MISSION:

The Graduate program in the Department of Geoscience emphasizes excellence in research and education in the physical, chemical, and biological aspects of the Earth as a basis for fundamental understanding of its processes, materials, structure, natural resources, and history. Our goal at both the M.S. and Ph.D. levels is to produce well rounded, knowledgeable, independent scientists who are skilled at gathering and analyzing data from multiple sources, synthesizing it, and communicating the results in written and oral formats. We train professional earth scientists at the M.S. and Ph.D. levels for careers in industry, government, and academia.

ADMISSION PROCESSES AND CRITERIA:

• **Student Demand.** The Department experienced an increase in demand for its graduate programs that coincided with a period of faculty turnover and new hires from 2000 to 2003. Since then our applicant pool has averaged about 40. During the last three academic years our graduate enrollment has ranged from 40 to 46, approximately evenly split between M.S. and Ph.D. students. This is close to our historical norm since 1998 (44.5) and is the proper number and mix of students for a Geoscience department of our size.

• **Criteria for Selection.** Recommendations on admission are made by the six-person Graduate Admissions Committee, chaired by the DGS. Factors considered are GRE, GPA, personal statement, letters of recommendation, coursework preparation, previous research experience, etc. The Department enforces a minimum admission standard for the MS degree of combined 1100 verbal/quantitative and 4.5 analytical writing on the GRE OR 3.0 undergraduate GPA and for the PhD degree of combined 1100 verbal/quantitative and 4.5 analytical writing on the GRE OR 3.2 graduate GPA and 3.0 cumulative GPA. Recommendations on priority ranking for financial aid are made via a consensus sum of ranks of each of the six committee member's individual rankings.

• **Success in Enrolling the Highest Quality Students Admitted.** The Department has done reasonably well in attracting its top-ranked admitted applicants to its graduate programs. In 2009, 4 of the top 10 applicants joined the program, 8 in 2008, 8 in 2007, 5 in 2006, 3 in 2005, and 5 each year in 2004 and 2003. Average GPA of Geoscience graduate applicants admitted during 2004-2007 was 3.22, slightly below the UI physical sciences average of 3.31. The GRE scores of Geoscience during the 2004-2007 period were well above the national average for geology departments (+62) and slightly below (-21) the average of UI physical sciences departments. These are significant improvements from the 2003-2006 period when Geoscience GRE scores were 31 points above the national geology departments average and 48 points below the UI physical science department average. GRE analytical writing scores for our incoming graduate students average 4.6 for the period 2004-2007, well above the average of UI physical science programs (4.3) as well as all UI graduate programs (4.4).

• **Success in Enrolling a Diverse Student Cohort.** Geology as a discipline faces considerable challenges with underrepresented minorities and gender equity. The Department has and
continues to work vigorously to improve in this area. In the area of advising and mentoring, we currently have four female faculty members, which is above average for a geoscience department of our size. We currently attract around a 50:50 gender split in graduate applicants (19:20 M:F in 2009). We currently have one graduate student on a NSF-AGEP Fellowship. We also boost qualified minority applicants in our rankings for admissions and aid by giving them first preference in the case of equal ranking with non-minority applicants.

- **Graduate student financial support.** The Department awards TA positions on a competitive basis, following the ranking recommendations of the graduate admissions committee (see above). Students recommended for admission to our Masters program with financial aid typically receive a commitment of two academic years of a research or teaching assistantship. PhD students typically receive a commitment of four academic years of an assistantship. These offers apply as long as satisfactory work is being done for the graduate assistantship, and satisfactory progress is being made toward completion of the degree. The number of research assistantships and post-docs offered to students each year depend on individual faculty funding through external grants. Over the last three academic years, we have offered an average of 5 RA positions each year supported by grants, and we presently have two post-docs.

**PROGRAM OUTCOMES:**

- **Degree completion and time to degree** A total of 15 Ph.D. and 38 M.S. degrees were granted in Geoscience for the 5 year period from August of 2003 to December of 2008. Time to degree for PhD students in the 2003-2008 period was 6.7 years, significantly longer than the average TTD of 5.4 years for Math/Physical Science and Engineering. Our TTD is still lower than the average TTD of those earning a PhD in the broader Earth, Atmospheric and Ocean sciences in 2003 (7.1 years w/o Masters Degree, 10.1 years with PhD-related Masters) (http://www.nsf.gov/statistics/infbrief/nsf06312/ accessed 9/10/09). Available data on PhD completion are from students enrolled in the program in 2000-2008. Our completion rate of 56% is in the upper-middle of UI mathematical and physical sciences (average 53%). This represents a significant increase over the period 1996-1998 (completion rate of 40%) and reflects an improving cohort of students attracted by our recent hires and improving research facilities. We anticipate this improvement trend will continue.

- **Graduate student fellowships, awards, honors and publications.** Participation by the Department’s graduate students in fellowships, student grants, and other opportunities, both internal and external, has increased markedly over the past few years, but there is room for improvement to reach our full potential. We currently have one GAAN Fellow one Dean’s Graduate Fellow (both PhD candidates), and have had 6 students awarded Graduate College Summer Fellowships in the 2004-2008 period. Over the past 3 years graduate students in our program have received 7 research grants and one “best student research proposal award” from the Geological Society of America. Resident students have been author or co-author on more than 45 published abstracts of papers presented at professional meetings and conferences, and have authored or co-authored 19 papers in peer-reviewed journals. The faculty is actively working with our graduate students to increase this level of external research funding and scholarship by encouraging submission of proposals for external research and travel funds, encouraging MS candidates and requiring PhD candidates to report on their research at professional meetings, and by encouraging thesis formats oriented toward publishable papers.
**Graduate student placement.** The placement of our graduate students matches the mission statement of our Department well. Among 10 Ph.D. recipients in the 2005-2008 period, 5 teach at colleges or universities (all on tenure-track), 3 are employed by a government agency and one has left the field. Among 16 MS recipients, 9 are enrolled in Ph.D. programs, 2 work for government agencies, 2 work for industry, one teaches K-12, and the placements of 2 are unknown.

**PROGRAM CHARACTERISTICS:**

**Size and nature of the graduate program.** The Department currently has 15 regular faculty FTEs, all of whom are advising current graduate students. The Department currently has 44 graduate students (23 PhD, 21 MS). Individual faculty members are responsible for advising between 1 and 6 graduate students, with an average of 2.9 per faculty member. The Department operates on the principle that 25% of teaching effort, or 10% of overall faculty time on a standard PTEA, should be spent on mentoring and advising graduate students. Given our faculty size, space availability, and areas of expertise, about 45 graduate students is an appropriate program size, split evenly between PhD and MS students.

All our faculty members are involved in undergraduate education. Besides Undergraduate Geoscience majors departmental faculty also advise students in three of the Environmental Science Program tracks and teach the GER Introduction to Environmental Science class (12/159:008). Our TAs have taught approximately 1000 students each semester over the past few years, and we expect that number to be about 1100 this year. Most of these students are taught in labs or discussion sections in our general education courses. Approximately 80 to 100 students are assisted by TAs in non-GE courses.

**Comparison with similar programs.** The size and gender mix of our graduate population compares favorably with programs having similar faculty numbers in peer institutions. In the latest U.S. News and World Report our program is tied for 70th overall for Earth Sciences, #43 for public schools. Our Paleontology program is #8 overall and #5 for public schools.

**Candid analysis of the current strengths and weaknesses of the department's graduate degree program(s).** One strength of our graduate program is the quality of research and teaching done by our graduate students. As shown above, many present talks at national and international meetings and publish papers in high-impact journals. Our students typically serve as excellent teaching assistants for our courses. Another strength is the success of our students gaining employment or continuing in their education when they complete the degree. We have a good balance of PhD students, and MS students. In addition, most of the graduate students meld into a cohesive and optimistic group and are generally express satisfaction with their education here.

Our principal weakness is the TTG for our PhD students, which at 6.7 years is too long. In Spring 2007, the Department reinstituted an annual faculty meeting specifically for assessment of graduate student progress toward degree completion. Beginning this fall (2009), a designated member of the Graduate Admission Committee will be responsible for communicating with graduate students about their progress every semester. The goal is to bring our TTD in line with the average for other UI mathematics, physical science, and engineering departments (5.4) within the next three years.
• **Opportunities for potential growth or reorganization to improve graduate program excellence.** Our plans to enhance the excellence of our graduate students include tightening supervision, which will include an evaluation of progress every semester to make sure they are meeting guidelines. We have been increasing the RAs funded by external grants over the past several years as the funding levels from University sources has decreased. We intend to continue this upward momentum. Discussions at our Geological Alumni Advisory Board meetings over the past couple of years have focused on enhancing alumni-graduate student interaction to make sure our ability to place our graduates in successful career paths remains strong. Our graduate student’s research presently involves faculty members from Biology, Computer Science, Museum Science, and Anthropology. We would like to continue and enhance this cross-disciplinary work to make sure our students are prepared for the challenges of the coming decades. The recent focus on sustainability at the University of Iowa will offer additional opportunities of this nature in the near future.

• **Other factors to consider in deliberations of the Task Force?** Graduate students are essential to the Department’s teaching and research missions. TAs are needed to run laboratories for our large classes including the large and popular courses undergraduate students use to satisfy the CLAS General Education requirement in Natural Science. The thesis research accomplished by graduate students as well as their contributions as Research Assistants play crucial roles in our faculty’s drive to increase external funding and improve our national and international visibility.

**CONCLUSION/SUMMARY:**

Our graduate program will continue to focus on the development of highly productive scientists with knowledge and skills needed to excel in academia, government, and industry. To accomplish this, we will continue to have a balanced mix of M.S. and Ph.D. students (~50:50) with about three graduate students per faculty member. We expect the quantity and quality of students applying to our graduate program to continue to increase as our newly hired faculty establish themselves in the discipline. We also intend to implement measures to decrease the time to degree completion of M.S. and Ph.D. candidates, increase presentation of student research at national meetings, increase successful student application for grants, and encourage submission of student manuscripts to peer reviewed journals prior to graduation.