Marty Baxter, Jodi Ryder and Patrick Kinnicutt

Central Michigan University Department of Geology Pre-workshop Essay

The department contains 11.5 tenure track faculty, with 3 in meteorology, 8 in geology, and .5 in science informatics. In addition, the department has 4.5 non-tenure track faculty. The department offers undergraduate major and minor programs in Geology and Meteorology with thesis and non-thesis options. The department also offers a concentration in Hydrogeology/Environmental Geology and contributes heavily towards Integrated Science, Environmental Studies, and Earth Science majors. The Meteorology program left the Geography department to join with the Geology program in the Fall of 2008.

The department has grown over the past 6 years from 4 faculty to its current state. Both the meteorology and geology programs have solid reputations in teaching, research and service, providing an undergraduate-only program where most of the students either continue on for graduate studies or successfully find employment in a geoscience position. The department encourages and promotes curricular development amongst the faculty. The meteorology program is currently the only undergraduate meteorology program in Michigan. The geology program, while maintaining its classical tradition, has added new courses in geostatistics and engineering geology and discussion of new courses continues. The department also strongly encourages faculty to attend pedagogical workshops, and has actively been using collaborative teaching techniques and modern technologies in its courses. Many opportunities for undergraduates to participate in research exist in the department. Undergraduate students regularly present at national and international conferences, and students have won numerous awards for their research. The department has some of the most rigorous scholarly expectations in the college even though it is the only undergraduate-only department. Faculty have also received numerous grants from major agencies such as NSF and have been active in their professional communities. In professional service, faculty have been involved in activities such as chairing conference sessions, reviewing grant proposals and journal papers, and serving as editor or assistant editor. The faculty also participate heavily in college and university shared governance. All the faculty are actively involved in all of the above activities, with everyone pulling their share. Historically, the department has self-governed itself as a committee of the whole, with everyone serving on all the departmental committees.

The department, while very strong, has recognized weaknesses which we are attempting to address. The department has a low number of majors relative to the number of faculty, with all faculty teaching service-level courses to maintain the department's budget. Recruitment of students has been an ongoing concern in geology, and significantly impacts the number of upper-level course offerings that can be offered during a given semester. Research expectations in the university have increased during the past 5 years, with no reduction in teaching load (3-3) or service expectations to compensate. As the university operates under the student credit hour model, the development of interdisciplinary programs and cross-listed courses is mired in interdepartmental politics.

With the merger of the Meteorology and Geology programs, challenges exist in leveraging the strength of each individual program to raise the level of the department. The faculty believe that by starting a new program in hydrology, the expertise of both meteorology and geology faculty can be combined into a program that serves our student population effectively. A hydrology program fits well with the interests of many of the faculty in the department, and would serve the student population who want to stay in Michigan, as there are few hydrology programs anywhere in the country. One major issue the department is grappling with concerns how the new program can effectively start without financial support from the administration; we believe the addition of one new faculty member would be necessary to start the new program.

A new department self-study is in the works which incorporates the addition of the meteorology program. Both programs have active program assessment plans in place. In planning the future direction of the department, the faculty have contacted departments that have similar programmatic structures, and have integrated meteorology and geology programs. In addition, the department recently held an alumni summit to discuss the relationship between future directions of the department and the current state of the geosciences field. In the Fall of 2009, external evaluators will examine the most appropriate structure for an Earth Science major given the fact that both the Geography and Geology departments offer earth science related coursework. The external review of Earth Science was initiated by the Dean's office, while the proposed hydrology major was initiated by the Geology department faculty. It will be a challenge for all vested parties to define the best solution for the college and university in the face of diminishing resources.

**Ntungwa Maasha**

# Geology at the College of Coastal Georgia

## Introduction

The College of Coastal Georgia is a unit of the University System of Georgia (USG). Up to last year (2008) the college was a 2-year community college offering primarily pre-baccalaureate associate degrees and college transfer programs as well as career certificate programs in technical areas. Most of the classes for the 3000-strong student population are held at the main campus of the college in the coastal city of Brunswick and the remaining are conducted at the Camden center about 45 miles south of Brunswick.

Currently the college is in the process of transitioning from a two-year to a 4-year college. Beginning the 2009 fall semester students can enroll in any of the four approved baccalaureate programs: nursing, business, elementary education, or secondary education. The college will continue to award the Associate degree in other areas it offered as a community college.

## The Geology Program

Geology is housed in the Division of Mathematics, Science, and Physical Education. It is offered as a concentration leading to an Associate of Science degree in geology. As all Associate degree programs in the University System of Georgia, the geology program complies with all the requirements of the USG Core Curriculum and meets the criteria for transfer to any four-year unit of USG. Our program at the College of Coastal is comprised of:

Area A- Essential Skills (9 credit hours in Language arts and mathematics)

Area B –Institutional Options (4 credit hours in communication, computer science, or foreign language)

Area C-Humanities/Fine Arts (6 hours in literature, humanities of fine arts)

Area D- Science and mathematics (11 credit hours in science and mathematics)

Area E -Social Sciences (12 hours in political science, US history, anthropology, or world civilization)

Area F – Area of Concentration (18 credit hours in course that support geology)

- 8 credit hours in geology (physical and historical geology)
- 10 credit hours in chemistry, physics, or mathematics.

Area G – Physical Education (4 Credit hours in healthy living concepts and an a course in a physical activity

Presently the only courses in geology taught at the College are physical and historical geology. Both courses have a laboratory component and have no pre-requisite so that they can be taken independently of each other by any student in an Associate degree or transfer program. Typically, students in each course take several field trips to places of geological interest to complement laboratory work (e.g. Providence Canyon, beaches on any of the islands in Brunswick, or active quarries).

The geology faculty consists of one full-time and two part-time teachers. In the fall and spring semesters sections of both physical and historical geology are offered in Brunswick while the offering at the Camden center alternates between historical and physical geology.

While the geology program at the College of Coastal Georgia is still in its infancy, its strength has been the power to expose the students to the earth sciences especially through field trips and laboratory exercises.

Submitted by Nrungwa Maasha, PhD

May 6, 2009

Brent Owens, Professor and Chair
*Department of Geology at the College of William and Mary*

The Department of Geology at the College of William and Mary consists of six faculty members one full-time laboratory instructor, and one administrative assistant and is an undergraduate-only department. Our program is designed to provide each major with a strong, broad background in geology that is sufficiently flexible to allow students freedom to follow their own interests. The major may choose one of two options, either general geology or environmental geology. At any given time, we have approximately 40 declared majors, and we graduate about 20 seniors each year.

Ours is a vibrant department committed to the twin missions of teaching and research. All of our faculty members (with the exception of our most recent hire) have won multiple teaching awards at the college level, and three have won the Biggs Award, awarded nationally by the Geoscience Education Division of the Geological Society of America. In addition, all are active in research, receive external funding for research, and routinely publish in a wide array of peer-reviewed earth science journals (as well as geologic maps, field trip guidebooks, etc). Participation in national and regional meetings is consistently high.

A hallmark of our program is the involvement of undergraduates in research. In fact, completion of a senior thesis that includes original research is a requirement for all majors. Many students present the results of their work at regional, and even national GSA or AGU meetings. A subset of these students ultimately become co-authors (in some cases first author) on journal articles or other publications (e.g., geologic maps).

We are a close-knit department, and we value and nurture a sense of community among students and faculty. This community is built in various ways, including class and departmental field trips, annual events (fall and spring picnics, a holiday brunch, a winter chili cook-off), and the intense student-faculty interaction that happens during the senior research experience. We also have a weekly brown-bag series in which students, alumni, and faculty give presentations as well as a visiting speaker series. The Geology Club is active, though the level of activity varies from year to year. We have an outreach program, **Geology on Wheels**, in which pairs of geology students teach earth science lessons in local elementary schools, scouts, and others, and our website includes webpages on the *Geology of Virginia*, that earth science teachers across the state tell us is a valuable resource. Geology majors serve as undergraduate teaching assistants in our introductory lab courses. The sense of closeness continues after students graduate, and we maintain strong ties with most of our alumni and publish an annual newsletter. Our alums, in turn, are strong financial supporters of the department.

The department contributes to the Environmental Science and Policy program on campus and faculty within the department serve on Arts and Sciences and university-wide committees. They are also involved in professional geoscience organizations at the state to national level.

The relatively small size of our department, coupled with our undergraduate-only program, does result in some limitations. With only six faculty, we don't have faculty expertise in all the sub-disciplines of geology. We also have little in the way of analytical equipment, although we are making progress in this area. An inherent limitation in this regard is a general lack of physical space, a problem that negatively impacts our teaching and research.

Our department has no formal planning process, but we generally hold at least one retreat (half- or full-day) each year to assess various issues with our program. For example, we recently met for a half-day to discuss a single agenda item – the future of the senior research requirement in our department. In past years, we have discussed skills we want to develop in our students (using the matrix approach pioneered by Carleton College), and have revised our curriculum

Our most recent external review was held more than a decade ago. Given the significant changes in our department since that review (e.g., three new faculty members), that assessment is now out of date. However, we are scheduled to undergo an external review during the next academic year.

Ben Edwards and Pete Sak
*Dickinson College*

The Department of Geology at Dickinson College is likely very typical for a geoscience department at a selective liberal arts college. We have four faculty members with diverse Ph.D. specialties (Igneous Petrology, Structural Geology, Marine Geochemistry, Paleontology) that are responsible for teaching upper level classes to a relatively small number of majors (average ~ 6 majors/year over the past 50+ years) and a large number of non-majors (~150/year in introductory classes). We are well equipped, with good microscopy facilities including an SEM-EDS system, sound basic X-ray and geochemistry facilities (Panalytical XRF, Philips XRD, Flame and graphite furnace AA, and C analyzer), and a full-time, MSc. level departmental technician. We have consistently taken students on research/course-related fieldtrips to a variety of interesting locations in the US and abroad (Caribbean, Costa Rica, British Columbia, Iceland, Hawaii, Bahamas, eastern Europe, Scotland/England/Wales, Galapagos) to ensure that our students have broad exposure to different geological environments, and our faculty have been actively involved in several international study programs. We also have a long tradition of encouraging students to study abroad for one semester during their 3rd year, which is definitely a benefit to the students but presents curricular challenges.

We have some opportunities and challenges that are possibly more unique. Our location, in Carlisle, PA, is at the intersection of the Great Valley, the Blue Ridge, the Triassic lowlands, and the Valley and Ridge geological provinces, which means that we can drive less than 20 minutes to show students a diverse suite of rock types, depositional environments, and structures. Dickinson College, founded in 1783 by a scientist, Benjamin Rush, owns a farm on which we have a small well field for hydrogeological studies. We take many short fieldtrips, and even have outcrops of limestone on campus. Additionally, our college has recently made a strong commitment to sustainability, including the formation of a Center for Environmental and Sustainability Education and the hiring of a fulltime GIS staff member for teaching and assistance with research projects. This represents a significant opportunity for geoscience as well as a significant challenge: how do the geosciences fit in to programs for 'Environmental' and 'Sustainability' education? Another of our academic challenges is determining how to interact with a separate Department of Environmental Studies, which also houses a major in environmental science, but which is ecologically-based and places only a very minor emphasis on geoscience.

Two years ago we submitted plans for significant revisions to our department to the college-wide Academic Programming and Standards Committee (APSC), including changing our department name to the Department of Earth Science, and adding an Environmental Geology major. The plan was soundly rejected by APSC, partly because they were in the mood to reduce instead of expand the number of separate majors offered by the college, but also because they thought these changes represented too much overlap with the existing programs in environmental studies and science; however, these programs presently have only a very minor emphasis on geoscience. This summer we have been awarded modest funding to support a week-long departmental retreat to help

formulate a new plan for curricular revisions. One of the associate provosts, who sits on the APSC committee, will meet with the department for the week, and we have one student (rising senior doing earth science teacher certification) who will attend and help with developing our curricular plans. Our formal planning processes mainly comprise submitting an application to APSC outlining whatever curricular changes we want to make for their approval, at which time the proposed changes are submitted to vote of the entire faculty.

Our most recent external evaluation was completed in 2000. Since that evaluation two faculty members have been replaced in the department, and we have submitted several applications for a fifth faculty position, which, due to the present economic climate, is unlikely to be funded in the immediate future. The summary recommendations from the 2000 external evaluation included the following: (1) the department needs to consider restructuring the major requirements, partly to facilitate having more time to teach upper level electives; (2) Geology and Environmental Studies should work together to better integrate curricular goals; and (3) involvement in study abroad programs should continue to be developed but the impact needs to be carefully monitored and evaluated. In the nine years since this evaluation, all three of these issues have remained important points of discussion within the department and will form focal points for some of our July 2009 departmental retreat.

# Strengthening Geoscience Departments Workshop

**Eastern Kentucky University**
**Walter S. Borowski and R. Thomas Lierman**

Our department's survival depends on the throughput of graduating majors. Our struggle of late has been to attract sufficient majors to our program, and we have seen the number of majors rise slightly over the past two years but are not assured whether this rise will be sustained. So, our charge is to attract majors in a consistent fashion, but retain the advantages a small number of faculty (5 geoscientists) in keeping our classes smallish with one-on-one student-faculty interaction.

A small, close-knit department is our largest advantage, offering great learning possibilities in the classroom, in the field, and through independent research projects. We also have the advantage that many of our graduates do indeed go on to capture jobs in local and state government, in environmental firms, and in the petroleum industry (especially of late). Do to considerable local interest, we have just revitalized our interest in the latter by offering a course in *Petroleum Geology* and creating a co-op program with a local oil and gas company. The geosciences are also embracing the use of geographic information systems and we currently require our geology majors to take several courses in GIS, which of course is a very marketable skill. We have good facilities in terms of GIS offerings, and have several geography faculty skilled in its use.

Our weaknesses also abound. First and foremost, our department and college are resource starved. We desperately need a hydrologist/hydrogeologist, but have been unable to make this crucial hire because of the financial state of our department, university, and state. The number of our graduating majors are down, so we cannot convince the College and University to fund this crucial faculty line, but we are hampered in graduating more majors without a trained hydrologist/hydrogeologist. A classic problem. A lot of hiring occurs in local government and the environmental business that would provide jobs for our graduating majors.

Our faculty efforts are also somewhat diluted. Faculty must teach 2-4 general education courses per semester in order to keep our university numbers satisfactory, resulting in less time with our majors. Of course we use these introductory geology courses as a gateway into the major, but unfortunately our classroom audiences consists mainly of upperclassmen, who will not switch majors and who generally have little interest in geosciences; in fact, some are downright science-phobic and this negatively influences classroom atmosphere. Thus, the possibilities diminish for recruiting majors through these courses.

Finally, our geology curriculum is traditional. We teach classical geology with course classes in mineralogy, petrology, structure, sedimentation, and stratigraphy. This approach is generally fine, but the contents of the courses may not be effectively geared toward employment in the geosciences today. While some of graduates do go on to graduate school, our majors are interested mainly in getting jobs in industry or government. Thus, our curriculum must satisfy both groups. Also, we note that our graduates are not proficient in critical reading, writing, and presentation skills and we wish to remedy that by embedding pertinent exercises in all of core courses and electives that effectively build upon one another to produced skilled graduates. This Fall, we are re-programming our curriculum, so our learnings gained at this workshop will be most helpful.

Our University has a strategic planning system in which we participate, perhaps grudgingly. Our planning tasks have been useful in the fact that it "forces" faculty to brainstorm and construct strategies in bolstering our weaknesses, and also induces us to formally track the results of our initiatives. We know what initiatives have and haven't worked for us, but the overall process hasn't really worked for us. For example, the largest success of the planning process would be to justify and capture our hydrologist/hydrogeologist faculty line, and this has not happened. We will have a copy of our planning document on hand at the workshop.

***Strenghts and Weaknesses of the Geology Program***
***At Elizabeth City State University***

*A. Current Elements of Distinctiveness*

- Our program is unique among HBCUs in its offering of a Bachelor of Science degree in geology.
- Faculty are diverse in training and research interests, yet provide an integrative approach to issues that affects the planet, its people, and its environment.
- The program's expertise in spatial and geologic analysis gives it a distinct advantage in teaching, developing, and promoting Geographical Information Science (GIS) and Remote Sensing (RS) approaches to problem solving.
- The program is recognized for the success of our graduates in fields such as energy exploration, minerals management, land use management, environmental protection, atmospheric and oceanographic research, and education.
- The is distinctive in the University for its long history of successful professional public service to the local community in the form of K-12 school visitations, workshops for both teachers and students, and support of Port Discover (the local hands-on science center).

*B. Strengths*

- Research opportunities are available in the Department.
- The geology program has a good record of developing student internships in a variety of research, government, and business environments.
- Successful placement of program graduates in graduate school or their preferred employment fields.
- Geology students can graduate with the academic credentials required for eventual professional registration at the state and national levels (one of our faculty is a currently Licensed North Carolina Geologist).

*C. Institutional Limitations:*

- Incoming students generally are poorly prepared to handle the rigors of the geology curriculum. *Solution*: Require geoscience instruction for teacher certification and encourage K-12 teachers to develop geoscience curricula.
- The University has allowed the physical plant (building, environment, public spaces, etc.) to deteriorate to the point where students are physically uncomfortable as they attempt to learn (e.g., classrooms kept at 55 ºF or 95 ºF). *Solution*: Repair the physical plant to an acceptable level of operating comfort and efficiency.
- The University's campus recruiters do not speak specifically about the geology programs. *Solution*: Develop a specific marketing strategy for campus recruiters that includes the specific programs in earth science.

*D. Program Limitations:*

- The Department of Geological, Environmental and Marine Sciences (GEMS) was dissolved in the Fall of 2007 due to low enrollment in its two program, geology and marine environmental science. This came about as a result of the call of the then new president of the UNC system for increased efficiency. The geology program is now in the Department of Chemistry, Geology and Physics, and the marine science program is now in the Department of Biology
- The program has a limited budget for enhancing student research and other learning activities. *Solution*: Develop additional monies through grants and service contracts. The faculty has been doing research for a number of years to fund student research, equipment and supplies acquisitions and travel
- In the past, program relies almost exclusively on lower-division service classes to recruit majors and minors. *Solution*: Develop a diversified plan for student recruitment, and develop appropriate courses that will attract more students to the Department and the program. A scholarship program sponsored by Exxon and an alumnus has been funded, and selection of awards will be made this summer.
- The ability of the program to grow has been limited by a lack of understanding by administrators, politicians, and others of the critical importance of geoscience in education and in the community. *Solution*: Develop a long-term plan to promote the value and importance of the Department's curriculum to all constituents. As the faculty has limited time and expertise to develop marketing and promotion materials, the University's offices of Admissions, Recruitment/Retention, and Career Services and other divisions should help us to develop a more aggressive marketing strategy and provide promotional materials.

Randy McBride and Julia Nord-Cooper
*Department of Atmospheric, Oceanic and Earth Sciences (AOES) at George Mason University (GMU)*

**GMU Department Essay**

The Department of Atmospheric, Oceanic, and Earth Sciences (AOES) was recently created within the GMU College of Science and has 16 tenure-stream faculty. The geology and earth science program within AOES is small, consisting of four tenure-stream geology faculty and two full-time term faculty, and strongly oriented towards undergraduate education (similar to a geology department at a liberal arts college). The department offers a Geology B.A. and an Earth Science B.S., the latter degree has five different concentrations (geology, earth surface processes, oceanography & estuarine science, environmental science, and earth science education). Additionally, the department offers three minors, comprised of five to six courses each (i.e., 18 to 21 credits): a) geology, b) earth science, and c) ocean & estuarine science. The four tenure-stream geology faculty have expertise in the following areas: a) stratigraphy and sedimentary geology; b) geomorphology, coastal geology, and geological oceanography; c) structural geology and paleomagnetism; and d) igneous petrology. The two term faculty members have been part of the geology program for over five years each and have expertise in mineralogy, igneous and metamorphic petrology, and in paleontology and paleoclimatology. Although oriented towards undergraduate education, some of the department's geology faculty teach graduate-level courses and have graduate students through affiliated GMU departments, such as Environmental Science & Policy (ESP) or Geography and Geoinformational Sciences (GGS) that also offer M.S. and Ph.D. degrees.

In terms of student enrollments, about 1300 to 1400 students complete geology courses annually. Most students (~1200) are enrolled in the introductory geology courses (Geol 101 [physical] and Geol 102 [historical]) as part of the general education requirements of the university. Geol 101 typically has ~700 students annually with up to 28 lab sections of 28 students each, whereas Geol 102 has ~500 students annually with up to 16 lab sections. Most of these labs are taught by part-time adjunct faculty or geology graduate assistants. Currently, the department has a total of about 85 declared majors (65 Earth Science B.S., 20 geology B.A.) and about 35 minors (6 Geology, 11 Earth Science, and 18 Ocean & Estuarine Science). In 2009, 20 majors are scheduled to graduate (16 Earth Science B.S., 4 Geology B.A.), which is above average as compared to past years. Typical geology and earth science graduates secure jobs with geotechnical companies or Federal agencies (e.g., USGS) in the Washington metropolitan area and a few go on to graduate school.

**Strengths**

Geology faculty have continually taught a traditional geology curriculum (i.e., physical geology, historical geology, mineralogy [hand sample and optical] igneous & metamorphic petrology, sedimentology & stratigraphy, geomorphology, structure, field mapping, paleontology), and we require geology field camp for both the Geology B.A.

and Earth Science B.S. (geology concentration only). This has enabled us to expand the 100-level classes to their current size and provide dedicated, well-supplied laboratory classrooms and a geology prep room for both lower and upper level geology classes. . Because most of our upper-level classes are small in size (10-24) and include field trips, we have an excellent rapport with our students.

Students do pay lab fees, which are returned directly to the department for lab support. The program has 18 good quality petrographic microscopes, many binocular microscopes, and a large collection of rocks, minerals, thin sections, and fossils for both teaching and display. Following rather static enrollments from 1995 to 2005, the geology and earth science program is now experiencing a moderate increase in the number of majors and minors. We believe this is due to the following decisions: 1) started to offer all required upper-level geology courses annually (instead of alternate years), 2) added new concentrations in the Earth Science BS in oceanography & estuarine science, earth surface processes, and environmental science [Note: We will be introducing a new concentration in atmospheric sciences in Fall 2009], 3) added a new minor in Ocean & Estuarine Science, and 4) started to make short classroom visits to conduct corporate advising (i.e., PowerPoint presentation) about geology and earth science degrees and minors (Note: Geology Coordinator visits all Geol 101 and 102 lecture sections once each semester and during summer school).

GMU is located on the Piedmont, close to Washington D.C. and associated federal museums (Air and Space, Natural History), federal agencies (e.g., USGS, NASA, MMS, etc.), numerous consulting companies and NGO's, and local geoscience groups. The university's location in the metro area provides access to well-qualified professional peers who teach some upper-level classes and geology labs. We probably could better utilize our location and access to a large pool of professional peers. Our geological location is also strategic. The majority of our upper-level courses have a required 2+-day field component, and we can easily access Precambrian Blue Ridge rocks, the Paleozoic sedimentary rocks of the Valley and Ridge, the Tertiary Coastal Plain deposits, and Holocene shoreline sediments.

**Challenges or Limitations**

We are critically short of tenure stream faculty and need to increase the number of permanent faculty who complement existing tenure-stream and term faculty. Also, Northern Virginia is extremely expensive. GMU salaries are not keeping pace with high costs in the area. Thus, it is challenging to recruit new faculty and maintain existing faculty. Also, teaching stipends are not competitive in the local market.

Over the past ten years, after starting out as part of the Department of Chemistry in the 1980's, we have been part of the following departments: Geography and Earth Systems Science, Environmental Science and Policy, and now AOES. We have lacked a consistent departmental home. Geology has always been the smallest piece of the respective departmental pie so it has been difficult to have a consistent plan and stick to it

and get other non-geology faculty to agree with our needs. As such, long-term planning has been challenging.

Although we have three tenured and one tenure-track faculty, we lack full-time in-residency of these faculty. One faculty member is currently in the Dean's Office, one has been at NSF four of the last five years, and one is split between AOES and the Center for Teaching Excellence. This situation has been a drag on the geology and earth science program resulting in faculty fragmentation, difficulties in getting together for meetings, and lack of cohesive goals. In addition, as most of the tenure/tenure-track faculty are often elsewhere, it is challenging to involve undergraduate students in ongoing research. We do have some graduate students in MS and PhD programs. Moreover, classroom and space resources are now stretched almost to the breaking point. Geol 101 has increased to 28 lab sections, and thus this lab classroom is used beyond capacity for six days of the week. A new science lab classroom building is scheduled to be built over the next four years, and faculty are heavily involved with design input. Thus, the geology and earth science program will hopefully have four dedicated geology labs, one of which may be shared with another department.

Living in Northern Virginia is again a mixed blessing for our students. As stated earlier, the cost of living is expensive and many of our students have to work full-time or part-time to simply get by, thus they are typically spread too thin. GMU is the most diverse university in the Nation (Princeton Review) but this is not reflected in our geology student population. In addition to being a degree that is not necessary popular with parents (i.e., they want their child to be a doctor or lawyer or to pursue a degree with a better job potential), weekend field trips can be challenging because they might encroach on religious practices (e.g., Sabbath services), and even dietary and clothing restrictions can pose issues.

**Planning and Evaluation**

Over the past five years, we have had several faculty retreats where the geology and earth science curriculum was reviewed, discussed in detail, and modifications implemented. Also, the State Council of Higher Education for Virginia (SCHEV) performs an official state review each time a new degree is proposed in the Commonwealth of Virginia. Moreover, the entire university is currently experiencing an internal review as part of the Southern Association of Colleges and Schools (**SACS**) reaccreditation process. More specifically, AOES has started an external review process of the entire department. The external review committee has been organized, and committee members will visit the campus in fall 2009.

James Welsh
*Gustavus Adolphus*

The Geology Department at Gustavus Adolphus is a small (3 FTE) department in a college with a traditionally strong science division. However, because of our small size we have a lower campus visibility, and struggle with attracting students because (like most undergraduate geology programs) few of our students enter Gustavus with the expectation of majoring in geology. We normally graduate 5-8 students per year; but as of recent those numbers have dropped drastically. We will graduate 7 this year; but only one next year; and two or three the following year. Our strengths have been our faculty and students, with a research requirement of our graduates. Upward of 50% of our majors have gone on to graduate programs. Besides the problems inherent with a small staff, our other primary weakness is lack of modern instrumentation, as we have been slow to develop a lab/analytical focus to our program.

Gustavus is in the midst of a campus-wide strategic planning process, and we have recently completed a departmental strategic plan. We have also recently undergone an external review (2007). We had been a stable department (i.e. same faculty) since the early 1980's. In 2001 the senior member retired. Two years later our geomorphologist left for a position in Sweden. Those positions were subsequently filled; but both junior members departed (for family/personal reasons); one in 2006; the other in 2007. We therefore had to undergo new searches for those positions. That has now been completed. Because of this recent fluidity in our staffing; our "planning" process has essentially been on hold. Upon the first resignation (2006) our dean asked us to undergo an external review (essentially advancing a regularly scheduled review by one year). While the review was ostensibly established to solicit outside advice with regard to our search (and shaping the department for the future); it was in reality also a scrutiny; especially in light of a recommendation of a previous dean (a year earlier) to reduce geology to two FTE (in the context of a campus-wide reallocation). The review helped affirm our status (of three FTE). One of the recommendations of the review was for us to hire one of the vacant positions at the associate level (in order to better stagger the experience levels; and to take some of the administrative pressure off the remaining senior member of the department). That recommendation was accepted by our administration, and we recently completed that search. The review also suggested that we consider merging with our Geography and Environmental Studies Departments. This suggestion was also made

primarily for administrative purposes. (For example; because of the turnover in the last five years, the senior member is long overdue for a sabbatical.) Such an alignment with those programs might also "reduce" the competition (in terms of "departmental" enrollments) for many of the same students. However; there are potential costs. One is potential loss of visibility (for geology). The other is potential for dilution of program or even faculty in the broader context of the "new" departmental entity. The external review also raised curricular issues. Of particular note is a recommendation that we reconsider our senior thesis requirement (for all of our students). This recommendation was made out of concern of the additional strain (and in some cases unequal advising loads) that it places on faculty. We are reluctant to follow this advice.

Benjamin Cuker

## Hampton University Department of Marine and Environmental Science

Mission Statement:
The Department of Marine and Environmental Science (MASC) prepares graduates to pursue a career in the interdisciplinary, eclectic field of environmental science or enter graduate school in a specific area of marine or environmental science, such as marine biology, ocean engineering, and chemical or physical oceanography, environmental protection, environmental law or environmental consulting.

The Department promotes *learning, building of character, and preparation of promising students,* as evidenced by the success of our graduates and our Number One ranking of graduating African-American geoscientists over the last eight years.

As an integral part of the School of Science, the Department provides a formalized instructional program for majors at the baccalaureate and master's levels through Biological Sciences; offering discipline-specific research experiences to complement the instructional program through internships and on-campus grant support; and provides services to undergraduate students of the University by offering general education science courses in the MASC, and to the community through outreach activities.

DEPARTMENTAL OBJECTIVES

Upon the completion of required marine science and environmental science courses, the student will be expected to:

1. Synthesize principles and skills derived from the basic sciences in the application of the scientific method to problems relevant to marine and environmental science;
2. Review critically germane scientific literature, based on specific criteria;
3. Integrate extracted information from scientific literature;
4. Conduct field and laboratory investigations that will include data analysis to statistical hypothesis testing;
5. Demonstrate competency in presenting the results of field and laboratory investigations at professional meetings; and culminate in a scientific journal style paper;
6. Complete successfully an internship at an external site by satisfying established requirements: six-week minimum duration; direct supervision and evaluation; involvement in a variety of meaningful activities; responsible performance of tasks and duties required, and completion of a final summary paper.

## Program Review Summary

SECTION I: GOALS AND OBJECTIVES

Strengths:

This department, though small in comparison with others within the School of Science, is almost unique in offering an undergraduate degree in the field of Marine and Environmental Science. It clearly articulates goals and objectives to effectively train minority students for entry into this increasingly vital field. These goals and objectives reflect the mission of Hampton

University. Both faculty members and students clearly articulate these goals and objectives and work together to achieve them. Regularly scheduled faculty meetings allow for goals and objectives of the program to be reiterated. A review of the course syllabi reflects goals and objectives being communicated to students. Student interviews affirmed that students understand and can articulate these goals and objectives; they strongly feel that the curriculum meets its own projected standards.

Challenges:

The department would benefit from a university-wide system to track alumni after graduation in order to evaluate long term success in meeting these goals and objectives. They are able to track students who are associated with specific government funding, but general tracking has not been possible. This challenge links directly to the ability to assess outcomes.

As reported in the 2004 review, students express an interest in linking public policy courses to the major for those entering environmental law.

SECTION II: CURRICULUM

Strengths: The curriculum is rigorously constructed to prepare students for work and graduate study; each course incorporates an element of research, ranging from controlled experiences in the early courses to independently constructed and completed research projects in the junior and senior years. All students participate in a minimum of two external internships, and many complete three.

Challenges: The interviews with both faculty members and students elicited the suggestion that students be introduced to the major through the course Introduction to Marine Science rather than Geology. Both groups felt that this would aid in retention, though both groups also emphasized the importance of Geology in the curriculum as a whole. Again, both faculty and students suggested that the department consider placing courses such as chemistry and physics earlier in the curriculum, though there was much less unanimity around this issue.

SECTION III: CONNECTIONS

Strengths: In the area of connections, this department functions as a model for the university community. All faculty members and students are engaged in ongoing research that takes them into the local community around issues of marine ecology, and the department occupies prime territory for such research. The department partners with the Virginia Institute for Marine Sciences, and with national organizations such as the National Oceanic and Atmospheric Administration ( NOAA). Faculty and students regularly attend and host conferences. Both faculty members and undergraduates engage in research that leads to publication and to the securing of grant funds.

Challenges: The department faces no apparent challenges in this area.

Planning Process

This is mostly handled by the chair, with some input from the faculty members in the rare departmental meeting (once a semester is typical).

**Michael Poage, Jon Lewis, and Katie Farnsworth**

**Geoscience Department - Indiana University of Pennsylvania**
The Geoscience Department at IUP is an undergraduate (~50-60 majors) department of seven faculty offering two Geoscience majors (Geology Track, Environmental Track) and an Earth and Space Science Education major.

**Department *strengths* include the following:**

- Our faculty is comparatively young (four new tenure-track professors hired in the past six years) and for IUP research active, with programs involving undergraduates and resulting in peer-reviewed publications. Success with external funding is modest in comparison to more research-oriented universities; success with internal funding is excellent.
- At present, our department operates unhindered by significant personality conflicts. This creates a collegial environment that allows for efficient and un-contentious decision-making and execution of department business.
- Our department lab facilities are adequate in size and function. Faculty have individually allocated lab spaces housing discipline-specific equipment purchased through modest start-up funds and internal/external funding.
- We are transitioning into a more modern, liberal curriculum emphasizing research and field experiences throughout the student's tenure in the program.
- We currently offer an array of popular introductory courses satisfying the science component of IUP's liberal studies requirements. The ability to consistently offer large-enrollment service courses makes for a solid working relationship with the Dean's Office, allowing us to teach smaller upper-level majors classes. The burden of teaching these classes is generally shared amongst the faculty.
- We currently control a fleet of four vans used for field trips and student/faculty research.

**Department *weaknesses* include the following:**

- On a per faculty basis, the number of majors in our department is comparatively low, despite regionally important natural gas and coal resources. This translates into low-enrollment upper-level courses, which we are under increasing pressure to replace with additional sections of larger introductory courses.
- Many students enrolled in our programs are poorly prepared for college. Issues include lack of basic math and writing skills, and poorly developed study habits. Consequently attrition is high in our majors-level introductory classes, and many that do pass struggle in later, more quantitative and writing-intensive courses.
- The university maintains the equivalent of a 4/4 teaching load. There are limited opportunities for course release for research active or grant writing faculty. This teaching load places severe time constraints on research activity, the pursuit of outside funding, and our ability to enact major departmental initiatives.
- We also have a high departmental, college and university service load as required service assignments are distributed across fewer faculty than many departments at IUP.
- Our department budget is sufficient to operate only at a bare minimum level having been virtually stagnant for the past twenty years.
- Since 2000, we have lost 1.25 FTE, leaving holes in our curriculum (most notably in Geophysics) and limiting our ability to expand upper-level course offerings given the expectation that we continue teaching large introductory courses at the our current rate.

**Department Planning Process**

Our departmental planning process involves formal and informal components. Being a small and collegial department many ideas are hatched in informal settings both on and off campus. These often generate the seeds of new ideas for directions that courses, research, curricula or departmental projects might take. Recurring themes from informal discussions often eventually enter the more formal component of our departmental planning.

Our regular faculty meetings are most often restricted to basic departmental business such as budget expenditures, course schedules, multi-year course rotations, and departmental events etc. Long-term planning usually occurs at our annual (or twice annual) day-long faculty retreats. Retreats usually involve a significant component of self-evaluation, reviewing how we have met previously established goals, and setting goals for both the short- and long-term. We also conduct five-year reviews for the university that entail assessment of all aspects of department programs, facilities, faculty productivity etc. (see below).

**Summary of 2004-2005 Department Review**

The Geoscience Department conducted an internal and external review in 2004-5 as part of IUP's five-year program evaluation process. Identified goals (and resultant actions) from the internal review include:

- The department should institute a new and comprehensive student learning outcomes assessment program for major classes and degree programs. Department retreats and workshops have resulted in a focused, simple program to measure outcomes which has since been implemented for all degree programs
- The BSEd General Science Education program should be eliminated as recent changes in Pennsylvania Department of Education requirements rendered it obsolete. It was eliminated in 2008.
- The curriculum of the Geology and Earth and Space Science Education degree programs should incorporate more hands-on research early in the program and include new insights from earth system science. We have completely overhauled the curriculum for all three remaining degree programs incorporating interdisciplinary content and research earlier in the undergraduate experience.
- The department needs to recruit more and better students both externally and from within the university. To this end, we have modernized our website and eased the entry requirements into our programs so that students may start in their sophomore year and still graduate within four years.

Identified goals (and resultant actions) from the external review include:

- More lab and office space will be needed as older faculty are replaced with younger faculty who need more space for their research programs. To this end, we have renovated our office complex, adding an additional faculty office. We have also converted a large laboratory classroom into two research labs for newer faculty.
- Deferred maintenance of teaching labs gives the department a poor appearance and detracts from attractiveness to potential students. This continues to be a problem as all of our teaching labs are housed in a building not significantly renovated since its construction in 1959. Funds for renovation or a new science complex are unavailable.
- Major students need a larger and more modern computer room as well as a reading/study room in the department. We have established a modern computer lab (eight PCs) exclusively for student use. A reading/study room is not established for lack of space although teaching lab rooms are available for this use during off hours.
- The department should have more reliable access to a large lecture hall in order schedule more large-enrollment courses. Through negotiation with the Dean's Office, we now

have relatively consistent access to large classrooms.

**Melissa Lobegeier**

## Middle Tennessee State University Department of Geosciences

The major strength of Department of Geosciences at MTSU is the dedicated and experienced faculty. The department has a long history of graduates who are well-prepared for the workforce and graduate school. Recent graduates are successfully employed as oil company exploration geologists, environmental managers, college professors, regional planners, and high school teachers. Recent alumni have received full graduate scholarships to schools such as Notre Dame, The University of Oklahoma School of Geophysics, Vanderbilt, and Miami-Ohio. The Department is home to the state-wide Tennessee Geographic Alliance. Over the past decade, Geosciences faculty have received over $1 million in external funding from agencies such as NSF, USEPA, NASA, and USAID and currently have over $800,000 in pending external grant proposals. All grants to Geosciences faculty are used to support undergraduate research and acquire research instrumentation. The Department has received over $200,000 in NSF-funded analytical geochemistry instrumentation, and recently completed a $150,000 renovation of its Geographic Information Systems (GIS) Laboratory. The geochemistry and GIS labs are used extensively by students and faculty from across the university as well as users from other universities and government agencies. The Department has a strong history of student-centered learning with a very strong undergraduate research program. The faculty teach numerous field courses across the United States and student participation in regional and national geosciences conferences is strongly encouraged. The Department has the only Gem, Mineral, and Fossil Museum at any Tennessee state institution; thousands of teachers and K-12 students visit annually. The faculty participates in numerous programs (Boy Scouts, Girl Scouts, Women in Science and Engineering, Expanding Your Horizons, Girls Raised in Tennessee Science, Science Olympiad) for outreach and recruitment from underrepresented groups.

In terms of weaknesses the Department is understaffed, underfunded and has limited space. The Department has 10 tenured and tenure-track faculty, three temporary full-time faculty and two administrative faculty. The Department has approximately 75 majors and offers three courses in the General Education curriculum: Introduction to Earth Science, Physical Geology, and Regional Geography. In the 2008-2009 academic year, approximately 2500 students enrolled in these courses. The Department produces a high total of student credit hours and there is a significantly higher workload on faculty than in many other MTSU departments. The Department has space constrictions in its current building. Additional space is necessary in order to accommodate additional courses and much needed faculty. In addition to the newly renovated GIS lab, only one other classroom utilized by the department can be classified as a master classroom. Another weakness is that there are currently too many options for majors. The Department currently has three concentrations for geography majors and three for geology majors. We are working on how to best consolidate these concentrations into fewer options. The Department also lacks visibility on campus. The Department is in the College of Liberal Arts at MTSU and not in the College of Basic and Applied Sciences leading to lower visibility and possibly lower numbers of majors.

The Department has no formal planning process. If a need is identified faculty are selected to work on fulfilling this need and then options are presented to the full Department. Decisions are made in departmental faculty meetings.

The most recent external review of the Department stated, “The Department of Geosciences is a successful program operated under excellent leadership, with diverse and experienced faculty.” The review noted that more space is required and that the current curriculum is effective but that a senior thesis requirement should be considered. It was also noted that the Department has a high service load but we do not attract as many majors as we should. It was suggested that housing the department in “Sciences” rather than “Liberal Arts” might increase visibility.

**Mount Royal College, Calgary, Alberta; Department of Earth Science; BSc geology major**

**1. Department strengths and weaknesses**

Mount Royal College is an institute in transition. We find ourselves in the incredibly exciting process of accepting our first geology majors into a brand new BSc geology major program, which developed from a two year university transfer program. Mount Royal College has always presented itself as a student-focused institution, with small classes and faculty whose primary focus was on teaching. We also have an exceptionally collegial spirit amongst our faculty which draws instructors from a variety of backgrounds that are searching for a reasonable balance in their lives.

This transition period has created several challenges, many faculty feel overwhelmed and we do not yet have alumni. Perhaps the largest challenge for many of us is a switch towards research (we can now choose between a teaching or a research stream). We are uncertain on how to incorporate our students in our research or how to structure our fourth year geological research capstone course. Even more challenging is our inability to apply for federal grants until we become a university and can call ourselves professors.

One exceptional strength at Mount Royal College is the support for faculty which includes several programs and centres such as (see page 3 for individual program descriptions):

i) ISP - Instructional Support Program for new faculty

ii) ADC - Academic Development Centre

iii) Triad program - support groups for faculty

iv) Professional Development Days - a two day retreat

v) MRC SoTL (Scholarship in Teaching and Learning) program

vi) WRAPP (Writing for Academic Publication Program) - suport faculty in publishing

We believe that these programs outline the commitment of the college towards creating an environment that the faculty enjoys working in.

Our department is small, 6 full time instructors, 3 tenured (2 recently), 2 tenure-track and one term certain. Three of us are female, though none of us are visible minorities. We are very careful to hire based on capability (research and teaching) and compatibility. Our department head is very supportive and has mentored all of us. We are all willing to experiment with new techniques to improve the learning experience in our classrooms. Even with the funding challenges outlined above, four of us will be conducting field based research this summer, one in Virginia and Newfoundland, one in Ontario, and two in Alberta/British Columbia. Dr. Paul Johnson will be co-ordinating the conference in celebration of the 100th anniversary of the Burgess Shale in Banff, Alberta this summer. Dr. Boggs is spear heading the introduction of a high school geology course in Alberta, which we intend to spread across Canada.

## 2. Planning Process

Our curriculum is controlled by two main factors, our accreditation bodies (provincial and national professional associations) and the Mount Royal College general education requirements (11 courses from the four clusters of Numeracy and scientific literacy, Values beliefs and identity; Community and society; Communication). We do not intend to compete directly with the much larger research-oriented University of Calgary that is 15 minutes away from our campus. Therefore we chose to develop a broad/general geology program that would permit our future graduates to work anywhere (petroleum, mining, paleontology, environment, scientific journalism, teaching, etc) or to go into academia. The result of this process was a geology major with the following structure:

- Geology (and Geophysics) 20 courses
- Fundamental Science 9 courses
- General Education 11 courses

A provisional curriculum for the geology major was developed by faculty and then circulated internally and externally to geosciences professionals in government, industry and academia for feedback. This process resulted in minor revisions to our program. The program was then submitted, along with other BSc majors to the Campus Alberta Quality Council for feedback/ approval before final authorization by the provincial government.

## 3. Department/Program Review

Our BSc in geology program is in its first year of operation and has therefore not had a formal review. However, MRC has a formal program review process which must be applied to all programs on a 7-10 year cycle. This process consists of the following six steps:

i) Preparation

ii) Initiation

iii) Self Study

iv) Peer Review and report

v) Finalization of Advancement Plan

vi) Institutional Review of complete process

Neither the provincial nor national associations provide accreditation to geology programs. They give accreditation to individuals once they have completed the requirements for graduation and some work experience. We are liaising with these associations to ensure that our students can achieve accreditation if they so desire.

**MRC Program Descriptions**

Mount Royal College is dedicated towards the professional development of its faculty and the creation of a collegial environment for the faculty. Each of the following programs was developed by the faculty for the faculty.

i) ISP - Instructional Support Program for new faculty. Every new hire must complete this program, which involves mentoring from senior award winning faculty. The two leaders of this program co-ordinate a 3 day retreat in August followed by small group sessions for three years. This was an incredible experience that forms the new faculty into a strong supportive group.

ii) ADC - Academic Development Centre. This centre is staffed by several award-winning instructors. This group of people co-ordinate programs such as ISP, Triad, PD days, SoTL and WRAPP. They also make several professional development seminars available throughout the term. Other faculty support programs include the Sandbox program (where we can ask questions and get advice on using technology to support our teaching and research) and the Garage program (where students will complete various technologically-oriented projects for teaching and/or research).

iii) Triad program - every faculty member must participate in a support triad every other year. We are free to pick our triad members and may use this system for support, finding peer reviewers for our tenure process or simply for social outlets. This starts off every year with an event off campus known as the 'Triad Kick-off Day'.

iv) Professional Development Days - a two day retreat (May) is set aside for voluntary participation. There are a variety of sessions that cover different topics and several social activities in the afternoons ('Rock, walk and talk' is our annual contribution). Our faculty enjoy participating in these events because we enjoy each other.

v) MRC SoTL program with Richard Gale as our visiting scholar. Dr. Boggs is our representative in this program which is designed to assist us all in developing SoTL research programs and to implement various techniques into our new degree programs. This involves three retreats, monthly meetings and bi-monthly updates on the individual projects.

vi) WRAPP (Writing for Academic Publication Program) - designed to assist faculty in publishing their academic works. This involves one retreat followed by monthly meetings with an editor/mentor.

Math, Science, & Engineering Division - Geology Department

## Overview

Counting by number of student credit hours taken, Northern Virginia Community College ('NOVA') is the largest institution of higher education in the Commonwealth of Virginia. NOVA is a multi-campus institution, with five 'main' campuses that offer the full range of coursework (Alexandria, Annandale, Loudoun, Manassas, and Woodbridge), plus a campus dedicated to medical education, and two 'centers' offering classes in high-population areas (Arlington, Reston). The College also offers a series of online courses through its Extended Learning Institute. Students pursue Associates Degrees, Certificate programs, workforce skills, and pre-requisites for transfer into universities.

Of NOVA's campuses, the Annandale campus is the largest. The geology department here is part of the Math, Science, and Engineering Division, the largest of the four divisions on campus. The geology department is relatively small; It consists of two full-time faculty, plus four to five adjunct instructors per semester. Each semester we offer approximately eight sections of traditional four-credit introductory-level geology courses, plus three sections of one-credit Field Studies courses.

## Strengths

The NOVA-Annandale Geology department is fortunate to find ourselves in a well-funded institution, in a well-equipped facility, within an easy drive of a diverse suite of natural outcrops of rock spanning half a billion years of geologic time. The full-time instructors have a dedication to providing field experiences for the students; the vast majority of students react enthusiastically to these experiences.

The populated DC-metropolitan area provides a relatively robust pool of adjunct faculty, meaning that we are able to offer more sections than a comparative institution located far from urban population centers. Additionally, our metro-area location provides plenty of opportunities for student (and faculty) engagement in seminars, lectures, museum exhibits, and field trips led by other institutions, such as the Geological Society of Washington.

We also get strong administrative support for new initiatives, such as our diverse suite of summer course offerings, travel to conferences, grant applications, and Honors programs. For instance, last summer, we got eight field-trip leading faculty trained in

Wilderness First Aid, thanks to a grant from the Virginia Community College System and support from our division dean.

We have a strong record of “generating” geology majors for our neighbor, George Mason University. Administrative links between NOVA and GMU remain strong, and students find the transfer process relatively seamless as a result.

## Weaknesses

Our faculty lack ethnic diversity, being predominantly white. Like much of the geoscience workforce, we have more males than females. In the current academic semester, two of our five adjunct instructors were female. Both full-time faculty are white males.

Like any institution with adjunct instructors, we have found that teaching is as much a labor of love, as a job. Adjuncts are paid very little for their work. Some may take this as a signal to be less than fully engaged, while others ignore the meager pay as incidental to their profound interest in their work. To our knowledge, only one adjunct instructor (out of four) leads any field trips.

## Planning process and departmental review

NOVA-Annandale Geology has neither a formalized planning process, nor have we undergone a departmental review in more than a decade (when the program was quite different). Our participation in the SERC workshop is likely to be foundational in framing a coherent strategy for future self-assessment and organization.

Gillian Stewart and Stephen Pekar

Queens College

Overview:

The Department of Geology was created in 1960 and was the second youngest science department at Queens College. Strictly an undergraduate department at first, it added the M.A. in Geology in 1966.The department name switched between Geology and Earth and Environmental Sciences until 1996, during which time the emphasis was in classical geology. The department was also instrumental in forming the CUNY consortial Earth and Environmental Sciences doctoral program in 1983.

In 1996, the department reconstituted itself as the School of Earth and Environmental Sciences in an effort to create a truly interdisciplinary entity that would make the environment a centerpiece of intellectual activity on campus. New majors were created in Environmental Sciences with concentrations in Geology, Biology, or Chemistry, and in Environmental Studies with a combination of social sciences and humanities as well as the basics of environmental sciences. A new M.S. program in Applied Environmental Geosciences was established in the mid 2000s, moved course offerings in new directions.

These varied offerings needed a broader faculty base that could comfortably be included within the classic geology discipline. Thus was born the "School" rather than a department to enable us to make hires of the interdisciplinary faculty necessary to continue our growth. Today, marine biologists, ecologists, and soil scientists share with geologists, geochemists, and geophysicists the excitement of the study of our Earth.

Recently, the Environmental Science programs have been completely revised and updated to reflect our current faculty strengths. Potentially, this rigorous program will represent the leading undergraduate program in the Environmental Sciences in the New York City area. While our core Geology program already has a strong regional and national reputation, a future goal will be to revisit the Geology curriculum once the new Environmental Science program has been implemented. The challenge will be for us to maintain two strong departments within the limitations of our relatively small faculty.

Strengths:

QC School of Earth and Environmental Sciences has provided a solid foundation in geological and environmental sciences in the New York City urban setting for over 40 years. Our strengths include our world-renown faculty, our diverse undergraduate population, and our constantly improving facilities and research infrastructure. For a liberal arts college, we provide cutting edge research experiences for undergraduates and graduate students. Our department has had a consistently strong dedication to teaching excellence, as evidenced by our high student satisfaction, retention, and recruitment (double FTEs and majors since 2000) and college teaching awards, and student evaluations. Despite our relatively high teaching demands, our department has successfully maintained externally funded research in a broad range of topics. Currently, the School represents research in both Geosciences and Environmental Sciences that range from estuarine geochemistry to paleo-seismicity, atmospheric modeling, Antarctic climate change, to pollutant remediation. In all cases, faculty serve as mentors to students but also publish and present their findings in high caliber peer-reviewed journals. Further, we contribute widely to service both within our School and College, and within the broader scientific and lay community. For example, we house the Northeastern Chapter of GLOBE, we regularly contribute to news media and educational outreach, and many faculty serve on review panels and editorial boards.

Weaknesses:

The School does currently face challenges, but thus far, we have managed to compensate for issues that include infrastructure, faculty attrition, monetary support, insufficient personnel, and balancing teaching a diverse curriculum and maintaining high research productivity. Currently, we have no room for expansion, either in classrooms, offices, or research laboratories, despite the fact that we have hired 5 new faculty in the past 3 years and expect to continue to grow, with at least one new line in the near future. We only employ one full time secretary and one technician for the entire School.

The School currently offers seven unique degrees (3 B.A., 2 B.S., 1 M.A., 1 M.S) with only 15 teaching faculty divided almost equally between Geology and Environmental Sciences. Thus, everyone in the department is expected to teach multiple courses at multiple levels. The current age distribution in our department is skewed, with half of the Geology department older than 65. This represents a significant and near-term loss in terms of expertise in geological research, teaching, as well as institutional memory since many of these faculty have previously served as administrators at Queens College. Replacing these losses will be difficult and represents a challenge in preserving the Geology program at Queens College. Additionally, recruitment of high caliber faculty will be difficult in the future because of lack of resources for conducting faculty searches. On the other hand, the junior faculty at Queens College as a whole are facing challenges as the expectations for research accomplishments and overheard earnings increase without a decrease in the teaching and service demands.

Planning and Review:

The School of Earth and Environmental Sciences is currently in the midst of a college mandated self study (every 10 years). This involves a review of our staff, resources, productivity, students, and curriculum. This document eventually goes to the administration of Queens College and external reviewers who visit the campus and interview faculty and staff. In the past, the self studies have provided five-year plans for the School which have been successfully implemented. Specifics have included the development of the Environmental Sciences program, the creation of a M.S. program in Applied Environmental Geosciences, and priorities in the research interests and teaching skills of future hires.

We look forward to the development of an action plan to strengthen our already strong School. After this workshop, we will organize a retreat with the entire faculty to discuss ideas and strategies to improve our curriculum and department assessment, and maximize our potential.

**Building Strong Geoscience Departments Workshop**

Department of Geography and Earth Science, Shippensburg University
Tim Hawkins and Tom Feeney

**Strengths**

- Collegial and enthusiastic faculty
- Broad-based undergraduate and MS programs allow for flexibility upon graduation
- Strong field-based component to curriculum
- Active faculty research agendas involving undergraduate and MS students
- Strong program in GIS
- Take seriously departmental and program reviews and use information for improvement
- Teach a LOT of general education which allows recruitment of new majors
- Newly renovated building with smart classrooms.

**Weaknesses**

- Need human and physical resources to continue success
- Teach a LOT of general education which detracts from majors courses
- Broad-based degrees may lack depth of knowledge upon graduation
- Need to improve advertising to incoming undergraduates not familiar with discipline
- Need to improve advertising to potential MS students

**Department's planning process**

- Monthly faculty meetings and annual/biannual retreat
- Minimal committees: curriculum, facilities, professional affairs
- Committees produce proposals that are voted on by the full faculty
- Occasionally, individuals assigned specific task or lead department in these tasks: five-year review, middle-states assessment, general education assessment
- Meet with external departmental advisory board once a semester and use feedback to improve marketability of graduates

**Summary of internal five-year review (Spring 2009)**

- Maintained a mean enrollment of 161 undergraduates and 41 graduate students, for a total of 202 majors. Our graduate program is tied with Organizational Development as the largest graduate program in the College of Arts and Sciences (Chapter I).
- Received mean teaching scores above or well above college and university averages in *every* teaching category (Chapter IV).

- Published 66 refereed articles and reports in regional, national, and international journals, an average of nearly one article per faculty member per year for the five year evaluation period (Chapter IV).
- Presented 141 papers at regional, national, or international meetings, an average of 1.7 papers per year per faculty member over the last five years (Chapter IV).
- Won $ 1.5 million dollars in grants from organizations such as NASA, NOAA, NSF, DCNR, the National Park Service, the Department of Education, Growing Greener, and the State System of Pennsylvania (Chapter IV).
- Continued to strengthen and expand the Department's Center for Land Use in its mission to provide wise land use decision-making to the seven county South-Central Pennsylvania region (Chapter IV).
- Continued to provide valuable support and service to professional organizations in the discipline of Geography, including the Presidency and Vice Presidency of the National Council for Geographic Education and several executive positions in the Pennsylvania Geographical Society (Chapter IV).
- Continued to expand our field curriculum and use of the Marine Science Consortium facilities at Wallops Island Virginia. Took more than 2,500 students into the field in general education and majors courses during the last three years (Chapters II and VI).
- Completely revised and expanded our program assessment to better match Middle States accreditation protocol (Chapter VI).
- Continued to show progress in meeting diversity goals in terms of faculty, students, and curriculum (Chapter VII). Of four faculty hired in the department since 2004, two are diversity hires (Chapters IV and VII).
- Continued to strengthen and expand our commitments to student placement through our annual Career Day, Advisory Board, and Center for Land Use activities and contacts (Chapter IV).
- Continued to be a university leader in student advising, after winning the University's first annual Advising Award recognizing advising excellence (Chapter V).
- Met or exceeded all the recommended actions spelled out in our last five year review (Chapter VII).

Kyle Nichols
*Skidmore College*

# Skidmore College Geosciences

Change has been constant in the Department of Geosciences at Skidmore College over the past seven years. Change, while providing opportunity, can be unsettling and difficult if there is little possibility for renewed stability, especially in terms of resources. However, through a little luck (when preparation meets opportunity), we are now entering a period of renewed resource stability, have a more rigorous major, and have increased our presence on campus. Below is a brief description of our strengths, weaknesses, planning process, and a summary of our 2007 external report.

## Strengths

The *strengths* of our department depend on one's frame of reference. Since we serve many different constituents of the college, we will try to highlight some of our perceived strengths from several different reference points.

We can identify several strengths from the department perspective. In 2006 we overhauled our major to reflect the changing nature of our discipline, realignment with faculty expertise, and a more rigorous curriculum. We now deliver a flexible, field-based curriculum that allows us to keep pace with the advancement of the discipline. Our graduates are still accepted to good graduate schools and find employment in the geosciences, when they want to. Although we have limped along for over half a decade with only two-tenure track lines and several different contingent faculty members, we have managed to climb out of survival mode and we now have three tenure-track lines which increases faculty expertise and student research opportunities. We have always been able to provide research opportunities, early and often, to our students. Lastly, it cannot be understated how significantly our recently hired Teaching Associate has improved student recruiting in one year.

The institution values different strengths of our department. The department is committed to the general education of our student body. Approximately 25% of graduating students fulfill their natural science requirement through Geosciences courses, impressive for a department of three. Each year the department offers an interdisciplinary Scribner Seminar as part of the First Year Experience. We always have representation on the different science initiatives and committees that are working to enhance the sciences at Skidmore (part of institution's strategic plan). Our faculty members also participate in the faculty governance system and engage in important institutional conversations. Recently, our new hire in climate sciences was awarded the endowed Charles Lubin Family Chair for Women in Science which will bring additional notoriety across the campus and to the Board of Trustees. Lastly, all department faculty are integrated into, and are a vital to, the success of the strong and growing Environmental Studies program.

While we can list our strengths, and the institution can identify our value, our continued success and survival ultimately depends on students identifying our strengths. Our students have mentioned that: we are dedicated and enthusiastic about our discipline, we offer ample one-on-one instruction both in terms of help with classes and also research, we provide engaging research experience, our classes make connections to relevant real world applications and they are 'hands-on, engaging, and fun'. The students also like that the major is flexible enough to let

them study abroad. And lastly, the most common comment from students is that we are a close knit community and they feel comfortable and welcome.

**Weaknesses**

Simply put, our major weaknesses are two fold. We still only have three tenure-track lines and we are constantly trying to recruit more majors. While we are relieved to achieve the three-tenure track line threshold again, four lines would allow us another degree of freedom in our curriculum. As of now, we still have holes in our curriculum that are going to be difficult to fill in the current economic climate. Most importantly, though, we are always trying to recruit more majors. Out of the approximately 650 students that enroll in Skidmore each fall, less than a handful (five) list Geosciences as a potential major and in several recent years, there were no students that listed Geosciences as a potential major. Compounding the frustration we hear all too often, "I would have been a Geosciences major if I knew about it sooner" from juniors and seniors. Sometimes we are able to find a way for some juniors to declare the major, but most of the time there is not enough time to complete the major.

In addition to these two major problems, we are finding that reputations and rumors die hard. Our department was almost closed six years ago. While we are much stronger and more stable now, that reputation has lingered in the recesses of our less in tune colleagues. Just last week one colleague asked if there was still a Geosciences Department. While this is rare, it is discouraging. Potentially related to this, it seems like every other year or so, around advising time, someone starts a nasty rumor that we are no longer accepting new majors. It is difficult to know how much traction these rumors have and just as difficult to find the source.

**Planning process**

We are entering a new stage for planning now that we have all permanent faculty positions starting in the fall. This summer and early next semester we will revisit our planning documents to assess the progress that we have made since our 2005-2010 Vision for the Geosciences. Many of our major goals have been achieved, such as establishing a new major and a securing a third tenure track line, but we need to assess our progress on the other goals. Unfortunately, regular assessment has been lacking and thus developing a sustainable assessment plan, that will allow us to identify and take action on our deficiencies, is a high priority for this summer and next year. Additionally, we need to start to plan for the retirement of our senior colleague that will likely occur in less than a decade.

**Summary of latest external review**

Our department went through an external review in the spring 2007. The major findings of the external review showed that there was a significant commitment from Skidmore College to support Geosciences. The report stated that the department provides "a good model for a practical liberal arts education". They recommended that the college invest in a larger faculty (two additional tenure-track lines within the next five years and a full-time teaching associate) and additional research laboratory space. Other recommendations included that the department should deepen its offerings at the 200- and 300-level, but additional faculty would address this problem. Also, the review committee suggested that we be more proactive in advertising the department to the campus community.

Bosiljka Glumac and Amy Rhodes

Department of Geosciences, Smith College

Smith College is a liberal arts college for women in Northampton, Massachusetts. The Department of Geosciences has a number of specific strengths. Our faculty (currently five full time tenured faculty, one full time tenure-track faculty, and one half-time lecturer) are committed to both teaching and research. Even though all faculty engage in geological research and publish in a wide variety of journals, everyone also has participated in a number of professional activities dedicated to and focused on teaching. We average approximately 36 majors at any one time, or roughly 12 in each class. Our intermediate-level courses normally do not exceed 16 students and often have only 12.

We are fortunate to have good facilities, both in terms of space and equipment. We have an equipment inventory similar to that of many quality undergraduate departments, but we also have a range of specialized equipment that is more typical of graduate departments. A significant strength is that our majors and minors are able to use this equipment in course work and for research projects. We also maintain a computer laboratory with quality computers and peripherals that enhance course work and research projects and that provide valuable skills for the workplace.

The Geosciences at Smith College have always been a leader and willing participant in interdisciplinary initiatives. Because of such participation, we have close ties with, and detailed knowledge about, programs in archeology, public policy, environmental science, marine science, and engineering. These contacts mean we can advise geoscience majors and minors fully about opportunities, both for summer internships and career preparation, in a wide range of other disciplines that interconnect well with a geological background.

Additionally, geoscience faculty are active in Five College (Smith, Amherst, Mt. Holyoke and Hampshire Colleges and the University of Massachusetts, Amherst) cooperation. We give lectures at other local colleges, maintain close contacts with local geology colleagues, organize and participate in Five College Geology field trips, and sponsor and participate in special symposia organized by local geoscience departments. These contacts and activities offer our majors and minors greatly increased and more diverse educational opportunities.

Our educational philosophy emphasizes inquiry-based learning, and geological inquiry is best accomplished in the field. We strongly believe that fieldwork is critical to understanding geologic processes, and we therefore include extensive fieldwork in most of our courses. In addition we provide, on a regular basis, extended field trips to the Bahamas, Death Valley, and Hawaii. We also recognize that geology is increasingly a science that relies on sophisticated instrumentation for sample analysis, and we are committed to training our students in instrumental analysis using advanced techniques (such as energy dispersive X-Ray microanalysis, the SEM-EDS facility shared with the Biology department, and an ICP, AA-GF, and IC-MS shared with the Chemistry department). These two aspects can best be merged in a culminating research experience, and we encourage our majors to do independent research projects. Our department is also a member of the Keck Geology Consortium - a group of eighteen liberal arts colleges throughout the United States – which provides opportunities for our students and faculty to participate in field-based research.
During our most recent review process, the department developed a new curriculum for 2009/10 with 3 concentrations within the geoscience major. Besides the traditional geoscience concentration, the program includes new concentrations in environmental geoscience and educational geoscience. The environmental geoscience concentration is an outgrowth of the emergence of the study of environmental issues as an important field within geosciences. The visiting committee report from our last decennial review in March of 2000 identified

environmental consulting firms as one of the major employers of geoscientists today. This concentration requires interested students to take additional courses in ecology, environmental policy, and chemistry while having fewer requirements and more flexibility in course selections at the intermediate level in geosciences. Students are also required to do independent research as part of either a special studies project or honors thesis project.

The educational geoscience concentration is an outgrowth of the emergence of earth science as a field explicitly identified as a required area of study for K-12 students in both national and state frameworks. This was also an area identified by the visiting committee as being of increasing importance to geosciences majors. This, coupled with the critical need to train high quality K-12 teachers, has led us to develop a concentration where a geoscience major can take education courses that will help her evaluate this career option and will provide a basis for her certification as a teacher. A student choosing this option is required to take 3 education courses in lieu of 3 advanced and intermediate geosciences courses.

Even though as part of the department's decennial review in 2000, the visiting committee reported that "One could argue that the Smith College Department of Geology constitutes a national model for undergraduate geological education" and that "The defining characteristic of the department is its dedication to student learning and personal student development," we currently face several major challenges:

Smith College does not have core requirements. Thus, students are not required to take a science lab course. For this reason the enrollments in our introductory lab courses are relatively low. As part of the ongoing personnel cuts due to the current financial struggles, the College has eliminated our 2/3 time lab instructor position, which we had since 2003. We had to make major adjustments to our course offerings for 2009/10 in response to this loss. It is still too early to evaluate the full impact of this and other possible future cuts upon our program, but we must continue to attract students to geosciences - a field that they come to Smith knowing almost nothing about. Similarly, we struggle to attract a diverse student population that would include students from traditionally underrepresented groups in geosciences. Healthy enrollments in our courses at all levels are absolutely critical for maintaining a strong geoscience program at the time when additional reductions in the number of faculty and staff are being announced college-wide. Effective communication with the College administration about the strengths and values of our program becomes highly critical under these conditions so Smith can maintain its strong geosciences program.

Amy Sheldon and Dori Farthing
*SUNY Geneseo*

**Geneseo Essay**

**SUNY Geneseo – Student Profile**
SUNY Geneseo is a highly selective public liberal arts college in upstate New York. Roughly eighty-five percent of the entering students are in the top 20 percent of their high school class; the high school average of the entering class is 93 and the mean SAT score is over 1300. Thus, Geneseo, and the Geology Department, attracts students with outstanding credentials. Geneseo students are highly motivated and demand excellence in every facet of their college experiences.

**Department of Geological Sciences - Strengths & Weaknesses**
The Department of Geological Sciences at SUNY Geneseo consists of 6 faculty (3 tenured, 3 tenure-track), one department secretary, and roughly 50 undergraduate majors. The faculty's areas of expertise are diverse, including glacial geology and global climate change, geomorphology, mineralogy and petrology, hydrogeology, structural geology, and paleontology. The Department offers three general education courses specifically for non-science majors that serve roughly 600 students a year, in addition to introductory courses for majors that are open to non-majors (~75 seats, 2/3 filled with non-majors). We offer 10 upper-level elective courses (most offered on a 2-year rotating basis) that provide significant depth in a breadth of areas within the geosciences, and a capstone seminar course. In addition to the major in geology, the Department also offers majors in geochemistry and geophysics. Geology majors have the option of adding adolescent certification to their geology degree. The College is in the process of developing a new major in environmental science with tracks in biology, chemistry, geology and computational science. We are also in the process of creating a 5 year Masters program for adolescent certification in science.

Some of the strengths of the Geology program include:

- a strong field component to the program by the integration of field trips in many required courses,
- an extended field trip on alternate years that is the cornerstone of a year-long capstone seminar,
- the opportunity for all majors to be teaching assistants in one or more introductory labs,
- the opportunity for all majors to pursue research with a faculty member and present the results of their research to the department in a seminar, to the College at a campus-wide research symposium, and to the scientific community at regional and/or national conferences,
- student attendance and participation at professional conferences,
- developing students' professional presentation skills, and
- new facilities, including classrooms and teaching instruments (microscopes, brunton compasses, wave tank, flume, etc.), research laboratories, and research equipment (XRD, XRF, SEM, ICs, GC, research scopes, etc.)

These academic and co-curricular activities and opportunities are augmented by what many consider to be the greatest strength of the department; the family-like atmosphere and genuine respect that exists amongst and between faculty and students. The rapport between faculty and students begins in the classroom, but is strengthened by frequent outside-the-classroom interactions that are academic and/or social in nature. The atmosphere in the geology quarters is quite similar to that at a graduate school – upper level students accept a great deal of responsibility for their own learning, they function well both independently and collaboratively, they are competitive but in a supportive manner, and they are very much aware of deadlines.

Some of the challenges the department faces include the lack of an instructional support specialist, the introduction of a rotating department Chair, attracting and retaining students from underrepresented groups, and developing a planning strategy for the next 5-yrs to decade. The department moved into a new facility with all new equipment in 2006. The lack of a support specialist means that valuable faculty time is used preparing, re-stocking, and maintaining laboratory exercises and equipment. After 16 years of continuous and reliable leadership, we have re-introduced a rotating position for the department chair. It would be advantageous for us to develop a system that would provide a smooth transition between chairs. Although the majors are 50-70% female, there are very few majors from other underrepresented groups. We would like to increase the number of majors from minority groups. We are also interested in developing some short and long-range departmental goals, which are expressed in the *Department Planning* section. In addition to these challenges, we seek additional assessment techniques to enhance our existing program (or program component) assessment methods.

**Description of Department Planning Process**

The department undergoes an internal and external program review every 5 years, with the next review anticipated for the 2010-2011 academic year. In addition to the routine issues involved in our program assessment, we would like to develop a planning strategy for the next decade. The College is facing substantial budget cuts and is asking for creative ideas to fill the budget gap in order to prevent the elimination of programs. We would like to develop cost-saving initiatives to meet and aid the mission of the College in this regard. Although the budget issues are likely to be long-term, the need for creative solutions is immediate. Another long-range planning goal will be the replacement of a senior faculty member upon his retirement. Although it may be many years before this event occurs, we want to stay abreast of trends while avoiding fleeting fads within the geosciences marketplace and identify the areas of expertise for a replacement faculty member that would best augment and compliment our existing program.

**Summary of Most Recent Department Review**

The last several department reviews were all very positive. The most recent review stressed the continued importance of the department being strategic in our course offerings and program options. This is an issue that has been and remains critical in our planning process. The only suggestions made were to consider hiring someone who specializes in the geology of lakes, and to hire a support specialist.

**James Ebert**

## State University of New York (SUNY) College at Oneonta

## Earth Sciences Department

The Earth Sciences Department at SUNY Oneonta is a multidisciplinary department offering majors in Geology, Water Resources (Hydrogeology), Meteorology, Earth Science (commonly a dual major with Adolescence Education) and Environmental Science (with a concentration in Earth Science). The department comprises 9.25 faculty. Five are geologists; one is a hydrogeologist and three are meteorologists. The quarter line is held by a wetland soil scientist/global carbon cycle biogeochemist and is a shared position with the Biology Department.

### Department Strengths and Weaknesses

The Earth Sciences Department at Oneonta has many strengths. We have a strong tradition of mentoring students and engaging them in undergraduate research. We enjoy a campus reputation for excellent teaching and we are recognized as a department with a friendly, supportive environment. Our academic programs in Meteorology, Geology, and Water Resources have regional reputations for graduating well trained and skilled students, ready for careers or graduate study. Our NCATE-accredited Earth Science Education program has a national reputation for preparing excellent teacher candidates.

External reviewers have noted that our faculty and students are enthusiastic, our coursework is rigorous and relationships with alumni are long lasting. An extensive departmental Alumni Newsletter facilitates these relationships. We have a Student Advisory Council that provides guidance to the department chair so that students have a voice in departmental matters. We host an annual Majors' Night, where alumni return and share their experiences with our students and an annual Department Picnic that draws students, faculty, emeritus faculty and alumni. We are able to offer scholarships, student research grants and support students attending conferences through the generosity of our alumni. Undergraduate research is common in the department and has been institutionalized in some coursework. We host the ESPRIT listserv, the largest and most active listserv in the nation for the professional development of high school and middle school teachers of Earth Science.

Our faculty are collegial and we function as a closely knit team. However, we could do a better job of mentoring new faculty members. We view teaching as our primary responsibility. Two of our current faculty are recipients of the SUNY Chancellor's Award for Excellence in Teaching and one received the SUNY College at Oneonta award for Excellence in Academic Advising. Five emeritus faculty members received the Chancellor's Award and three were recognized as Distinguished Teaching Professors, a rank above full professor and the highest rank in the SUNY system. Because of this team atmosphere and the overall high quality teaching, our students form close attachments which persist after graduation.

Having five distinct majors in the department is a significant advantage for our students in terms of the flexibility that it provides. There is considerable overlap in

several combinations of curricula at the introductory level. This overlap facilitates students in changing majors without adversely affecting their time to graduation. At the same time, this allows the department to retain majors who might be lost otherwise to other departments on campus, a key factor in maintaining our overall number of majors.

Offering five majors also presents the department with significant challenges. So that our students progress toward graduation in a timely fashion, it is necessary for us to offer a wide array of advanced classes in each major in each semester. This tends to spread our faculty resources rather thin. As a consequence, we are not able to offer as many sections of introductory courses as our competition, the other science departments, that only offer single majors. We firmly believe that a significant fraction of our majors are recruited from our introductory classes and the inability to offer more sections of introductory classes adversely affects recruitment of majors.

Staffing is a strength and a weakness for our department. Over the past 6 years, we have seen the retirements of 6 veteran faculty in a department of 9.25. Two of these were Distinguished Teaching Professors and one was a recipient of the Chancellor's Award for Excellence in Teaching. In addition, three of these retirees were active in research and regularly involved students in their projects. We have been fortunate in that we have been allowed to replace 5 of these faculty and have been given permission to search for a one year replacement for a faculty member that announced in April his intent to retire at the end of the spring, 2009 semester. We are optimistic that we will be able to launch a tenure track search for this vacancy next year.

The new faculty that we have recruited have been, for the most part, excellent additions to the department. All five have been active (in varying degrees) in research and have involved students in these efforts. All three of the new geologists are developing into strong teachers and active researchers. One of the two new meteorologists has been extremely active in research and public outreach and is showing signs of great promise as a teacher. Unfortunately, the other new meteorologist is in the process of being denied tenure and there may be staffing problems that result from this. The infusion of new "blood" into the department has had an invigorating effect on the curriculum and on the involvement of our students in various activities. However, the new faculty have also placed greater demands on departmental resources to support their professional development (e.g. conference attendance, etc.). This was less of an issue with the now retired faculty as some of them were considerably less active.

From May 2006 through August of 2008, our building was closed for major renovation. We are now in the newly renovated space with electronically enhanced classrooms and laboratories. Some of our labs have been reconfigured to foster student interaction and group work. We have also acquired substantial new equipment as part of the renovation and start-up grants to new faculty. This includes an X-ray fluorescence spectrometer, Raman spectrometer, ground-penetrating radar unit, an electromagnetic induction profiler, differential gps technology, total station, a rotating fluid tank, and 24 hand-held Kestrel weather meters. Acquisition of this equipment has opened numerous new opportunities for joint undergraduate/faculty research. This represents a major new strength for the department.

Like most geoscience departments around the country, recruitment of majors is a significant problem for us. Currently, we have 124 majors in our five major curricula. Earth Science (mainly dual majors with Adolescence Education) comprises the largest group with 44 majors. Meteorology has 37 majors and Environmental Science with a concentration in Earth Science has 21. The remaining 22 majors are divided between Water Resources and Geology, formerly the largest major in the department. We also serve majors in Childhood and Early Childhood Education who choose concentrations in Earth Science (19 students) which is the second largest science concentration, behind General Science.

**Description of the Department's Planning Process**

The long term stability of our faculty (at one point, something like 17 years elapsed between faculty hires) led to a culture of collegial decision-making in which the department functioned as a committee of the whole. We are the only department on campus that schedules weekly two-hour meetings. With the recent turnover of faculty, it is time for us to consider new models of planning and management. As it stands now, we do not have an 'official' planning process.

**Summary of Latest Departmental Review**

Our campus reviews majors rather than departments on a seven year cycle. From 2004 through 2006, all five of our majors underwent self study and external evaluation. Because Environmental Science is an interdisciplinary major with concentrations in Earth Science as well as Biology and Urban Planning, we will exclude that major from discussion here.

Our Geology curriculum was described by reviewers as rigorous and traditional. They recommended the institutionalization of undergraduate research in the form of a senior thesis or capstone, which we had proposed and have since implemented. Curricular revisions that were also proposed in the department's self study were commended by the reviewers and have been implemented. Concerns regarding equipment and instrumentation have been partly addressed. The reviewers recommended seeking external funds for upgrading instrumentation, something that we have yet to do. The reviewers also suggested that we highlight student research and conference participation on our website and use this as a means of recruiting additional majors. We have made minor progress in these regards.

Reviewers found that our Water Resources curriculum is strong, well-respected, and rigorous. They also noted that it offers coursework not typically available at the undergraduate level. Our reviewers suggested improvements to facilities, which were accomplished in renovation of our building and adding faculty with expertise in surface water hydrology. This has been addressed partly through the hiring of our new geomorphologist. Reviewers noted the potential for growth of the program, a recurring theme with several of our majors.

The Earth Science program was recognized for providing a solid and diverse foundation in all areas of the Earth Sciences. The reviewers suggested that our Earth Science major (or the department as a whole? The review was unclear on this point.) could serve as a role model for similar sized institutions where teaching is the main

mission. The reviewers recommended hiring a third meteorologist and increasing the diversity of the faculty, both of which have been accomplished since the review. The reviewers also commended the department on institutionalization of research in the context of courses and recommended that a senior thesis or capstone be implemented in all major curricula in the department, which we are considering.

External reviewers found that our Meteorology program is of high quality and boasts an impressive record of placement of graduates. They noted the need for a clear recruiting/enrollment management plan and the need for us to advertise accomplishments of alumni. The reviewers also commended the faculty on fostering a sense of identity among the majors. The need for a third meteorologist and absence of Unidata for class use were cited as major shortcomings. A third meteorologist has been hired and we have acquired the first component of Unidata and are working on the rest. The reviewers also indicated a need for a course in Atmospheric Thermodynamics, which we have implemented, and that there is room to expand the curriculum in light of the fact that similar institutions typically have more requirements than our program. That goal was accomplished last year with the addition of four new courses and a major revamping of the requirements for related coursework.

Pete Berquist and Lynsey LeMay

# Thomas Nelson Community College

## *Department of Geology*

## Overview:

The Geology Department at Thomas Nelson Community College is comprised of one full-time faculty member, and at least two adjunct instructors each semester. The full-time faculty position is also the Department Head, and reports directly to the Dean of the Division of Science and Allied Health; this division additionally includes Chemistry, Biology, Physics, Science Education, Health, Physical Education, and a diverse Nursing program. Each program within the division has their own dedicated labs, although we collectively share purchasing budgets. The Geology Department is relatively young, having had a full-time instructor for ~4 years, and in that time has moved from the Division of Math, Engineering, and Technology to the present Division.

As an institution, TNCC serves ~14,000 students annually, where students are pursing Associates Degrees, Certificate programs, workforce development, or transfer status into 4-year academic programs. Geology receives ~ 200 to 250 students each semester (except for summer terms, which draw ~30 students). Informal polling of students inquiring why they decided to take a geology course reveals that over 95% perceive that geology will be easier than physics, chemistry, or biology.

## Strengths

- We are fortunate to have an adjunct instructor who expresses a strong (and long-term) commitment to the geology program. Additionally, this instructor works very well with the full-time instructor, especially in regard to shared/complimentary teaching styles and philosophy, inclusion of field work, trying new teaching methods, and overall interest in providing students with geoscience education relevant to their daily lives.

- Interest and flexibility by instructors to adapt courses to student and other department's interests and needs.
- Support of our academic Dean and Vice President. Our administration has made it clear that they are interested in supporting the development of the geology program as mush as possible. This does not come in the form of unlimited funding, however, they are helpful in acquiring resources when available, and especially supporting faculty in grant writing. Additionally, administration is very supportive of providing field experiences for students. This support comes in the form of providing vehicles, field supplies (when possible), and encouragement to incorporate and develop field experiences.
- Dedicated laboratory space, with assistance from Division-wide lab coordinators.
- Geology courses are required for students pursuing their teaching certificates. This ensures enrollment in students, but moreover, students who recognize that they my one day have to teach this subject. Generally, the education students add a very positive dynamic to the classes.

## Weaknesses

- Having only one full-time faculty, I think, presents the greatest challenge for the continued development of the geology program. Although the Geology Department is unique in that we have a committed and available adjunct instructor, in general, adjuncts have less flexibility in offering and developing courses, and receive very little economic incentive for their efforts. By bringing on at least one more full-time instructor, I strongly believe that we would be able to offer 1) more sections of existing classes, 2) more diverse course offerings, 3) increased opportunities to apply for external funding, and 4) stronger advocacy for the department.
- Course enrollment is generally low. I believe this is due, in part, to 1) limited course offerings and 2) strict adherence to a minimum enrollment of 15 students per class. The number of possible course offerings are also contingent on the availability of adjunct instructors

- The student body is largely either/both unaware or uninterested in the geosciences. While this trend may in part be a function of the community served, the Department could only benefit by increased (and more effective) visibility and advertising

## Planning process

The Geology Department does not have a formal planning process. Decision about the number of courses, and development of courses involves consultation with adjunct instructors and the Division Dean. Ideas for courses that may be of interest to students, and developed in the future come from informal conversations with other instructors at TNCC.

## Recent department review

To my knowledge, the department has never received a formal review, and there are no plans to conduct such a review. However, Departments are required to review, and update, their curriculum every two years. This review is restricted to courses currently offered and does not account for any future plans for the department.

Azam Tabrizi
*Tidewater Community College*

The Geology Program at Tidewater Community College (TCC), Chesapeake Campus is part of the Division of Languages, Mathematics and Sciences. We are a growing department with one full time faculty and five to six adjunct faculty depending on need and availability. Our program began with one faculty member in the Summer of 2000 offering two lecture and two lab sections in Introductory Physical Geology. We now offer courses in Introductory Physical and Historical Geology and Earth Science. During the Spring 2009 semester we ran nine face to face lecture sections plus two online sections in Physical Geology reaching a total of 234 students. We will begin offering online Historical Geology in the Summer 2009 semester. TCC, Chesapeake is located in a suburban growth community serving six high schools and offering a multitude of degree and certificate programs.

Our small department offers the students a good environment in which to take their introductory science courses. The lecture and lab material are planned and coordinated by the instructors. The instructors follow the same lecture and lab topic schedules and use the same text and lab manuals to assure that the students all receive a consistent curriculum. Most lecture sections offer supplementary BlackBoard access where announcements, lectures, assignments, and grades are readily available to the students. The small department also allows the instructors to communicate regularly, provide support and cover for occasional absences, and, most importantly, keep track of students that may be facing personal or academic difficulties. In response to student need, tutoring has been arranged specifically in geology through our Student Academic Development office.

We offer a Geology Club which provides students with the opportunity to "dig a little deeper" into the subject matter. The Club plans local/regional field trips and opportunities to attend community events related to the Earth Sciences.

Our weaknesses involve technology and time. Most of the class assignments and lab activities are paper driven. Display technology and Internet access is available in the classroom for the instructor to use to enhance lecture and lab however direct student access to technology for classroom instruction is very difficult to schedule. With only one full time faculty who is also responsible for teaching a full credit load, release time is not available to pursue grants and other programs to enhance classroom instruction.

Our departmental planning process is quite simple and is accomplished by the full time teaching faculty member. Prior to each semester the student numbers are analyzed; appropriate numbers of lecture and lab sections are scheduled always with an anticipated 5-10% increase in student numbers to match the overall campus growth.

Jonathon Filer
*Towsen University*

Towson University's Geosciences program is small and teaches undergraduates only. We have four full time tenured faculty members, one of whom is serving as Acting Dean and can only provide limited teaching support. The full time faculty teach all of the upper division courses. Part-time faculty teach some of the introductory courses, but the full time faculty all teach them as well. Each of our faculty specifically sought a position in an undergraduate only department, and remains committed to undergraduate education. Our upper division courses typically have 20 students or less, and are mixture of geology, environmental science and studies, and earth and space science (mostly pre-service teachers) majors. Two of our faculty members also teach courses for a Master of Science in Environmental Science, and one of our faculty members directs that program.

Towson University is a suburban regional comprehensive institution, within the University System of Maryland, and is located in the Baltimore metropolitan area. Many of our geology and environmental science majors are employed either part time or full time with geotechnical companies, and the most common post graduate path for those majors is employment in that field. Some of our majors in recent years have gone on to graduate school to prepare for careers in academics and petroleum geology.

Because of interdisciplinary collaborations that have developed in recent years between faculty in geosciences, physics, chemistry and biology, Towson's Fisher College of Science and Mathematics has been able to win external funding to acquire state-of-the-art analytical equipment, including an Inductively Coupled Plasma Mass Spectrometer and instruments for X-Ray Fluorescence, X-Ray Diffraction and fluid inclusion analyses. An external reviewer in 2007 noted that the amount of instrumentation available to the program is remarkable. Each geology major designs and completes a senior research project for one or more credits. Our students are very active in using this instrumentation both for their own independent research and in support of faculty research.

Towson expects tenure track and tenured faculty to maintain an active role in scholarship in their field and to make conference presentations and to publish in peer-reviewed journals. In recent years, our Geosciences program has been funded by the National Science Foundation, Petroleum Research Fund, and the Maryland Historical Trust. Our physical facilities for teaching are at best adequate; we have two teaching labs, one for upper division courses and another for lower division courses. A plan for renovation of our introductory lab into a more modern configuration has been approved and is currently scheduled to take place in the summer of 2010. Research space is sufficient and is either in individual labs or multi-disciplinary labs.

Our greatest need at this time is additional instructors and staff, as was noted by an external reviewer in 2007. We have effectively three faculty members to handle the Geosciences program and make a significant contribution to interdisciplinary undergraduate and graduate Environmental Sciences programs. As a consequence, we teach most upper level courses every other year and offer very few electives. We have no laboratory manager so that task is shared among the faculty. The external review specifically noted the need for an additional faulty member and a full-time support person.

**Department of Geology, University at Buffalo**

*Strengths*

By far, our greatest strengths are our faculty and staff. Our faculty are internationally recognized researchers, and all faculty have currently active research grants. Similarly, we have a robust graduate program, and most of our M.S. and M.A. candidates are employed prior to their thesis defense. Our staff are wonderfully competent; the Assistant to the Chair actually received her M.S. in geology through UB, so she is particularly attuned to the inner workings of the department. Perhaps most importantly, the department as a whole places a high value on collegiality. Every one gets along, and all major decisions are reached via heart-felt discussion involving the entire faculty.

*Weaknesses*

We do not have enough full-time tenure-track faculty, and we do not have a permanent physical home.

Universities of comparable size and scope—our "peer institutions"—employ 16 – 18 full-time faculty. We have 12 full-time tenure-track faculty, and must hire 1 – 2 lecturers every year to fill in the gaps. Our small size means that each faculty member must wear several hats simultaneously, and that it is difficult to protect junior faculty from excessive service. Most pressing is the challenges in balancing our graduate and undergraduate course offerings.

Although this is a "temporary" problem, the University is in the process of moving our department from one building to another. Unfortunately, there isn't enough money to move the entire department at once, so our faculty, staff, and teaching resources are currently scattered amongst 5 buildings on campus. The current plan is to have us all moved, and into one building, by 2013. Meanwhile, the lack of coherency is causing strain amongst faculty, staff and students.

*Planning Process*

We hold an annual "faculty retreat" where the entire faculty, and full-time lecturers, meet for a full day to discuss department long-term and short-term goals. These goals and resulting plans are reviewed on an annual basis, or when we perform a search for a new faculty hire, whichever comes first.

*Departmental Review Summary*

The last external review was performed in 2003, and we are preparing for our next review in the 2009-2010 academic year. Overall, the review

indicated that our department was “outstanding” in terms of research and teaching. The external reviewers pointed out that our department is too small, requiring faculty to wear too many hats at a given time. I am pleased to state that our department is still outstanding: we have nationally recognized graduate programs; a high retention rate of undergraduate majors; and all faculty are actively engaged in advising graduate students and funded research projects. I am less pleased to state that we are still too small, making it difficult to balance the needs of the department with those of individual faculty and with those of the university. Currently, our challenge lies in finding enough instructors for the required undergraduate courses without negatively impacting our graduate and research programs.

**Lewis Owen and Barry Maynard**

**Department of Geology, University of Cincinnati**

Our Department has built on its long-standing excellence in paleontology, geomorphology, and stratigraphy-sedimentology and currently focuses on 1) **paleontology and paleobiology**, 2) **sedimentology, stratigraphy and low-temperature geochemistry**, and 3) **Quaternary geology/geomorphology and landscape dynamics**. We center our curriculum around these strengths, providing our students with opportunities to have hands-on experience in research in these areas, but endeavor to provide a holistic training in geology. Until about four years ago our enrolment of majors in Geology (BS and BA) was in the mid-twenties. Since then we have progressively increase our numbers to over 70 majors. This is likely a consequence of active recruitment and commitment to retention of enrolled students. In particular, we implemented a freshman seminar series. Our graduate program comprises between 20 to 25 masters and doctoral students, most of whom work as teaching or research assistants funded about 2/3 by the College, and 1/3 from grants and endowments.

The Department has a faculty of one Associate Professor and 10 Professors. Unfortunately, in the last year, the Department has lost three faculty members (two retired and one died). We are a faculty of "older white men", which contrasts markedly with our undergraduate and graduate student populations. In 2009-2010, for example, graduate students will comprise fewer than 50% non-minority, male students (40% female). The average age of faculty in the Department is 58, with only two faculty members being younger than 50, and it is likely that we will see at least four more retirements within the next 5-10 years. There is clearly a need to increase diversity and address the age structure of our faculty. The last new faculty appointment was made in 2004 and the latest previous appointment was made in 1998. These two appointments significantly strengthened our research focus in paleontology, stratigraphy/sedimentology, and Quaternary geology/geomorphology, which resulted in increased graduate (and undergraduate) enrollment and enhanced external funding. These two hires also significantly increased the publication and grant output of the Department. But with our recent loss of faculty, and our age structure and composition, new appointments are vital for the health of the Department. Moreover, our losses have diminished our ability to deliver teaching and research across the range of subdisciplines that maintains the integrity of the core topics of geology. We are "promised" two new faculty positions in the coming years, plus a joint appointment with the Department of Geography. We aim to attract young female or minority candidates to these positions. Subject areas will be in biogeochemistry/biodiversity/paleobiology, isotope geochemistry and geomorphic hazards. These are aimed to enhance the analytical and quantitative aspects of our program. The real challenge is to find the right young individuals that we can support to help drive our department in the coming years.

The University of Cincinnati has made the decision to convert from the quarter to semester system in 2011. This means we have to convert all our courses from 10 week programs to 16 week programs. However, this provides us with the opportunity to totally revamp our program to simplify and rationalize it for more efficient and effective teaching. Furthermore, the administration is insisting that we do not teach courses to fewer than 21 students, unless absolutely essential. Clearly, even with 70 majors this is a challenge. We, therefore, need to

develop innovative ways of including non-majors with our majors without jeopardizing the in depth and essential training for our majors. The College is also requiring that we implement 4+1 degree courses, that is, a BA progressing into a MS in 5 years. We are the initial stages of implementing this program, the principal hurdle being delineating it from our normal 2-ear program. Changes to our curriculum are undertaken under the direction of the Head upon the recommendation of an ad hoc committee comprising several faculty (including the undergraduate and graduate director) and approved by the whole faculty.

To help increase the efficiency of implementing the new curriculum changes, the increased student numbers, the new 4+1 degree program, and to oversee the management of fieldwork and several laboratory courses, we have created a new position, the Academic Director, at the expense of loosing one of our secretarial staff. This position will be advertised soon and the new person, with a MS degree in geology will be in place ready for the next academic year. This will also help bridge the gap between our old faculty and students. To include students in research projects and to help with retention we have developed a graduate-undergraduate mentoring program. This has proved very effective and has helped bridge the gap between our aged faculty and young undergraduate students.

Our Department emphasizes the research aspects of Geology, possibly at the expense of the applied aspects. A few decades ago, we had strong links with industry, notably the petroleum industry, and have many alumni in high positions with international oil companies, but those links have weakened with the retirement of our petroleum-centered faculty. We need to investigate ways of renewing these connections.

Our last program review was five years ago, but we are scheduled to undertake a whole program review next year. This will be done internally.
The department has a generous endowment and as a consequence can fund many student and faculty activities. However, the return on our endowment has decreased by 20% during the last year. Nevertheless, we should still be able to continue most of our internally-funded programs for the coming year. But, our College is suffering from the recession and the full implications of the budget cuts have still to be fully realized. We are hoping this will not affect the faculty positions we are promised in the coming years. Of particular concern is securing sufficient start-up funds.

Our department has also seen a change in leadership in the last year. An Acting Head was appointed, who will now take over a Head for the next 5 years. This clearly presents some challenges and new opportunities for leadership and changes in the immediate future.

In summary, our department has a long history or relative stability and success in training student, but like most Departments of Geology, we are in a time of rapid change and financial challenges.

Jodie Hayob and Melanie Szulczewski
*Department of Earth & Environmental Sciences, University of Mary Washington*

**Overview:**

The University of Mary Washington (formerly Mary Washington College) is a public, co-educational university with a strong emphasis on liberal arts that primarily serves undergraduate students. Master's programs are offered in a few disciplines such as business and education, and are being planned in a few other areas. Mary Washington has offered majors in both Geology and Environmental Science (with either a natural or a social science concentration) for 30+ years, although the particular departments that housed these programs have varied. In 1993 the Department of Environmental Science & Geology was created for our two programs; in 2007 we changed our department's name to the Department of Earth & Environmental Sciences to better reflect our course offerings and focus.

In 2007 we overhauled the Environmental Science concentrations, in part so that the core courses required for the natural vs. social science tracks would be more distinct, and we added new core and elective offerings. The core requirements of the Geology major have remained constant for many years, but as our faculty have grown we have added quite a few new electives to this major (e.g., computer applications w/ GIS, soil science, fluvial geomorphology, hydrology). Currently, we have about 20 majors in Geology and about 100 in Environmental Science; numbers have held steady in the geology program and increased in environmental science in recent years.

**Strengths:**

Mary Washington has offered a major in Geology for over 40 years, and our program in Environmental Science (established in 1979) is one of the oldest in the state of Virginia. Our location is ideal for a variety of research projects and field trips – we are within an hour or less of the Chesapeake Bay, the Rappahannock River, Lake Anna, the Appalachian Mountains and Washington, DC. We have 7 full-time, tenure-track faculty and until recently also maintained a part-time adjunct position to help teach introductory geology courses (this position has been eliminated for the fall of 2009 due to budget cuts). Our most recent faculty members were hired in 2000, 2003, 2005, and 2008 – so we have a steady track record of adding new faculty in the last ten years. Most of our faculty teach courses that appeal to both majors, so we are a close-knit group pedagogically. Our faculty have complementary expertise in aquatic ecology/animal physiology, structural geology/GIS, mineralogy/petrology, hydrology/geochemistry, micropaleontology/climate change/stratigraphy, geomorphology/watershed analysis/GIS, and soil science/environmental chemistry/environmental policy.

We are well equipped for a public institution with ~ 4000 undergraduate students. Laboratory equipment includes: an automated powder XRD, a fluid-inclusion microscope, a U-stage, a uv/vis photospectrometer, a magnetic susceptibility detector, research-grade

petrographic and wide field microscopes w/ image capture software, a Coulter counter, student petrographic microscopes and various apparatus for sample preparation (fume hood, centrifuge, drying oven, kiln, rock saws, etc.). Our department shares in the maintenance of a fairly new Hitachi VP-SEM with EDS, and we have access to an ICP-AES, GC-MS and NMR. All classes and labs are fully networked and we have a departmental computer lab (including ArcGIS software and a dedicated plotter/printer for poster presentations). Field equipment includes: a 22' research vessel w/ coring winch, a network of on-campus monitoring wells, GPS instruments, a diamond coring drill, soft-sediment coring devices, and various water chemistry instruments. Students have routine (supervised) access to all of our equipment and facilities.

Excellence in teaching is a core value at Mary Washington, and is the primary consideration when faculty are tenured. However, research expectations have risen greatly over the past decade or so, and our department has a strong emphasis on high quality research (usually collaborative with our students). We strongly encourage all majors to engage in internships and/or independent study; qualified students are encouraged to pursue honors research (we have a well established set of guidelines and expectations). Our close proximity to Washington DC and our state capital (Richmond, VA) gives our students ready access to a variety of internship opportunities.

**Weaknesses:**

Teaching Load: One of our most significant weaknesses is our heavy teaching load (~ 4/4 equivalent). This is partly due to Mary Washington's strong history as a teaching institution, and partly a reflection of our strong general education requirements (all students must take two science classes, one of which has a lab, and one must be a pre-requisite to the other). Each fall, we offer ~ 7 sections of introductory geology and the equivalent of 4 sections of introductory environmental science; in the spring we typically offer 10 introductory sections to satisfy general education needs. Because of our heavy teaching loads, we have not yet been able to develop and offer a field course within our program (although most courses include extensive fieldwork or fieldtrips). Ideally, we would like to create a hybrid course to serve both majors. The situation is improving however, as more flexibility has recently been given to department chairs to set teaching loads and develop creative ways of decreasing them.

Support Personnel: our department does not have any dedicated technical or administrative support. The four science programs in our building (biology, chemistry, physics, and earth and environmental sciences) share one administrative assistant/secretary. We had a second person for a year who has left, but has not been replaced because of current budget constraints. We do have two laboratory specialists who serve the entire building, but the chemistry and biology departments consume most of their time and energy.

Space/Infrastructure: the science faculty had already outgrown our new building when we moved in during the summer of 1998. Our space crunch has only worsened: the building has only 4 classrooms for general use (the rest have already been converted to laboratories),

and the building lacks any dedicated rooms for seminars (we had two, but both have since been converted to offices for new science faculty). We actually had to carve up part of our departmental computer lab to create another office after our most recent faculty hire this past year.

**Planning and Review:**

Our department will develop a Sustainability minor during this next year (Szulczewski is leading this initiative). This new minor will combine courses already offered in the department as well as new courses to be implemented next year. We are also considering the addition of a major in Environmental Geology. Finally, we are considering a 5$^{th}$ year masters in environmental science or environmental studies. We hope to get advice and feedback from others on the viability of these offerings and how best to develop these additional programs. Our department's next 10-year external review is scheduled to begin fall 2010, so this summer going into the '09-10 academic year is an ideal time to be preparing for this review process. We hope to network and possibly recruit external reviewers to assess our programs for this external review process. We would also like to engage in discussions about how best to prepare our students for the workplace and how to better recruit/retain geology students in particular.

Geology & Geography Department
UNC-Pembroke
Martin B. Farley

Geology is part of the Geology & Geography Department at the University of North Carolina at Pembroke (UNCP). The geology program has been growing over the last eight years. From less than one FTE geologist in 2001-2002 (the geologist had to teach some geography at that time), geology now has three tenure-eligible faculty and one full-time lecturer (of seven faculty total). UNCP is a minority-serving institution (27% African-American; 18% Native American; 6% others), so we have an opportunity to present geology to a population under-served by college-level geology instruction.

One contributor to our success in building geology is that the administration sees us as helpful in providing general education across the class schedule as enrollment has grown since 2001. General education geology has filled 99% of capacity since 2003 and Fall 2009 sections are currently 63% full before any incoming freshmen have registered.

Although we don't have a geoscience major as yet (see below), we have a geology minor and are an important contributor to science education (bachelor's and master's). This means the program has a dozen courses beyond general education that need to be taught periodically. The number of earth science education majors are far out of proportion to the relative number of faculty among science departments. We also received a NSF grant to improve earth science education in local high schools (these, as with UNCP, are dominated by students from underrepresented groups).

Classes are small (32 or fewer students; beyond general education, much smaller), so that faculty can be flexible in their teaching approach. Until recently, there was no problem with low enrollment courses, but the current fiscal situation has provoked the administration to start worrying about this.

UNCP is a teaching institution with standard 4/4 teaching loads. Labs count as only half a course for load purposes, this is a particular problem if a faculty member has to teach different labs. In addition to the high total loads, the preparation load is high (3-5 preps per geologist). This hinders much activity besides teaching and university service during the academic year.

We face a number of hurdles in research. UNCP's history means that there are essentially no research labs in the sciences. In geology, we have about 140 square feet that must act as storage for teaching collections (rocks/minerals/fossils/maps) and research lab. This is a major handicap in conducting research. It has been difficult to get students involved in research: science education majors point towards student teaching, many students commit to the minor or earth science ed only late in their college career, and many students are non-traditional with jobs or families. As with many institutions, scholarly expectations have increased.

Although we have increased the field component of our course work, our location on the Coastal Plain without significant rock exposures has made routine field trips difficult for topics beyond surficial features. We have created a geology field trip in the May summer session, but its viability is tenuous because the maximum practical enrollment is the same as the minimum allowed for summer classes.

We have designed a major flexible enough to allow students to follow either a geology or geography path. This seems more sensible than separate majors, both to recruit reasonable numbers and to avoid increasing the preparation burden on faculty. This major did not require addition of any geology courses beyond what we already teach. This major has been approved at UNCP, but requires approval by the UNC System administration as well. This broader approval has been hung up for more than a year because the System has been revising the approval procedure.

The university expects that departments will create plans on about a five-year interval. At the moment, department planning is in hiatus because of a university-wide strategic planning initiative. Since the department was reinstated four years ago, there has not been a departmental review, although one would be due soon. The most recent review in 1998 stems from the previous incarnation of the department, before the arrival of any of the current geology faculty.

**The Earth and Environmental Science (EES) Department at the University of Pennsylvania** is a diverse department consisting of an undergraduate program (with degrees in Environmental Studies, Geology, and Paleobiology, and minors in Environmental Studies, Geology and Sustainability and Environmental Management); a professional masters degree program (Masters of Environmental Studies and Masters of Applied Geoscience) and a research Ph.D. program (Ph.D. in Earth and Environmental Science). The department has 9 standing faculty and several full-time staff members and lecturers. There are approximately 95 undergraduate majors and minors in the department, 130 professional masters students, and 17 Ph.D. students. This essay will focus on the undergraduate program.

*Department's Strengths, Planning, and Related Course Changes*

Our undergraduate course and curriculum planning begins at a faculty and staff meeting held each semester and is continued throughout the semester by the Associate Director and chair. The major course related changes we have been implementing in the past few years have been to 1) increase the quantitative skill sets of the students and 2) provide students with thematically linked courses in their concentrations.

The undergraduate program has at its primary strength the interdisciplinary **Environmental Studies (ENVS) major**, which was updated in the spring of 2008. This curriculum change increased the number of core courses in the ENVS major and provided students with clearer descriptions for approved concentrations (see department's curriculum description). The Junior Research Seminar was incorporated into the new curriculum and was taught in the spring semester of 2009. The goal of the course is to help ENVS majors plan for and gain the skills to complete a senior thesis. Ten Juniors and one Sophomore successfully completed the course this spring.

The EES department also has plans to **restructure the Geology major**, which currently is composed of two tracks: Geology and Paleobiology, into an Earth Science major with three tracks: Geology, Paleobiology and Environmental Science. The Associate Director is currently putting together a curriculum. This curriculum will be presented to the faculty, and a small committee will finalize the proposed curriculum to be put to the College's curriculum committee for final approval.

In addition to the Junior Seminar, we offered **2 other new courses this year** that were very successful: In the fall, "Global Climate Change" was taught for the first time, and in the spring we offered "Ocean Atmosphere Dynamics". In the fall of 2009, we will offer a new course entitled "Geochemistry of the Atmosphere and Oceans". These courses have helped us to achieve a goal of offering more courses within our department of interest to Environmental Studies majors, and attracting Penn students to the Earth and Environmental Sciences.

Our department has a strong **Academically Based Curriculum Service (ABCS)** learning program, currently made up of four courses. One of these, "Urban Environments: Speaking About Lead in West Philadelphia", has been approved as part of the University

of Pennsylvania's College curriculum requirements (in the Natural Science and Mathematics sector). In addition we are in the planning stages of offering a fifth ABCS course, "State of Philadelphian Watersheds", which will involve synthesizing and communicating publicly available environmental information on Philadelphian watersheds for local community groups and existing watershed partnerships.

*Advising and Student Involvement*

The Associate Director of undergraduate programs stays in touch with all majors via email and meets with them on a drop-in and appointment basis. She is the primary major advisor for all Environmental Studies and Geology students, and she keeps students abreast of opportunities and the curriculum on the undergraduate website and actively works with the **EES Undergraduate Advisory Board (UAB)** to promote the department and address student concerns.

Every other week the EES UAB meets with the Associate Director. The UAB successfully keeps the EES staff and faculty abreast of student concerns, plans social events, helps with visibility events for the department on campus, and for the first time this spring hosted a faculty panel discussion on Climate Change. The UAB hopes to make the faculty panel discussions a yearly event. Additionally, they will play an advisory role in shaping the new Environmental Science track.

*Visibility*

To promote our department and our majors, we typically host booths at several student fairs on campus. In addition, the UAB hosts social events and invites prospective majors (a "prospective EES student" email list is kept), and the Associate Director attends "Majors Dinners" (dinners hosted by house deans in the undergraduate houses) each semester.

*Challenges*

Our department is strengthened by the many professionals who teach both full-time and part-time in our department. Because of this, however, it is a constant challenge to make sure our standing faculty members and lecturers are fully integrated into all aspects of the undergraduate curriculum. Additionally, our most popular major is the interdisciplinary ENVS major, which means that the majority of our students do not take all of their major classes within our department. This can make building a cohesive student group in the department a challenge. The very small number of Geology majors (1-5 per year, compared to 20-40/year for ENVS) creates an imbalance in the department, and is not in line with faculty research interests, which are primarily earth science. Another challenge for the department is the lack of female faculty members. Lastly, a challenge and a strength of the department is the addition to our department of 3 assistant professors in the last 5 years, a group that makes up one third of our standing faculty.

Diane Doser
University of Texas at El Paso

The Department of Geological Sciences at the University of Texas at El Paso (UTEP) is of moderate size (15 faculty) with ~30 undergraduate and 50 graduate students. We have functioned well as a department with relatively little friction for over 15 years.

I believe our biggest strength is that we work hard to develop a sense of community between faculty, undergraduates and graduate students. Most faculty welcome students on a "drop-in" basis and provide plenty of mentoring and life skills coaching, as well as assistance with academic and research problems.

At the undergraduate level we try to engage as many students as possible in research projects, especially paid research. The research helps them to see how to apply their classroom experiences to real world situations, as well as building skill sets such as keeping a field or laboratory notebook, making oral and written presentations, and learning to organize and take a project to completion.

At the graduate level most students participate in one or more "research groups" that focus on discussions of cutting edge research papers, solutions to problems encountered in the students' own research, and the ins/outs of preparing for life after graduate school.

The highlight of our academic year is a student run research colloquium where undergraduates and graduates present research projects in oral or poster form. Professionals from industry and neighboring academic institutions serve as judges for the presentations. Feedback from the judges is used to help assess the quality of our undergraduate and graduate programs. We also use the colloquium as a recruiting tool. Community college students are invited to attend the evening undergraduate poster session. They have opportunities to talk with undergraduates, tour the geology department, and talk with professors about the program. Prospective graduate students from outside UTEP are also brought to campus for colloquium. This provides them with the opportunity to talk with students, faculty, staff, and prospective employers all in a short period of time.

Although we function well as a department, we face many external challenges to our program. Our graduate program is strong and recognized as an asset by the administration, but we are continually challenged to increase our enrollment at the undergraduate level. Over the past 5 years we have worked hard at outreach, especially at the high school and community college levels, and we have begun to see a small increase in enrollment.

A recent legislative mandate to cut all university undergraduate degree plans to a maximum of 120 semester credit hours (including a mandated 37 hours of core courses taken outside geology), forced us to completely overhaul our curriculum. It was extremely difficult to develop a degree plan that would adequately serve our geophysics undergraduates. We eliminated the requirement for geology majors to have a minor.

This allowed for more electives in their degree plans but necessitates more careful advising to insure the electives are selected to enhance a student's career goals.

Funding for graduate teaching assistants has not been increased for several years and no state funds can be used to provide tuition assistance for students. At first we were able to stay competitive by offering "signing bonuses" and other incentives funded through gifts from oil companies and a few endowed funds. However, this year nearly all the prospective graduate students we made offers to (who are not currently UTEP students) turned us down because we were not sufficiently competitive with regard to salaries and other support. Since we have worked hard to keep our graduate program a successful mix of about 1/3 local students, 1/3 U.S. citizens from other regions of the state and nation, and 1/3 international students (including many from Mexico), this will be a difficult hurdle for us to overcome. We are currently contemplating if we will need decrease teaching assistantships, allowing us to increase salaries, but also increase student workloads. Faculty with grants can provide research assistantships that are competitive with other institutions, but we are way of building a two tier system of support. Many students also may need to switch between teaching and research support during their two to four years of study at UTEP, and would be unhappy to take a pay cut when reverting to a teaching assistantship.

Another challenge we face is that our university is working hard to obtain "Tier 1" status, but with a strong commitment to "access and excellence" using limited resources. This demand is taking a toll on our faculty who have heavier teaching loads than Tier 1 institutions, but are still expected to increase research funding with limited infrastructure and staff support.

*University of West Florida*
*Matthew Schwartz*

The University of West Florida's Department of Environmental Studies (EVR) is based on a core of four faculty positions from a Geography background and one faculty member with a Geology/Oceanography background. These five faculty positions make up the academic and research core of the department; several adjuncts teach core courses, including those at the introductory/general education and upper-level undergraduate level. An undergraduate B.S. degree in Environmental Science is offered with three tracks: Natural Science, Geography, and Environmental Policy. A graduate M.S. degree in Environmental Science is offered with both a thesis and non-thesis option; the majority of graduate students choose the non-thesis option.

The primary strengths of the UWF EVR program are an academically diverse set of faculty specializations that enable the program, as a whole, to meet a broad spectrum of interests associated with the general field of environmental studies: soil science, aquatic science, meteorology and climatology, biodiversity, and coastal land-use. The department also benefits from the presence of the UWF GeoData Center, a suite of hardware and software that facilitates the learning and application of Geographical Information Science and Systems (i.e., GIS). Finally, the program, as a whole, is established to take advantage of a continuing and rising level of student interest in the environmental studies, including such topics as sustainability and environmental assessment and remediation.

Furthermore, UWF EVR has made certain efforts to offer courses across the continuum of the environmental studies and via an expanding number of media, including online offerings and distance learning technologies. The graduate-level Environmental Science degree was established to be easily accessible to non-traditional students, including members of the local professional workforce. This has facilitated a continuing connection between the town (Pensacola) and broader region (Northwest Florida) with the program.

It is the opinion of this reviewer that the major challenges faced by the EVR program are a lack of coordination of academic effort that has led to a failure to define a focus for the academic program. Environmental Studies is, by nature, a fairly broad interdisciplinary program and, as such, does not lend itself well to a core academic mission of UWF. Because the program has been established as Environmental Studies, rather than Geography or Geology (or even Environmental Science), it necessarily depends on prerequisite courses from other "classic" academic programs, such as Biology and Chemistry, while contributing three courses to the UWF general education program: Environmental Science, Physical Geography, and Physical Geology. The Environmental Science course is marketed as a less-rigorous science course and thus serves mainly to meet general education requirements for majors from outside of the physical and natural sciences. Physical Geology is offered as an introductory course to EVR majors, who are inclined to follow the Natural Science track within the EVR major; however, there is not an opportunity for students interested in Geology to pursue other courses (except for Environmental Geology, which is offered as an upper-level elective). Physical Geography is offered as a course between Environmental Science and Physical Geology: perhaps less scientifically rigorous than Physical Geology, but of more use to science majors than Environmental Science. It also serves as the introductory course to the Geography track specialization within EVR.

The majority of the EVR faculty are geographers; however, it appears that the academic programs have been developed to attract students to a range of tracks, rather than focus on the Geography core experience of the faculty. The Geography track is the second- or third-most populated major track. The Environmental Policy track is currently the most popular major

track, but is a poor match for the existing faculty specializations, as none of the faculty have academic specializations specific to natural science policy issues.

The EVR program at UWF is currently undergoing an external program review that will be completed by the end of May 2009. One component of this review was a quantitative assessment by the College of Arts and Sciences Dean's office. That assessment issued lower-than-anticipated rankings for the EVR department in terms of Faculty Quality and Association with the UWF Mission. This assessment is being appealed. Early word from this assessment process has indicated that it may be necessary for the Environmental Studies department to merge with an academic program closer to the core curriculum of the College of Arts and Sciences (e.g., Chemistry) to maintain viability through the current period of state budget cuts and associated program management by the University and College.

Paul Vincent
*Valdosta State University*

**Strengths & Weaknesses**

There are several strengths of the Environmental Geosciences Program at Valdosta State University. I feel that the one aspect is the diversity in our department. This is reflected in the different departmental programs and the diversity of faculty. The program is housed within the Department of Physics, Astronomy, and Geosciences. This offers us the opportunity to regularly interact with variety of professors with expertise in fields very different than our own. Faculty within the geosciences program are very diverse in both their cultural backgrounds as well as their academic pursuits. This diversity provides many different viewpoints and serves to strengthen the experiences of our students.

The other strength of our program is the undergraduate research experience that our students have to complete during their senior year. Each student is expected to complete an entire individual project from a proposal to the final written document and poster presentation at an appropriate venue.

On the down-side, out biggest weakness is that we are short two tenure track faculty members. This leads to a series of difficulties within the program. The first is that the current faculty are over-extended. As such, we have to devote a majority of our time to fulfilling our teaching obligations. This leads to individual faculty members operating in isolation and isolation leads to limited communication. The end result is that we are reactive, as opposed to proactive, to issues that may arise.

**Departmental Planning Process**

Our department head takes the responsibility for the majority of operational planning. He ensures that academics are on track and an adequate budget is in place to meet the needs of the department. Beyond the operational aspects of planning there is a university-wide strategic initiative system. This allows each unit of the University to submit proposals that, if implemented, further the mission of the University. Our department has a committee that collects ideas from the other faculty. These are submitted to the Department Head who then submits the initiatives to the Strategic Planning Database.

**Most Recent Departmental Review**

During the academic year 2003-2004, the Environmental Geosciences Program underwent a seven-year periodic review by the Board of Regents. Below is the Department Head summary of that review.

The Environmental Geosciences Program at Valdosta State University is strong and viable. Our program is a credit to Valdosta State University and to the University System of Georgia. Furthermore, the future and continued success and vitality of the program is now assured. The University system of Georgia has recently made a very important commitment to the Environmental Geoscience Program with a nearly $5 million dollar renovation project for the building that houses the geoscience program. The renovation will provide state of the art facilities with numerous smart classrooms, smart laboratories, and research facilities for faculty and students. The newly renovated space will attract and accommodate many new students to the major, and the excellent research

facilities, such as the GIS Center, will expand the opportunities for faculty consulting and undergraduate research.

Furthermore, one of the Department's Strategic Planning Initiatives was funded for FY04, providing the program with a high-end GPS unit, associated software, and supporting instrumentation needed to upgrade our capabilities to industry standard.

The program has always had excellent faculty members dedicated to quality teaching and research, but has been limited in its efforts to expand by the inadequacy of available laboratory and classroom space. As we move into the renovated facilities, we can envision a second degree program in Geographic Information Sciences, and a Master's Program in Environmental Geography within the next ten years.

Jeff Walker

Program in Earth Science
Department of Earth Science and Geography
Vassar College

Program Strengths

The Program in Earth Sciences is one half of the Department of Earth Science and Geography. There are four full-time faculty positions, and in the past decade we have graduated anywhere between 3 and 10 majors per year. The small size allows us to give individual attention to our students, and the students tell us that this is one of the really nice things about the program.

We have a wide range of interests represented by our faculty, including mineralogy and petrology, soils and agriculture, nature writing, paleoclimatology, geomorphology, geophysics, earthquakes and tsunami, human responses to natural disasters, fluvial sedimentology, feminism and environment, and environmental justice. The fact that we are a combined department with a social science strengthens our ability to address the human aspects of the earth sciences; we routinely team-teach classes with our geography colleagues, and have a combined major called "Earth Science and Society."

Vassar College is located in a glaciated terrane with exposures of igneous, metamorphic and sedimentary rocks. A relatively complete stratigraphic column from the PreCambrian up through the Devonian can be found within an hour's drive of campus, while Triassic basins can be studied within two hours. The landscape is an excellent laboratory for traditional, deep-time geology, but offers some challenges for teaching active tectonics, volcanism, and hazards. The Hudson River valley has a long history of cultural interaction with the landscape, and a long environmental history as the Storm King Mountain case is considered by some to be the birth of the environmental movement. Vassar College owns a 500 acre farm adjacent to campus with a meandering stream and glacial features ranging from a drumlin to lake bed clays. We have a well-endowed field trip budget that allows our faculty to make use of our surroundings, so almost every class involves multiple field experiences.

We have access to instrumentation appropriate to a small liberal arts geoscience program, including thin section equipment, automated X-ray diffractometer, shallow geophysical equipment, a microscopy lab, an ICPAES shared with Chemistry, and a shared-resource GIS lab. The college has active multidisciplinary programs in Environmental Studies and Women's Studies with when we regularly participate, and the opportunities for interdisciplinary teaching and research have led to faculty development.

Program weaknesses

Vassar College does not have a laboratory science requirement, and many Vassar students state that this why they chose the college. Almost all of our recruiting is through half-credit, general interest classes such as "Geohazards" or "The Earth Around Us." Our introductory physical and historical geology courses are laboratory based, and are usually

well subscribed but not always filled. The small number of faculty means that while our interests are wide ranging, our expertise is limited. We have an older building, and our facilities can be cramped. There are other programs in the building so we have little room for expansion should the opportunity present itself.

We maintain an unusually high commitment to multidisciplinary programs (highest per capita among departments at Vassar). This situation, coupled with a high number of administrative leaves in recent years, means that our focus has not always been on the geosciences or the earth science program. Finally, two of our faculty are not actively involved in geological research, so the other two faculty bear a larger portion of the burden teaching laboratory-based classes and advising research projects and senior theses.

Planning Process

Because of the size of our program, our planning process has not been formalized. We often gather at the end of the academic year for half- to full-day retreats to discuss issues, especially the curriculum, and attracting and retaining majors. We have regular monthly faculty meetings of all department faculty, and less frequent program faculty meetings usually to discuss staffing and budget issues. We have not had an internal or external departmental or program review for over 20 years.

Elizabeth Malcolm
*Virginia Wesleyan College*

**The Earth and Environmental Science Department at Virginia Wesleyan College**

History & Background

The Earth and Environmental Science Department (EES) at Virginia Wesleyan College is a relatively young department (~8 yrs old) at a small private liberal arts college. In the last few years we have graduated 3-8 majors per year. We have two full time faculty: a geologist and an atmospheric scientist. A Biology professor and a Physics professor are also affiliated with our department. In addition to our upper-level courses we teach introductory-level courses that fulfill the "Laboratory" general education requirement.

Historically the Division of Natural Sciences and Mathematics has been the smallest division at the college, with few majors in any of the programs. Research was discouraged, and some believed that the division's main mission was providing general education requirements for non-science majors. In the last 7 years however, we have seen a major increase in new faculty in the science and mathematics departments. This has created a dynamic and exciting atmosphere, with faculty from the division working together to take a fresh look at our programs and to initiate needed change. Some of the changes that have occurred include: creation of BS degrees, a laboratory requirement as part of general education, research start-up funds for new faculty, independent research opportunities for students, and creation of a shared undergraduate research laboratory. Our college president recently initiated a capital campaign that includes a green science building and a research vessel. The research vessel should be available for use in fall courses. We have not had success in raising money for a new science building, and may instead settle for a small addition and renovation on the current building.

Our department has also undergone many recent changes. In 2007 we created a B.S. track as an addition to our B.A. In April 2009, we created a new minor in Marine Science, which is jointly offered with the Biology Department. Our hope is that it will increase enrollment in some of our courses (Oceanography, Climatology, GIS), and help recruit new students to the college.

Strengths

There is a true sense of community in our department that is created by our small class size, small faculty size and primary focus on teaching. Each professor in our department is strongly committed to the intellectual and personal growth of our students. Our major has a good breadth of courses, which includes requirements in physics, chemistry, and biology. Despite our small faculty size and heavy teaching load, two professors are very active in research, and about half of our students complete independent research projects. Our graduates have been very successful in finding employment and acceptance to graduate school. Our recent alums in grad school report that we prepared them well. We have kept close ties with our alumni.

Weaknesses

Our small faculty size means that we do not have upper-level courses in all sub-disciplines. We would like to hire another geologist, but cannot justify the position until we increase the number of EES majors.

We desperately need new and upgraded teaching laboratories. Our new academic dean is sympathetic to our needs, but he does not have many resources in the current economic climate.

Planning

As a small department, much of our planning takes place in informal and unscheduled meetings and conversations. We have never had an external review, and we are required to complete a minimal internal review annually. We have been strategic and creative in the last few years to do as much as we can with our limited resources, but with the current climate at the college (budget cuts, hiring and salary freezes, dropping enrollment, etc.) we are not optimistic that we can make significant gains in the next few years.

Jennifer Smith
*Washington University*

**Washington University in St. Louis EPS Department**

**Strengths and weaknesses**

*Strengths*

The Washington University Earth and Planetary Sciences (EPS) department has several strong research foci, in planetary geology and geochemistry, geophysics/seismology, and terrestrial geochemistry. With 17 teaching faculty (4 assistant, 3 associate, and 10 full) and 5 research faculty (as of fall '09), we are a moderate-sized department that nonetheless has excellent laboratory and analytical facilities and a large (~30 scientists) research support staff. The Pathfinder Program in Environmental Sustainability, a guided undergraduate curriculum which recruits outstanding highschool students interested in the environment to Washington University, has been a feeder of a small group of excellent majors.

*Weaknesses*

This department has had difficulty recruiting both at the undergraduate and graduate level. We graduate only ~5-8 undergraduate majors per year, and many upper level courses have fewer than 10 students. Graduate applicant pools are not large, and yield is typically 40%, that 40% generally coming from the lower end of our ranked list of accepted applicants.

Though the Environmental Studies (EnSt) program (an interdisciplinary degree program that is not housed in any one department) was founded by an EPS faculty member and is currently directed by another, the EPS department is not well integrated into the program. Due largely to the research foci of our faculty, few actively participate in teaching or advising of EnSt majors. The EnSt program is a source of students (EnSt graduates ~50 students/yr) and resources, yet EPS has largely failed to engage this population.

*Concerns*

The following aren't specifically strengths or weaknesses but are areas of concern for our department.

-The existence of a "Research Professor" position, as a parallel track to "Teaching Professor", with varying responsibilities and levels of departmental support, has created some difficulty in department structure and interaction.

-Hiring strategies in the past have focused on developing "world-class intellectual clusters", thus we have small groups of faculty working on closely related research topics, with large gaps between them. Certain traditional areas of geoscience are nearly unrepresented (stratigraphy/paleontology, climate/global change, tectonics). As we move forward, do we focus solely on building our strengths in established areas, or do we try to fill in some of our gaps?

**Planning Process**

The department has a "Strategic Planning Committee", consisting of the Chair and ~3 tenured members of faculty, representing each major research focus in the department. This committee

meets once or twice a semester. At their discretion, these discussions are communicated to the rest of the faculty during faculty meetings for more general input.

**Summary of review**

EPSc underwent external review in spring of 2007; the recommendations of this review committee largely echoed our self-assessment of strengths and weaknesses. The committee felt that on most research axes our department was performing above average for a department our size, and that our facilities and research staff were superb. The Pathfinder Program was identified as a unique strength in our educational activities. Our relatively low undergraduate enrollment, as well as low yield rates on graduate student acceptances (and the particularly low yield rates for the most desirable subset of applicants) were noted.

It was recommended that we foster a greater presence in the environmental studies program, and that our future hiring take this into account. The committee also felt there was a need for greater faculty involvement in and contributions to strategic planning, mentoring, and leadership development, as well as the teaching mission of the department.

Wesleyan University

The Earth & Environmental Science Department consists of eight tenure-track positions (7.5 FTE), two research professors, two emeriti faculty who remain active in research, one technician and one administrative assistant. The department also offers a masters of arts degree with about four M.A. candidates at any one time.

The geology department at Wesleyan redefined itself in 1973 when it became the Department of Earth & Environmental Sciences. In addition to a traditional earth science major it created an interdisciplinary program in geology, biology and chemistry. Over time the distinction between the two separate curricular tracks blurred and in 1993 the department reshaped the curriculum into a single major with a great deal of flexibility for the undergraduate majors. This curricular flexibility places a premium on advising and each year a faculty member is assigned to be the advisor for a class.

More recently the department contributed to the development of the Environmental Studies Certificate Program (essentially a minor course of study) that includes curricular offerings beyond the sciences. With the addition of a senior faculty member with a joint appointment in the Biology Department and E&ES, this program has been strengthened and next year Environmental Studies will be a "linked major" such that students can elect it as a second major building on any other major at Wesleyan. Currently the E&ES Department has nearly 50 majors split evenly between the junior and senior class. This represents a near doubling in size over the previous two graduating classes. The new Environmental Studies major has about 12 students enrolled for next year.

Our graduate program is small. The university provides us with stipends to support four students at a time and we work hard to make sure that they can complete their work in two years, although this can be a challenge depending on their background. Wesleyan also has a program where seniors can stay for a fifth year, tuition free, and complete a research project to earn an M.A. degree. The graduate students play a valuable role in the life of the department, they help to sustain the research program, help as teaching assistants and serve as role models and mentors for the undergraduate majors. In some years it has been difficult to identify and recruit students who can benefit from our small program.

The department was last reviewed in 2002. At that time the roster of the department was in flux, with two faculty on leave for administrative purposes, turnover at the junior faculty level and the impending retirement of two senior faculty. We also experienced an all-time low in the number of majors. Since then the department has successfully hired four new faculty and the department is at full strength with the return of faculty who were on leave. One of the strengths of our current faculty is the interdisciplinary nature of their research which helps to provide a broad curriculum for our students and links to other departments such as astronomy through planetary science and remote sensing. One of the constant pressures is each year balancing the number of general education classes that feed the major with sufficient number of our required core courses and upper level electives for our majors.

The department continually evaluates its curriculum. Most students who eventually major in E&ES do not come to Wesleyan with that goal in mind. Most decide to major after taking one of our many general education classes perhaps as late as their sophomore year. This has created a tension about a single required gateway class for the major and what body of knowledge should the students have to enter the major. At the other end of the spectrum the transcript of two graduating seniors might look very different from one another. As an experiment, we decided four years ago to attempt to address this issue at the other end of the major experience by requiring all seniors to participate in a senior seminar. This capstone experience has a January field trip where all seniors participate in an intensive field experience. Over the past three years the destination has been either Death Valley or Puerto Rico. During the spring semester they focus on research projects that they develop during the field trip and present their results at the department colloquium at the end of the year. The course has been very successful, but we now face the challenge of supervising nearly twice the number of students. Currently two faculty are assigned to the seminar and we are concerned that this is too few for the field component. The other potential issue is the strain on the overall teaching resources in any single year. The department also spends about $1000 per student for this course and the larger classes are going to stretch our budget to the point where we may have to modify the seminar.

The expectation at Wesleyan for tenure is to be a productive scholar-teacher. In our department we still stress field work but our analytical capacity has grown dramatically over the part two decades. While this is a positive outcome for the productivity of our faculty and for opportunities for our students it has placed a strain on our teaching space that has been slowly consumed by permanent laboratories and for the time demands on our department technician. During the current financial crisis, the university has decided to not go ahead with an ambitious plan for new science facilities and it is also clear that we will not be able to add additional personnel to help with our equipment, so we will need to be creative as we manage these resources.