-time faculty members on modified service. The faculty is divided by discipline into three divisions within the department, each with a director. These divisions represent, to some degree, the major thrusts of research

interests in the department: Environmental Science, Biochemistry and Molecular Biology, and Physiology and Neuroscience. Five institutes and centers are represented from these divisions including the Institute of Applied Sciences (including the Water Research Field Station), the Center for Remote Sensing, the Center for Plant Lipid Research, the Center for Network Neurosciences, and the Center for Forensic Science. A brief summary of each division follows.

Biochemistry and Molecular Biology: Biological Sciences houses a unique combination of diverse research programs in biochemistry and molecular biology. The University of North Texas is one of the only institutions in the region to offer undergraduate (BS or BA) and graduate (MS or PhD) programs in Biochemistry. In addition, as part of the Federation of North Texas Universities, UNT offers graduate programs (MS and PhD) in Molecular Biology. The faculty members in these areas are nationally and internationally recognized scientists. Basic research efforts by faculty in metabolic regulation and structural biology are funded by various federal, state and private-foundation sources. Many of the faculty members work in collaboration on a variety of projects. Applied research in biotechnology prepares many of the division's students for careers in biomedicine and agriculture. Expertise in animal, plant and bacterial model systems provides a comprehensive array of laboratory and classroom experiences. Current areas of focus include metabolic regulation, structural biology, and plant and microbial metabolism. Areas targeted for future development include functional genomics.

Environmental Science: For the past 60 years, environmental studies have been conducted at the University. Beginning with and continuing in aquatic biology, environmental studies have become interdisciplinary, with various facets of the program contributed by the Departments of Biological Sciences, Geography, and Philosophy. Members of the Environmental Science Division have achieved national recognition in extramurally funding research and development of undergraduate and graduate education programs in environmental science. The success and ability of the division to respond to challenges from within and outside the university derives from the flexibility and adaptability of an integrated faculty that anticipates local, state, regional and national needs and responds accordingly. Environmental Science plans to continue to build and extend a faculty that can interact and form partnerships within and outside the university as necessary to meet the challenges of the future. Current areas of focus include land and water resources and K - PhD environmental science education. Areas targeted for future development include air quality and environmental health.

Physiology / Neurobiology (Cell and System Biology): The function, behavior, and survival of organisms depend on complex interactions among physiological systems. UNT faculty in this interdisciplinary field have research interests spanning several levels from molecular biology, membrane physiology and cell biology, to organ systems, behavior and evolution. Specific research areas include biosensors, neural networks, somatosensation and pain, developmental regulation of cardiovascular and respiratory systems, neural plasticity, and brain development. Increasing public

appreciation of the importance of cell and systems biology for the health and well being of our population is reflected in increased federal funding for these areas. The division has active collaborations in education and research through its participation in the Federation of North Texas Area Universities, the North Texas Neuroscience Consortium, and the interdepartmental Center for Network Neuroscience at UNT and in Rostock, Germany and the Technical University of Munich. Current areas of research focus include network neuroscience, developmental / comparative physiology, and neuroscience. Areas targeted for future development include cell physiology, comparative physiology, and developmental biology.

Faculty Size: A survey of numbers of faculty in departments of biology or biological sciences for 13 institutions comparable to UNT or with whom we compete for students is presented in Table 1. Of the 14 institutions listed (including UNT), the range in numbers of faculty is from 26 to 45 (mean = 33), and UNT ranks 10th. Considering that Biochemistry is in the Department of Chemistry at all institutions with fewer faculty in their biology departments, the Department of Biological Sciences ranks 14<sup>th</sup> out of 14. It is clear that Biological Sciences has far too few faculty members to represent the various disciplines considered to be components of a well-based biology department.

**Table 1. Numbers of Faculty for Departments of Biology or Biological Sciences**

Institution	Faculty Numbers
Arizona State University <sup>1,4</sup>	45
Texas A&M University	41
University of Utah	39
Auburn University <sup>1</sup>	37
Texas Tech University	35
University of Houston	34
University of New Mexico <sup>3</sup>	32
Univ. Nevada Las Vegas <sup>1</sup>	32
University of Missouri <sup>2</sup>	31
<b>University of North Texas</b>	<b>29</b>
Univ. of South Florida <sup>1</sup>	28
Univ. of Southern Mississippi <sup>1</sup>	28
University of Arkansas <sup>1</sup>	26
UT Arlington <sup>1</sup>	26
<b>Mean</b>	<b>32.9</b>

<sup>1</sup>Biochemistry in Dept. of Chemistry

<sup>2</sup>Biochemistry is a separate department

<sup>3</sup> Biochemistry & Mol. Biol. In separate department of 12 faculty

<sup>4</sup> Plant Sciences and Microbiology in separate departments

The primary mission of the Department of Biological Sciences is to educate graduate and undergraduate students. However, the department recognizes that while

contributions to teaching and related activities are important, research productivity is a primary factor of consideration in the evaluation of its faculty. The current status of the departments teaching and research activities follows.

### Teaching:

The numbers of semester credit hours taught by faculty in Biological Sciences is high, with as many as 13,846 undergraduate SCHs and 1,031 graduate SCHs generated during the fall 2003 semester (Table 2). Table 2 is informative in that it demonstrates the very large commitment that the department has to non-majors in the university. For example, in fall 2003, about 80% (8,065 SCH) of the total 10,057 SCH produced from lower level undergraduate courses were generated from students majoring in something other than biology.

The university is funded by a formula based on generation of SCH during legislative base years. During the summer 2003, fall 2003, and spring 2004 semesters (latest time period for which base year data are available) faculty in the Department of Biological

**Table 2. Semester Credit Hours Generated by Faculty in Biological Sciences for 2001/02 to 2003/04.**

	2001/02		2002/03		2003/04	
	Fall	Spring	Fall	Spring	Fall	Spring
<b>Lower level UG majors</b>	1,947	1,509	1,992	1,560	2,115	1,808
<b>Lower UG non-majors</b>	7,884	7,371	8,065	7,213	8,163	6,870
<b>Upper level UG majors</b>	2,188	2,288	2,571	2,636	2,840	2,877
<b>Upper level UG non-majors</b>	458	434	543	641	728	683
<b>UG Total</b>	12,477	11,602	13,171	12,050	13,846	12,238
<b>Masters</b>	575	560	595	607	601	611
<b>Doctoral</b>	407	399	374	341	430	418
<b>Graduate Total</b>	982	959	969	948	1,031	1,029

Sciences generated 30,675 SCH (28,501 undergraduate, 1,256, masters, and 918 doctoral). This resulted in a total of \$5,204,612 being generated in tuition and formula funds. This sum exceeded the total needed to cover all components of the instruction and operations formula (\$4,771,385) by \$433,227 to support this instruction. Thus, the department was “under-supported” by nearly 10% of what it generates. A more revealing measure of the importance of Biological Sciences to the teaching mission of the university is the fact that the department generates more SCH than eight of the institutions<sup>10</sup> schools and colleges.

Based on calculations from actual enrollments in lecture sections (Table 3), the enrollments by course level average from 42 to 129 at the undergraduate level, with an average faculty/student ratio of 89:1. Enrollments in graduate lectures range from 10 to 35 with an average faculty/student ratio of 17.4:1. These representations of the faculty loads and enrollments more accurately reflect the instructional demands placed upon faculty and what students experience in the classroom than those reported by the administration.



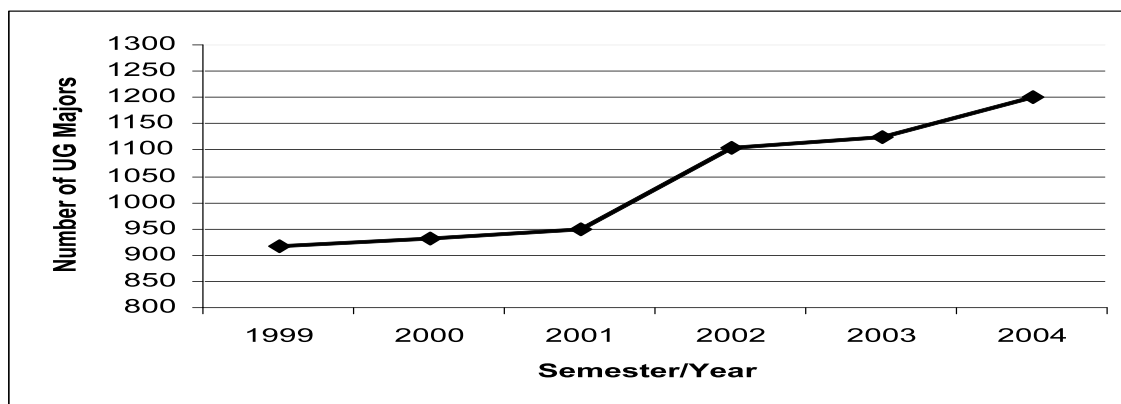
Class Level	2000/2001		2001/2002		2002/2003		2003/2004		Ave.
	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	
1000 Level	131.4	116.1	145.2	127.9	124.9	131.2	129.6	127.3	129.2
2000 Level	118.6	100.3	95.8	125.3	127.2	100.4	130.3	99.0	112.1
3000 Level	70.3	66.1	69.0	48.9	114.4	69.8	85.3	72.1	74.5
4000 Level	49.8	35.6	38.7	37.0	47.4	41.6	45.5	43.3	42.4
<b>Ave. Undergraduate Level</b>	<b>92.5</b>	<b>79.5</b>	<b>87.2</b>	<b>84.8</b>	<b>103.5</b>	<b>85.7</b>	<b>97.7</b>	<b>85.4</b>	<b>89.5</b>
<b>Ave. Graduate Level</b>	<b>13.9</b>	<b>10.3</b>	<b>13.3</b>	<b>10.3</b>	<b>14.0</b>	<b>11.4</b>	<b>31.3</b>	<b>35.0</b>	<b>17.4</b>
<b>Overall Ave.</b>	<b>71.8</b>	<b>68.4</b>	<b>77.5</b>	<b>78.4</b>	<b>85.6</b>	<b>70.0</b>	<b>93.1</b>	<b>89.3</b>	<b>79.2</b>
<b>Ave. Admin. Reporting</b>			<b>15.5</b>		<b>15</b>		<b>16.9</b>		<b>15.8</b>

Enrollment trends in courses taught by the department track closely with data collected on semester credit hours. The department provides instruction to an average of 6,800 students per semester, including majors, non-majors, and graduate students (Table 4). Typically, enrollments in the fall semesters are higher than in spring, a trend that mimics enrollments at the university. As is the trend at the university, increases from fall semester to fall semester have been dramatic. Between the fall semester of 2001 and fall 2003, the department experienced a 15% increase in the numbers of students taking courses. This compares to only a 4% increase in enrollments in course over the entire university.

The numbers of undergraduate majors in the department has increased in a similar fashion (Table 5; Figure 1), while the number of graduate students has remained relatively stable (Table 5).

Numbers of Majors	2001	2002	2003
UG	949	1009	1124
Post-Bachelor	8	12	26
MS	80	70	72
PhD	71	65	68

	2001/02		2002/03		2003/04	
	Fall	Spring	Fall	Spring	Fall	Spring
<b>Lower level UG majors</b>	459	634	862	696	1,001	798
<b>UG non-majors</b>	2,632	2,372	2,603	2,243	2,611	2,124
<b>Upper level UG majors</b>	1,290	1,303	1,510	1,428	1,516	1,575
<b>Upper level UG non-majors</b>	1,622	1,504	1,724	1,626	1,781	1,659
<b>Masters</b>	341	348	394	433	410	445
<b>Doctoral</b>	141	142	135	105	151	141
<b>Totals</b>	<b>6,485</b>	<b>6,303</b>	<b>7,228</b>	<b>6,531</b>	<b>7,470</b>	<b>6,742</b>



**Figure 1. Increase in Numbers of Undergraduate Majors in Biology 1999 to 2004**

The dramatic increase in the number of biology majors since 1999 tracks the increases in enrollment at the university over the same time period. However, the percent increase in undergraduate majors in the department has been greater than that of undergraduate enrollment increases experienced by the university between 1999 and 2004, 20% vs. 16%, respectively. Clearly, the department is seeing increases in undergraduate instructional needs that exceed those experienced by the general university.

The department awards 109 to 140 baccalaureate degrees each year (Table 6). These numbers actually vary little over the short period for which data are shown. It is expected, however, that undergraduate degrees awarded will begin to increase as a result of the dramatic increases in numbers of majors.

**Undergraduate Biological Sciences Degrees  
Awarded by Academic Year**

**Table 6.**

Academic Year	Biology	BA	BS	Biochem	BA	BS	Med Tech	Cytotech	TOTAL
2000-01	124	14	110	9	3	6	6	3	142
2001-02	96	7	89	9	3	6	1	1	107
2002-03	99	11	88	13	3	10	0	0	112
2003-04	97	15	82	9	1	8	1	2	109
<b>Totals</b>	<b>416</b>	<b>47</b>	<b>369</b>	<b>40</b>	<b>10</b>	<b>30</b>	<b>8</b>	<b>6</b>	<b>470</b>

The department awards an average of 30 graduate degrees per year of which 13 to 24 are MS degrees and 9 to 14 are for the PhD (Table 7).

**Table 7. Graduate Biological Science Degrees Awarded by Academic Year**

Academic Year	MS	PhD	Total
2000-01	17	14	31
2001-02	13	9	22
2002-03	24	14	38
<b>Total</b>	<b>54</b>	<b>37</b>	<b>91</b>

**Research:**

Faculty members in all three divisions are engaged in national and international collaborations, publishing in leading scientific journals, and performing research supported by peer reviewed externally funded grants.

Publications in refereed journals, invited papers, book chapters, and reviews are judged to be vital measures of faculty productivity. Over the 6-year period from 1998 to 2004, the average number of publications produced per year by faculty members in the department was 47 (Table 8). In Biological Sciences, the typical faculty member averages about 2.2 publications per year. Of course variation from year to year is dependent on a number of factors relating to lag time between submitting a paper and its appearance in press, with the review process varying from one to several months. The downward trend in numbers of publications from 1998/99 to 2003/04 appears to be a result of the departments having fewer faculty members since the average numbers of publications per faculty members has remained relatively constant.

<b>Academic Year</b>	<b>Refereed Articles</b>	<b>Invited Articles</b>	<b>Book Chapters</b>	<b>Book Reviews</b>
<b>1998/99</b>	42	1	8	2
<b>1999/00</b>	40	2	5	1
<b>2000/01</b>	45	3	9	0
<b>2001/02</b>	35	0	10	0
<b>2002/03</b>	33	0	2	0
<b>2003/04</b>	35	0	6	0

The department has been extremely successful in garnering external funding for research as demonstrated by grant awards over the four most recent fiscal years (Table 9). Most importantly, the department has experienced an increase in funding each of these years, with a 30% increase in externally funded research dollars between FY01 and FY04. This is not just a reflection of an increase in the number of active researchers, since there has also been a significant per capita increase in external funding of 20%. Thus, more faculty members have external funding and have been awarded larger grants.

**Table 9: Biological Sciences Grant Activity FY 01 Through FY 04.**

<b>Year</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>
<b>DBS Grant Awards</b>	\$2,294,616	\$2,455,192	\$2,541,256	\$3,264,371
<b>FTE Faculty</b>	21	22	22	25
<b>Award Per Capita</b>	\$109,267	\$111,600	\$115,512	\$130,575
<b>Grant Awards in A&amp;S</b>	\$8,049,175	\$11,390,762	\$9,289,284	\$5,990,789
<b>Percentage DBS Awards in A&amp;S</b>	28.5%	21.6%	27.6%	54.4%
<b>Source of Funds</b>				
<b>Federal</b>	24	19	25	10
<b>State</b>	5	7	2	3
<b>Municipality</b>	0	0	2	5
<b>Industry</b>	4	3	5	4
<b>Private</b>	4	5	0	1
<b>Total</b>	<b>37</b>	<b>34</b>	<b>34</b>	<b>23</b>

Numbers of presentations at state, regional, national, and international meetings are also a reflection of the faculty's professional visibility. The average number of presentations for the department as a whole for the period 1998 to 2004 was 53 (Table 10), while the typical faculty member in the department presented an average of 2.4 papers per year. Most importantly, an average of 84% of these presentations were at the national and international levels.

Invitations to present research seminars at peer institutions are also a reflection of the stature of the faculty. Faculty in the department presented an average of 15 invited seminars each year (Table 10).

<b>Academic Year</b>	<b>International</b>	<b>National</b>	<b>State</b>	<b>Regional</b>	<b>Seminars</b>
1998/99	7	51	8	3	17
1999/00	7	39	4	6	14
2000/01	6	40	4	3	11
2001/02	2	48	0	9	8
2002/03	2	30	2	2	11
2003/04	8	31	4	6	24

Finally, during an average year Biological Science faculty members are invited to serve on 12 to 15 national grant review panels. Agencies requesting our faculty's expertise

include the National Science Foundation, National Institutes of Health, U.S. Department of Agriculture, Department of Energy, and the Environmental Protection Agency.

### **Departmental Mission and Vision, and the UNT Academic Plan:**

For more than a half century the Department of Biological Sciences has served as a one of the cornerstone departments in the College of Arts and Sciences and the University. The department's success, in part, stems from its instinctive adherence to its mission statement that expresses fundamental goals in the areas of teaching, research, and service. The department's vision statement is a direct extension of its mission statement. And although the department's mission statement is not unique, achievement of the steps outlined in the vision statement will allow us to elevate ourselves to a position of statewide and national recognition, separating ourselves from the numerous comprehensive departments of biological science that share similar goals.

The department's vision to enhance the quality of the undergraduate experience of majors and non-majors, expand graduate education, and promote research and scholarship is clearly supportive of the university's focus on enhancing and solidifying undergraduate education, graduate education, and research and scholarship to strengthen its new role as an emerging research institution, as outlined in the institutional Academic Plan.

### **COWS Analysis:**

#### **Challenges:**

- Providing quality introductory undergraduate instruction to biology majors and non-majors with the current number of tenure track and tenured faculty.
- Providing quality, diverse upper level undergraduate instruction to biology majors with the current number of tenure track and tenured faculty.
- Providing an undergraduate research experience to qualified majors.
- Performing first class, state-of-the-art research without adequate infrastructure and personnel support.
- Competition from other area public universities that are placing a high priority on life and environmental science education (University of Texas at Arlington, University of Texas at Dallas).

#### **Opportunities:**

- Unique opportunity to establish a Life Science Research and Teaching Complex
- Large, untapped alumni base to develop into a donor network.
- Establish a donor-supported graduate scholarship program that can be used as a model for obtaining a federally supported pre-doctoral training grant program.
- Coordinating with faculty in our College of Engineering and departments in Arts and Sciences (Mathematics and Geography) to develop programs in bioengineering, environmental engineering, and computational biology.

**Weaknesses:**

- Current number of faculty tenure and tenure track lines limits the department's ability to meet its current teaching and research needs, and to reach its full potential.
- Departmental demographics describe an aging faculty.
- Graduate teaching assistantship stipends are not competitive with regional and national institutions.
- Current space allocation inhibits the department's ability to deliver suitable instruction to current students and will not permit the absorption of projected growth in SCH generation demands.
- First class or state-of-the-art research is inhibited by lack of instrumentation or equipment age.

**Strengths:**

- Biological Sciences is well established and has a long tradition. The department has a firm foundation on which to build future development.
- Biological Sciences has an identified niche among students seeking undergraduate degrees in biology as demonstrated by the growth in enrollment of majors.
- Research productivity of the faculty (especially recent new hires) as reflected in growth in the extramural funding base over the past four years.
- Number of undergraduate and graduate degrees authorized by the THECB, especially PhD degrees in Environmental Science, Biochemistry, and Biology, and Molecular Biology through the Federation.
- Large graduate student population.
- Increasing cooperation / collaborations of faculty with national and international colleagues (Mexico, Germany, Switzerland, and Israel).

**Planning Process:**

This strategic plan is based on information prepared by the Biological Sciences as part of the department's current Academic Program Review. The Academic Program Review documentation, widely distributed to and commented on by the department's faculty members, clearly characterizes the department's current state and points out areas needing investment of resources.

The chair in close consultation with an expanded departmental Executive Committee membership (Executive Committee members included: Drs. Jim Kennedy, Douglas Root, Jannon Fuchs, Bob Pirtle, and Ed Dzialowski; additional members appointed by the chair included: Drs. Tom La Point, Dan Kunz, Earl Zimmerman, Sam Atkinson, and Guenter Gross) composed the strategic plan. Thus, 40% of the tenure / tenure track faculty in the department had direct involvement in writing the strategic plan. The Executive Committee membership was charged with providing information to their division membership about the strategic planning process and providing division feedback to the planning committee.

The chair will discuss the strategic plan with each faculty member during the summer as part of the individual faculty planning / review process. Following these individual meetings, the final draft of the strategic plan will be discussed in an open faculty meeting for adoption.

## **Academic Goals**

### **Academic Goal 1: Establish a Department of Biological Sciences Research and Teaching Life Science Complex.**

**Rationale:** The completion of the new Chemistry Building with the associated move of chemistry faculty from Masters Hall provides the university and the Department of Biological Sciences with a unique opportunity to establish a Teaching and Research Life Sciences Complex composed of the Biology Building and Masters Hall, Biological Sciences would vacate space in the Science Research Building. The Complex can serve as the focus of the planned multi-million dollar renovation of the Biology Building and Masters Hall scheduled to take place during the 2006 through 2008/9-time period.

**Background:** At this point in time, establishment of the Complex is vital to the department's ability to expand its mission to discover, advance, and disseminate basic and applied knowledge in the life and environmental sciences. Additionally, the complex is essential to the department's vision to expand its graduate programs, broaden its extramural funding base, promote interdisciplinary research, and enhance the undergraduate research experience of majors. These efforts echo the strategic initiatives outlined in the university's Academic Plan to strengthen UNT's role as an emerging research institution through expansion of both graduate and undergraduate education, research and scholarship, and extramural funding.

The Complex, critical to fulfilling the department's teaching and research ambitions, would allow our biochemist / molecular biologist, physiologists, and microbiologists to be housed in well planned / designed multi- / interdisciplinary laboratory clusters under one roof for the first time in 25 years. This arrangement would enhance research activity by facilitating scholarly interactions among faculty and graduate students resulting in an increase in extramural funds (See Academic Goal 3). The Complex will provide space to house an increasing number of research assistants, postdoctoral fellows, research technicians, graduate students, and equipment resulting from an overall projected 42.0% increase in extramural funding during the 2005-2009-time period.

In addition to satisfying research needs, the Complex will allow us to absorb the projected growth in our undergraduate and graduate programs. Table 11 projects an overall 28.9% increase in student headcount during the 2005-2009 time period.

**Table 11: Department of Biological Sciences Historical and Projected Student Headcount for the Years 2000 Through 2009. Numbers are for Fall Semesters.**

Year	Historical					2000/04 % Change	Projected					2004/09 % Change
	2000	2001	2002	2003	2004		2005	2006	2007	2008	2009	
<b>Total Majors-Headcount</b>	1134	1108	1155	1290	1310	15.5%	1376	1444	1521	1600	1689	28.9%
<b>Undergraduate</b>	962	949	1009	1124	1177	23.3%	1237	1300	1366	1436	1509	28.2%
<b>Masters</b>	99	92	85	101	80	(19.2%)	83	86	89	92	95	18.8%
<b>Doctoral</b>	73	67	61	65	53	(27.4%)	56	58	66	72	85	60.4%

Continued strong interest at the undergraduate level in health related majors, including pre-professional programs (medicine, dentistry, pharmacy, etc), medical technology, and cytotechnology; and biology / biochemistry majors leading to post graduate training or employment in secondary education, private industry, or government leads us to believe that these numbers are accurate.

Increases in graduate enrollment reflect an increase in new faculty lines allocated to the department (the department currently has approval for four new lines) and the retirement and replacement of several faculty currently not engaged in graduate education with faculty actively involved in building graduate programs. Additionally, a recent gift to the department of approximately \$1.50 M, partially earmarked for tuition scholarships, will allow us to attract increased numbers of high quality students during the 2005 - 2009 time period.

Increased enrollment will result in the department generating additional semester credit hours (SCH). Table 12 projects an overall 34.9% increase in SCH during the 2005 - 2009 time period.

Increases in undergraduate SCH production reflects both greater numbers of non-majors enrolling in core required courses and majors enrolling in biology courses. Additionally, we believe that the percentage of traditional (full time) undergraduate students in our program will continue to increase resulting in more of our majors enrolling in 14 to 16 hours per semester.



**Table 12: Department of Biological Sciences Historical and Predicted Semester Credit Hour Generation for the Years 2000 Through 2009. Numbers are for Fall Semesters.**

Year	Historical					2000/04 % Change	Projected					2004/09 % Change
	2000	2001	2002	2003	2004		2005	2006	2007	2008	2009	
<b>Semester Credit Hours</b>	13060	13459	14140	14877	15395	17.9%	16346	17355	18428	19568	20780	34.9%
<b>Undergraduate</b>	11908	12477	13171	13846	14337	20.4%	15240	16200	17220	18306	19460	35.7%
<b>Masters</b>	655	575	595	601	579	(11.6%)	600	621	644	667	691	19.3%
<b>Doctoral</b>	497	407	374	430	479	(3.6%)	506	534	564	595	629	31.3%
<b>Lab contact Hours</b>	2019	2014	2086	1977	2196	8.0%	2334	2481	2638	2804	2980	35.7%

Graduate student SCH increases are a direct result of increased enrollment since most graduate students will continue to enroll in 9 SCH as a requirement for obtaining a teaching assistantship.

It will be extremely difficult for the Department of Biological Sciences to absorb this growth in SCH generation (and headcount) using its current space allocation. For example, this past fall 136 undergraduate laboratory sections were scheduled with a seating capacity for 3,162 students. Students filled 3,047 or 96.4% of the seats. Laboratories are scheduled from 7:30 AM until 9:50 PM leaving no additional times to add laboratory sections given our current teaching laboratory inventory. Development of the Teaching and Research Life Science Complex would allow us to return Biology Building Rooms 203, 229, 231, 310, and 322, currently converted into faculty research laboratories, to the classroom inventory as much needed teaching laboratories.

**Action Item 1.1: Approval of the Biological Sciences Teaching and Research Life Science Complex.** Allocation of renovation funds and planning renovations are the joint responsibilities of the Chancellor, Vice Chancellor for Administrative Affairs, President, Provost and Vice President for Academic Affairs, and Vice President for Administrative Affairs with input from the Dean and Chair.

**Action Item 1.2: Comprehensive departmental space analysis.** Current space assignments in Biological Sciences represent a mixture of history and assignments made on an as needed bases as new space became available. Analysis of space needs will allow us to assess current space allocations, assignment locations, and reallocation when appropriate. Space analysis will be driven by undergraduate and

graduate teaching needs, research productivity, external funding, faculty growth and replacements, research personnel (technical staff, postdoctoral fellows, etc), and most importantly discipline specific needs such as requirements for common equipment facilities. The Chair in consultation with the departmental Space Committee will develop specific methodologies to be used in space analysis. The departmental Space Committee will perform the analysis.

**Action Item 1.3: Planning space and space assignment in the Teaching and Life Science Complex:**

Planning is the joint responsibility of UNT facilities personnel, external architects and contractors, and the department chair and faculty. For planning of research space, all efforts will be made to define discipline-specific space needs that allow for multi- and interdisciplinary interaction among faculty and graduate students and development of common equipment rooms. On the teaching side, efforts will be made to increase the number of teaching laboratories, concentrate teaching labs in the Biology Building, and arrange laboratories and preparation facilities to allow for teaching concurrent sections of upper level courses such as Microbiology, Cell Biology, Genetics, and Animal Physiology. The Chair in consultation with the departmental Space Committee will develop specific methodologies to be used in space assignment. The departmental Space Committee will perform the analysis. The department realizes that assignment of space in CAS is ultimately the responsibility of the Dean.

**Action Item 1.4: Planning research service support centers.** A departmental *ad hoc* committee, representing various research expertise will be appointed by the chair to study and recommend the establishment of research service centers / laboratories in the new facility, for example, DNA sequencing laboratory, electronic/mechanical support shop, light microscope facility, analytical laboratory, etc. The chair will solicit funding for these centers from the Dean of the College of Arts and Sciences, the Vice President for Research and Technology Transfer, and the Provost and Vice President for Academic Affairs.

**Action item 1.5: Planning and coordinating equipment transfer.** Establishing an equipment moving fund and in the event of damage to equipment, a replacement and repair fund.

**Academic Goal 2: Expand and Enhance Graduate Education in the Department of Biological Sciences.**

**Rationale:** Our goal is to increase the number of graduate students enrolled in the department to meet the increasing demand for professionals who can think critically and generate new knowledge in basic and applied science necessary to meet societal needs of the 21<sup>st</sup> century. Additionally, our graduate program provides the department its greatest visibility and graduate students perform the majority of bench research.

**Background:** Over the past three years the numbers of graduate students in the department has remained stable or declined slightly (see Table 5). Factors relating to this condition are three-fold.

First, the decline in the department's graduate enrollments mirror those seen nationwide in graduate programs for the same time period.

Second, stagnant graduate enrollments in Biological Sciences are due to reduced numbers of graduate faculty resulting from faculty accepting administrative appointments, retiring or going on modified service, resigning, or being unwilling to accept students due to proximity to retirement.

Third, the Department of Biological Sciences regularly loses quality graduate students to other universities because our graduate teaching assistantships (TA) are not competitive. Total compensation for TAs after including overloads, proctoring and grading, and other duties averages \$5,880 per semester. After tuition expenses (approximately \$2,874 without course fees) TAs have an average of \$3,006 or approximately \$668 per month for living expenses.

While under compensated, we estimate that our 143 TAs employed during the fall 2003 and spring 2004 semesters generated 5,702 SCH resulting in the production of approximately \$1.3M in tuition and formula funding. Over this time period the department was provided \$840,800 (\$585,900 in part time teaching funds provided by the college and \$254,900 collected in course fees) to fund TA salaries, resulting in a surplus in the region of \$459,000. This surplus was retained by the administration.

**Action Item 2.1: Increase the number of research faculty with active graduate programs to a minimum of 35 tenured / tenure track FTEs by filling current vacant lines, immediately replacing anticipated retiring faculty upon their retirement, and obtaining new lines.** The Chair will work with the biological sciences faculty and the Dean of the College of Arts and Sciences to obtain additional lines to hire faculty in established programs based on potential contributions to the research and graduate education mission of the department as well as undergraduate curriculum needs with priority assigned to environmental sciences due to faculty retirements.

In 1996, the department had 28 FTE graduate faculty members eligible to direct graduate students. The reduction in numbers of doctoral students from 2000 to 2004 is a result of retirements and the unwillingness of senior faculty to make the four or five year commitment necessary to mentor doctoral students. Currently the department has 21 graduate faculty members actively engaged in doctoral education. We project additional faculty added during the 2006-2009 time period will result in a 19% increase in MS and a 60% increase in PhD graduate enrollment (Table 13).

**Table 13: Department of Biological Sciences Historical and Predicted Student Headcount for the Years 2000 Through 2009. Numbers are for Fall Semesters.**

Year	Historical					2000/04 % Change	Projected					2004/09 % Change
	2000	2001	2002	2003	2004		2005	2006	2007	2008	2009	
<b>Masters</b>	99	92	85	101	80	(19.2%)	83	86	89	92	95	18.8%
<b>Doctoral</b>	73	67	61	65	53	(27.4%)	56	58	66	72	85	60.4%

**Action Item 2.2: Create 10 \$5,400 graduate student tuition scholarships using the Beth Baird Endowment to Fund the Beth Baird Graduate Scholarship Program.** Following the recommendation of the departmental *ad hoc* Beth Baird Gift committee the chair will institute the Baird Graduate Scholarship Program. The program will be administered by a standing departmental scholarship committee composed of five members, including elected representatives of each departmental division (biochemistry and molecular biology, environmental science, and physiology and neurobiology), a representative appointed by the Dean of the College of Arts and Sciences, plus the department chair, who will serve as chair of the scholarship committee. The scholarship committee will hold a yearly competition. Applications for the first scholarships will be due in July 2005. Subsequent scholarship applications will be due in January on the first working day after the New Year's holiday, with awards announced by February 15. Both new and continuing students will be eligible to receive Beth Baird Graduate Scholarships. Awards to master's students will be made renewable once for a maximum tenure of two years, with continued funding in the second year contingent on demonstrating satisfactory progress in the first year of the award. Awards to doctoral students will be made renewable twice for a maximum tenure of three years, with continued funding in years two and three contingent on demonstrating satisfactory progress over the previous year of the award.

**Action Item 2.3: Increase graduate student teaching assistantship and compensation to \$18,000 per year through increases in salary, awarding of tuition scholarships, creating teaching fellowships, or a combination of the above.** The department chair and faculty will work with the Dean of Arts and Sciences to convince the UNT administration to increase funding for UNT's graduate fellowship program and departmental part-time teaching budgets earmarked for teaching assistant salaries. Whenever possible the department chair will shift funds for part-time and adjunct instruction to create teaching fellowships.

**Action Item 2.4: Increase graduate student research assistantships to \$18,000 per year through increases in salary and awarding tuition scholarships.** As part of the sign off procedure, the department chair will

counsel faculty to include well-paid research assistantships and tuition compensation in research proposals, whenever possible. Additionally, the department will establish three graduate research assistantships. These departmental assistantships will be used as a model for application to federal pre-doctoral training grant programs. The graduate scholarship committee, described above, will be used to select recipients and track monitor their post-graduate success.

**Action Item 2.5: Require doctoral students to write and submit a dissertation based research paper to a refereed journal prior graduation.**

The departmental Graduate Curriculum Committee will study the institution of this requirement for inclusion in the next revision of the *Graduate Catalog*.

**Action Item 2.6: Increase graduate student recruitment efforts.** Biological Sciences will allocate \$5,000 in departmental funds from the Beth Baird Endowment Distribution Account beginning in the summer of 2005 to fund recruitment travel by individual faculty members, campus visits by prospective graduate students, and an on-campus preview day held in the mid-fall for prospective graduate students organized by Rollie Schafer. Additionally, in the fall of 2005 the department will make \$2,000 available to produce a power point / video recruitment tool, highlighting the department and individual laboratories, that can be placed on the departmental web site and presented by faculty on recruitment visits. Dr. Sam Atkinson will be responsible for the production.

**Action Item 2.7: Improve the graduate student experience in Biological Sciences.** Student experiences will be improved through continued and increased support of the Biology Graduate Student Association, establishing a mentoring program to help graduate students write thesis and dissertations, and continuing and augmenting the department's Research Appreciation Day.

**Academic Goal 3: Enhance the Department of Biological Sciences Research and Scholarship in Environmental Science, Biochemistry / Molecular Biology, and Physiology / Neurobiology.**

**Rationale:** Our overall aim is to develop excellence in and recognition of our research programs in the areas of Biochemistry/Molecular Biology, Physiology, and Environmental Science increasing the visibility of the department and its faculty on the state, national, and international levels. Accomplishment of this goal is essential to the department's vision to achieve statewide and national leadership in life and environmental sciences research and its mission to contribute to the discovery and advancement of basic and applied knowledge. Fulfillment will aid UNT in meeting the challenges in the Academic Plan by solidifying the university's position as an emerging research university and accomplishing its scholarship responsibility to create, transmit and apply knowledge.

**Background:** The department identifies three areas that have potential to expand as areas of strength in research and graduate training. These relate, in part, to graduate degrees offered by the department and include programs in Biochemistry/Molecular Biology, Environmental Science, and Physiology. The department has been relatively successful in garnering external funding for research as demonstrated by grant awards over the four most recent fiscal years (see Table 9 above). The department has experienced an increase in extramural funding each year from FY2001 through FY2004, with an overall 30% during the period. This is not just a reflection of an increase in the number of active researchers, since there has also been a significant per capita increase in external funding of 20%. Thus, more faculty members have external funding and have been awarded larger grants.

**Action Item 3.1: Increase the number of research faculty to a minimum of 35 tenured / tenure track FTEs by filling current vacant lines, immediately replacing anticipated retiring faculty upon their retirement, and obtaining new lines.** The department has authorization to hire three senior level developmental biologists. The chair will work with the biological sciences faculty and the Dean of the College of Arts and Sciences to obtain additional lines to hire faculty in established programs based on potential contributions to the research mission of the department as well as curriculum with priority assigned to Environmental Sciences due to faculty retirements.

**Action Item 3.2: Increase the Departmental Extramural Funding Base.** Our objective during the 2006-2009 time period is to increase our external funding base by a minimum of 40% (Table 14). This growth reflects the fact that increases in external funding can only occur if the funding base level continues from year to year, dollars already awarded are replaced and new dollars obtained. With the right hires and good fortune, the department's extramural funding level can increase more than the projected amount. The chair will direct faculty members to include grant funds for postdoctoral fellow positions, research assistant positions, tuition compensation, and equipment funds as part of the departmental sign-off process, whenever possible.

**Table 14: Department of Biological Sciences Historical and Projected Extramural Funding for the Years 2000 through 2009.**

Year	2000	2001	2002	2003	2004	2001/04 % Change	2005	2006	2007	2008	2009	2004/09 % Change
<b>Funding (X\$1000)</b>	\$836	\$2294	\$2455	\$2541	\$3264	42.2%	\$3538	\$3812	\$4086	\$4360	\$4634	42.0%

**Action Item 3.3: Enhance scholarship through investment in state supported research positions.** The Chair of Biological Sciences will work with the Dean of Arts

and Sciences and other science department chairs to convince the UNT administration of the need for state supported research technician positions. Research cannot be first class without such positions, just as the university's information technology cannot be first rate without technical support. Over the past 20 years millions of dollars have been invested in computer support staff positions, but zero dollars have been invested in research support staff positions.

**Action Item 3.4: Initiate a dialog with other departments and the administration to re-institute the concept and operation of a research institute/foundation to promote research at UNT through optimization of indirect cost returns to investigators, streamlining institutional procedures, provide tax incentives to potential benefactors, and promote a source of seed money for exploratory research.** Reestablish the North Texas Research institute (NTRI). This institute operated in association with the university during the 1980's and 1990's. Businesses and industry recognized that the flow of knowledge between basic and applied science is bi-directional, and often seeks links with universities. NTRI provided faculty from multiple disciplines, departments, and colleges a focal point to conduct multidisciplinary research in basic and applied sciences. Because NTRI was associated with but not a division of the university it was able to operate under different financial constraints than the UNT research office, this as of particular importance because the institute retained a greater percentage of grant revenues to reinvest in capital equipment, new research endeavors, and entrepreneurial efforts. If the university is to establish itself as a major research institute we must reestablish a research institute at UNT.

**Action Item 3.5: Promote interdisciplinary / multidisciplinary approaches to research and teaching.** Department of Biological Sciences will work with the College of Engineering to plan teaching and research programs in biological engineering and environmental engineering. Preliminary conversations concerning these plans are taking place between the chair and the Dean and Associate Dean of the College of Engineering. Drs. Sam Atkinson and Guenter Gross, who have undergraduate engineering degrees, will join the planning process as it moves forward.

The department is also working with the departments of Computer Science and Mathematics to develop a program in computational biology. Planning conversations are underway between the chairs of Biological Sciences and Mathematics and Dr. Armin Mikler of the Computer Science department. The goal is to develop an interdisciplinary graduate degree.

#### **Academic Goal 4: Enhance Undergraduate Education in the Department of Biological Sciences.**

**Rationale:** Our goal is to enhance the training of undergraduate students, both majors and non-majors, to expand their decision-making skills needed to be informed

citizens and to better prepare them for professions, professional schools, and graduate programs that will meet the increasing demand for graduates who can think critically, generate new knowledge, and meet the technical demands of the 21<sup>st</sup> Century.

**Background:** The department's goal to provide the best undergraduate instruction by using tenure/tenure track faculty can no longer be met. In the past, Biological Sciences has always attempted to achieve excellence in teaching at the introductory course level by having tenure/tenure track faculty deliver instruction. With increasing demand for introductory science courses by both majors and non-majors we are forced to meet more of our teaching needs with adjunct faculty and lecturers. In the fall of 1995 non-tenured/tenure track faculty delivered 22% of the departments SCH production. This increased to 27% in fall 1997, 37% in fall 2001, and reached 50% in fall 2003. This trend is a result of non-tenure/tenure track faculty being hired to fill ever-increasing needs of large introductory sections that exceed the enrollments of upper division courses. In the fall 2003 the student: tenure/tenure track faculty ratio was 89 students per faculty member.

In addition to introductory course instruction, the current number of faculty members limits the department's ability to meet its faculty's teaching / research needs and the enrollment demands of Biological Sciences majors enrolling in upper division courses. Due to degree requirements and enrollment demands, many courses, including Biology of Microorganisms, Principles of Ecology, Genetics, Cell Biology, and Animal Physiology, must be offered every semester. Enrollment in these courses is always at or higher than 100 students. This teaching schedule inhibits the ability of faculty, especially those responsible for teaching these courses and others teaching popular upper level electives (Parasitology, Immunology) to offer graduate level instruction. Additional faculty would allow the department to expand the number of different upper division courses, or sections of current courses offered. This would also permit current faculty release time from undergraduate courses to teach at the graduate level or offer a greater variety of undergraduate courses. The additional courses would allow our majors the opportunity to broaden their education in biological science and to be dispersed over additional offerings, reducing class size.

**Action Item 4.1: Increase the number of undergraduate courses by increasing the number of tenure /tenure track faculty to a minimum of 35 FTEs.** This action item can be accomplished through cooperative efforts of the chair and faculty to identify disciplines important to quality education; and with the Dean of Arts and Sciences to fill current vacant lines, immediately replace anticipated retiring faculty upon their retirement, and allocate new lines.

**Action Item 4.2: Evaluate our undergraduate curriculum with a focus on improving the quality of our undergraduate majors.** The department implemented a pre-major in Fall 2004 which requires students to demonstrate proficiency in principles of biology, ecology, microbiology, general chemistry, and organic chemistry prior to acceptance into the major. Students must have grades of C or above in each of the required biology and chemistry courses, and



maintain a minimum 2.5 grade point average in the required pre-major courses. The departmental Undergraduate Curriculum Committee will review on an annual basis the requirements for entering the major in conjunction with other assessment measures in the major in order to determine if the pre-major requirements are adequately preparing students for work in the major.

A departmental *ad hoc* committee is currently reviewing our lower level curriculum to ensure that our students receive the strong foundation necessary in biological sciences for them to excel in upper division courses while at the same time addressing the fundamental issue of increasing enrollments. It is hoped that the results of this study will allow the department to improve the quality of an already superior program, enhance opportunities for students, and introduce flexibility for both students and faculty.

**Action Item 4.3: Foster mechanisms to enhance and increase the undergraduate experience in research.** The departmental Undergraduate Curriculum Committee will investigate the requirement that students interested in enrolling in Special Problems courses (Biol. 4900-4910) also complete an Honors Thesis. The chair will direct faculty members to include summer research stipends for undergraduate students in grant applications as part of the sign-off process.

**Action Item 4.4: Increase career opportunities for students who are not majoring in pre-professional studies.** Faculty, in cooperation with colleagues in the Department of Chemistry, will complete the development of a certificate program in forensic science by the fall 2005 semester as an option for students earning a BS in Biological Sciences.

**Action Item 4.5: Increase the number of departmental scholarships available to attract and retain outstanding students.** See Academic Goal 5.

**Action Item 4.6: Stimulate within undergraduate students an appreciation for interdisciplinary collaborative teaching and research that can be fostered by interaction with other academic units within UNT.** See Action Item 3.5 above.

Additionally, the chairs of Biological Sciences and Philosophy and Religion are working together to develop a core course in scientific ethics. This course will be taken by all majors to fulfill the social and behavioral science portion of the university core curriculum.

**Academic Goal 5: Establish greater communication with our alumni base to develop a donor network.**

**Action Item 5.1: Develop an alumni list.** Working with the College development officer, the chair will identify and locate the department's alumni. Emphasis will be placed on graduates who went on to earn professional degrees.

**Action Item 5.2: Establish a departmental newsletter.** The chair, working with the division directors will design a Department of Biological Sciences Newsletter. The newsletter will be the primary vehicle used to update alumni. The newsletter will be published each long semester. Ms. Rebeka Moreno will be responsible for assembling the newsletter.

**Action Item 5.3: Develop a donor program.** Working with the College development officer, the chair will develop a list of potential donors. Initial efforts will be focused on alumni who received graduate degrees from the department before going on to earn MD, DO, or DDS degrees. The chair, with the college development officer and the graduate's major professor, will contact these alumni to discuss giving to the department. The strong faculty-student relationship established during graduate school should result in a high percentage of success. Donations will be used to fund undergraduate and graduate tuition scholarships, and undergraduate summer research stipends.

Dr. Ken Dickson will be encouraged to reestablish the Silvey Society.

The chair will work with Dr. Kenneth Stewart and Dr. Ken Dickson to establish endowed scholarships in their names.

**Action Item 5.4: Establish a departmental advisory board.** Using its alumni base the department will begin to establish an advisory board. Following this initial step, the advisory board will be expanded to include non-alumni members.