

A strategic plan through the year 2010

**for the College of Natural Sciences
University of Northern Iowa
Cedar Falls, Iowa
May 4, 2007**

Mission Statement: The mission of the College of Natural Sciences is to provide a high quality education that will prepare students to live and work in an increasingly scientific, technological, and mathematical world. The faculty is committed to achieving academic distinction through dedicated teaching, basic and applied research, including student-centered research, and public and professional service.

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Vision and Aspiration:

The College of Natural Sciences at the University of Northern Iowa aspires to remain a distinguished college of science, mathematics, and technology in a learning-centered, comprehensive university setting. We acknowledge our need to improve – we need to recognize and address the new challenges that the college now faces. For example:

- Changing abilities, inconsistent preparation, and shifting interests of incoming students in science and mathematics
- Changing valuation of science by society. An era of unprecedented reliance on science and technology charges us with redoubling our efforts toward citizen science-literacy.
- Narrow but organized sub-groups of society particularly ill informed of science (e.g. the "intelligent design" movement)
- Science's share of policy-making influence is in the ebb phase of an ebb flow cycle.
- A potential for under-valuation of niche programs essential to the College's academic mission.
- Increasing indifference to supporting public higher education among legislators, including under funding of programs.

We need to work with other educational institutions, government, and industry, building on each other's strengths to provide Iowa's citizens with the education they need for future occupations and citizenship.

Goals of the College:

Goal 1: Increase scientific, technological, and mathematical literacy among UNI students and the general public within reach of the college.

Future leaders in government, business, education, and the media would benefit from a comprehensive understanding of science and technology. People who possess higher levels of scientific and technological literacy are better prepared to make well-informed cultural, social, economic, and political decisions on matters that affect or are affected by science and technology.

Subgoal 1: Re-visit University-wide LAC science, math and technology requirements

- Encourage new science topics (courses) that fit the new Capstone model
- Support collaborative Capstone courses with faculty outside of the College of Natural Sciences

To promote scientific, technological and mathematical literacy, the College of Natural Sciences will provide teaching and learning systems that promote in UNI students and the general public the ability to:

Subgoal 2: Distinguish relationships between science and technology.
Strategies to achieve this sub goal include:

- Expand curriculum to teach the following:
 - Science and technology are pursued for different purposes.
 - Science often advances with the introduction of new technologies.
 - New technologies are often developed through advancements in science.
- Use a strong lab-based curriculum to teach students to understand and use the scientific method.

Subgoal 3: Evaluate and recognize positive and negative impacts of science and technology on all aspects of society and government.
Strategies to achieve this sub goal include:

- Promote field trips to industrial plants and applied science projects where students can observe real-life applications of science, technology, and mathematics.
- Maintain communication with appropriate government agencies to understand the ongoing impact of science, technology, and mathematics on policy.

Subgoal 4: Analyze challenges regarding science, technology and mathematics in all aspects of today's society.

Strategies to achieve this sub goal include:

- Involve students in innovative projects to design useful scientific, technological, and mathematical models.
- Invite speakers to discuss perceived controversies regarding science and technology.
- Critically evaluate popular media's treatment of science, technology, and mathematics through college-wide action

Subgoal 5: Understand the historical developments and future trends of science and technology.

- Use historical case studies to analyze successes and failures and future trends in science, mathematics, and technology.

Goal 2: Maintain Academic Rigor

The most important long-term indicator of our survival as a University is going to be the quality of education our students receive, particularly as lower-cost alternatives proliferate.

Subgoal 1: A University of Northern Iowa degree must be an impressive credential, representing a substantial liberal arts education.

Strategies to achieve this sub goal include:

- Advocate for separate resources that support College of Natural Sciences liberal arts core (LAC) courses
- Review promotional and recruitment materials from College of Natural Sciences to ensure they emphasize the quality of our education and the quality of our faculty.

Subgoal 2: Every course taught in the College of Natural Sciences must meet the top standard of excellence for our discipline.

Strategies to achieve this sub goal include:

- Compare current department offerings and course content with curriculum recommendations from professional societies, peer institutions, and accrediting agencies
- Continue to maintain student grades as an honest and accurate assessment of student learning.

Subgoal 3: Departments should ensure that their curricula are as current and useful as possible.

Strategies to achieve this sub goal include:

- Continue to involve local industry in the design of our curricula
- Examine options to require or encourage students to take a technical writing course if it is not already integrated in the curriculum

Subgoal 4: Increase the number and applicability of all content courses taken by elementary education majors.

Strategies to achieve this sub goal include:

- Promote the dialogue between Science Ed and the College of Ed to better communicate the necessity of elementary teaching majors being well prepared to teach science, technology and mathematics.
- Actively promote the basic science minor
- Provide incentives for students in elementary education to take more science, mathematics, and technology courses.

Subgoal 5: Recreate a College of Natural Sciences student culture where college is the student's number one priority.

Strategies to achieve this sub goal include:

- Create more opportunities for meaningful, program-related work-study.
- Use the current scholarship models (e.g. athletics and music) to establish our own scholarship program.
- Coordinate with the UNI Residence Hall Association to develop a College of Natural Sciences Residence Hall program.

Subgoal 6: Create articulation agreements that reflect and maintain standards of excellence within our discipline.

Strategies to achieve this sub goal include:

- Provide basic course information such as current syllabi and textbooks to the local community colleges, and request this information from them as well.
- Meet annually with faculty from community colleges to discuss the transition of students from community colleges to UNI and to College of Natural Science courses.

Goal 3: Increase the visibility of the College of Natural Sciences

To highlight the strength of our academic programs, the scholarship and quality of our faculty, and richness of our overall environment:

Subgoal 1: Increase opportunities for underrepresented populations of students in science, mathematics, and technology programs.

Subgoal 2: Develop a successful student-recruiting program for the college.
Strategies to achieve this sub goal include:

- Create a staff position for a person to be in charge of college wide recruitment.
- Increase the number and amount of scholarships.

Subgoal 3: Strive to Integrate College Center Activities and Academic Programs
Strategies to achieve this sub goal include:

- Coordinate outreach with grade-schools, high schools and community groups
- Fund academic research, seminars and special courses with line-item appropriations and earmarks
- Provide funds for student activities/travel e.g Intercollegiate Academic Funds

Subgoal 4: Augment/support outreach projects to the community an awareness of science (e.g. observatory, Boy Scout merit badges)
Strategies to achieve this sub goal include:

- Support College of Natural Sciences sponsored community activities on a regular basis (Sigma Xi lectures, Leland Wilson lectures, botanical center open houses, etc.)
- Promote a closer tie between academic programs and the UNI Foundation, by inviting a foundation representative to present a summary of their yearly activities at the annual faculty meeting

Subgoal 5: Take advantage of the current public visibility of the need for more science, technology, and mathematics teachers
Strategies to achieve this sub goal include:

- Provide more professional development opportunities for current teachers
- Provide more course-work using non-traditional means (summer school, distance learning, evening and Saturday courses etc.)

- Encourage more interaction among pedagogical and content approaches to science, technology and mathematics education
- Increase opportunities for underrepresented groups in science education

Goal 4: Increase support for scholarly activity

Our college must maintain an atmosphere where scholarship and professional growth is encouraged, in order to continue to attract external funding, students, prestige, and more top-notch faculty.

Subgoal 1: Make course load reductions available for faculty members for grantsmanship and research.

Strategies to achieve this sub goal include:

- Validate alternate workload models that deviate from traditional teaching, service, research proportions to allow faculty to be more engaged in a specific area.
- Collaborate with the Office of Sponsored Programs (OSP) to develop grant writing support programs.
- Provide seed money for research on a competitive basis.

Subgoal 2: Help provide funding for graduate and undergraduate teaching assistantships.
Strategies to achieve this sub goal include:

- Institute college wide efforts to obtain extramural support for graduate and undergraduate programs.
- Create a College of Natural Sciences endowment fund to provide graduate student stipends from the college.

Subgoal 3: Make materials necessary for research available on a sustainable basis.
Strategies to achieve this sub goal include:

- Persuade administration to provide funds from all indirect revenues, including earmarks, to maintain and repair scientific materials/supplies.
- Dedicate a portion of the fee for use of a facility from external grants/consulting for material/supplies and software maintenance.
- Compile a college-wide inventory of scientific equipment, perhaps having a unified College of Natural Sciences Central Supply Store

Subgoal 4: Expand our undergraduate research programs.
A strategy to achieve this sub goal is:

- Provide more summer undergraduate research fellowship opportunities for all departments.

Goal 5: Provide strong support staff for all college programs

High quality college programs can only be sustained with strong support in computer services, academics and student assistants.

Subgoal 1: Increase quality of College of Natural Sciences computer support.
Strategies to achieve this sub goal include:

- The College of Natural Sciences Computer Advisory Committee (CAC) shall perform an annual survey of needs that addresses the following topics: types of operating systems required, hardware vs. software needs, email clients used, MAC vs. PC use.
- College administration shall adjust support based on survey results.
- Hire qualified student workers who are more technologically diverse.

Subgoal 2: Redistribute support staff to allow for academic support of under-prepared students.
Strategies to achieve this sub goal include:

- Create consolidated College of Natural Sciences tutoring center, in coordination with the University tutoring center, staffed by students under the direction of staff.
- Use support staff to establish communication with local community colleges and high schools to decrease the gap between the perceptions of “preparedness” vs. the reality of “preparedness” at the University level.

Subgoal 3: Redistribute or add support staff to strengthen academic programs.
Strategies to achieve this sub goal include:

- The Dean shall survey all College of Natural Sciences departments to determine the needs of technical vs. administrative support staff by spring 2008.
- College administration shall reallocate or add staff based survey results.

- Help support student assistantships by increasing visibility of the College of Natural Sciences in University sponsored programs such as Cooperative Education and Internship programs.

Goal 6: Strengthen graduate programs within the College of Natural Sciences

The College of Natural Sciences at UNI is at a critical juncture with respect to graduate education because of the present opportunities and challenges with respect to integrating the new Professional Science Masters (PSM) programs into existing traditional MS and MA programs in biology, mathematics, computer science, chemistry, science education, industrial technology (includes doctorate) and environmental science/technology and health.

Subgoal 1: The College of Natural Sciences shall promote an active, diverse, but unified graduate community

Strategies to achieve this sub goal include:

- By Fall, 2008, the College of Natural Sciences will establish a task force to investigate recruitment strategies that may include centralizing all admissions through one coordinator.
- By Fall, 2009, the College of Natural Sciences will organize and support at least one formal gathering/semester of all College of Natural Sciences graduate students.

Subgoal 2: The College of Natural Sciences will strive to ensure that all its programs attract highly qualified students

Strategies to achieve this sub goal include:

- Budget competitive Research Assistant stipends for at least six MS (thesis) students in each program.
- Budget competitive Teaching Assistant stipends for graduate students.

Subgoal 3: Strengthen support for both disciplinary and interdisciplinary research

Strategies to achieve this sub goal include:

- Increase incentives and support (e.g., research start-up, funded course releases, professional development, etc.) for launching innovative projects.
- Increase College Center (i.e. CEEE, RRTTC, Metal Casting) support for graduate students and support-staff for experimental research
- Formally recognize and reward graduate mentoring

Subgoal 4: Articulate and assess excellence in graduate education
Strategies to achieve this sub goal include:

- By Fall, 2007, establish clear expectations for MS vs. MA vs. PSM students
- By Fall, 2008, require departments to establish evaluation criteria for students from admission to graduation
- By Spring, 2009, establish a mechanism to monitor student progress and to track employment after graduation

Goal 7: Maintain state-of-the-art facilities

The quality of academic and scholarly programs depends on maintaining state of the art facilities in teaching and research laboratories as well as classrooms. This can serve to recruit qualified students and faculty to our University.

Subgoal 1: Maintain instrumentation in teaching and research laboratories.
Strategies to achieve this sub goal include:

- Persuade administration to provide funds from all indirect revenues, including earmarks, to maintain and repair scientific equipment.
- Dedicate a portion of the fee for use of a facility from external grants/consulting for equipment and software maintenance.
- Compile a college-wide inventory of scientific equipment that is readily accessed by faculty and administrators.
- Compensate in some way the faculty members responsible for equipment maintenance and training, and include the possibility of additional hires for that end.

Subgoal 2: Update or renovate outdated classroom and laboratory space.
Strategies to achieve this sub goal include:

- Provide support to renovate/update all College of Natural Sciences teaching laboratories and classrooms on a regular basis.
- Set up a rotating schedule between College of Natural Sciences departments where some work is done every year.

Subgoal 3: Update support for distance learning.
A strategies to achieve this sub goal is:

- To deliver better education to off-campus students, supplement Iowa Communications Network (ICN) with Internet-based communications.

Goal 8: Foster collegiality in the College of Natural Sciences

A collegial culture fosters a mindset of shared governance that includes the spirit of friendliness, agreement, and professional respect of others; which in turn promotes academic quality and productivity.

Subgoal 1: Encourage social congeniality among students, faculty, and staff
Strategies to achieve this sub goal include:

- Facilitate student-faculty interactions via extra curricular activities
- Re-energize and centralize Family Weekend event with fun activities.
- Strengthen existing departmental activities, such as student recognition, banquets, and student academic associations.

Subgoal 2: Strengthen social interactions and academic collaboration among faculty
Strategies to achieve this sub goal include:

- Promote interdisciplinary teaching, service, and scholarly activities in the College.
- Promote intellectual exchanges and recreational interactions outside the classroom (Brown Bag seminars, intramural sports, social hours, etc.).

Subgoal 3: Increase social interactions and academic dialogue among administrators.
Strategies to achieve this sub goal include:

- Hold annual Department Heads-only social events.
- Increase contact between center directors, department heads, and faculty.

Subgoal 4: Promote professional relationships between the college and the community at large.
Strategies to achieve this sub goal include:

- Make proactive efforts to participate in community groups and programs (Kiwanis Club, School Advisory Boards, Lions Club, etc.).
- Faculty involved in community engagement should be recognized by the College for their efforts.
- Invite members of community groups to college meetings and conferences relating to issues of mutual interests.

Appendices:

Description and Characteristics of the College

The College of Natural Sciences at the University of Northern Iowa seeks to educate students to live and work in an increasingly scientific and technological world. To carry out this mission, the College emphasizes quality teaching, research and experiential learning. In addition to liberal arts and technical programs, teacher preparation programs are offered in the sciences, mathematics, and technology. The College also believes in sharing its knowledge through technology transfer to the community and through public and professional service.

The College of Natural Sciences includes the departments of Biology, Chemistry and Biochemistry, Computer Science, Earth Science, Industrial Technology, Mathematics, Physics, and Science Education. Students can select from a wide variety of teaching and nonteaching majors in these areas.

Students also have the option of combining an interest in one of the natural sciences with an environmental emphasis, or they may decide on an interdisciplinary major such as biotechnology or chemistry/marketing. New majors and courses in bioinformatics, networking and system administration, and nanoscience and nanotechnology are now available.

The College offers 42 bachelor's degree (both B.A. and B.S.) programs, 18 master's degree programs, and one doctoral program. Approximately 180 faculty and staff members, housed in eight campus buildings, serve roughly 1,600 graduate and undergraduate CNS majors.

CNS students benefit from a favorable instructor-to-student ratio and many opportunities to participate in undergraduate research projects and other experiential learning opportunities such as field trips and internships. A host of student organizations offer many ways for students to become involved.

Many of the special programs in the College, such as the Recycling and Reuse Transfer Center, the Tallgrass Prairie Center, and the Metal Casting Center, offer students opportunities for experiential learning and at the same time serve the local community and the region by providing technology transfer. Still others, such as the Center for Energy and Environmental Education, are an important resource for educating specific groups within the community as well as the community at large.

Among the College's facilities are two observatories, two greenhouses, a federally funded weather simulation laboratory, and the UNI Biological Preserves System, which consists of 145 acres of native and reconstructed prairies and forests.

Trends and Assumptions

Students:

Between 2001-2002 and 2006-2007, undergraduate major enrollments within the CNS Departments has fallen from 1685 to 1551, a drop of 8%. (To provide some context for this, overall UNI undergraduate enrollment dropped by 14% during this period.) During this period, the numbers of majors in Biology, Chemistry, and Earth Science have increased, Industrial Technology has remained steady, those in Mathematics and Physics have declined slightly, and those in Computer Science and Science Education have decreased by more than 40%.

During that same period, graduate major enrollments in CNS have dropped from 136 to 107, a drop of 21%; the UNI decrease was only 4%. Significant declines are noted in Computer Science (from 22 to 8), in Environmental Science (from 14 to 9), and in Industrial Technology (from 42 to 22).

Student credit hours generated by the college have dropped by 24% over the five-year period. The significant trends here have been declines of more than 20% in each of Biology, Computer Science, Mathematics, and Physics.

Faculty:

During the period from 2001-2002 and 2006-2007, the number of tenure-stream faculty has increased in CNS from 108 to 114 (5.5%). Biology increased by 3 faculty members, Chemistry by 2 and Industrial Technology by 3, while Mathematics was down 2.

Budget:

During this period, the total money budgeted for salaries in CNS has increased by 18%. Supplies and services (S&S) funds have decreased by 22% while the budget within CNS for equipment has decreased by 23%.

Significant support for commercializable faculty research was provided by the Battelle funds; that program is unlikely to be continued by the state this year. Federally directed appropriations have provided additional support for faculty activities; that source too will be less helpful in the coming year.