Executive Summary: Department of Geology

Mission
The mission of the Department of Geology is to advance higher learning, serve society, and have a leadership role among geoscience programs through the discovery, dissemination, and application of knowledge. The Department of Geology educates undergraduate (BA and BS) and graduate students (MS and PhD), provides education to the University and its cooperating institutions, does exemplary basic and applied research in the geological sciences and collaborates with other segments of the University and its cooperating institutions.

Faculty
The Geology Department currently consists of 21.75 FTEs, with a total faculty size of 23. At the time this document was written the faculty consisted of five assistant professors, nine associate professors, and nine professors. Of those, two professors are only half time in the department and one associate professor is three-quarters non-tenured position. For practical purposes the faculty is grouped into seven research and teaching focus groups: geobiology, geophysics, glaciology, hydrogeology, paleontology, sedimentary geology, and tectonics.

The teaching contribution of our faculty in terms of student credit hours (SCH) per faculty member is high, primarily because of the large enrollments in the service courses mentioned above Geology faculty teach several general basic courses that service the general population (Introduction to Geology, History of the Earth, Geology Fundamentals Laboratory, Prehistoric Life: DNA to Dinosaurs, and Earthquakes and Natural Disasters). In addition other courses such as Oceanography, Environmental Geology, and Geomorphology serve as popular elective requirements in one or more programs within the College of Liberal Arts and Sciences. Several courses such as Sedimentology, Petroleum & Subsurface Geology, and Geoscience & Petroleum Engineering service the Petroleum Engineering curriculum. The teaching contribution of our faculty in terms of student credit hours (SCH) per faculty member is high, primarily because of the large enrollments in the above service courses.

The presence of the Kansas Geological Survey at the University of Kansas affords us the opportunity to enhance our programs by establishing connections with KGS researchers. The majority of PhD research scientists at the KGS hold courtesy appointments and are able to supervise MS students and co-advice PhD students. The Department has a wide range of long-term collaborative relationships with other administrative research units at KU. These include, the Kansas Biological Survey, the Paleontological Institute, the Biodiversity Institute, and the Tertiary Oil Recovery Project. More recent collaborations that began since the turn of the millennium include the Center for Remote Sensing of Ice Sheets, the KU IGERT project, and the Transportation Research Institute. Ongoing relationships with academic departments include Geography, Ecology and Evolutionary Biology, Civil Environmental, and Architectural Engineering, and Chemical and Petroleum Engineering.

Research in the Department of Geology at the University of Kansas is diverse and spans multiple disciplines in an effort to understand the interaction among various earth systems. Geology faculty publish in high impact peer-reviewed journals across relevant disciplines, and our annual number of publications continues to steadily increase. Research grants are mainly garnered from federal sources (NSF, DoD, DoE, and NASA), and state sources include the KDOT and KDHE. Private funding sources include the numerous major and mid-size oil and gas corporations, environmental and engineering companies, and several private foundations.
Yearly research expenditures (via KUCR or KU Endowment) routinely exceed $1 million and we are on track to routinely exceed $2 million per year.

**Bachelor’s Degrees (BA and BS)**

The Department of Geology offers the following undergraduate programs:

- Bachelor of Arts with concentrations in General Geology and Environmental Geology
- Bachelor of Science with concentrations in General Geology, Geophysics, Environmental Geology (with a specialized track in Hydrogeology), and Engineering Geology
- Earth and Space Science Licensure (K-12 teachers)
- Minor in Geology

Most geology courses include a strong field component in addition to classroom instruction and laboratory sessions. Undergraduate degree programs require field courses during 2 summers. Students take Field Investigation (Geol 360) in the summer after completing the first-year introductory courses and geology field capstone course sequence Introductory Field Geology (Geol 560) and Field Geology (Geol 561) are taken in the summer between the junior and senior years. Over the recent years we have seen an increasing trend in the number of geology majors and in minority students. The geology undergraduate student body has over 100 majors, with ~ 30 \% female students, ~13 \% minority students and ~5\% international students. Our undergraduates come primarily from the State of Kansas accounting on average for 74 \% of geology majors over the 2005-2009 period. The quality of KU Geology majors has remained consistent over the last ten years with an average ACT Composite Score of 24.9. The 2005 – 2009 State of Kansas average ACT score was 21.9 and the nationwide five-year average was 21.1.

While we know that most of our undergraduates continue on to graduate programs in Geology or other professional degrees (e.g., law, business, engineering), and some do secure employment in private and public sector, the department and the review committee do recognize a need to improve tracking of undergraduate students. The department and external review committee also recognize the fact that the current undergraduate curriculum does not reflect the current faculty expertise and a curricular revision to enhance the program and include current disciplinary breadth is needed.

**Master’s Degree (MS)**

The department offers thesis and non-thesis options, though the latter is rarely utilized as employers and PhD programs strongly favor student with thesis option degrees. Enrollments in the MS program have increased and in recent years have ranged from 60 to 75 students. Over 80\% of the MS graduates seek employment with the oil and gas industry, approximately 10 \% seek employment with environmental consulting companies and government agencies (e.g., KDOT, KDHE, KGS EPA, US Army Corps of Engineers, USGS, etc.), some 5 \% go on to PhD programs, and the remainder pursues opportunities in variety of areas outside geology.

There is no set curriculum for the MS program and field of specialization and career objectives of the students mostly determine courses taken. The program is rigorous and MS students take courses alongside PhD students. One-on-one mentoring is provided for all students. The number of applicants reflects the program strengths in over 100 a year, allowing us to be selective in our admissions and by the strong recruitment and hiring of our students (nearly 100 \% placement).
Doctoral Degree (PhD)

KU Geology offers the only geology PhD in the state of Kansas. Currently 30 to 35 students enroll in the program and reflect a balance between research endeavors and meeting private and public sector demands for geoscientists. As with the MS program, there is no set curriculum and field of specialization and career objectives of the students mostly determine courses taken. Enrollment in our PhD program has increased at par with MS student enrollments, as has our applicant pool.

Over 50% of graduates obtain employment with the oil and gas industry, over 30% seed academic careers (tenure track faculty and postdoctoral positions), and remainder pursue a variety of opportunities with government agencies (e.g., USGS, Dept. of Energy, and National Laboratories), environmental consulting, and other private and public sector opportunities. Placement of students after graduation is well over 90%.

Our national rankings, the numerous applicants, and strong recruitment of students by industry reflect the strength of the program. Placement of PhD graduates in academic programs has also increased in the last decade.

Changes as results of the review process

The overall review of the program was very positive, nevertheless some important recommendations were made and the following actions are being taken or will be pursued.

Enhancing research productivity:
• The department leaderships is actively utilizing differential effort allocation to balance workloads, permanent DOE agreements will be pursued for a few faculty.
• Changes in graduate student guidelines have being made that should increase publication output by students and advisors.
• Memorandum of understanding was adopted by Department and KGS Geohydrology section that has resulted in enhanced research activities, increased graduate student enrollments, and streamlining of resources.
• Endowment funds are being aggressively used to foster enhanced productivity (publications, presentations, grant proposals, etc.) by both faculty and students.
• The department has encouraged pursue of industry partnership to increase and diversify funding base

Revision of undergraduate curriculum:
• The department has been undergoing introspection regarding its undergraduate program and will soon be revising its curriculum (Fall 2012).

Graduate program:
• Changes in graduate student guidelines have been made in order to improve time to completion as well as better define expectations for students, advisors, and committee members.
• Faculty-student sessions have been implemented to address concerns
• Seminar option is being pursued currently limited by facilities

Hiring priorities
• Faculty hiring priorities are in agreement with recommendations of external review and focus on maintaining and building on current strength seeking critical mass in those areas.
Facilities

• The Department, College, and University are aggressively pursuing funding for Lindley expansion that could result in major improvement in infrastructure.

Overall evaluation

The KU Geology department provides fundamental science education to the University and the State of Kansas through its service courses. It trains numerous professionals that are employed by the state of Kansas Oil and Gas Industry, Engineering and Environmental firms, key state agencies (KDHE, KDOT, KGS), and K-12 education system. Its graduates also help meet the increasing national demand for US trained geoscientist. Research by KU Geoscience faculty address fundamental question as well as critical applied issues that are relevant to the state of Kansas such as improving oil and gas exploration and extraction, water resources availability and conservation, environmental monitoring and remediation, and study past climate variability in the Midwest to provide an understanding of future climate variability.

The geology program at KU is the flagship earth science program in the state, as reflected by its national ranking and the accolades of alumni; it attracts bright young students from within and outside the state. KU geology trains the majority of geoscientist in the state of Kansas. Research and teaching at KU strives to meet Kansas, national, and global needs for geoscientist.
Highlights: Department of Geology

The Geology Department has been educating geologists for industry, academia, government, and other careers for more than a century. Many of our alumni have earned prestigious awards from various professional societies, several have risen to executive levels in Fortune-100 corporations, and several are distinguished academicians at highly ranked research-intensive universities. Faculty and students routinely earn accolades from professional societies, are well funded by government agency grants (federal and state), private foundations and professional societies, and industry grants and contracts. Since the inception of the US News graduate program rankings KU’s Paleontology and Sedimentology programs have been highly competitive. Paleontology has consistently ranked among the top ten and among top five of public universities (3rd in 2010). Until the recent change in the ranked categories, the sedimentology program was also ranked in the top ten (1999). In 2010 US News ranked the Department’s graduate program at 36th among public funded universities, and 54th among all PhD programs.

While the Department was built on the classical soft-rock subjects of paleontology, stratigraphy, and sedimentology, it has increased in breadth over the past 40 years. In addition to those soft-rock specialties, the Department has emphases in geobiology, geochemistry, geophysics, glaciology, hydrogeology, and tectonics.

The department offers BA and BS in Geology with five concentration options (General Geology, Engineering Geology, Environmental Geology, Geophysics, and Earth and Space Science Licensure). Enrollments in the last ten years have steadily increased with over 100 undergraduate students enrolled in the program. Diversity has also increased steadily and as of Fall 2011 over 10% of the undergraduate students were from underrepresented groups.

The department offers an MS in Geology and the only Geology PhD program in Kansas. Graduate enrollments have steadily increased currently hovering around 100 students with approximately 70% in the MS program and 30% in the PhD program. With over 30% female and over 10% underrepresented students the program is one of the most diverse in the country. Over 80% of our graduates are employed by the Oil & Gas industry and well over 95% are employed immediately after graduation or continue to other graduate programs.
THE UNIVERSITY OF KANSAS

DEPARTMENT OF GEOLOGY

SELF STUDY FOR 2011 PROGRAM REVIEW

January 17, 2011.
QUESTIONS TO REVIEWERS

1. Should KU Geology try to modify our graduate program to favor PhD level education following NRC ranking criteria? Given that our strong alumni support is derived predominantly from MS graduates working in the oil industry, how do we enhance our PhD program without sacrificing "service" to industry and our alumni support?

2. Given near future budgetary limitations, which of our research emphases or core areas should be selected for enhancements, be sustained, or if needed, reduced?

3. Our undergraduate curriculum is currently a very traditional one in need of integrating new expertise. How do you suggest we modify our curriculum while maintaining breadth and field experiences, which are hallmarks of our program?

4. Given the continuously increasing competition for limited sources of unrestricted research funding, should we be pursuing more research partnerships with industry including those with proprietary restrictions?

5. Are the strategies for future enhancements including hiring outlined in the self-study the most appropriate to allow us to effectively compete with our aspirational peers?
# Table of Contents

QUESTIONS TO REVIEWERS ................................................................................................................... i

MISSION ................................................................................................................................................. 1

OVERVIEW ................................................................................................................................................. 1
Faculty Overview .............................................................................................................................................. 2
Department of Geology links with other entities ......................................................................................... 3
  The Kansas Geological Survey ................................................................................................................. 3
  Other Kansas Entities ............................................................................................................................... 4

RESEARCH ................................................................................................................................................... 5
Funding and Research ........................................................................................................................................ 6
Research Plan for the Department of Geology ............................................................................................. 6
Department visibility and enhancing outreach of non-traditional expertise ................................................ 7
Geoinitiative 2015 ........................................................................................................................................... 7
  Energy and Environment/Solid Earth Sciences Infrastructure ................................................................ 8
  Energy and Environment – Faculty ........................................................................................................... 8
  Solid Earth Sciences – Faculty .................................................................................................................. 9
  Immediate faculty hires ............................................................................................................................ 10

GRADUATE STUDIES ................................................................................................................................. 12
Graduate Recruitment ................................................................................................................................. 12
Program Productivity .................................................................................................................................... 13
  Student Productivity ................................................................................................................................. 13
Program Quality Outcomes .......................................................................................................................... 13
  Student Employment and Satisfaction ...................................................................................................... 13
  Student Outreach and Engagement .......................................................................................................... 14

UNDERGRADUATE STUDIES .................................................................................................................... 15
Undergraduate Demographics ..................................................................................................................... 15
Undergraduate Teaching ............................................................................................................................... 16
Service Courses ........................................................................................................................................... 16
Geology Teaching Progress Tracking and Evaluation Plan ........................................................................ 17
  “GEO-533 Plan” ...................................................................................................................................... 17
Undergraduate Curriculum ........................................................................................................................... 17
  Undergraduate Research ............................................................................................................................ 18
  Undergraduate Support and Scholarships ................................................................................................. 18

SERVICE AND OUTREACH BY FACULTY ............................................................................................... 19

FACILITIES ................................................................................................................................................... 19

APPENDICES ............................................................................................................................................... 24
I. Faculty Teaching Loads ............................................................................................................................. 24
II. Discipline Research Statements ............................................................................................................. 26
  Geobiology ............................................................................................................................................... 26
  Geophysics .............................................................................................................................................. 27
  Glaciology ............................................................................................................................................... 28
  Hydrogeology ......................................................................................................................................... 28
MISSION

The mission of the Department of Geology is to advance higher learning, serve society, and have a leadership role among geoscience programs through the discovery, dissemination, and application of knowledge. The Department of Geology educates undergraduate and graduate students, provides education to the University and its cooperating institutions, does exemplary basic and applied research in the geological sciences and collaborates with other segments of the University and its cooperating institutions.

We envision a Department of Geology with the following attributes:

- A major leadership role among geoscience programs in key areas concentrating on areas of excellence but not excluding breadth
- All in one building with excellent facilities and support
- Balance between fundamental and applied research and teaching
- Diverse in ethnicity and gender
- Successful in training future leaders in both academia and industry
- Internationally and nationally recognized for its research
- Well funded through grants and other resources
- Leaders in interdisciplinary research within the university as well as outside of the university
- An increased impact through increased size of high quality faculty and student body

OVERVIEW

KU has a Department of Geology to advance higher learning through the discovery, dissemination, and application of geological knowledge, and to educate students for productive careers. The Department has been educating geologists for industry, academia, government, and other careers for more than a century. Many of our alumni have earned prestigious awards from various professional societies, several have risen to executive levels in Fortune-100 corporations, and several are distinguished academicians at highly ranked research-intensive universities. The loyalty and generosity of our alumni has resulted in a substantial endowment that provides for scholarships, field trips, faculty travel, and other activities well beyond the normal means of the University.

The size of the Department faculty has grown by about 50% over the past decade to its current 23 (Tables 1, 2, and A1), accompanied by an approximate doubling of both graduate and undergraduate enrollments. The Department has more Distinguished Professor positions per capita of faculty than any other department at KU. The Department is one of very few on the Lawrence campus that ranks in the upper third in both research funding per faculty member and student credit hours per fulltime-equivalent faculty member.

While the Department was built on the classical soft-rock subjects of paleontology, stratigraphy, and sedimentology, it has increased in breadth over the past 40 years. In addition to those soft-rock specialties, the Department has emphases in geobiology, geochemistry, geophysics, glaciology, hydrogeology, and tectonics.

Our students compete well for KU fellowships and scholarships, highlighted by the receipt of the Self Fellowships by four PhD students within the past five years. Each of these four-year fellowships is valued at approximately $164,000 and includes extensive leadership and public policy training. Students have also fared well in securing fellowships in the interdisciplinary C-
Change IGERT program and the UKanTeach program. The research competitiveness of our students is highlighted by the numerous external awards (GSA, AAPG, SEG, SEPM, Sigma Xi, etc.) that they have garnered in the past five years.

The average annual number of BS/BA level graduates prior to 2009 was 14 and increased to 20 last year reflecting the increased enrollments in the last five years. In the last five years annual average for MS degrees was 10 and three at the PhD level.

Since the inception of the US News graduate program rankings KU’s Paleontology and Sedimentology programs have been highly competitive. Paleontology has consistently ranked among the top ten and among top five of public universities. Until the recent change in the ranked categories, the sedimentology program was also ranked in the top ten (1999). Currently the Department’s graduate program is ranked by US News at 36th among public funded universities, and 54th among all PhD programs.

We have examined the 2010 version of the NRC report and have included KU Graduate Studies summary in appendix VI. Unfortunately, we did not fare as well in the numbers-based 2010 report as we did in the more reputational-based 1986 NRC report. This may be related in part to our emphasis on providing MS-level education rather than PhD training which would provide larger contributions to the numbers that were deemed important by the NRC methodology.

We also note that our Department is quite different in 2011 than it was when the data were last provided to the NRC in 2006. We have added seven faculty since 2005, and our headcount of PhD students has grown from 25 to 37 during this period. If we were to place major emphasis on those numerical parameters that were favored in the 2010 NRC report, the nature and perhaps the mission of our Department would need to change toward favoring PhD-level education. The department is considering the options, implications, and ramifications of such a move.

### Faculty Overview

The Geology Department currently consists of 21.75 FTEs, with a total faculty size of 23. At the time this document was written the faculty consisted of six assistant professors, eleven associate professors, and six professors. Of those, two professors are only half-time in the department and one associate professor is three-quarters non-tenured position. Two assistant professors and three associate professors are currently up for promotion to the next rank.

For practical purposes the faculty is grouped into seven research and teaching focus groups: geobiology, geophysics, glaciology, hydrogeology, paleontology, sedimentary geology, and tectonics (Table 1). However, there are significant collaborations among these groups and many of the faculty can be considered as secondary faculty in one or more groups. Two of these foci are recent additions to the program. Geobiology was initiated with the hiring of Jennifer Roberts. The

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Faculty</th>
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<tbody>
<tr>
<td>Geobiology</td>
<td>Fowle</td>
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<td></td>
<td>Marshall</td>
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<td>Olcott-Marshall</td>
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<td>Roberts</td>
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<td>Geophysics</td>
<td>Black</td>
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<td></td>
<td>Steeples¹</td>
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<td>Tsoflias</td>
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<tr>
<td>Glaciology</td>
<td>Stearns</td>
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<td>Hydrogeology</td>
<td>Devlin</td>
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<td></td>
<td>Macpherson</td>
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<tr>
<td>Paleontology</td>
<td>Hasiotis</td>
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<td></td>
<td>Lieberman²</td>
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<td></td>
<td>Selden</td>
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<tr>
<td>Sedimentology</td>
<td>Franseen³</td>
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<tr>
<td></td>
<td>Goldstein</td>
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<tr>
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<td>Gonzalez</td>
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<tr>
<td></td>
<td>Kamola⁴</td>
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<tr>
<td></td>
<td>Rankey</td>
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<td></td>
<td>Walton</td>
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<tr>
<td>Tectonics</td>
<td>Möller</td>
</tr>
<tr>
<td></td>
<td>Stockli⁵</td>
</tr>
<tr>
<td></td>
<td>Taylor</td>
</tr>
<tr>
<td></td>
<td>Walker</td>
</tr>
</tbody>
</table>

¹2003-10: 10 % Geology, 90% Provost’s Office
²Joint appointment, 50% in Geology
³Joint appointment, 51% in Geology
⁴Non-tenure track, 75% appointment
⁵Recently recruited by another institution

Table 1. Geology research groups.
Department capitalized on the tuition enhancement program proposing two additional hires (Fowle and Olcott-Marshall) and on the institutional commitment to spousal accommodation (Marshall). Glaciology is the most recent addition and the position emerged from an institutional commitment to the Center for Remote Sensing of Ice Sheets (CReSIS). Presently, one faculty (Stearns) resides in Geology while another KU/CReSIS glaciologist resides in the Geography Department. In recent years, the Geology Department has also had a total of 12 research staff composed of postdoctoral scholars and research associates.

Faculty in the Geology Department are required to teach at both graduate and undergraduate levels. Course loads are spread over the entire faculty (Fig. 1). Because of the current curriculum design, the Sedimentology and Tectonics groups teach a somewhat larger share of undergraduate majors. Similarly, these two groups have a greater number of graduate students and student credit hour production for Geology majors. Faculty teaching productivity over the last five years is summarized in Appendix I.

The Department offers a variety of introductory service courses that include Introduction to Physical Geology (GEOL 101), History of the Earth (GEOL 105), Prehistoric Life: DNA to Dinosaurs (GEOL 121), and Earthquakes and Natural Disasters (GEOL 171). Enrollment in these courses ranges from 100 to nearly 1000 (GEOL 171). In addition other courses such as Oceanography (GEOL 302), Environmental Geology (GEOL 351), and Geomorphology (GEOL 541) serve as popular elective requirements in one or more programs within the College of Liberal Arts and Sciences. Several courses such as Sedimentology (GEOL 331), Petroleum & Subsurface Geology (GEOL 535), and Geoscience & Petroleum Engineering (GEOL 837) service the Petroleum Engineering curriculum.

The teaching contribution of our faculty in terms of student credit hours (SCH) per faculty member is high, primarily because of the large enrollments in the service courses mentioned above. For example as shown in Appendix V "Comparative Faculty Workload Information", our five-year weighted average for tenured and tenure-track faculty is 293 SCH per fall semester, which is 169% of the average for AAU public institutions with whom we have been compared by KU's upper administration.

Department of Geology links with other entities

The Kansas Geological Survey

The presence of the Kansas Geological Survey at the University of Kansas affords us the opportunity to enhance our programs by establishing connections with KGS researchers. Collaborations exist at many levels between the Department of Geology and the KGS. Those efforts are primarily at the level of individual faculty – KGS researcher, or sub-discipline – section level. The majority of PhD research scientists at the KGS hold adjunct appointments and are able to supervise MS students and co-advice PhD students. Although there has been interest over the years for broader institutional links, they have not materialized to date. A recent effort to strengthen ties
with KGS with the joint appointment of three scientists resulted in one such appointment. We continue to work to strengthen linkages with KGS and its researchers.

The most extensive links between KGS researchers and Geology faculty are in sedimentology area (carbonates, clastics, and includes geobiology faculty working with sedimentary sequences) with one joint faculty/researcher appointment, multiple joint research projects, joint student advising, and teaching of graduate level courses in the department. KGS staffers team-teach or teach courses such as Geological Log Analysis, Carbonate Petrophysics, Regional Field Geology (including foreign locales such as Spain, China, and the Dominican Republic) and others. These fruitful interactions result in more than doubling the functional size of the sedimentology group at KU and the supervision of a larger group of graduate students.

In geophysics, the KGS section of Exploration Services actively recruits and co-advises graduate students with geophysics faculty, give guest lectures in areas of specialty (Xianghai Xia, Julian Ivanov), team-teach a course in near-surface seismology (Rick Miller KGS – Don Steeples Geology), and conduct collaborative research, although not at the level of the sedimentology groups. Potential exists for further enhancing collaboration between the two groups.

Hydrogeology has yet to capitalize on the complementary expertise between the KGS and the Department of Geology. While there has been limited interaction among researchers in the two units, in general, research efforts are not aligned between the two groups and the KGS Geohydrology Section has not engaged in graduate student recruitment and teaching.

The Department of Geology and the Kansas Geological Survey have some common research facilities (e.g. drilling equipment, gravimeters, Lidar etc.) and share technical support in geoinformatics and geochemistry. These collaborative efforts have lead to the training of graduate students – one example is a recent study of active ground deformation from subsurface salt dissolution in Hutchinson, KS quantified using terrestrial LiDAR imaging.

Other Kansas Entities

In addition to the collaborative interactions with the Kansas Geological Survey the Department has a wide range of long-term collaborative relationships with other administrative research units at KU. These include, the Kansas Biological Survey, the Paleontological Institute, the Biodiversity Institute, and the Tertiary Oil Recovery Project. All of these relationships span more than 30 years. More recent collaborations that began since the turn of the millennium include the Center for Remote Sensing of Ice Sheets, the KU IGERT project, and the Transportation Research Institute.

We also have ongoing and past collaborative relationships with several academic departments, including Geography, Ecology and Evolutionary Biology, Civil Environmental, and Architectural Engineering, Chemical and Petroleum Engineering, Electrical Engineering and Computer Science, Chemistry, Pharmaceutical Chemistry, Physics, and Anthropology. Activities have included joint listing and instruction of classes, joint seminars, service on search committees and graduate dissertation committees.

Other State agencies in Kansas have benefitted from collaboration or consultation with our faculty and graduate students, including the Kansas Department of Transportation and the Kansas Department of Health and Environment.

Some of our facilities are used to assist other departments and research entities on the Lawrence Campus. These include the Keck Stable Isotope Lab, the Isotope Geochemistry Lab, the Plasma Analytical Lab, and our LIDAR equipment. We also benefit from facilities that belong to other groups, such as chemistry labs and seismic equipment that are housed at the Kansas Geological Survey.
RESEARCH

While our facilities are described elsewhere in this report, our research enterprise is limited by inadequate space and in some cases outmoded facilities. We have very good to excellent equipment in many of our laboratories and in our field capabilities, but we are limited by lack of technicians, especially field technical assistance.

Research in the Department of Geology at the University of Kansas is diverse and spans multiple disciplines in an effort to understand the interaction among various earth systems. Departmental research efforts focus on the atmosphere, hydrosphere, cryosphere, biosphere, and lithosphere. The Geology Department is aligned with the University initiative on strategic themes - in particular, energy and the environment. Recent grants include exploring renewable energy in the form of geothermal resources, CO2 sequestration in southern Kansas and Oklahoma, and the utility of biogeochemistry in mineral exploration. Environmental efforts are focused on water resources in arid environments, the effects of climate change on polar ice sheets and sea level change, microbial

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Number of Faculty</th>
<th>Postdocs &amp; Researchers</th>
<th>Total # Graduate Students (degrees awarded)</th>
<th>Research Expenditures 2005-2010 (thousands)1</th>
</tr>
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<tr>
<td>Geobiology</td>
<td>4</td>
<td>1</td>
<td>8 (1) 7 (2) 15 (3)</td>
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<td>18 (12) 8 (3) 26 (15)</td>
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<td>$1,587</td>
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<tr>
<td>Glaciology3</td>
<td>1 (*2)</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Hydrogeology</td>
<td>2 (*1)</td>
<td>9 (5) 4 (0) 13 (5)</td>
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<td>$618</td>
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<tr>
<td>Paleontology</td>
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<td>$870</td>
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<td>Sedimentology</td>
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<td>$2,094</td>
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<tr>
<td>Tectonics</td>
<td>4</td>
<td>6</td>
<td>21 (8) 11 (0) 32 (8)</td>
<td>$7,122</td>
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<tr>
<td>Total</td>
<td>21.75</td>
<td>12</td>
<td>106 (49) 52 (14) 158 (63)</td>
<td>$13,966</td>
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</tbody>
</table>

1Includes research dollars contributed through KU Endowment Association and KUCR. Does not include in kind gifts, such as software and services.
2 Geophysics FTE is 3 as of October 2010 with the return of Steeples to Geology full-time
3Recent program addition (2008-2010)
*Refers to additional faculty with a peripheral role.

Table 2. Distribution of Geology faculty by discipline, showing number of postdocs, graduate students, degrees awarded, and funding amounts between 2005-2010.
Funding and Research

Research grants are mainly garnered from federal sources including NSF, DoD, DoE, and NASA, while state sources include the Kansas Department of Transportation and Kansas Department of Health and Environment. Private funding sources include the American Chemical Society-Petroleum Research Fund, Anglo-American, Apache-Egypt, Chesapeake, Encana, Ecopetrol, Exxon-Mobil, Hess, Saudi Aramco, Schlumberger, and Shell. Yearly research expenditures routinely exceed $1 million and we are on track to routinely exceed $2 million per year. Table 2 and Fig. 3 list 2005-2010 cumulative expenditures.

The Department of Geology has responded to the University of Kansas’ vision, as recent hires have emphasized interdisciplinary research and collaborative and synergistic efforts. In particular, most recent hires are focused on emerging fields such as geomicrobiology and climate change. Cross-campus collaborations are noted in the previous section of this report.

Research Plan for the Department of Geology

During the last decade, and last five years in particular, we have been successful in

- Increasing number of peer reviewed publications
- Increasing receipt of external funding
- Diversifying our funding sources
- Expanding our analytical facilities
- Creating one of the largest geobiology groups in the country
- Increasing faculty engagement in research with a large number of projects funded per faculty
- Increasing interdisciplinary collaborations
- Increasing the pool size and quality of graduate student applicants
- Diversifying the faculty and student body

The achievements of the Department of Geology follow and contribute to the goals outlined in KU’s INITIATIVE 2015 document. With modest growth and key investment the Department is poised to make major improvements on its research profile that will in turn translate to higher standing among its peer institutions and more effective contribution to INITIATIVE 2015.

Currently many of our programs frequently compete for graduate students and research funding with top ranked programs. We thus aspire to improve our effectiveness as a research unit to allow us to continue to successfully compete with our aspirational peers. Most of the geosciences programs that we commonly compete with, as well as KU’s defined peers (Appendix II, Table A2), have a larger number of faculty, research faculty, research scientists and postdoctoral scholars and lower teaching loads than exist in our Department. To effectively compete, our Departmental vision includes improving our research profile, a modest increase in the number of full-time faculty, and
increasing the funding for postdoctoral scholars (via grants and endowments). Maintaining our programmatic strengths remains a priority, and we anticipate replacing positions from faculty retirements and other forms of attrition. Additionally we consider building and expanding the breadth of existing programs through key hires that strengthen one or more programs as a means of improving the Department as a whole.

Department visibility and enhancing outreach of non-traditional expertise

The quality and impact of KU Geology research is indicated, in part, by the large amount of media attention various research discoveries have received. Faculty research has been featured on myriad news outlets in the past five years, including the New York Times, MSNBC, Geotimes, Yahoo News, Discovery News, New Scientist, CNN, Scientific American, Washington Post, Lawrence Journal World, PBS, Nature, and the BBC World News. Faculty have also been invited to act as authority figures on popular-science television shows, including Animal Planet, the History Channel, and National Geographic. We recognize that better coordination of research endeavors and collaborations among disciplines as well as collaborative interdisciplinary research with other units at KU can result in major gains in research productivity, funding, and student recruitment. Importantly these strategies can be effective in bringing recognition of non-traditional strength with only minor efforts and investments.

In the following section we outline the Geology Department’s overarching research plan, GEOINITIATIVE 2015, which is aligned with the University’s research initiative plan. This is followed by our approach for implementation, focusing on harnessing current resources within the Department, across the KU campus, and by developing a research infrastructure. We then outline additional resources in the form of additional faculty necessary to elevate KU Geology to a top 25 status for geoscience departments.

Geoinitiative 2015

The Department of Geology has consistently aligned its strategic goals with those of the University and the State of Kansas and will continue to do so in the future. We believe that in order for the Department to take the next steps towards better serving our University and the State of Kansas and to effectively compete with our functional and aspirational peers, many of which are among the top 25 Geology programs in the country, our unit and the University must continue to invest in our core programs. These have traditionally included sedimentology, paleontology, geophysics, tectonics, and hydrology, and more recently glaciology and geobiology. We intend to strengthen these programs as outlined in our strategic plan through the development and enhancement of two thematic areas: Energy and the Environment and Solid Earth Sciences.

As the University of Kansas moves from the planning stages of INITIATIVE 2015 to the implementation stage, the Department of Geology is well poised to contribute to broad campus-wide research and training initiatives through the development of infrastructure and through cross-cutting faculty hires. One such research and infrastructure nucleus is under the umbrella of Energy and the Environment. We have broad research and teaching collaborations across the campus in Engineering (Chemical, Petroleum, and Civil Engineering, TORP), Ecology and Evolutionary Biology, Geography, and Kansas Geological and Biological Surveys. These collaborations currently enable or could enable study of some of the most important scientific and engineering questions facing Kansans in the future. Questions include: What energy resources remain in the subsurface and how can we extract them? Can carbon dioxide be safely and effectively sequestered at depth in our state? With climate changing, what do the future
environment and water resources of our state look like? What is the rate of environmental change and how do we quantify it? Can paleoenvironments provide important clues to the future?

The Department of Geology has traditionally been a leader on campus in addressing both energy and environmentally related research questions. To raise the research bar and enhance collaboration and training on KU’s campus in this area, and to foster the Geology Department’s leadership, we foresee need in two key areas: 1) research and training infrastructure, and 2) faculty.

Energy and Environment/Solid Earth Sciences Infrastructure

We recognize that quality space for faculty and students will facilitate recruitment and retention of faculty and students. Furthermore state of the art facilities are essential to our research endeavors and our success in attracting external funds. The Department is actively engaged in fund raising to secure much needed additional space and improve our infrastructure. These efforts include the addition of key research facilities or the centralization of existing facilities. These include:

- **Visualization Center (Flex CAVE)** – the proposed state-of-the-art visualization environment will enable visualization and analysis of multiple complex spatial datasets. One focus is in immersive datasets to visualize the interaction between the Earth’s interior and its surface. The CAVE is a useful tool for research and teaching and will serve as a nexus for interdisciplinary collaborations and in the recruitment of faculty and students.

- **Midwest Center for Geochemical Analysis** – we have significant geochemical resources (staff and equipment) distributed across campus. Centralization of all analytical and isotope geochemistry on campus would enable pooling of staff resources (e.g. central accounting, shared technicians) and reduction of overhead associated with duplication. This centralization will allow movement towards greater cost recovery through commercialization of analysis services. Having state-of-the-art centralized facilities will be a major recruitment tool for geochemical research at KU.

- **PVT laboratory for high T, high P experimentation and characterization of reservoir materials both mineral and organic in nature.** This will provide a recruitment tool for faculty and industry/government research funds and a site for engineering/geology training.

Energy and Environment – Faculty

A majority of the sub-disciplines within the Department have indicated a need or desire for more faculty and many of the suggested positions fit under this umbrella and would support this research focus. As a Department we are committed to this research direction and are already using an endowed chair and external research funds to support the hiring of two faculty: 1) a physical hydrogeologist with a focus in areas of scarce water resources (supported initially through research grants and endowment funds); and 2) the Ritchie Chair will have a focus on energy resources and clastic sedimentology. To build on our cross-campus collaborations on climate change, carbon sequestration and resource development, there are several key positions needed to ensure we have the expertise on campus to train the next generation of geoscientists addressing carbon utilization and environmental change in our state and throughout the world.

**Near-surface geophysics / Exploration geophysics (2)** – A traditional strength in the Department, we see a need for growth and sustainability in this area with the upcoming retirement of Steeples (2013). Specifically, we foresee a growth position with expertise in electrical or electromagnetic methods to help bridge the Department’s gap in direct measurement of biogeochemical and environmental processes in the field. This position would augment the current programmatic
expertise in near-surface geophysics (seismic and GPR), it will be a key collaborator for biogeochemists and hydrogeologists across campus (e.g. Civil Eng., EEB, KBS, KGS) and it will provide opportunity to increase the scale of many environmental change and monitoring projects. One hire in exploration geophysics is needed to bolster campus-wide efforts on reservoir exploration and characterization for oil recovery and carbon dioxide sequestration. This hire will have strong ties to the Tertiary Oil Recovery Project, the Kansas Geological Survey, and industry and will enhance renewal applications for a variety large-scale Department of Energy projects. This individual would be a key user of the proposed visualization facility associated with the Lindley addition.

**Climate and Environmental Change (2)** – The Department of Geology and the University of Kansas (EEB, KGS, KBS) have had a rapidly improving reputation and funding rate in climate and paleoclimate research. Climate change has become a focal point for graduate training on campus through the funding of the C-Change NSF IGERT, EPSCOR (alternative energy) and CReSIS. Our contribution to this research has been through developing models for paleoclimate, directly testing paleoclimate models through experimentation in the field and laboratory, and measurement of glacier dynamics. This area remains a focus on campus, and two strategic hires could bolster our reputation for strength in stable isotope geochemistry and paleontology and provide a more sustainable group with this focus in the Department. We fully support the hiring of an individual with skill in numerical methods in Glaciology via collaboration with CReSIS and would suggest that the development of the proposed visualization and computing facility would make Geology an appropriate home. To leverage one of our NRC ranked programs we propose the hiring of a paleontologist who utilizes stable isotope or other geochemical techniques to study paleoenvironments. This position would enhance collaborations between EEB, Geology, KBS and the Biodiversity Institute on campus and could be a key cog in institutional commitment for renewal of the C-Change IGERT.

**Solid Earth Sciences – Faculty**

The solid earth sciences have long been an important component to our Department both pedagogically and through research. This group, which broadly includes tectonics and geophysics, is responsible for the training of significant numbers of graduate students and has consistently attracted the largest sponsored research projects in the Department. Unfortunately, the loss of Danny Stockli to the University of Texas in 2011 is symptomatic of a lack of critical mass in the group, which has lost a number of faculty over the last 15 years. We propose that the addition of a number of geophysicists, a mineralogist and a rehire of a higher temperature geochemist will ensure the long term stability of this well-funded and high-reputation program. Additionally, the development of the visualization facility and centralization of geochemical facilities on main campus in a new building would likely enhance both retention and recruitment efforts.

**Moderate Temperature Geochemist** - In particular, we propose the hiring of a new faculty studying general petrology/geochemistry applied to igneous or metamorphic rocks using concentration of unusual elements in ordinary minerals (e.g., Ti in quartz). This is a rapidly expanding field in understanding petrologic processes. This position would have strong synergy with existing and proposed faculty, and, if appropriate, could participate in the solid earth group’s work on geothermal energy.

**Mineralogy** – although we have recently added expertise in *in-situ* analysis of mineralogy and its trace chemistry (Möller and Marshall) the University of Kansas lacks expertise in the study of earth materials and their properties at geologically relevant temperatures and pressures. This expertise is critical for collaborations between solid earth scientists, geochemists and petroleum
engineers and would enhance or build collaborations in this area. Typically mineralogists with this expertise also build strong bridges to groups that study material science in general.

**Solid Earth Geophysics** - Studies of deep earth processes such as mantle dynamics and its effect on Earths’ surface is a new and exciting field in geodynamics. This position will provide strong ties to the Tectonics group and provide a more holistic view of the Earth and enhance student learning. An immediate impact is in providing more breadth to the geophysics program, aiding in student/faculty recruitment and retention efforts. The addition of an earthquake seismologist would have a large impact on the Department in building a solid earth focus. The majority of the research interests of the tectonics faculty emphasizes active fault systems and is an area of obvious overlap with an earthquake seismologist.

### Immediate faculty hires

In our most recent strategic plan faculty hires in three areas had been identified as priorities necessary to maintain programmatic strength: hydrogeology, geophysics, and isotope geochemistry. In addition a search for a Distinguish Professor (The Ritchie Chair), a growth position in the area of clastic sedimentology, has been active for several years. These hires are in line with the GEOINITIATIVE 2015.

As discussed previously we are capitalizing on a recent grant to recruit a faculty member in physical hydrogeology and groundwater modeling to strengthen the program and build critical mass in this area. The search for a Distinguished Professor in clastic sedimentology is still underway. This key hire is vital to diversifying the sedimentary geology group and will complement the existing strengths in carbonate geology.

Current plans call for geophysics to augment strength in near-surface geophysics with expertise in electrical or electromagnetic methods. A hire in this area will fill programmatic research and teaching needs, it will enhance collaboration with the geobiology, hydrogeology and other programs, and it will ensure continuation of KU’s international reputation in near surface geophysics. A hire in isotope geochemistry is still needed to enhance programmatic strengths in isotope geochemistry and tectonics. A hire in this area would enhance a variety of programs and help establish the isotope geochemistry groups (stable and radiogenic, or light and heavy) as a prominent program that can compete at the national and international level.

An additional hire in moderate temperature geochemistry is needed to ensure continuity in critical instructional and research areas currently covered by Dr. Daniel Stockli, recently recruited.

#### GEOINITIATIVE 2015 HIRES

<table>
<thead>
<tr>
<th>Ongoing Searches</th>
<th>Immediate Hiring Needs</th>
<th>Future Hires (Growth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Hydrogeology and Groundwater Modeling</td>
<td>Moderate Temperature Geochemistry: Solid Earth Sciences (Stockli replacement)</td>
<td>Earthquake Seismology, Geodynamics: Solid Earth Sciences</td>
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<tr>
<td></td>
<td>Isotope Geochemistry: Solid Earth Sciences (growth)</td>
<td>Glaciology: Climate and Environmental Change (CReSIS hire)</td>
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<td>Mineralogy: Solid Earth Sciences</td>
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<td>Paleontology, Paleonvironement: Climate and Environmental Change</td>
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<td></td>
<td></td>
<td>Stable Isotope Geochemistry: Climate and Environmental Change</td>
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</tbody>
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Table. 3. Ongoing faculty searches, and immediate and future hiring needs.
away by the Jackson School of Geoscience at UT-Austin. This additional hire is absolutely necessary to maintain the high level of funding and research trajectory of the Tectonics program.

The immediate hires are currently our priority and in the normal course of events once those hires are made we will move forward with pursuing planned future hires outlined in GEOINITIATIVE 2015 – focusing on energy and the environment, and the solid earth. However, it is Departmental policy to review hiring priorities and revise our plan on an annual basis with input from all faculty. This allows us to respond to change and pursue special opportunities (e.g. opportunity hires; joint appointments with units across the University) that will enable us to achieve the goals of GEOINITIATIVE 2015.
GRADUATE STUDIES

The Department of Geology at the University of Kansas offers three graduate programs: i) M.S. degree with Thesis, ii) M.S. degree Non-thesis, and a Ph.D. degree.

From 2000 - 2009 we have seen growth in our graduate program from under 50 students to over 90 in 2009 (Fig. 4). This growth is tied to increased research funding in the Department, faculty hires and enhanced recruiting efforts over the last 10 years. Growth has not resulted in decreases in the quality of our graduate students, as we have seen a decrease in the ratio of students enrolled/applied while maintaining similar entrance examination scores (Appendix III Figs. A8 and A9).

Graduate Recruitment

The Department of Geology has invested time and resources to enhance the diversity and quality of our graduate program. Specifically, the program has recruitment initiatives at national meetings (Geological Society of America and the American Geophysical Union) with follow-up Department-sponsored visits of prospective students. This continues to bring a steady stream of highly qualified students into our program. Recruitment to KU has been enhanced by our strong relationship with a wide variety of energy companies, many of whom sponsor student scholarships and hire our students into internships each summer. The majority of enrolled students are supported through GTA and research funds (Appendix III Figs. A6 and A7). Beyond the more traditional avenues of recruitment, the Department actively seeks and is successful in securing and/or facilitating fellowship opportunities for incoming Ph.D. students. Current examples include the Madison and Lila Self Fellowship ($164,000 each over 4 years; 3 students), and NSF IGERT and STEM programs (3 students). One recruitment issue that remains is the quality of space in the Department (i.e., Lindley Hall), which is not up to the standard of several other geology facilities on West Campus.

Diversity of our program has been greatly enhanced over the last ten years. Although we have traditionally been able to successfully recruit high-quality female graduate students, we have lagged in our ability to recruit minorities into our program. More recently, we have seen increases in the diversity of our program (Fig. 5). Much of this success can be attributed to a partnership among the University of Puerto Rico, KU Department of Geology, and ExxonMobil. This program has resulted in faculty-led field trips with students from both institutions and visits of KU faculty to present seminars and recruit graduate students at the University of Puerto Rico. The Department remains committed to making further progress.
in this area of recruitment through the use of endowment funds, industry sponsorship and NSF programs.

Program Productivity

The Department of Geology graduates an appropriate number of graduate students per year (on average 10 MS and 3 PhD). Progression towards graduation for students is facilitated through direct interactions with their supervisors, committee meetings, the graduate handbook, and biannual faculty meetings devoted to discussing individual student progress.

We note that the time to the PhD degree in the Department of Geology for the past ten years is greater than 5 years (Fig. 6). As we examine individual cases, we find that the average is skewed upward by three phenomena. First, we have students who leave for employment in Houston or other industry locations, and they find that finishing a dissertation in absentia is more difficult than they had anticipated. Secondly, we have occasional students who work full time in Lawrence, Kansas City, or Topeka who attend class and perform their research on a part-time basis over several years. Finally, and most problematic, we have a few students who either have a lot of remedial course work or have false starts on their research project, delaying the completion of the degree.

Student Productivity

Department of Geology graduate students actively seek internal and external funding for their research, receive recognition for the quality of their ideas and work (2 outstanding GSA student research grants in 2010 alone), and publish their work in peer-reviewed journals. In the last five years, we have seen a steady increase in both the number and dollar-amount of student-funded projects (Appendix III Fig. A3). Additionally, we have observed a steady increase in first-author, peer-reviewed publications and conference abstracts by our students (Appendix III Figs. A4, A5).

Program Quality Outcomes

Student Employment and Satisfaction

Graduates of the Department of Geology are in high demand for placement in the oil and gas industry, environmental consulting, government, and academia. We place a strong emphasis on all of our students learning not only how to critically think, but how to utilize their skills in the field and laboratory through course work and a variety of graduate-level field courses (e.g., Puerto Rico, Bahamas, Western US, China). Evidence for their successful training is depicted in Fig. 7, which
KU Geology Department Self Study

outlines career placement of our graduates directly tied to their education in geology. Note that only one student is currently unemployed.

Even though our graduates experience strong placement success, our satisfaction surveys (Appendix V) show an overall decrease (although not statistically different) from 2005 to 2009. Whether this difference is real or not, there is clearly room for improvement in all categories, and we are committed to seeing all of these measures increased to over the 75th percentile. While no specific measures have been adopted or implemented at the time of this report, the graduate studies committee has been charged to critically review graduate student guidelines and propose modifications that should result in a better experience for graduate students.

Student Outreach and Engagement

Graduate students within the Department actively participate in, and give back to, their community. The primary vehicles for such outreach are the departmental clubs and student chapters, which include the Association for Women Geoscientists (AWG), Sigma Gamma Epsilon (SGE), Geology Club, Society of Exploration Geophysicists (SEG), and the American Association for Petroleum Geologists (AAPG). Outreach activities are focused on engaging youth in science and encouraging enthusiasm and participation in science. For example, members of AWG hold workshops at Women In Science Day at Washburn University in Topeka and Expanding Your Horizons at Emporia State University, both aimed at encouraging middle school girls to enter the sciences. Expanding Your Horizons is a national, well-recognized program with the goal of motivating girls to become innovative and creative thinkers ready to meet 21st Century challenges.

The geology clubs also participate in numerous local science fair events, including judging high school and middle school projects and manning booths at the Schwegler Elementary Science Fair Kick-Off Night and the Science Night at Wakarusa Valley Elementary School. AWG has also created and proctored the paleontology module for the northeastern Kansas regional Science Olympiad competition for high school students. Similarly, the Department has participated in Career Horizons, a summer program for local 6th graders geared towards those children at risk of dropping out of school.

Kansas’ Pennsylvanian-aged rocks provide plenty of opportunities for fossil collecting, and inspiring awe in past biodiversity. AWG and SGE have led fossil collecting trips for under-represented groups in the sciences, such as elementary school students who speak English as a second language. Fossils also play a prominent role in the activities associated with helping Boy and Girl Scouts obtain their Rocks Rock! badge, which AWG sponsors biennially, and at the “Digging for Fossils” booth at the Kansas City Gem and Mineral Show.

SGE, in association with AAPG, have adopted local highways to rid ditches of litter. The money received from these efforts goes back into sponsoring community activities. AAPG also hosts an annual holiday canned food drive to raise money for families in need. Graduate students have also been involved with outreach events at the KU Natural History Museum, including but not limited to identifying the public’s natural treasures and presenting museum oddities to children.

More globally, AWG sponsors a year of schooling for girls in developing countries through the program World Vision.
UNDERGRADUATE STUDIES

Students majoring in geology learn the fundamentals of theoretical and applied geological sciences giving them the knowledge and skills for successful professional careers and the pursuit of graduate studies. We also provide general education courses to a broad spectrum of undergraduate students at The University of Kansas.

The Department of Geology offers the following undergraduate programs:

- Bachelor of Arts in:
  - General Geology
  - Environmental Geology
- Bachelor of Science in:
  - General Geology
  - Geophysics
  - Environmental Geology, with a specialized track in Hydrogeology
  - Engineering Geology
- Earth and Space Science Licensure (K-12 teachers)
- Minor in Geology

A student may combine an interest in geology with a degree in business, education, or journalism. Degree requirements for each program are listed in Appendix IV.

Undergraduate Demographics

At present, the geology undergraduate student body has 104 majors, with 28.8% female students, 13.5% minority students and 4.8% international students. Nine students have declared a minor in geology. Our undergraduates come primarily from the State of Kansas accounting on average for 74.3% of geology majors over the 2005-2009 period. Over the recent years we have seen an increasing trend in the number of geology majors and in minority students (Fig. 8).

The quality of KU Geology majors has remained consistent over the last ten years with an average ACT Composite Score of 24.9. The 2005 – 2009 State of Kansas average ACT score was 21.9 and the nationwide five-year average was 21.1.

The 2001 - 2009 average annual number of geology baccalaureate degrees awarded was 14. During the same period, the median time to graduation has been 4.6 years and the mean GPA 3.0. A significant factor for exceeding the four-year graduation rate is that many of our majors discover geology late in their undergraduate studies. This is evidenced by the consistently increasing number of declared geology majors from lower to upper classmen, and by graduating-student credit hours exceeding the 124 credit baccalaureate degree requirement by 19 credits (or 15%) on average (Fig. 9).
Undergraduate Teaching

The undergraduate Geology curriculum at the University of Kansas offers a set of courses covering the fundamentals of General Geology (e.g. Physical and Historical Geology, Mineralogy, Sedimentology, Petrology, Stratigraphy, Structural Geology, Geophysics, Field Geology) as well as courses for the various BS and BA tracks (e.g. Environmental Geology, Geomorphology, Hydrogeology, Environmental Geophysics) (for a comprehensive listing of courses refer to Appendix IV). In addition to undergraduate courses, faculty allow undergraduate students into select graduate-level courses which offer the opportunity to learn about topics typically not found in undergraduate curricula (e.g. geobiology).

Teaching of geology courses includes a strong field component in addition to classroom instruction and laboratory sessions. Undergraduate degree programs require field courses during 2 summers. Students take GEOL 360 Field Investigation in the summer after completing the first-year introductory courses GEOL 101 & 103. This early immersion to the geology of the mid-continent and the Rocky Mountains fosters collaboration and builds camaraderie among geology students that lasts throughout their studies at KU and beyond. The KU Geology field station in Canyon City, CO, operated since 1922, is the base camp for the geology capstone course sequence GEOL 560 Introductory Field Geology and GEOL 561 Field Geology taken in the summer between the junior and senior years. The Department of Geology offers substantial scholarship support to geology majors who enroll in those courses.

Undergraduate courses with integrated field instruction are: GEOL 103 Geology Laboratory, GEOL 331 Sedimentology and Surface Processes, GEOL 532 Stratigraphy, GEOL 541 Geomorphology, GEOL 552 Introduction to Hydrogeology, GEOL 562 Structural Geology, and GEOL 577 Environmental Geophysics.

Service Courses

The department offers several courses of interest to non-majors who wish to learn more about geology and related areas such as environmental science, oceanography, and economic resources. Principal courses include GEOL 101 Introduction to Geology, GEOL 105 History of the Earth, GEOL 121 Prehistoric Life, GEOL 171 Earthquakes and Natural Disasters, GEOL 302 Oceanography, and GEOL 351 Environmental Geology. GEOL 103 Geology Laboratory may be taken in conjunction with either GEOL 101 or GEOL 105 to fulfill the CLAS laboratory science requirement. GEOL 304 Historical Geology, GEOL 360 Field Investigation, and GEOL 552 Introduction to Hydrogeology all offer opportunities to study more specialized aspects of the earth and do not require advanced prerequisites.
The "GEO-533 Plan" was developed in response to the Provost's Teaching and Learning task force recommendations, particularly the "Documenting Learner Outcome" recommendation. In 2009 the Department of Geology received the 2009 Outstanding Teaching award from the University of Kansas Center for Teaching Excellence in recognition of our furthering of the initiative.

The "Geo-533 Plan" is a student tracking system by which the geology department ensures that undergraduate majors are developing the skills that the faculty collectively determines should be the benchmarks of a top-tier geology department. These skills include: (1) 3-dimensional thinking and visualization coupled with geological mapping, (2) Critical geological thinking best expressed in the concept of geological superposition of rocks and structures, and (3) Collection, distillation, interpretation, and communication of scientific data through proficient technical writing. The plan is designed to isolate potential areas in which the program may need adjustment and to determine the best way to make those adjustments efficiently. Our goal is to maximize the teaching effectiveness of the department.

The GEO-533 Plan tracks student progress and learning in two ways: 1) Individual progress through the undergraduate program, starting at the 300-level courses and 2) Overall student progress with assessment from year to year. All student work is archived electronically. We are currently in year three of the plan, where we track 5+ students per academic level in 3 categories, evaluating 3 items each (hence the 533 plan). We are tracking students from the 300 level (initial majors) through upper 300-500- level classes, through some of the 500-level cap-stone classes. Data collection is intended to capture work from students at the entry, intermediate, and advanced (near graduation) levels to more effectively track student learning from initial exposure to conceptual materials through graduation.

Categories and detailed assignments for data collection:

3D geological thinking and visualization (Maps): We are tracking maps from the following GEOL classes: 360 (map exercise 2), 562 Structure (field trip map exercise), 561 Field Camp II (digital map).

Logical Geological thinking is best expressed in the concept of geological superposition of rocks in time and space. We are tracking field exercises dealing with stratigraphic sections from the following GEOL classes: 360 (one measured section), 331/532 (one measured section), and 560/561 (one measured section).

Communication of scientific data through sound technical writing. We are currently tracking written assignments from the following GEOL classes: 360 (final report), 532 (class paper), and 561 (final report).

Planned next step: The Geological Time Scale/Geological History: 521 (time-scale exercise), 360/331/532/562/ (exam question), 532 (correlation exercise) or alternative theme from different classes (e.g. Ancestral Rocky Mountains).

Undergraduate Curriculum

As outlined in the preceding sections, the Department of Geology offers a comprehensive, traditional undergraduate curriculum covering the fundamentals of geological sciences. Broad multidisciplinary collaborations of geology faculty with other units at The University of Kansas, along with recent additions of faculty with new areas of expertise (e.g. geobiology, glaciology), the
implemented GEO-533 plan and the Provosts’ initiative to revamp undergraduate education offer the opportunity to the Department of Geology to re-design its undergraduate curriculum to include the new science directions to the existing strengths of the undergraduate program. Curriculum examination will be undertaken over the upcoming years in response to major University-wide changes that are expected in the undergraduate general-education requirements.

Undergraduate Research

Undergraduate research is an integral part of education in the Department of Geology. Faculty routinely employ undergraduate assistants in funded research, pursue REU funding from NSF, and URA funds from KUCR. Undergraduate research assistants gain experience in our geochemistry, geobiology, hydrogeology and thermochronology laboratory facilities, they are trained in field surveying (DGPS, Lidar) and geologic mapping, and in field geophysical investigations. Many of our undergraduate research assistants transition into our graduate study programs.

In addition, superior students are invited to enter the Department of Geology Honors program and complete an undergraduate research thesis, supervised by a faculty member and defended to the honors program committee. In the last five years the Department of Geology awarded five Undergraduate Geology Honors degrees.

Undergraduate Support and Scholarships

The department of Geology, through its endowment funds, awards numerous scholarships to undergraduate students (Fig. 10). Academic Scholarships are awarded to the top-ranked undergraduate students. Scholarships are also awarded to all students enrolled in the summer field courses GEOL 360, GEOL 560 and GEOL 561.

Figure 10. Number of academic and field scholarships awarded between 2005 and 2010.
SERVICE AND OUTREACH BY FACULTY

Several of our faculty have served as editors, associate editors, and elected officers of professional organizations. Most faculty provide invited seminar lectures at other universities, including service as formally designated Distinguished Lecturers by various professional societies. All faculty provide manuscript reviews for journals and proposal reviews for funding agencies.

Faculty members often assist the public by identifying various rocks, minerals, and fossils that are brought in at random times from random places. Faculty also provide informative lectures at service-club luncheons and in other public venues, especially when public interest is high after various natural disasters such as the Haitian earthquake and the devastating Indian Ocean tsunami.

Occasionally faculty are asked for advice by government agencies at the local, state, and federal levels, either on an ad hoc basis or as a member of an advisory panel or committee.

FACILITIES

The department faculty operate several facilities that serve not only the need of individual researchers but also provide services to the Department as a whole, to other KU researchers and to researchers outside KU. These include:

Aqueous Geochemistry Laboratory maintained by Dr. Gwen Macpherson. This facility, located in 110A,B Lindley Hall, was renovated in 1989-1990, and is equipped with two standard fume hoods, a polypropylene wet-process work station, a class-100 HEPA-filtered air laminar flow work station, a class-100 HEPA-filtered air two-layer dry box, a boiling-water still, a Nanopure-II water purification system, a quartz sub-boiling still for purification of acids, a Sartorius B120S balance, and a New Wave Research MicroMill (2001). Additional equipment includes a constant temperature-shaker bath, ovens, and miscellaneous field hydrogeology equipment including pH meters, conductivity meters, dissolved oxygen meters, as well as hand and electric well pumps. In addition, a van dedicated for hydrogeologic research and teaching is outfitted for ground-water sample collection in a dust-free, oxygen-poor environment. Analytical equipment in this lab includes a Spectronix 2000 spectrophotometer, and Dionex 4000i Ion Chromatograph (IC; 1988) with autosampler.

University of Kansas Plasma Analytical Laboratory (KU-PAL), maintained by Dr. Gwen Macpherson. This facility, located in 105 and 105A Lindley Hall, includes a HEPA-filtered air climatecontrolled instrument room and HEPA-filtered air preparatory laboratory. The laboratory has a Barnstead Ropure ST reverse-osmosis water purification system, class-100 HEPA-filtered air laminar work station, class-100 HEPA-filtered air polypropylene exhausting hood, and a polypropylene wet-process work station. The instrument room contains a JY138 Ultrace ICP-AES (inductively-coupled plasma, atomic-emission spectrometer, 1996) used for rapid and accurate determinations of major elements in dissolved rocks and in water, and a laser-ablation microprobe (LAM), the Merchantek LUV266x laser ablation microprobe (2000), which is a front-end sampling device for the ICPMS. The LAM allows direct ablation of solids for investigation of small-scale geochemical variations such as are found in zoned crystals and cements, and a VG PQIIXS Q-ICP-MS (1996) used for determinations of trace elements in dissolved rocks and in water.

The Hydrogeology Organic Geochemistry Laboratory maintained by Dr. Rick Devlin consists of 250 square feet of office space and about 400 square feet in Moore Hall, a Kansas Geological Survey building. The space has two dedicated fume hoods and adjoining bench space in a separate 400 square foot office/laboratory. The Kansas Geological Survey has cold sample storage facilities
available dry sample storage shelves. The laboratory is equipped with a Hewlett Packard 1100 HPLC with diode array detector, supporting Chemstation software, and a Hewlett Packard gas chromatograph 6890 with autosampler, FID and PID detectors and Chemstation software. The laboratory is completely stocked with glassware, stirrers, chemical cabinets and a 18 mega-ohm, organic-free water system by Barnstead. For the field, I have custom conductance meters for use with multilevel piezometers, portable pH and millivolt meters and pumps. Through the geology department I also have access to a van modified to serve as a field laboratory, and access to the GEMS field experimentation site

**Geomicrobiology Laboratories** joint facilities of Dr. Jen Roberts and Dr. David Fowle: This facility is part of ~5500 square feet of shared laboratory space (including The University of Kansas W. M. Keck Foundation Paleoenvironmental and Environmental Laboratory, Geomicrobiology Lab, and Biogeochemistry Lab) in the Multi-Disciplinary Research Building. This is state-of-the-art laboratory space with dedicated fume hoods and ultra-pure, RNAase-free water source (Barnstead Diamond LS system). The Geomicrobiology Lab contains an autoclave, incubator, thermocycler, microcentrifuge, -80 C freezer, and a Coy anaerobic are in place. The lab is stocked with glassware, pH meters, dessicators, chemicals, furnaces, platinum crucibles, refrigerated storage, with full microbial culture capabilities. A laboratory Agilent 6890 gas chromatograph with flame ionization and thermal couple detection is also available. The PI also has a Nikon E600 microscope equipped with epifluorescence and phase contrast. The microscope includes a 10x plan fluor objective with phase, 60x and 100x oil plan apo objectives with phase and high transmission fluorescence. The microscope is equipped with a workstation with Opti Auto image analysis package for counting, shape, size, and spatial analysis, and a Nikon DXM1200, 3840 x 3072 color digital camera.

**The University of Kansas W. M. Keck- NSF Paleoenvironmental and Environmental Laboratory** directed by Dr. Luis A. González: is housed in the Multi-Disciplinary Research Building has capabilities for the analyses of a broad range of inorganic and organic samples including carbonates, bulk organic matter (TOC), specific compounds, gases, and water and dissolved gases. All instrumentation is optimized to handle the smallest sample sizes at the highest precision. The laboratory houses two mass spectrometry systems based on ThermoFinnigan Mat 253 Isotope Ratio Mass Spectrometers. The first system is exclusively a continuous flow system consisting of a ThermoFinnigan TC/EA and a ThermoFinnigan GASBENCH II interfaced via a Confllo III and Costech Elemental Analyzer. The second system operates in dual-inlet or continuous-flow mode and peripherals consists of a ThermoFinnigan KIEL III interfaced to the dual-inlet and ThermoFinnigan Trace GC ultra interfaced via a GC/C III. The laboratory currently houses mechanical microsamplers, micro-balances and a variety of liquid-handling (micro-volumes) systems are available. A NewWave MIR 10-30 CO2 laser system can be interfaced to either mass-spectrometer. The laboratory is under the direction of Dr. Luis A González and daily laboratory operations are overseen by full time laboratory manager, Mr. Gregory Cane, and staffed by graduate and undergraduate research assistants.

**The Paleobiogeochemistry Laboratory** is operated by Dr. Alison Olcott-Marshall. The laboratory is equipped with standard equipment for organic extractions. This includes a Mars Express microwave-assisted solvent extraction system capable of organic solvent extractions and acid digestions, and a Biotage blow-down evaporating system that can handle small 2 mL GC vials, as well as 40 and 60 mL large vials. Additionally, the lab is equipped with a ThermoFinnigan Trace gas chromatograph-DSQ quadrupole mass spectrometer with a thermal couple detector, a flame ionizing detector, and two different direct insertion probes all which allow for the identification and quantification of organic compounds. Additionally, this lab possesses an Olympus BX51 petrographic microscope with 10x, 40x, 60x, and 100x oil immersion objectives. This microscope is
equipped for both reflect and transmitted microscopy, and is interfaced with a computer.

**The Raman Spectroscopy Laboratory** is operated by Dr. Craig Marshall. The laboratory has a Renishaw *inVia* Reflex Spectrometer and combined Raman and FTIR system - Iluminat IR II. This fully automated Raman, confocal Raman, Raman imaging (Streamline™ Plus fast chemical imaging) is combined with an Iluminat IR II system capable of transmission, reflection, and diamond attenuated total reflectance (ATR) microspectroscopic applications. The Raman imaging system is equipped with 4 sources of internal laser with 5 excitation wavelengths (HeCd: 325 nm, Argon Ion: 488 and 514.5 nm, NIR diode: 785 nm, and Nd:YAG: 1064 nm), a full range of objectives (5X, 20X, 50X, and 100X) and UV objectives (15X and 40X), high resolution digital camera, Streamline™ Plus fast chemical imaging. The new StreamLine™ Plus technology from Renishaw enables you to produce Raman chemical images far faster than has been possible before from previous Raman systems.

**Portable Raman Spectrometer System** is shared by Dr. Olcott-Marshall and Dr. Marshall. The DeltaNu Rockhound™ portable Raman spectrometer is lightweight (<5 lbs) battery powered instrument operates for approximately 5 hours on a rechargeable battery. The system has a simple point and shoot attachment, which is used to obtain Raman signatures on a variety of solid materials for example, minerals, rocks and soils. The Rockhound is also coupled with a lightweight optical microscope, the NuScope™, a digital optical microscope accessory with a 100x microscope objective, which provides fine focusing on finely isolated portions of the sample. The laser is a 120 mW system with an excitation wavelength at 785 nm, the laser spot size is 35 µm and is focused and simultaneously viewed on a discrete portion of the sample. The instrument has a 8 cm⁻¹ spectral resolution across the whole spectral range (200-2000 cm⁻¹). This instrument is operated remotely from a PC laptop using Bluetooth® technology, and the laptop has a built-in mineral library of over 500 spectra.

**(U-Th)/He Laboratory**, under the direction of Dr. Danny Stockli: This laboratory in Nichols Hall was fully funded through departmental and university startup funds. It has been fully operational since 2002 and has produced >2000 high-quality analyses a year (2005-2008). The primary components of the lab are two vacuum gas extraction and purification lines for measuring ⁴He contents and an ICP-MS for measuring U and Th contents. The daily laboratory operations are overseen by full time laboratory manager, Dr. Roman Kislitsyn, and staffed by graduate and undergraduate research assistants.

A Nikon SMZ-U stereomicroscope with a rotating stage is used to screen mineral grains for inclusions mineral grains. The stereomicroscope is equipped with a Nikon digital ColorView® camera used for digital documentation and subsequent morphometric analysis of the grains using AnalySIS® imaging software.

The KU (U-Th)/He laboratory houses two state-of-the-art, all metal, ultra-high vacuum noble gas extraction and purification line for measuring ⁴He. One quadrupole He mass spectrometry system consists of the following principle components: 1) a U.S. Laser continuous-mode Nd-YAG laser for total fusion He laser extraction, ideal for single crystal work, 2) an all-metal extraction line equipped with computer-controlled pneumatic Nupro valves and pumped by a combination of ion, turbo and rough pumps, 3) a precise volume aliquot system for spiking sample gas with ³He for isotope dilution, 4) a precise volume aliquot system for delivering a ⁴He standard with a separate system to monitor ⁴He tank depletion, 5) a gas purification system consisting of two SAES NP10 getters and a Janis cryogenic trap capable of separating He from other gases by variable temperature release at 16-37K, and 6) a Blazers Prisma QMS-200 quadrupole mass spectrometer for measuring ³He /⁴He ratios. The helium isotope dilution procedure allows very low-blank (<1 femtomole) and high-precision (<1-2%) measurements of ⁴He in dated crystals while allowing for
recovery of the crystals for U and Th measurement in the same aliquot. The KU extraction line components and valves are fully interfaced with a central computer and are fully automated using LabView software. The $^3$He spiking, cryogenic trap temperature cycling, and mass spectrometric analysis of samples, gas standards, and blanks are fully computer controlled. The laser heating of samples is controlled through a feedback loop using a video capture card allowing for continuous computerized adjustment of the laser output power for even heating. The laser sample planchet sits on a computer-controlled Newport X-Y stage and holds up to 36 samples.

The KU (U-Th)/He laboratory also houses a second state-of-the-art, all metal, ultra-high vacuum noble gas extraction and purification line for measuring 4He dedicated to He diffusion experimental work and step-heating He extraction, but also has the potential for in-vacuum dissolution (acid digestion) degassing. The diffusion line is equipped with four specially designed diffusion cells to perform detailed in-vacuo step-heating experiments. Inside the diffusion cell the Cu-foil wrapped sample is suspended by a K or J-type thermocouple and is heated by a 120V halogen bulb projected through a sapphire window. Precise temperature control is accomplished through a feedback mechanism involving a Watlow thermal controller and a phase-angle-fired Eurotherm power supply. Estimated temperature stability during each step is better than ±1°C. The Watlow thermal controllers are interfaced with the lab computer, allowing the helium diffusion experiments to be executed in a fully automated mode using LabView software.

**Thermal Ionization Mass Spectrometry**, under the supervision of Dr. J. D. Walker. The KU TIMS laboratory in Nichols Hall houses a 1987 version, fully automated VG Sector variable 6-collector TIMS with a 10-sample turret, Daly multiplier, optical pyrometer, etc. The Sector was purchased with substantial funding from NSF and is still a state-of-the-art instrument: renovations during the summer of 1995 overhauled the collector cups and replaced the analog Daly system with an ion-counting system for an order of magnitude improvement in sensitivity. High-precision Sr and Nd analyses are routine; typical external and internal precisions for these elements are +/- 20 ppm. Pb analysis on rocks and minerals is also routine: we analyze as little as 25 pg total Pb with blank levels of 0.5 to 3 pg. Replicate analyses of standards give reproducibility of fractionation better than 0.025%/amu. The main emphasis of TIMS at KU is for geochronology (especially U-Th-bearing accessory minerals such as zircon, monazite, rutile, and titanite) and petrologic studies. The low Pb blanks and high sensitivity of our VG Sector allow for routine and high-precision geochronological studies. In addition, $^{235}$U and $^{233}$Th spiked samples can be analyzed by isotope dilution by TIMS as well as ICP-MS.

**High-resolution sector-field ICP-MS laboratory**: The HRICP-MS laboratory under the supervision of Dr. A. Möller consists of an ELEMENT2 high resolution sector-field ICP-MS, which is a state-of-art high precision ICP-MS and a distinct over the existing Q-ICP-MS, while mass switching is just as fast. This instrument is housed in 2-room custom refurbished complex, equipped with a UPS system. Solution work will be carried out for trace and ultra-trace element concentrations and Sr isotopes, with superior sample data acquisition compared to TIMS, and better sensitivity and mass resolution than Q-ICP-MS instruments. HR-ICP-MS instrument acquisition costs and refurbishment of the laboratory space are completely covered by University of Kansas start-up funds to Möller.

**Geophysical Instrumentation**: Extensive field instrumentation has been amassed by the geophysics group to support intensive field research programs across the globe. The instrumentation has been acquired through start-up funds to faculty and external funding sources (e.g. Federal, State, and private). Two four wheel-drive field vehicles including a heavy duty extended bed truck are available to support seismic and GPR instrumentation transport and storage during field expeditions.
The Ground Penetrating Radar (GPR) system is maintained by Dr. George Tsoflias. It consists of: PulseEKKO PRO surface GPR system with 25, 50, 100, 200 MHz antennas, PE100 400 V and 1000 V transmitters, two PE PRO receiver, high-frequency transducers of 250, 500 and 1000 MHz, and a multi-channel adaptor. PulseEKKO 100 borehole GPR antennas 50, 100, 200 MHz. PulseEKKO 1000 surface GPR system 225, 450, 900 and 1200 MHz. The equipment is utilized in research as well as teaching.

The Shallow Seismic equipment is maintained by Dr. Don Steeples. It consists of ten portable 24-bit seismographs (seven 24-channel Geode; two 72-channel Strataview; one 96-channel Bissen) with 408 channel recording capability, a wide range of high-resolution geophones and cable configurations, a selection of high-resolution seismic energy sources (Betsy Seisgun, 30-06, 0.223, 0.22, 50-caliber, auger-gun sources, sledgehammers).

Gravity and Magnetic equipment is maintained by Dr. Ross Black. The gravity field equipment consists of two La Coste & Romberg, Model D gravimeters. The magnetic equipment consists of a portable proton-precession field magnetometer.

Additional geophysics facilities include a computer laboratory in Lindley 319, with nine workstations and a suite of geophysical software. A well equipped machine shop dedicated to the geophysics program is available for instrumentation repairs, maintenance and fabrication of custom components.
## APPENDICES

### I. Faculty Teaching Loads

<table>
<thead>
<tr>
<th>Faculty</th>
<th>(yrs of service)</th>
<th>Discipline</th>
<th>Head Count</th>
<th>Total SCH</th>
<th>Undergrad Majors SCH</th>
<th>Graduate Majors SCH</th>
<th>Non Majors SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fowle</td>
<td>(06-10)</td>
<td>Geobiology</td>
<td>702</td>
<td>2099</td>
<td>58</td>
<td>267</td>
<td>1774</td>
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<td>Marshall</td>
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<td>438</td>
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<td>153</td>
<td>36</td>
<td>926</td>
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<td>243</td>
<td>634</td>
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<td>124</td>
<td>486</td>
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<td>Geobiology</td>
<td>1167</td>
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<td>410</td>
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<td>374</td>
<td>187</td>
<td>570</td>
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<td>2938</td>
<td>7938</td>
<td>23</td>
<td>75</td>
<td>8044</td>
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<td>Geophysics</td>
<td>2362</td>
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<td>41</td>
<td>325</td>
<td>5969</td>
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<td>(09-10)</td>
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<td>177</td>
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<td>722</td>
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<td>655</td>
<td>1804</td>
<td>84</td>
<td>167</td>
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<tr>
<td>McElwee</td>
<td>(05-08)(^1)</td>
<td>Hydrogeology</td>
<td>150</td>
<td>408</td>
<td>24</td>
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<td>266</td>
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<td>Hasiotis</td>
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<td>2829</td>
<td>535</td>
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<td>1971</td>
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<td>Kaesler</td>
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<td>1532</td>
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<td>69</td>
<td>2207</td>
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<td>811</td>
<td>50</td>
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<td>697</td>
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<td>Kamola</td>
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<td>469</td>
<td>1390</td>
<td>696</td>
<td>411</td>
<td>392</td>
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<td>2207</td>
<td>5521</td>
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<td>4808</td>
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<td>Möller</td>
<td>(08-10)</td>
<td>Tectonics</td>
<td>319</td>
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<td>Stockli</td>
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<td>Tectonics</td>
<td>629</td>
<td>1038</td>
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<td>530</td>
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<td>Taylor</td>
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<td>Tectonics</td>
<td>750</td>
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<td>1415</td>
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<tr>
<td>Van Schmus</td>
<td>(05-06)(^1)</td>
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<td>14</td>
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<td>55</td>
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<td>657</td>
<td>1342</td>
<td>482</td>
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<td>698</td>
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\(^1\)Retired  
\(^2\)Deceased

Table A1: Student head count and student credit hour production (SCH) by faculty members.
Figure A1. Student Credit Hour production for individual faculty.

Figure A2. Total SCH production and head count for all faculty. Note that SCH axis is logarithmic.
II. Discipline Research Statements

Geobiology

Core Faculty: Alison Olcott Marshall, Craig Marshall, David Fowle, Jennifer Roberts

The mission of the Geobiology faculty in the Department of Geology is to:

• Perform transformative research on the origin and evolution of organisms and their influence on and in connection to geologic processes spanning modern to ancient time, using innovative analytical and experimental approaches and linking traditional subdisciplines in Geology such as paleontology, geochemistry, hydrogeology, and sedimentology with other disciplines with new emerging technologies with biological, ecological and chemical approaches.

• Participate in the undergraduate curriculum, exposing students to interdisciplinary and systems-based science and providing them skills that enhance and transcend traditional Geology, informing their professional careers in environmental, energy and mining industries, and preparing them for further graduate study.

• Recruit and train highly qualified graduate students, who are rigorously trained in an interdisciplinary fashion, skilled broadly in analytical and field techniques, produce quality research and enter academic and industry jobs.

• Because this is an emerging and changing field, the members of this group are active and serve in leadership positions in young Geobiology organizations as well as established societies in Geology and Geochemistry.

Vision:

The program seeks to be a top 5 program that is regarded as the place to study geobiology from the Precambrian to the modern with a general focus on geomicrobiology. The geobiology group at KU has reached a critical mass of scientists and looks to move forward towards leading large-scale research and training grants in this area. As a truly interdisciplinary group we have brought this training approach into our graduate program with courses in the field, and laboratory aspects of the science. In the future we wish to see more direct integration into the undergraduate curriculum. To ensure future excellence and competitiveness in our program we are actively recruiting high quality graduate students from aspirational peers and small liberal arts colleges, and have considered opening our field class to students from other universities. Although further hires would help propel our group forward we recognize the need of other groups in the department and instead would like to support hires in other units in next-generation sequencing and microbial ecology that would greatly benefit our group.

Hires that would enhance the program:

Novel isotope geochemist—high resolution—paleoenvironments
Microbial ecologist—bioinformatics (from environmental point of view)/proteomics/pyrosequencing)—joint appointment
Geoinformatics/Pattern recognition/ecosystem modeler

Connectivity to KGS exists with Hydrogeologists, Sedimentary Geology, and Geophysics
KU Geology Department Self Study

<table>
<thead>
<tr>
<th>Related Faculty</th>
<th>Ecology and Evolutionary Biology</th>
<th>Civil and Environmental Engineering</th>
<th>Geography</th>
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<td>Geology</td>
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<td></td>
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<tr>
<td>Bruce Lieberman</td>
<td>Edie Taylor</td>
<td>Ted Peltier</td>
<td>Bill Johnson</td>
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<td>Belinda Sturm</td>
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<td>Paul Selden</td>
<td>Larry Martin</td>
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<td>Nate Brunsell</td>
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<td>Bob Goldstein</td>
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<td>Luis Gonzalez</td>
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<td>Andreas Moeller</td>
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Geophysics:

Core faculty: Ross Black, Don Steeples, George Tsolias

Applied Geophysics at the University of Kansas, Department of Geology and the Kansas Geological Survey is known internationally for the development and application of seismic and ground-penetrating radar methods to study the near-surface region of the Earth. Don Steeples (near-surface seismology), Ross Black (seismology; gravity) and George Tsolias (ground penetrating radar) are advancing the fundamental science of high-resolution subsurface geophysical imaging and are contributing to the understanding of earth processes, such as the heterogeneous flow of fluids in aquifers, hydrocarbon reservoirs and geothermal systems, the evolution of active tectonic settings and rapidly changing ice sheets, and the geophysical monitoring of active biologic processes. Geophysics at KU is interdisciplinary and strongly complementary to hydrology, sedimentology/stratigraphy, tectonics, glaciology and geobiology. The program has maintained a consistent graduate student enrollment of approximately 10-12 students. Graduates of the program pursue careers in exploration geophysics, with a small percentage employed by academic institutions, government agencies and environmental companies.

The discipline of near-surface geophysics has experienced rapid growth in the last decade with emerging fields such as "hydrogeophysics" and "biogeophysics" advancing the understanding of critical subsurface processes. The applied geophysics program at KU is at the forefront of those new research directions and strives to maintain its international leadership role in applied geophysics, engage in interdisciplinary research within and outside of the Department, and teach a broad geophysics curriculum to students.

Additional faculty hires will be necessary in order to maintain KU's leadership in applied geophysics and to broaden programmatic areas of research and teaching. Faculty hires in near-surface geophysics (electrical methods / hydrogeophysics / inverse theory and data fusion), energy-related fields (exploration geophysics), and solid earth geophysics (earthquake seismology) are needed (positions listed in order of impact to the program, from higher to lower). The group has extensive geophysical field instrumentation and computer facilities that need the addition of a full-time technician in order to support the program's field-intensive research activities. Upgrades to student office facilities and new space for post-doctoral associates and hosting visiting professors are needed.

The applied geophysics program at KU aspires first and foremost to maintain its international leadership role in near-surface geophysics and subsequently to broaden programmatically in the areas of exploration geophysics and solid earth geophysics.
**Glaciology**

Core faculty: Leigh Stearns

The glaciology group at the University of Kansas is an interdisciplinary group built on collaborations between the Department of Geology (Leigh Stearns, George Tsoflias, Mike Taylor), the Department of Geography (C.J. van der Veen), and the Center for Remote Sensing of Ice Sheets (CReSIS) (in particular, Prasad Gogineni, David Braaten, Carl Leuschen, and Sarah Seguin).

Our overarching mission is to improve ice sheet mass balance models by incorporating physically-based boundary conditions. Our current expertise is in glacier observations coupled with numerical models for glacier-wide systems. The next five-years of CReSIS is aimed at developing ice sheet models and, as a part of the CReSIS renewal, there is funding for a glaciologist who focuses on numerical models. Below are some specific goals for the next five years.

1. We will build the glaciology group with the addition of one more faculty member (numerical modeler) housed either in the Department of Geology or Geography, and ~10 graduate students working on glaciology projects (CReSIS affiliated and non-CReSIS affiliated projects) with Leigh, Kees, George (and the new hire).

2. We will continue our collaboration with CReSIS faculty, both at KU and our partner institutions (Pennsylvania State University, University of Washington, Los Alamos National Laboratory, University of Iowa, Elizabeth City State University, University of Montana). Some of these other universities have strong glaciology programs, and renowned ice sheet modelers, that we will work with.

3. We will schedule sufficient glaciology, and glaciology-related, courses so our graduate students can learn the information they need to pursue glaciological research.

4. We will develop an ice sheet remote sensing lab (Leigh’s), which will contain software (ERDAS Imagine, ENVI, Oasis Mirage) that can be used by the glaciology group, and other members of the Department of Geology as needed.

5. Our field work is currently active in Greenland, Alaska and Antarctica. These field programs will increase our exposure to the community and help in collaborative and recruitment efforts. We will also begin studying (though remote sensing and modeling), Himalayan glaciers.

6. We will increase our recruitment efforts through advertising on listservs, attending national and international meetings, and spreading the word with colleagues.

Our glaciology program is unique because we have observational glaciologists working closely with numerical modelers. As our program grows, we will train the next generation of glaciologists in both field techniques and glacier modeling, a skill set that will put them in high-demand in their glaciological careers.

**Hydrogeology**

As of September, 2010, faculty who specialize in hydrogeology include Associate Professor Dr. J. F. (Rick) Devlin, Associate Professor Dr. Gwendolyn L. Macpherson, and Associate Professor Dr. Jennifer Roberts who is also affiliated with the geobiology group.

The hydrogeology group focuses on both field and laboratory experiments and data collection, in both pristine and contaminated environments. Laboratories under the direction of the primary hydrogeology faculty are:

- Environmental Organic Chemistry Lab, Kansas Geological Survey (Devlin)
- KU Plasma Analytical Lab and Aqueous Geochemistry Lab, 105, 105A, 110A, and 110B Lindley Hall (Macpherson)
- Geomicrobiology Lab, Multidisciplinary Research Building (Roberts)
The specialties of the hydrogeology faculty permit them to work jointly on research projects, and provide an excellent coverage of natural-process and contaminant hydrogeochemistry and geobiology. Core research strengths include aquifer characterization for passive in situ remediation, and pollutant transformations (Devlin); chemical weathering, groundwater CO₂, and trace elements (Macpherson); and microbe-mineral interactions (Roberts). The anticipated future for funding in these lines of inquiry is very positive, and the faculty research programs are strong and attracting international attention.

**Issues raised regarding current programmatic structure and membership:**

The field of hydrogeology faces several important challenges for the future. These include management of water supplies, recovery of polluted water for human consumption, risk management for ecosystems, and the role of groundwater in global climate changes. In order to address these needs and support or build the hydrogeology program at KU, additional expertise is needed in several key areas. Foremost is the need for a physical hydrogeologist with primary expertise in resource evaluation. The retirement of Dr. McElwee in 2009 whose specialty was physical hydrogeology has created a serious programmatic deficiency in this area, and has added to the number of hydrogeology faculty needed to best serve students and build the reputation of the program. An immediate hire to reintroduce the physical hydrogeology expertise is essential, as current faculty are stretched to cover core courses. In addition to the lack of a physical hydrogeologist, the program is in need of personnel with mathematical modeling emphasis: skills in this area are absolutely necessary for hydrogeological research and to properly prepare students for private-sector careers. The saturated and unsaturated zones are vastly different hydrologically and both must be considered for a complete picture of hydrogeology. Therefore a third requirement for the program would be a faculty member with expertise related to flow above the water table. Any new hires with expertise that overlaps in these areas would be highly desirable, but if the KU hydrogeology program is to increase its profile in the scientific community, additional faculty will be needed to increase the publication footprint, graduate student population, and handle an expanded course offering.

**Paleontology**

Research in Paleontology at the University of Kansas is broad, cross-cutting, and interdisciplinary. Faculty and students emphasize interaction and working synergistically with each other and other faculty in the Departments of Geology, Geography, Ecology and Evolutionary Biology (EEB), and the Natural History Museum (NHM). KU Paleontology faculty take different but interrelated approaches to studying the fossil record. Links between the faculty are many and include: arthropod paleobiology (Lieberman and Selden), the study of modern analogs (Hasiotis and Olcott Marshall), investigations into the Cambrian radiation (Lieberman and Olcott Marshall) and terrestrial ecosystems (Hasiotis and Selden).

Our research plan involves working together and with colleagues in other North American and international institutions to explore the paleobiodiversity of life on Earth through time. A variety of research endeavors will use the geological record of organism, community, and ecosystem responses to major environmental changes to make better predictions of possible future changes to present biota, communities, and landscapes. We will use modern techniques on fossil evidence to study evolutionary responses of life to paleogeographic changes and biodiversity crises. We will study chemical signatures of life from microbes to macrobiota in terrestrial and extraterrestrial settings to further our understanding of how early life evolved and diversified through Earth history.

Our goal is to grow and expand the recognition of our highly visible, internationally recognized paleontology program. We aim to continue to be known as a place where faculty and students conduct
interdisciplinary research while drawing on resources like the *Treatise on Invertebrate Paleontology* and the NHM in new and innovative ways to move the discipline of paleontology forward. We want to be seen as THE place that does specimen-based paleontology with a strong analytical component, and trains students in high-profile paleontological research with an appreciation and understanding of fossils as a rich repository of data for testing hypotheses about evolution and the history of life. Our goal is to be in the top 3 paleontology programs in the nation. One way to attain this goal is to provide additional resources to support postdoctoral scholars and also graduate researchers in paleontology. In the area of postdoctoral scholars, several faculty have done this or are currently doing this, but we have not had the resources to do it in a consistent and programmatic manner. Another way is to provide more linkages with other very high quality programs in the department, especially those in soft rocks, through additional hires. A growth position in the dual areas of paleontology (especially micropaleontology) and stable isotope geochemistry would provide an excellent bridge to help build the paleontology program, the sedimentology and stable isotope geochemistry programs, and expand research and mentoring opportunities. Such a hire would help link our strong programs in geochemistry in general, and stable isotope geochemistry in particular, with the paleontology program, capitalizing on faculty strengths and interests in reconstructing paleoenvironments and utilize a substantial part of our fossil collections. Hiring Alison Olcott Marshall greatly assisted in this regard and this could be another critical addition.

Research of Stephen T. Hasiotis bridges the fields of biology (paleontology), sedimentology, and pedology (paleopedology) through ichnology—the study of organism behavior preserved as trace fossils: micron-to-kilometer-scale, three-dimensional structures produced by organisms interacting with media in environments that result in tracks, trails, burrows, nests, biolaminates, borings, and root patterns. Traces are studied via actualistic field and laboratory research for the purpose of using them as proxies for biodiversity, environment, ecological relationships, and climatic settings in the geologic record, particularly in continental settings. Trace fossils are used to study: (1) phenotypic expression of behavior of modern organisms and their recognition as trace fossils, (2) effects of environmental and climate change on organism size, diversity, and ecosystems, and (3) patterns in evolution and extinction. Considerable time is spent in field with researchers throughout the world in deposits that span the Neoproterozoic to present-day continental and transitional marine settings. His research will expand on the sedimentologic and stratigraphic patterns of trace fossils as proxies to interpret how climate change impacts organism and community responses to increases and decreases in temperature, precipitation, CO₂, and vegetation, resulting in changes to landscapes, community structure, and body size in terrestrial ecosystems.

Research in Bruce S. Lieberman’s laboratory focuses on using the fossil record to study the role that environmental and geological changes play in influencing evolution. A key aspect of this research is studying such key episodes in the history of life as the Cambrian radiation, end-Ordovician mass extinction, Late Devonian biodiversity crisis, end-Cretaceous, and the Neogene to gain insight into the nature of the evolutionary process and to make predictions about future changes in the present biota. Primary emphasis is on using quantitative approaches to test hypotheses about the relationship between evolution and environmental change. For instance, his lab uses phylogenetic analysis, statistical methods, Geographic Information Systems, and Ecological Niche Modeling to study these problems. He also has interests in evolutionary theory, evolution of arthropods in general, and trilobites in particular.

Alison Olcott Marshall’s research is two-fold: examining organic preservation pathways in the fossil record, and looking for chemical fossils of ancient microbial life. This is accomplished through analysis of: extractable organic material, recalcitrant organic material preserved within rocks, and a thorough investigation of the geological context of samples. Currently, she and her students are working in the Archean, Proterozoic, Cambrian, and Devonian. In the future, plans include continuing investigations of Precambrian and Cambrian biotas, and diversification of the research by examining modern analogs of ancient environments (e.g., the organic preservation pathways in modern stromatolitic formations to understand better Precambrian stromatolites).
The research of Paul A. Selden lies in the field of arthropod paleobiology, with particular reference to Chelicerata (especially spiders) and, to a lesser extent, Myriapoda. Research methodologies are comparative morphology, systematics, and phylogenetic analysis, involving study of exceptionally preserved fossil arachnids, using modern, innovative techniques such as synchrotron x-ray microtomography. One objective is to elucidate the phylogenetic and biogeographic history of Araneae, using evidence from fossil material. Other themes being followed include study of Cambrian arthropods, arthropods in terrestrial ecosystems, taphonomic processes, phylogeny of the Chelicerata and their relations to other early Paleozoic arthropods. Future projects include Jurassic spiders and myriapods, Caribbean paleobiogeography, and causes and timing of so-called Gondwanan biota distributions.

Sedimentology

Core faculty: Evan Franseen, Robert Goldstein, Luis Gonzalez, Diane Kamola, Gene Rankey, Anthony Walton

The sedimentology program is subdivided into two functional groups, Carbonates and Siliciclasitcs. The program is highly regarded by peers.

Carbonates

Current state: The University of Kansas Carbonates Program is a research and training program specializing in carbonate sediments, rocks and reservoirs. The program benefits from interactions with the staff of the Tertiary Oil Recovery Project (TORP) and the Kansas Geological Survey (KGS). The program's focus is on fundamental and applied research on carbonates including the following:

- Processes, facies attributes and distribution, and architecture of Holocene carbonates
- Sequence stratigraphic controls on facies distribution in carbonates
- Carbonate diagenetic controls on porosity and permeability
- Geochemical applications to paleoenvironmental reconstructions using carbonates
- Geophysical signatures of porosity, fractures, fluids, and facies in carbonates
- Geobiology, sedimentology and geochemistry of fine-grained carbonates and oil shales
- Enhanced oil recovery/CO₂ sequestration

Current strengths: The program has grown in recent years and is currently among the strongest in the nation in terms of diversity of faculty, quality of research product, student productivity, and overall reputation. It is broad, diverse, and strongly interdisciplinary, including students, faculty and researchers who study modern carbonate sedimentology, seismic imaging, ground penetrating radar, carbonate petrophysics, predictive carbonate diagenesis, quantitative sequence stratigraphy, reservoir modeling and fluid flow simulation, reservoir characterization, geochemistry, paleontology, ichnology and geobiology. This interdisciplinary group is providing novel insights and enhancing fundamental understanding of many aspects of carbonate systems.

Faculty and students receive many awards and honors for their research (four outstanding paper, talk, and poster awards in 2010 alone). The program hosts co-editorships of both SEPM journals (Journal of Sedimentary Research and Palaios) and four SEPM council members. Increasingly large numbers of high-quality graduate students apply to the program, and most students are successful at acquiring competitive grant funds for their research. Upon graduation, graduate students are highly successful and productive in academia, government and industry.

The program is widely respected for collaborative research and teamwork, a student-centered approach, world-class facilities, systematic quantification, a balance between fundamental and applied research, industry relevance, engineers, geologists and geophysicists who work
together, and integration of enhanced oil recovery and CO₂ sequestration. In addition, it is distinct from other carbonate programs in its expertise in study of: geobiologic influences on carbonate systems; the heterozoan carbonate facies association; thin, laterally extensive sequences; systematic, global analysis of Holocene carbonate depositional systems; conceptual and/or quantitative predictive depositional and diagenetic models; and geochemical approaches to understanding paleoclimate.

**Future and programmatic needs:** The program in carbonates is strong and has no need for additional faculty hires within the group, although it could benefit by future faculty hiring in complementary areas of research in shale geology, geophysics, invertebrate paleontology, or rock mechanics. Currently, the program is on the cusp of initiating the Kansas Interdisciplinary Carbonates Consortium (KICC), focused on research and training of relevance and interest to oil and gas industry partners. KICC funding will enable expansion of the program and provide seed funding for high-risk projects. KICC is expected to enhance the program's reputation and research impact, and will broaden interactions and collaboration within and outside of KU.

**Faculty:** include four primary faculty members with primary reputations in carbonates, and 12 additional faculty contributors from the Department of Geology and other units:

**Primary Faculty**

- **Evan Franseen** *(primary reputation in carbonates)* – Professor and Senior Scientist, carbonate sedimentology, sequence stratigraphy, reservoir characterization
- **Robert Goldstein** *(primary reputation in carbonates)* – Distinguished Professor, carbonate stratigraphy, diagenesis, fluid inclusions
- **Luis González** *(primary reputation in carbonates)* – Associate Professor, Chair, carbonate geochemistry, diagenesis, stable isotopes, paleoclimate
- **Gene Rankey** *(primary reputation in carbonates)* – Assistant Professor, carbonate sedimentology, stratigraphy, seismic attributes

**Ancillary Faculty**

- **John Doveton** – Senior Scientific Fellow *(Kansas Geological Survey)*, petrophysics
- **Paul Enos** – Emeritus Distinguished Professor, carbonate stratigraphy and diagenesis
- **David Fowle** – Associate Professor, geobiology of carbonates, microbial CO₂ sequestration
- **Steve Hasiotis** – Associate Professor, trace fossils in carbonates
- **Jenn-Tai Liang** – Associate Professor *(Department of Chemical and Petroleum Engineering)*, TORP Director, Secondary and Tertiary Oil Recovery, microbial enhanced oil recovery, water shutoff and conformance control, CO₂ sequestration in geologic formations
- **Craig Marshall** – Assistant Professor, geospectroscopy in carbonate systems
- **Alison Olcott Marshall** – Assistant Professor, Organic geochemistry of carbonates and oil shales, microbial carbonates
- **Jennifer Roberts** – Associate Professor, geobiology of carbonates, dolomitization, diagenesis, microbial CO₂ sequestration
- **Jyun-Syung Tsau** – Associate Scientist *(Department of Chemical and Petroleum Engineering)*,, CO₂ miscible flooding, CO₂ sequestration, near miscible flooding, phase behavior, CO₂-Foam mobility control, fluid flow in porous media, numerical simulation
- **George Tsoflias** – Associate Professor, geophysics, ground penetrating radar, and high resolution seismic imaging of carbonates
- **W. Lynn Watney** – Senior Scientific Fellow *(Kansas Geological Survey)*, subsurface stratigraphy, CO₂ sequestration
Siliciclastics

Faculty and Research Interests: Two faculty members at KU have primary interest in siliciclastic sedimentology, Diane Kamola and Tony Walton. Dr. Kamola is on a 3/4-time contract and is committed to overseeing the GEOL 103 lab program. Thus the two positions collectively are less than 2.0 FTE. A number of other faculty members have interests that overlap with siliciclastics, but who are not primarily researchers in that area (Steve Hasiotis, trace fossils; Danny Stockli, thermal history; Andreas Moeller, provenance studies; Bob Goldstein, diagenesis; and Doug Walker, tectonic stratigraphy in the Department of Geology, plus workers in the KGS, Department of Geography, Petroleum Engineering.)

Areas of Expertise: Kamola’s primary interest is sequence stratigraphy, depositional environments, stratal patterns and sedimentologic aspects of basin analysis. Walton was trained as a petrographer, but his research has included stratigraphy, deposition, and diagenesis of siliciclastic rocks, petroleum geology of Kansas, deposition and alteration of volcaniclastic deposits, and microbial trace fossils. Currently, we do not have specialists in fine-grained deposits, deep water systems, modern processes, and diagenesis or a strong linkage between sedimentology and tectonics.

Teaching assignments: Kamola teaches the undergraduate sedimentology class, Sequence Stratigraphy, and Basin Analysis, the latter two in alternate years. Walton teaches Terrigenous Depositional Systems and Volcanology in alternate years, Petroleum and Subsurface Geology, and Geoscience and Petroleum Engineering, in addition to Introductory Geology. Walton and Kamola collaborate on the Field Investigations class for beginning geology majors and an alternate year siliciclastic field trip to Sapelo Island, Georgia. Kamola leads field trips to the Colorado Plateau in conjunction with her graduate classes, and co-teaches a field trip on sedimentary basins and tectonics of the Colorado Plateau, currently with Danny Stockli. The Terrigenous class includes trips to the Ouachita Mountains and the Cretaceous of central Kansas. Core graduate-level siliciclastics courses draw students from among the carbonate groups, paleontology, and other parts of the spectrum of graduate research at KU.

Students: Currently, Walton has one MS student in residence and one MS student off campus but in the process of finishing. Kamola has five students in residence and one MS student off campus.

Funding: Currently, Walton is funded as a co-investigator on a DOE grant to the Tertiary Oil Recovery Project on campus. This project is investigating the application of modern chemical flooding methods to Kansas oil reservoirs. He also has NSF funding to conduct a community workshop to define the steps that should be taken in revitalizing the US program in continental scientific drilling. Kamola is a co-PI on a DOD Grant with Doug Walker, Danny Stockli (KU) and Jeffrey Unruh.

Future Direction: We anticipate that the addition of the Ritchie Professor will greatly enhance the visibility siliciclastic research and graduate education at KU to the point that it will complement the present strength in carbonate research to make KU one of the strongest programs in sedimentology in the US. However, the exact direction the program takes will depend upon the individual as well as the opportunities that the times present. Kamola plans to continue with field-based research focusing on stratal patterns and applying sequence stratigraphy to address large-scale problems in basin analysis. Walton expects to continue studies of petroleum geology of Kansas and alteration of basalt. Opportunities for the Richie position include a link to the tectonics group at KU, developing expertise in shale deposits, and studies of deep-water systems, in addition to further strengthening sequence stratigraphy.

Tectonics

Core faculty: Andreas Möller, Danny Stockli, Mike Taylor, and Doug Walker

Tectonics in the Department of Geology, University of Kansas, has a long-standing international reputation in addressing fundamental aspects of the timing and rates of geological processes via the
application of Geochronology, Thermochronology, and Isotope Geochemistry. The group strives to understand the rates of tectonic processes in the continents at all time scales and in all settings. Presently we have strengths using in situ dating of minerals recording higher temperature processes (Moeller), dating crystallization ages of rocks (Walker and Stockli), understanding neotectonic processes and earthquake rupture using InSAR/LiDAR/GPS (Taylor and Walker) and cosmogenic nuclides to date deformed geomorphic surfaces (Taylor and Walker), determining longer term processes using radiogenic isotope geochemistry (Walker), and using lower temperature thermochronometers to explore a variety of tectonic and thermal processes (Stockli). The group works on a host of problems with field areas spanning most of the globe, including work on active deformation in North and South America and Asia, tectonic development of orogenic belts worldwide, understanding geothermal occurrence models and systems, and answering many tectonics related questions. The group is also actively involved with Geoinformatics and Geoscience CyberInfrastructure. Tectonics faculty and students collaborate with a variety of other units around the University of Kansas, including programs in sedimentology and geophysics within the department, and the Kansas Geological Survey and Department of Medicinal Chemistry. Funding in the program is substantial (at present in excess of $5M) and comes from diversified sources including governmental (NSF, DoD, DoE) and industry (ExxonMobil, Ecopetrol, Apache) groups. We consistently have in excess 10 graduate students enrolled, and currently have 4 Postdoctoral and Research Associates. Students and professional staff typically move on to energy and academic related positions.

Additional faculty positions are needed to continue the development of our strong and diverse program and to build on our national and international reputation. An immediate and urgent challenge is presented by the departure of Stockli after this year, leaving a significant void in terms of teaching and research. Because we will continue collaborating with him, a direct replacement in the field of low-T thermo/geochronology is not our vision, although an immediate hire is urgent to maintain the strength of our program and continue our high trajectory. At this point, a hire in the area of moderate-T geochronology would meet programmatic needs as well as enable us to expand into a new and important area. This person could address needs in the program as well as probably allowing expansion into ore deposit work. Other than this urgent program continuation and maintenance hire, our highest priority is in the area of cosmogenic radionuclides, an ongoing area of need. Three additional hires would greatly strengthen the program, its interconnectivity to other groups, and the department as a whole. 1) A new faculty studying general petrology/geochemistry applied to igneous or metamorphic rocks using concentration of unusual elements in ordinary minerals (e.g., Ti in quartz). This is an strongly expanding field in understanding petrologic processes. 2) A geodynamicist and/or earthquake seismologist filling an important thematic void in solid earth sciences and providing a stronger link to the geophysics program. 3) A new faculty addressing recent processes using U-series or other disequilibrium methods, enhancing our repertoire in shorter time-scale quantification and providing essential contributions to other groups (e.g., paleoclimate and carbonate). These hires would strongly impact our program, the program interconnectivity, and the department as a whole. These hires would send a strong signal and build on high current productivity and an trajectory of our program. Outside of our immediate area, several other hires in the Geology Department would greatly enhance our group and allow for more holistic education and research. This includes, for example, a geophysicist with interests in numerical modeling of lithospheric deformation or whole earth mantle convection and additional support in clastic sedimentology and basin analysis.

The group has extensive laboratory facilities at the Isotope Geochemistry Laboratories (Nichols Hall) and in the Geology Department at Lindley Hall. Current support provided by the university includes only a half-time technician, a position that must be maintained. Other technical support (e.g., a computer programmer, postdoctoral researchers, technician) is funded by external research grants. Maintaining these facilities and personnel is critical to the continued success of the program, as is expanding by bringing new faculty brought into the program and department.
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Table. A2. Aspirational and functional peers. Department program routinely competes with these programs for students and programs aspire to attain similar rankings or stature as the listed peers.
III. Graduate Studies Data

Figure A3. Number of grants obtained by graduate students, parsed by discipline and year (2006-present).

Figure A4. Number of peer-reviewed graduate student publications by discipline (2006-present). Note that these are first-authored publications only.
Figure A5. Number of first-authored graduate student abstracts by discipline (2006-present).

Figure A6. Financial aid support to graduate students
Figure A7. Number of students funded by GTA and GRA positions.

Figure A8. GRE scores of PhD applicants, admitted to the PhD program, and enrolled in the program.

Figure A9. GRE scores of MS applicants, admitted to the MS program, and enrolled in the program.
IV. Undergraduate catalog
South America and the contemporary cultural geography of Brazil. Course also includes a survey of Brazil’s South American neighbors.

**GEOG 601 Indigenous Peoples of the World**

A survey of the varied responses of global Indigenous peoples as a result of the imposition of societal, economic, and political systems. An overview of disease, termination, issues such as land rights, economic development, resources and cultural property, language, knowledge systems, and women’s rights from the perspectives of Indigenous societies around the world. Delineated studies of Indigenous people seeking recognition and protection under international law are included. Same as ANTH 601.

**GEOG 657 Geographic Models**

A survey of methodologies and specific techniques from geographical and geodesic research that have proven applicability to public facility location decisions. The course emphasizes hands-on student experience with canned computer programs and real-world problems. Prerequisite: An introductory course in either urban planning, transportation, geography, urban geography, or a closely related discipline.

**GEOG 658 Topics in Geographic Information Science**

An introduction to topics in geographic information science. May include specific course work under the headings of methodological, basic research, theoretical, or applied applications; geographic information systems (GIS), global positioning systems (GPS), or geostatistics. May be repeated if topic differs. LEC.

**GEOS 670 Cultural Ecology**

An investigation of the interactions between socio-cultural systems and the natural environment, including a survey of major historical and descriptive studies. (Same as ANTH 670.) Prerequisite: An introductory course in geography or anthropology.

**GEOD 720 Information Design**

**GEOD 731 Advanced Cartography**

**GEOD 732 Geodetic Principles**

**GEOD 741 Field Experience**

**GEOD 742 Advanced Geomatics**

**GEOD 750 Development of Geodetic Thought**

**GEOD 760 Remote Sensing of the Earth**

**GEOD 771 Topics in Physical Geography**

**GEOD 772 Advanced Geodetic Field and Laboratory Techniques**

**GEOD 773 Soil Geomorphology**

**GEOD 774 Advanced Geomorphology**

**GEOD 780 Topics in Stable Isotopes in the Natural Sciences**

**GEOD 790 Analysis of Regional Development**

**GEOD 791 Topics in Urban, Economic Geography**

**GEOD 792 Problems and the Ecosystem and the Physical Environment**

**GEOD 793 Geographic Information Science**

**GEOD 794 Topics in Cultural Geography**

**GEOD 795 Problems in Political Geography**

**GEOD 796 Humanitarian Geography**

**GEOD 797 Seminar in Population Geography**

**GEOD 798 North American Regions**

**GEOD 799 Latin American Regions**

**GEOD 800 Regions of the Former U.S.S.R.**

**GEOD 895 European Regions**

**GEOD 896 Asian Regions**

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**Geology**

Chair: Luis A. Gonzalez

Lindey Hall, 1475 Jayhawk Blvd., Room 120

Lawrence, KS 66045-7575, www.geo.ku.edu, (785) 864-4974

Degrees offered: B.A., B.S., M.S., Ph.D.

**Why study geology?**

Because its leadership role among geoscience programs advances higher learning and serves society through the discovery, dissemination, and application of knowledge.

Geology is an interdisciplinary science that applies the principles of chemistry, physics, biology, and other fields to the study of the earth, its resources, and its natural processes. The field has many subdisciplines and specialties that offer stimulating challenges and careers. KU offers broad undergraduate programs in geology and geophysics but emphasizes research in paleontology, sedimentology, crustal evolution, hydrogeology, seismonics, and geomorphology.

**Courses for Nonmajors**

The department offers several courses of interest to nonmajors who wish to learn more about geology and related areas such as environmental science, engineering, and economic resources. Principal courses include GEOL 101, GEOL 105, GEOL 121, GEOL 171, GEOL 302, and GEOL 351. GEOL 105 may be taken in conjunction with either GEOL 101 or GEOL 105 to fulfill the CLAS laboratory science requirement. GEOL 304, GEOL 360, and GEOL 552 all offer opportunities to study more specialized aspects of the earth and do not require advanced prerequisites.

**Majors**

The B.A. program allows many free electives for background courses in the sciences or liberal arts. The program permits study of traditional geology (with emphasis on the solid earth, the earth’s surface, environmental geology and natural resources, environmental geology [with emphasis on water or urban environments], or an individually tailored program.

The B.S. program provides intensive training in geology and other sciences. B.S. majors may emphasize traditional geology, environmental geology (with a specialized track in hydrogeology), engineering geology, geophysics, or earth and space science licensure. The hydrogeology track, the engineering geology option, and the geophysics option combine basic training in geology with training in mathematics, engineering, physics, and geophysics. The environmental geology option combines training in geology with many different sciences.

Degree requirements may be altered to suit particular needs of a student upon petition to the undergraduate studies committee and in consultation with a faculty advisor. Special consideration is given to students with strong backgrounds in supporting sciences and students with superior records who desire to major in geology late in their programs.

**First- and Second-Year Preparation.** Students interested in geology, especially in the B.S. degree, should see a departmental advisor as soon as possible. They should enroll in mathematics, chemistry, and English in addition to Introduction to Geology and electives. Students should take GEOL 360 as soon as possible.

**Advising.** Developing a strong relationship with a faculty advisor helps students get the most out of their educational programs in the shortest time. Most courses for majors are offered in only one semester each year. Advisers can guide the student through complexities of the curriculum or into a specialized program.

**Requirements for the B.A. Major.** In addition to College requirements, these courses are required:

- MATH 115 Calculus I (3)
- MATH 121 Calculus II (3)

**Biol 154 Foundations of Chemistry I**

**Biol 155 Foundations of Chemistry II**

**PHYS 105 Introductory Physics I**

**PHYS 114 College Physics I**

**PHYS 215 College Physics II**

**CHEM 101 Principles of Biology**

**CHEM 105 Principles of Biology**

**CHEM 120 Foundations of Information Technology**

**ECOL 101 Introduction to Computing**

**Geology Core (24 hours)**

- GEOL 101 Introduction to Geology (3)
- GEOL 103 Geology Fundamentals Laboratory (2)
- GEOL 311 Mineralogy and Structure of the Earth (5)
- GEOL 321 Sedimentology and Surface Processes (4)
- GEOL 340 Field Investigation (2)
- GEOL 551 Paleontology (3)
- GEOL 560 Introductory Field Geology (3)
- GEOL 562 Structural Geology (4)

**Option A: General Geology**

**Colleges Requirements and Core Courses**

- **Chemistry:** A minimum of 15 hours in geology or related courses. Several possible tracks of support-level work are given below. No more than 40 hours in geology may be counted toward the minimum 124 hours required for graduation.

**Petri: Solid Earth**

- GEOL 301 Mineral Structures and Equilibrium Laboratory (5)
- GEOL 303 Introduction to Mineralogy (4)
- GEOL 311 Mineralogy and Structure of the Earth (5)
- GEOL 314 Sedimentation and Surface Processes (4)
- GEOL 340 Field Investigation (2)
- GEOL 551 Paleontology (3)
- GEOL 570 Geophysics (3)
- GEOL 573 Geodynamics and Plate Tectonics (3)

**Petri: Surficial Earth**

- GEOL 171 Earthquakes and Natural Disasters (3)
- GEOL 351 Environmental Geology (3)
- GEOL 352 Geology of the Earth (3)
- GEOL 541 Geomorphology (4)

**The University of Kansas 2010-2011**

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The original text is from the University of Kansas Geology Department's self-study report.
### Requirements for the B.S. Degree: General Geology Option

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<td>Geology Courses</td>
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<td>Electives</td>
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### Notes
- Students may substitute 106 or 107 for 101. 106 is recommended for students who plan to transfer to another institution. 107 is recommended for students who plan to minor in geology.
- For students who have completed 106 or 107, 108 is recommended.
- Electives should be chosen to meet the student's individual needs and interests.
- Additional core courses and departmental electives may be required for graduation.

### Environmental Geology Option

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<td>Geology Courses</td>
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<td>Electives</td>
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### Notes
- Students must complete 104 or 106. 106 is recommended for students who plan to transfer to another institution. 104 is recommended for students who plan to minor in geology.
- For students who have completed 106 or 107, 108 is recommended.
- Electives should be chosen to meet the student's individual needs and interests.
- Additional core courses and departmental electives may be required for graduation.

### Environmental Hydrogeology Track

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### Notes
- Students must complete 104 or 106. 106 is recommended for students who plan to transfer to another institution. 104 is recommended for students who plan to minor in geology.
- For students who have completed 106 or 107, 108 is recommended.
- Electives should be chosen to meet the student's individual needs and interests.
- Additional core courses and departmental electives may be required for graduation.

### Other Requirements
- All students must complete a minimum of 120 credits to graduate. 120 credits are required for a B.S. degree in geology.
- At least 60 of these credits must be upper-division courses (300- or 400-level courses).
- At least 18 of these credits must be in geology courses.
- At least 9 additional credits must be in a selected minor or other area of study.
- At least 9 additional credits must be in courses numbered 300 or above.
- At least 12 additional credits must be in courses numbered 400 or above.

### Additional Opportunities
- Students may choose to pursue a minor or a double major in another discipline.
- Students may participate in research projects and internships to gain practical experience.
- Students may consider pursuing a master's degree or a Ph.D. in geology.

### Note
- Students are encouraged to consult with their advisor to develop a personalized academic plan that meets their individual needs and goals.

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**KU Geology Department Self Study**

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**Geology**

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**Environmental Geology**

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**Environmental Hydrogeology**

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**Other Requirements**

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**Notes**

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**Undergraduate Catalog**

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**119**

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**41**
Geology

CE 330 Fluid Mechanics (4) or PHYS 313 Fluids of Physics (5) .................................................. 3-4

Technical Electives (9 hours). These normally are chosen from courses numbered
500 or above in geology, physics, mathematics, chemistry, engineering, or computer
science. Courses numbered below 500 must be approved by a geology advisor.

Requirements for the B.S. Degree: Geophysics Option

College English and Principal Course Requirements (21 hours)

ENG 101, ENG 102, and a third course specified by the College of Liberal
Arts and Sciences ............................................................ 9
Courses in humanities and social sciences ................................................. 12
At least 12 hours must be taken in each area. An introductory course in
geology is recommended.

Chemistry, Mathematics, Computer Science, Engineering (28-31 hours)

ECE 138 Introduction to Computing .................................................. 3 (or
Introductory Programming Skills ................................................. 0.5
CHEM 104 and CHEM 106* Fundamentals of Chemistry I and II ............. 10
MATH 123 Calculus I and II ....................................................... 10
MATH 323 Vector Calculus (5) and MATH 360 Elementary Linear Algebra (5) .... 5
MATH 330 Elementary Differential Equations ..................................... 3

Physics (9 hours)

PHYS 211 and PHYS 212 General Physics I and II .................................. 8
PHYS 213 General Physics III ....................................................... 3
PHYS 311 Mechanics ............................................................... 3
PHYS 331 Electricity and Magnetism ................................................ 3

Geology

GEOG 101 Introduction to Geology (5) and
GEOG 102 Introduction to Geology (5) ............................................. 8
GEOG 413 Mineralogy and Petrology ............................................... 3
GEOG 414 Sedimentology and Surface Processes ................................ 3
GEOG 460 Field Geology ................................................................ 3
GEOG 461 Field Geology ................................................................ 3
GEOG 520 Structural Geology ........................................................ 3
GEOG 571 Geophysics ................................................................. 3
GEOG 575 Geodynamics and Plate Tectonics (5) ................................ 3
GEOG 575 Geodynamics and Plate Tectonics (5) ................................ 3
GEOG 577 Structural Geology ........................................................ 3
GEOG 579 Environmental Geophysics (3) .......................................... 3

Technical Electives (9 hours). These normally are chosen from courses numbered
500 or above in geology, physics, mathematics, chemistry, engineering, or computer
science. Courses numbered below 500 must be approved by a geophysics advisor.

Free Electives (12 hours)

Graduate level courses must ensure a grade point average of 2.0 in both
physic and geology courses.

Requirements for the B.S. Degree: Earth and Space Science Licensure Option

This program fulfills the requirements for a Bachelor of Science degree in geology. The program also meets course requirements necessary to gain state license eligibility in earth and science to become a secondary teacher in Kansas, but completion of the program does not guarantee the student’s licensure. This list is a guideline. Contact the geology department for further information about meeting degree and additional licen- sure requirements. You may also contact the U.S.G.A. Teach- Of- Fice for information about similar tracks resulting in eligibility for licensure in this and other sciences and mathematics fields.

General Requirements (21 hours). These courses must be taken on a letter grade basis.

English: ENG 101 Composition I and
ENG 102 Critical Reading and Writing (5) or equivalent .............................. 6

Communications: COM 101 Speaker, Audience, Communication (3) or
COM 101 Personal Communication (3) or exemption (examination) .......... 3

Computer Science: CSE 121 Principles of Computer Science (see also MATH 120 Principles of Calculus (11)) and
HIST 316 or HIST 317 or equivalent approved by geology department) ....... 3

Social Science: Three courses, preferably from the Principal Course list
(see http://catalog.ku.edu/maas/maas.html) ......................................... 6

Major/General Science Requirements (44 hours). A minimum grade of C is re- quired in all courses counted toward the major.

Mathematics: MATH 123 Calculus I and MATH 122 Calculus II (5) or
MATH 121 Calculus I and MATH 123 Calculus II (5) and
MATH 117 Calculus (3) .................................................................. 10-11

Physics: PHYS 211 General Physics I and PHYS 212 General Physics II (4) or
CHEM 104 and CHEM 106* Fundamentals of Chemistry I and II .............. 10
CHEM 108 and CHEM 109 Foundations of Chemistry I and II .................. 10
Biology: BIOL 150* Principles of Molecular and Cellular Biology (4) and
BIOL 151* Principles of Organismal Biology (4) .................................. 8

Geology Core Requirements (21 hours)

GEOG 101 Introduction to Geology (3) and
GEOG 102 Introduction to Geology (3) ............................................. 6
GEOG 233 Mineralogy and Structure of the Earth .................................. 3
GEOG 305 Sedimentology and Surface Processes ................................. 3
GEOG 360 Field Geology ................................................................ 3
GEOG 371 Geophysics ................................................................. 3
GEOG 414 Sedimentology and Surface Processes ................................ 3
GEOG 420 Structural Geology ........................................................ 3
GEOG 460 Field Geology ................................................................ 3
GEOG 480 Environmental Geophysics (3) .......................................... 3

GEOG 520* Geophysics ............................................................... 3
GEOG 575 Geodynamics and Plate Tectonics (5) ................................ 3
GEOG 577 Structural Geology ........................................................ 3
GEOG 579 Environmental Geophysics (3) .......................................... 3

Total Hours: 120

THE UNIVERSITY OF KANSAS 2010-2011
and after further practice, candidates can sit for the Practice of Geology examination to become licensed. Regulations for license may vary from state to state.

Geology Courses

GEO 101 Introduction to Geology (3): N EN Introduction to the principles of earth sciences. Study of the formations, occurrence, and structure of minerals and rocks; action of streams, oceans, glaciers, and other agents in the formation and modification of the landscape; volcanoes, earthquakes, and plate tectonics. This course with GEO 102 satisfies the College laboratory science requirement. Concurrent enrollment in GEO 102 is recommended for students taking both. Course may be offered in lecture or online format.

GEO 102 Introduction to Geology (3): N EN Human section of GEO 101. An introduction to the principles of earth sciences. Study of the formation, occurrence, and structure of minerals and rocks; action of streams, oceans, glaciers, and other agents in the formation and modification of the landscape; volcanoes, earthquakes, and plate tectonics. This course with GEO 101 satisfies the College laboratory science requirement. Concurrent enrollment in GEO 102 is recommended for students taking both. Course may be offered in lecture or online format.

GEO 103 Geology Fundamentals Laboratory (5, U) A course in geologic laboratory studies. This course fulfills the General Education Requirement. The course and laboratory requirements are the same as the General Education Requirement. Concurrent enrollment in GEO 103 is recommended for students taking both. Course may be offered in lecture or online format.

GEO 104 History of the Earth (3): N EN An introduction to the physical and biological history of the earth, the methods used to decipher earth history, and the development of the geoscience. This course is GEO 103 satisfies the College laboratory science requirement. Concurrent enrollment in GEO 103 is recommended for students taking both. Course may be offered in lecture or online format.

GEO 105 History of the Earth Honors (3): N EN Honors section of GEO 104. An advanced introduction to the physical and biological history of the earth, the methods used to decipher earth history, and the development of the geoscience. This course is GEO 103 satisfies the College laboratory science requirement. Concurrent enrollment in GEO 103 is recommended for students taking both. Course may be offered in lecture or online format.

GEO 121 Prehistoric Life: DNA to Dinosaurs (3, N): N EN An introduction to the history of life and the origin and evolution of animals and plants during the last 541 million years. This course is intended to be taught in a lecture format and is recommended for students taking both. Course may be offered in lecture or online format.

GEO 157 Earth and Natural Disasters (3): N EN Addresses the subject of natural disasters with concentrations on earthquake effects and their mitigation. Topics include volcanic eruptions, tidal waves, floods, global warming, seismic waves, and tsunamis, emphasizing the potential for societal and human significance. Provides a background and rationale for earth science courses. Course may be offered in lecture or online format.

GEO 160 Historical Geology (3): N EN A course in the history of the earth, the methods used to decipher earth history, and the development of the geoscience. This course is GEO 103 satisfies the College laboratory science requirement. Concurrent enrollment in GEO 103 is recommended for students taking both. Course may be offered in lecture or online format.

GEO 178 Earthenworks and Natural Disasters (3): N EN Addresses the subject of natural disasters with concentrations on earthquake effects and their mitigation. Topics include volcanic eruptions, tidal waves, floods, global warming, seismic waves, and tsunamis, emphasizing the potential for societal and human significance. Provides a background and rationale for earth science courses. Course may be offered in lecture or online format.

GEO 211 Mineralogy and Structure of the Earth (5): N Basic identification and properties of rocks and minerals in the context of entire-rock structure and behavior. Includes basic chemical properties of rocks and minerals and their geological processes. Course may be offered in lecture or online format. Course may be offered in lecture or online format.

GEO 212 Mineral Structures and Equilibria Laboratory (3): U A laboratory course in which students are equipped with geological tools and techniques to interpret geologic structures. Course may be offered in lecture or online format.

GEO 213 Geology of Tectonics and Volcanism (5): N EN Physical, chemical, and biogeochemical processes in surficial and near-surface environments applied to the interpretation of the tectonic, magmatic, and volcanic processes of the Earth. Course may be offered in lecture or online format.

GEO 215 Geology of Tectonics and Volcanism (5): N EN Physical, chemical, and biogeochemical processes in surficial and near-surface environments applied to the interpretation of the tectonic, magmatic, and volcanic processes of the Earth. Course may be offered in lecture or online format.

GEO 216 Geology of Tectonics and Volcanism (5): N EN Physical, chemical, and biogeochemical processes in surficial and near-surface environments applied to the interpretation of the tectonic, magmatic, and volcanic processes of the Earth. Course may be offered in lecture or online format.

GEO 306 Field Geology (3): N EN A course in geology that provides students with practical experience in the field of geology and the interpretation of geological features. Course may be offered in lecture or online format.

GEO 312 Sedimentology and Surface Proc. (3): N EN Physical, chemical, and biological processes in surficial and near-surface environments applied to the interpretation of the tectonic, magmatic, and volcanic processes of the Earth. Course may be offered in lecture or online format.

GEO 313 Sedimentology and Surface Proc. (3): N EN Physical, chemical, and biological processes in surficial and near-surface environments applied to the interpretation of the tectonic, magmatic, and volcanic processes of the Earth. Course may be offered in lecture or online format.

GEO 351 Environmental Geology (5): N EN A course in the interpretation of geologic processes and the environmental impact of geologic processes. Topics include: tectonic features, and include geologic hazards such as floods, landslides, volcanic eruptions; the availability of water, mineral, and energy resources; and the environmental impact of resource utilization. The importance of recognizing geologic constraints in land-use planning and environmental impact is emphasized. Course may be offered in lecture or online format.

GEO 369 Field Investigation (2, N): N EN A field geology course that provides students with practical experience in the field of geology and the interpretation of geological features. Course may be offered in lecture or online format.
KU Geology Department Self Study

Geology | Germanic Languages & Literatures


GEOL 569 Introduction to Field Geology (1). N Summer session. The study of the principles of field geology and the application of field methods to solve geological problems. Includes use of topographic maps and aerial photographs for geological mapping, the study of stratigraphic methods by measuring sections, and working field trips to areas of regional geological interest. Given at the University of Kansas Geology Field Camp near Canon City, Colorado. Fee: Prerequisite: GEOL 340 and GEOL 562, or consent of Instructor, FLD.

GEOL 563 Field Geology (1). N Summer session. The application of the principles of field geology to solve complex geological problems in the field. Given at the University of Kansas Geology Field Camp near Canon City, Colorado, or at other sites as appropriate. Fee: Prerequisite: GEOL 560, FLD.

GEOL 560 Structural Geology (1). N A study of primary and secondary rock-structures and their genesis. Includes techniques of structural analysis and interpretation of rock structures. Lectures, laboratory, and required field trip. Fee: Prerequisite: GEOL 101 or GEOL 102 and GEOL 103 or GEOL 104, or consent of Instructor. FLD.

GEOL 571 Natural Disasters (1). N Scientific assessment of natural disasters with concentration on earthquake effects and their mitigation. Briefly treats volcanic eruptions, tidal waves, floods, global warming, severe weather, and catastrophic meteoric impacts in a geologic and human framework. A research paper is required. Prerequisite: An introductory course in a physical science. LEC.

GEOL 572 Geophysics (1). N An introductory study of gravitational, magnetic, seismic, electrical, and thermal properties of the earth. Modern concepts, instrumentation, and applications to exploration, earth structure, and global tectonics. Prerequisite: An introductory course in geology. Recommended in conjunction with either MATH 110 or MATH 112, and either GEOL 315 or GEOL 317. Fee: Prerequisite: Either GEOL 410 or GEOL 411. Fee: Prerequisite: GEOL 340, or consent of Instructor. LEC.

GEOL 573 Geodynamics and Plate Tectonics (1). N Study of physical processes in the earth and of geophysical approaches to studying Earth systems at regional and global scales. Topics include geodynamic fields, tectonic regimes, and modern plate tectonics. Prerequisite: GEOL 103 or consent of Instructor. LEC.

GEOL 574 Structural Geology (1). N An introductory study of gravitational, magnetic, seismic, electrical, and thermal properties of the earth. Modern concepts, instrumentation, and applications to exploration, earth structure, and global tectonics. Prerequisite: An introductory course in geology. Recommended in conjunction with either MATH 110 or MATH 112, and either GEOL 315 or GEOL 317. Fee: Prerequisite: Either GEOL 410 or GEOL 411. Fee: Prerequisite: GEOL 340, or consent of Instructor. LEC.

GEOL 575 Seismic Exploration (1). N Application of seismic reflection and refraction techniques to the description of near-surface geology and the exploration for energy and mineral resources. Theory of seismic interpretation, data collection, data processing, computer and image programming, and the interpretation of seismic profiles. Prerequisite: A course in computer programming, either FORTRAN or C, which may be taken concurrently. An introductory geophysics course, such as GEOL 512. LEC.

GEOL 576 Potential Fields Exploration (1). N Use of gravity, magnetic, and electrical methods for the exploration for energy and mineral resources. Theoretical, potential field theory, data collection methods, data analysis, and interpretation using computers. Prerequisite: A course in computer programming, either FORTRAN or C, which may be taken concurrently. An introductory geophysics course, such as GEOL 512. LEC.

GEOL 577 Environmental Geophysics (1). N Application of the methods of geophysical exploration to evaluate, mitigate, and prevent environmental problems below the surface of the earth. Development of fundamental principles and the discussion of environmental case histories using seismic, gravity, magnetic, electromagnetic, electrical, and other methods. Prerequisite: An introductory course in geology. Recommended in conjunction with either MATH 110 or MATH 112, and either GEOL 315 or GEOL 317. Fee: Prerequisite: Either GEOL 410 or GEOL 411. Fee: Prerequisite: GEOL 340, or consent of Instructor. LEC.

GEOL 595 Topics in Geology: An (1, 3, 5). May include lectures, discussions, readings, laboratory, and field work in geology. Will be given as needed. May be taken more than once. LEC.

GEOL 5 X Course (1-5).

GEOL 712 Micromorphology (3).

GEOL 722 Palaeoclimates (3).

GEOL 725 Palaeoclimates: A Course (3).

GEOL 727 Palaeoclimates: A Course (1). Fee: Prerequisite: GEOL 340, or consent of Instructor. LEC.

GEOL 728 Palaeoclimates: A Course (1). Fee: Prerequisite: GEOL 340, or consent of Instructor. LEC.

GEOL 729 Palaeoclimates: A Course (1). Fee: Prerequisite: GEOL 340, or consent of Instructor. LEC.

GEOL 731 Palaeoecology of the Tertiary Depositional Systems (3).

GEOL 732 Carbonate Depositional Systems (3).

GEOL 741 Advanced Geochronology (3).

GEOL 745 Physical and Transport Hydrogeology (3).

GEOL 753 Chemical and Microbial Hydrogeology (3).

GEOL 761 Regional Field Geology (1, 3).

GEOL 763 Tectonics and Regional Geology (3).

GEOL 764 Advanced Geophysics: An (3).

GEOL 772 Geophysical Data Analysis (3).

GEOL 773 Seismology (3).

GEOL 774 Finite Difference Methods for Geophysics (3).

GEOL 776 Near-Surface Seismology (3).

GEOL 780 Conservation Principles and Practices (3).

GEOL 781 Introduction to Museum Exhibits (3).

GEOL 782 The Nature of Museums (3).

GEOL 793 Museum Management (3).

GEOL 794 Introduction to Museum Public Education (3).

GEOL 785 Principles and Practices of Museum Collection Management (3).

GEOL 791 Advanced Topics in Geology: An (1-5).

Germanic Languages and Literatures

Chair: William Keel, keel@uark.edu
Wescow Hall, 1455 Jacksonville Blvd., Room 2080
Lawrence, KS 66045-7594
http://www2.uark.edu/~germanic, (785) 864-4803

Degrees offered: B.A., M.A., Ph.D.

Why study Germanic languages and literatures? Because understanding the language, literature, and culture of Central Europe is essential for our history and our future.

The study of German language, literature, and culture enables students to develop skills in reading, writing, speaking, and understanding German as well as the structure of language in general and introduces students to one of the world’s great literatures. A knowledge of German is useful in careers in business, journalism, and education or graduate work in the arts and sciences. Students interested in the future of Central and Eastern Europe find a knowledge of German essential. The department also offers the four-year proficiency sequence in a Scandinavian language (Swedish, Danish, or Norwegian), in Dutch, and in Hungarian.

Courses for Future Teachers

Candidates for the B.S. in education majoring in German should see the School of Education chapter of this catalog.

Honors Courses

Special honors sections such as GER 105, GER 109, GER 213, and GER 217 are offered in the basic language program.

Placement

Students beginning the study of German at KU should take GER 104. Students with high school German who attend orientation may take a placement test and see a placement adviser. Upon request, the department can give a placement test to other students who seek advice about initial enrollment in German.

Repetitive Credit

Students with prior college or university German course credit are eligible for repetitive credit according to the following formula:

Three hours of repetitive credit are awarded to a student who has two or three years of high school German who enroll initially at KU in a third-level German course (GER 213) and receive a grade of C. Students with two or four years of high school German who enroll initially at KU in a fourth-level German course (GER 214) and receive a grade of C or higher.

New hours of repetitive credit are awarded to a student with two or four years of high school German who enroll initially at KU in a German course with a fourth-level course as a prerequisite and receive a grade of C or higher.

Advanced Placement

See Advanced Placement under Undergraduate Admission and Scholarships in the General Information chapter of this catalog.

Credit by Examination

See Credit by Examination in the General Regulations chapter of this catalog.
V. OIRP Summary for Geology

Department of

Geology

Summary
## Student Credit Hours

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### By Instructor Type

- % of Fall UG SCH taught by TenTen Tch Faculty: 82.8% 82.3% 93.8% 79.3% 83.9% 72.2% 74.6% 94.9% 89.4%
- % of Fall UG SCH taught by TchTA: 0.0% 6.7% 5.6% 19.7% 12.7% 10.3% 18.6% 4.6% 19.9%
- % of Fall UG SCH taught by Other Faculty: 7.2% 1.0% 0.6% 0.5% 3.8% 6.5% 6.4% 0.6% 0.6%
- % of Fall Grad SCH taught by TenTen Tch Faculty: 79.4% 78.6% 72.7% 60.8% 79.9% 80.9% 80.8% 89.0% 86.2%

### By Major Type

- % of Department SCH taken by UG majors: 7.8% 9.5% 7.7% 7.3% 6.1% 7.8% 10.0% 10.4% 4.9%
- % of Department SCH taken by GR majors: 4.9% 5.4% 5.1% 6.8% 6.1% 8.0% 8.2% 9.3% 3.5%
- % of Department SCH taken by non-majors: 87.4% 85.1% 86.2% 85.5% 87.8% 84.2% 81.7% 60.3% 91.6%

### At Edwards Campus

- % of FY SCH at KUEC: 0.0% 0.1% 0.0% 0.1% 1.0% 0.6% 1.0% 1.1% 1.1%
### Budgeted Faculty

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Relative Index: 67.6% 70.3% 73.8% 71.5% 76.1% 76.4% 79.3% 94.3% 99.6% 100.0%

### Tenured and Tenure Track Faculty

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Relative Index: 67.7% 69.3% 73.1% 70.6% 76.5% 80.5% 77.3% 97.6% 100.1% 100.0%
### Instructor Workload Information

#### Instructional FTE by Faculty type

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#### Instructional SCH by Faculty type

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## Comparative Faculty Workload Information

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## Research Activity and Graduate Student Support

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### Research Expenditures

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<td>Number of Projects</td>
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<td>52</td>
<td>58</td>
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<td>Total Expenditures</td>
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<td>$2,267,568</td>
<td>$2,441,646</td>
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<td>Direct Expenditures</td>
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<td>$1,844,501</td>
<td>$1,974,800</td>
<td>$1,523,455</td>
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<tr>
<td>Indirect (F&amp;A) Expenditures</td>
<td>$470,648</td>
<td>$434,468</td>
<td>$437,147</td>
<td>$517,170</td>
<td>$397,162</td>
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<td>Fed Sci and Engr Res Expenditures</td>
<td>$2,297,212</td>
<td>$1,950,545</td>
<td>$1,953,658</td>
<td>$1,836,887</td>
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<td>Total Exp $ per Ten/Ten-Trk Faculty</td>
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<td>$143,626</td>
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### Graduate Student Support

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<th>Fall 2006</th>
<th>Fall 2007</th>
<th>Fall 2008</th>
<th>Fall 2009</th>
<th>Fall 2010</th>
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<tbody>
<tr>
<td>Majors with GTA positions</td>
<td>Count</td>
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<td>13</td>
<td>16</td>
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<td>19</td>
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<tr>
<td></td>
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<td>6.0</td>
<td>6.5</td>
<td>8.0</td>
<td>9.5</td>
<td>9.5</td>
<td>9.5</td>
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<tr>
<td>% funded in major’s department</td>
<td>91.7%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>89.5%</td>
<td>89.5%</td>
<td>89.5%</td>
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<tr>
<td>Majors with GRA positions</td>
<td>Count</td>
<td>27</td>
<td>29</td>
<td>28</td>
<td>33</td>
<td>31</td>
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<tr>
<td>% funded in major’s department</td>
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<td>55.6%</td>
<td>69.2%</td>
<td>60.6%</td>
<td>64.5%</td>
<td>64.4%</td>
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### Financial Aid Awarded

**to Students enrolled during Fall, Spring or Summer**

#### Undergraduate Information

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<th>FY 2007</th>
<th>FY 2008</th>
<th>FY 2009</th>
<th>FY 2010</th>
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<tbody>
<tr>
<td>Total Aid Awarded (All Types)</td>
<td>$501,619</td>
<td>$536,845</td>
<td>$506,649</td>
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<td>$693,843</td>
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<td>73.3%</td>
<td>86.6%</td>
<td>58.8%</td>
<td>54.7%</td>
<td>55.9%</td>
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<tr>
<td>Avg Amt Received (Kansas residents)</td>
<td>$7,535</td>
<td>$7,344</td>
<td>$6,249</td>
<td>$9,275</td>
<td>$9,502</td>
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<tr>
<td>Avg Amt Received (Nonresidents)</td>
<td>$6,095</td>
<td>$2,739</td>
<td>$10,640</td>
<td>$14,595</td>
<td>$18,544</td>
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<td>Total Federal Grants</td>
<td>$20,726</td>
<td>$21,925</td>
<td>$48,655</td>
<td>$68,971</td>
<td>$97,651</td>
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<tr>
<td>% of Students in this Unit Receiving</td>
<td>18.5%</td>
<td>12.7%</td>
<td>15.5%</td>
<td>15.1%</td>
<td>18.3%</td>
</tr>
<tr>
<td>Avg Amt Received (Kansas residents)</td>
<td>$2,813</td>
<td>$2,264</td>
<td>$3,059</td>
<td>$4,384</td>
<td>$5,141</td>
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<tr>
<td>Avg Amt Received (Nonresidents)</td>
<td>$3,600</td>
<td>$1,550</td>
<td>$2,315</td>
<td>$2,266</td>
<td>$5,179</td>
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<tr>
<td>Total Need-Based Loans</td>
<td>$82,821</td>
<td>$84,457</td>
<td>$102,038</td>
<td>$104,371</td>
<td>$150,731</td>
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<tr>
<td>% of Students in this Unit Receiving</td>
<td>38.7%</td>
<td>28.1%</td>
<td>25.8%</td>
<td>28.4%</td>
<td>32.3%</td>
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<tr>
<td>Avg Amt Received (Kansas residents)</td>
<td>$3,673</td>
<td>$3,655</td>
<td>$4,467</td>
<td>$4,571</td>
<td>$4,157</td>
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<tr>
<td>Avg Amt Received (Nonresidents)</td>
<td>$1,395</td>
<td>$1,750</td>
<td>$2,424</td>
<td>$4,164</td>
<td>$4,705</td>
</tr>
<tr>
<td>Total Non-Need-Based Loans (Includes PLUS and KUEA loans)</td>
<td>$123,009</td>
<td>$128,287</td>
<td>$202,786</td>
<td>$257,447</td>
<td>$289,420</td>
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<tr>
<td>% of Students in this Unit Receiving</td>
<td>31.7%</td>
<td>32.9%</td>
<td>32.0%</td>
<td>35.6%</td>
<td>38.7%</td>
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<tr>
<td>Avg Amt Received (Kansas residents)</td>
<td>$5,936</td>
<td>$5,521</td>
<td>$4,651</td>
<td>$5,510</td>
<td>$6,604</td>
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<tr>
<td>Avg Amt Received (Nonresidents)</td>
<td>$11,025</td>
<td>$4,456</td>
<td>$15,393</td>
<td>$12,403</td>
<td>$11,097</td>
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<tr>
<td>Total Institutional Grants and Scholarships (Includes KU Tuition Grant; excludes athletic grants)</td>
<td>$61,169</td>
<td>$63,335</td>
<td>$66,697</td>
<td>$79,450</td>
<td>$90,734</td>
</tr>
<tr>
<td>% of Students in this Unit Receiving</td>
<td>51.7%</td>
<td>44.3%</td>
<td>32.0%</td>
<td>29.2%</td>
<td>37.6%</td>
</tr>
<tr>
<td>Avg Amt Received (Kansas residents)</td>
<td>$2,160</td>
<td>$2,160</td>
<td>$2,410</td>
<td>$3,005</td>
<td>$2,356</td>
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<tr>
<td>Avg Amt Received (Nonresidents)</td>
<td>$1,413</td>
<td>$1,514</td>
<td>$1,583</td>
<td>$1,483</td>
<td>$2,165</td>
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<tr>
<td>Total State Aid (Grants and Scholarships)</td>
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<td>$7,075</td>
<td>$16,649</td>
<td>$15,726</td>
<td>$10,641</td>
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<td>% of Students in this Unit Receiving</td>
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<td>10.1%</td>
<td>9.3%</td>
<td>8.9%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Avg Amt Received</td>
<td>$1,100</td>
<td>$984</td>
<td>$1,839</td>
<td>$1,747</td>
<td>$1,757</td>
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<td>% of Students Receiving Aid Who Are Minorities</td>
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<td>5.5%</td>
<td>5.3%</td>
<td>3.4%</td>
<td>9.6%</td>
</tr>
<tr>
<td>% of Students Receiving Aid Who Are Kansas Residents</td>
<td>77.3%</td>
<td>72.7%</td>
<td>73.7%</td>
<td>79.3%</td>
<td>73.1%</td>
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Generated by: G:\Data\OIRP\AIMS\DEMIS\AIMS_Dept_PDF92.sas

Source: OIRP DEMIS databases

52
## Graduate 1st Professional Information

<table>
<thead>
<tr>
<th>Measure</th>
<th>FY 2008</th>
<th>FY 2007</th>
<th>FY 2008</th>
<th>FY 2009</th>
<th>FY 2010</th>
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<tbody>
<tr>
<td>Total Aid Awarded (All Types)</td>
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<td>$469,514</td>
<td>$605,748</td>
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<td>% of Students in this Unit Receiving</td>
<td>64.7%</td>
<td>75.4%</td>
<td>82.6%</td>
<td>88.5%</td>
<td>44.9%</td>
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<tr>
<td>Avg Aid Received (Kansas residents)</td>
<td>$9,533</td>
<td>$7,621</td>
<td>$5,277</td>
<td>$9,686</td>
<td>$10,063</td>
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<tr>
<td>Avg Aid Received (Nonresidents)</td>
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<td>$7,676</td>
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<tr>
<td>Total Need-Based Loans</td>
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<td>$32,855</td>
<td>$80,270</td>
<td>$104,955</td>
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<tr>
<td>% of Students in this Unit Receiving</td>
<td>23.3%</td>
<td>21.7%</td>
<td>16.7%</td>
<td>15.9%</td>
<td>14.3%</td>
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<tr>
<td>Avg Aid Received (Kansas residents)</td>
<td>$9,468</td>
<td>$7,932</td>
<td>$5,806</td>
<td>$7,169</td>
<td>$7,500</td>
</tr>
<tr>
<td>Avg Aid Received (Nonresidents)</td>
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<td>$5,664</td>
<td>$4,323</td>
<td>$5,551</td>
<td>$7,465</td>
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<tr>
<td>Total Non-Need-Based Loans (Includes PLUS and KUEA loans)</td>
<td>$58,540</td>
<td>$51,172</td>
<td>$39,891</td>
<td>$61,626</td>
<td>$78,188</td>
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<td>% of Students in this Unit Receiving</td>
<td>20.8%</td>
<td>14.5%</td>
<td>11.1%</td>
<td>12.2%</td>
<td>11.2%</td>
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<tr>
<td>Avg Aid Received (Kansas residents)</td>
<td>$4,584</td>
<td>$5,660</td>
<td>$4,730</td>
<td>$6,022</td>
<td>$6,354</td>
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<tr>
<td>Avg Aid Received (Nonresidents)</td>
<td>$4,005</td>
<td>$4,987</td>
<td>$4,922</td>
<td>$5,723</td>
<td>$6,926</td>
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<tr>
<td>Total Institutional Grants and Scholarships (Excludes KU Tuition)</td>
<td>$164,662</td>
<td>$253,531</td>
<td>$201,578</td>
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<td>% of Students in this Unit Receiving</td>
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<td>68.1%</td>
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<td>35.7%</td>
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<td>Avg Aid Received (Kansas residents)</td>
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<td>Avg Aid Received (Nonresidents)</td>
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<tr>
<td>% of Students Receiving Aid Who Are Minorities</td>
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<td>7.1%</td>
<td>12.1%</td>
<td>16.1%</td>
<td>19.2%</td>
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<tr>
<td>% of Students Receiving Aid Who Are Kansas Residents</td>
<td>25.0%</td>
<td>23.1%</td>
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<td>10.7%</td>
<td>9.1%</td>
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## Majors and Degree Counts

### Academic Program: Geology -- Undergraduate Information

<table>
<thead>
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<th>Level</th>
<th>Measure</th>
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<th>Fall 2002</th>
<th>Fall 2003</th>
<th>Fall 2004</th>
<th>Fall 2005</th>
<th>Fall 2006</th>
<th>Fall 2007</th>
<th>Fall 2008</th>
<th>Fall 2009</th>
<th>Fall 2010</th>
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</thead>
<tbody>
<tr>
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<td>Freshmen/Sophomore</td>
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<td>32</td>
<td>28</td>
<td>25</td>
<td>21</td>
<td>25</td>
<td>36</td>
<td>33</td>
<td>24</td>
<td>31</td>
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<td></td>
<td>Junior/Senior/5th Year</td>
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<td>42</td>
<td>52</td>
<td>52</td>
<td>47</td>
<td>51</td>
<td>63</td>
<td>61</td>
<td>72</td>
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<td>Total</td>
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<td>74</td>
<td>81</td>
<td>77</td>
<td>78</td>
<td>67</td>
<td>87</td>
<td>76</td>
<td>85</td>
<td>104</td>
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Relative Index: 78.0%  /  71.2%  /  77.9%  /  74.0%  /  80.9%  /  89.3%  /  83.7%  /  92.3%  /  91.7%  /  100.0%

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<tr>
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<th>Fall 2010</th>
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<th>Fall 2010</th>
<th>Fall 2010</th>
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<th>Fall 2010</th>
<th>Fall 2010</th>
<th>Fall 2010</th>
<th>Fall 2010</th>
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<td>78.4%</td>
<td>77.8%</td>
<td>73.8%</td>
<td>72.8%</td>
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<tr>
<td>% Minority</td>
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<td>6.8%</td>
<td>6.6%</td>
<td>5.9%</td>
<td>6.6%</td>
<td>7.0%</td>
<td>5.7%</td>
<td>5.9%</td>
<td>9.4%</td>
<td>13.5%</td>
<td></td>
</tr>
<tr>
<td>% Att. Ind, Black, Hispanic</td>
<td>2.5%</td>
<td>6.4%</td>
<td>7.4%</td>
<td>3.9%</td>
<td>8.5%</td>
<td>7.0%</td>
<td>5.7%</td>
<td>6.0%</td>
<td>8.2%</td>
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<tr>
<td>% International</td>
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<td>5.2%</td>
<td>8.5%</td>
<td>8.9%</td>
<td>4.2%</td>
<td>7.1%</td>
<td>4.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Female</td>
<td>33.3%</td>
<td>23.0%</td>
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<td>26.6%</td>
<td>41.4%</td>
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<td>36.0%</td>
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</tr>
<tr>
<td>% KS residents</td>
<td>75.9%</td>
<td>81.1%</td>
<td>80.2%</td>
<td>84.4%</td>
<td>75.9%</td>
<td>73.2%</td>
<td>73.6%</td>
<td>78.0%</td>
<td>72.9%</td>
<td>83.3%</td>
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<tr>
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<td>21.7</td>
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<td>21.8</td>
<td>21.8</td>
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<td>22.2</td>
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### Geology Undergraduate Degree Counts

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<th>Measure</th>
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<th>FY 03-04</th>
<th>FY 04-05</th>
<th>FY 05-06</th>
<th>FY 06-07</th>
<th>FY 07-08</th>
<th>FY 08-09</th>
<th>FY 09-10</th>
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<td>FY Degrees</td>
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<td>12</td>
<td>17</td>
<td>9</td>
<td>16</td>
<td>9</td>
<td>13</td>
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</tbody>
</table>

Relative Index: 54.6%  /  72.7%  /  64.6%  /  77.3%  /  49.9%  /  72.7%  /  49.9%  /  59.1%  /  103.0%

<table>
<thead>
<tr>
<th>Measure</th>
<th>FY 02-03</th>
<th>FY 03-04</th>
<th>FY 04-05</th>
<th>FY 05-06</th>
<th>FY 06-07</th>
<th>FY 07-08</th>
<th>FY 08-09</th>
<th>FY 09-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Minority</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>11.8%</td>
<td>0.0%</td>
<td>6.3%</td>
<td>11.1%</td>
<td>0.0%</td>
</tr>
<tr>
<td>% Att. Ind, Black, Hispanic</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>5.9%</td>
<td>0.0%</td>
<td>6.3%</td>
<td>11.1%</td>
<td>0.0%</td>
</tr>
<tr>
<td>% International</td>
<td>8.3%</td>
<td>12.5%</td>
<td>0.0%</td>
<td>17.8%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>22.2%</td>
<td>7.1%</td>
</tr>
<tr>
<td>% Female</td>
<td>16.7%</td>
<td>18.8%</td>
<td>50.0%</td>
<td>17.8%</td>
<td>65.8%</td>
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Majors and Degree Counts

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Source: ORP DEMIS databases
# Graduate Admissions Yield

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Source: OIRP DEMIS databases
### Graduate Admissions Yield

**Academic Program: Geology**

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<tr>
<td></td>
<td>% Minority</td>
<td>33.3%</td>
<td>0.0%</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>14.3%</td>
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<tr>
<td></td>
<td>% Intl.</td>
<td>33.3%</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>14.3%</td>
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<tr>
<td></td>
<td>% Female</td>
<td>33.3%</td>
<td>25.0%</td>
<td>0.0%</td>
<td>50.0%</td>
<td>14.3%</td>
<td>14.3%</td>
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</tr>
<tr>
<td></td>
<td>Mean Verbal GRE</td>
<td>496.0</td>
<td>482.6</td>
<td>580.0</td>
<td>510.0</td>
<td>585.0</td>
<td>496.7</td>
<td>638.6</td>
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<tr>
<td></td>
<td>Mean Quant. GRE</td>
<td>656.7</td>
<td>625.0</td>
<td>680.0</td>
<td>570.0</td>
<td>795.0</td>
<td>585.0</td>
<td>598.6</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>% reporting scores</td>
<td>100.0%</td>
<td>86.7%</td>
<td>75.0%</td>
<td>100.0%</td>
<td>50.0%</td>
<td>85.7%</td>
<td>100.0%</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applied to Admitted Yield</td>
<td>56.3%</td>
<td>55.6%</td>
<td>37.1%</td>
<td>18.6%</td>
<td>31.8%</td>
<td>22.2%</td>
<td>33.3%</td>
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</tr>
<tr>
<td></td>
<td>Admitted to Enrolled Yield</td>
<td>65.7%</td>
<td>60.0%</td>
<td>30.0%</td>
<td>66.7%</td>
<td>57.1%</td>
<td>87.5%</td>
<td>53.0%</td>
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</tr>
</tbody>
</table>
Undergraduate Level Student Satisfaction Measures

Comparative results from the Senior Surveys

- **Overall quality of instruction in major**
- **Overall education at KU**
- **This Unit's Means relative to other units**

University Mean:
- Unit's mean above 75th percentile
- Unit's mean between 25th & 75th percentile
- Unit's mean below 25th percentile

- **Intellectual challenge of major courses**
- **Integration of major courses**
- **Ease of meeting with instructors**

- **# of courses in major**
- **Availability of major courses**
- **Ease of obtaining Gen Ed courses**

- **Availability of personal interest courses**
- **Helpfulness of major advisor**
- **Helpfulness of upper division advisor**
Undergraduate Level Student Satisfaction Measures

Comparative results from the Senior Surveys

<table>
<thead>
<tr>
<th>KU Undergraduates overall</th>
<th>2005</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelli ch of courses in major</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td># of courses offered in major</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Obtaining</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Integration of courses in major</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Overall education at KU</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Helpfulness of UD advisor</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ease meeting with instructors</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ease of obtaining Gen Ed courses</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td># of courses offered in major</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Obtaining</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Intelli ch of courses in major</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td># of courses offered in major</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Integration of courses in major</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Overall education at KU</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Helpfulness of Fr/So advisor</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Percent Satisfied
Graduate Student Satisfaction Measures

Comparative results from the Spring 2005 and Fall 2009 Graduate Student Surveys

Mean response charts with 95% confidence intervals for each survey year.

University mean: 4

Bar color legend:
- below 25th percentile
- between 25-75th percentiles
- above 75th percentile

Overall program quality

<table>
<thead>
<tr>
<th></th>
<th>2005 Mean</th>
<th>2009 Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Very Good</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Fair</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Poor</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Quality of graduate teaching by faculty

<table>
<thead>
<tr>
<th></th>
<th>2005 Mean</th>
<th>2009 Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Very Good</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Fair</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Poor</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Quality of academic advising and guidance

<table>
<thead>
<tr>
<th></th>
<th>2005 Mean</th>
<th>2009 Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Very Good</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Fair</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Poor</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Overall, climate of program is positive

<table>
<thead>
<tr>
<th></th>
<th>2005 Mean</th>
<th>2009 Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Ambiv.</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Advised on how to search for a job?

<table>
<thead>
<tr>
<th></th>
<th>2005 Mean</th>
<th>2009 Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Satisfied</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Generally Satisfied</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Generally Dissatisfied</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Very Dissatisfied</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Select KU if starting over?

<table>
<thead>
<tr>
<th></th>
<th>2005 Mean</th>
<th>2009 Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Probably</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Maybe</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Probably Not</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Definitely Not</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Graduate Student Satisfaction Measures

Comparative results from the Spring 2005 and Fall 2009 Graduate Student Surveys

Factors that are obstacles to academic progress in unit

KU Graduate students overall

2005
- Work/financial commitments
- Availability of faculty
- Family obligations
- Program structure or requirements
- Course scheduling
- Other
- Immigration laws or regulations

2009
- Work/financial commitments
- Availability of faculty
- Program structure or requirements
- Family obligations
- Course scheduling
- Immigration laws or regulations
- Other

Obstacles

Percent

Major
Minor

Generated by: G:\Data\OIRP\AIMS\DEMS\AIMS_Dept_PDF92.sas
Source: OIRP DEMIS databases
VI. Research and Graduate Studies NRC Summary

2010 National Research Council
Data-Based Assessment of
Research Doctorate Programs

NRC Field: Earth Sciences (Programs Ranked=140)
KU Program: Geology

Higher rated programs have lower ranks.

### NRC Rankings 2010

<table>
<thead>
<tr>
<th>Dimensional Ranking</th>
<th>Ranking 90% Confidence Interval End Points</th>
<th>Rank as a % of Ranked Program Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Best Rank</td>
<td>Worst Rank</td>
</tr>
<tr>
<td>Regression-based Rankings (R)</td>
<td>71</td>
<td>109</td>
</tr>
<tr>
<td>Survey-based Rankings (S)</td>
<td>69</td>
<td>110</td>
</tr>
<tr>
<td>Research Activity Dimensional Ranking</td>
<td>68</td>
<td>126</td>
</tr>
<tr>
<td>Student Support &amp; Outcomes Dimensional Ranking</td>
<td>69</td>
<td>112</td>
</tr>
<tr>
<td>Diversity Dimensional Ranking</td>
<td>43</td>
<td>77</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Dimensional Ranking</th>
<th>Selected Variables included in Dimensional Rankings (Source*)</th>
<th>Raw Data</th>
<th>Rank in NRC Field</th>
<th>Rank as a % of Program Count</th>
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</thead>
<tbody>
<tr>
<td>Research Activity</td>
<td>Publications per allocated faculty (NRC)</td>
<td>1.15</td>
<td>74</td>
<td>53%</td>
</tr>
<tr>
<td></td>
<td>Citations per publications (NRC)</td>
<td>1.46</td>
<td>112</td>
<td>80%</td>
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<tr>
<td></td>
<td>Percent faculty with grants (NRC)</td>
<td>78.9%</td>
<td>96</td>
<td>69%</td>
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<td></td>
<td>Awards per allocated faculty (NRC)</td>
<td>0.15</td>
<td>64</td>
<td>46%</td>
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<tr>
<td>Student Support &amp; Outcomes</td>
<td>Percent 1st-yr students with full support (KU)</td>
<td>180.0%</td>
<td>1</td>
<td>1%</td>
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<tr>
<td></td>
<td>Percent completing within discipline time frame (KU)</td>
<td>37.3%</td>
<td>100</td>
<td>71%</td>
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<td></td>
<td>Time to degree (KU)</td>
<td>4.30</td>
<td>16</td>
<td>11%</td>
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<tr>
<td>Diversity</td>
<td>Percent non-Asian minority faculty (KU)</td>
<td>5.3%</td>
<td>27</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>Percent female faculty (KU)</td>
<td>15.0%</td>
<td>72</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td>Percent non-Asian minority students (KU)</td>
<td>21.4%</td>
<td>11</td>
<td>6%</td>
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<tr>
<td></td>
<td>Percent female students (KU)</td>
<td>30.4%</td>
<td>111</td>
<td>79%</td>
</tr>
<tr>
<td></td>
<td>Percent international students (KU)</td>
<td>34.8%</td>
<td>59</td>
<td>42%</td>
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<table>
<thead>
<tr>
<th>Dimensional Ranking</th>
<th>Additional Variables included in R &amp; S Rankings</th>
<th>Raw Data</th>
<th>Rank in NRC Field</th>
<th>Rank as a % of Program Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Overall Ranking Measures</td>
<td>Average PhDs 2002 to 2006 (KU)</td>
<td>2.20</td>
<td>81</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>Percent faculty interdisciplinary (KU)</td>
<td>48.7%</td>
<td>26</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>Percent 1st-yr students with external funding (KU)</td>
<td>0.9%</td>
<td>47</td>
<td>34%</td>
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</table>

*(NRC) indicates that the NRC obtained the data from a source other than KU.

Data used in this study were gathered in 2006-2007 but reflect data from prior years. Please refer to AIMS, https://edmisweb.ku.eduPortal, for current data trends.
Ross A. Black

Education
M.S., Geology, University of Iowa, 1981, Analysis of MAGSAT Satellite Magnetic Data, Midcontinent U.S.
B.S., Geology, The University of Iowa, 1977.

Experience
Associate Professor (Tenured), University of Kansas, Department of Geology, Lawrence, KS, 1994-present.
Associate Professor/Associate Chair, University of Kansas, Department of Geology, Lawrence, KS, 1994-2000.
Assistant Professor, University of Kansas, Department of Geology, Lawrence, KS, 1990-1994.
Acting Assistant Professor, University of Kansas, Department of Geology, Lawrence, KS, 1988-1990.

Selected Publications

Selected Published Abstracts
KU Geology Department Self Study


Selected Research Funding


Selected Recent Department, University and Professional Service

Kansas leader for EarthScope USArray Deployment, 2007-2009


CPEP (Central Plains EarthScope Partnership) founding member, National Science Foundation, 2007-current.

Graduate Director, Geology Dept., KU 2000-2009.

Academic Computing and Telecom Committee, KU, current (former Chair).

Students Supervised


Selected Courses Taught

Geophysics; Modeling in Geology and Geophysics; Seismic Exploration; Geophysical Data Analysis; History of the Earth Seismology; Historical Geology; Geomodeling and Inversion
KU Geology Department Self Study

J.F. Devlin

Education
Ph.D. (Earth Sciences), 1994, University of Waterloo, Waterloo, Ontario
M.Sc. (Geology), 1986, Queen's University, Kingston, Ontario
B.Sc. (Honours Chemistry), 1980, Queen's University, Kingston, Ontario
D.E.C.(Health Sciences), 1977, John Abbott College, St. Anne-de-Bellevue, Quebec

Employment
Associate Professor, University of Kansas, USA, 2005-present
Assistant Professor, University of Kansas, USA, 2001-2005;
Research Assistant Professor, University of Waterloo, Canada, 1994-2001;
Visiting scientist, EAWAG, Dubendorf, Switzerland, 1995-1996;
Lecturer, teaching and research assistant, University of Waterloo, 1989-1994;

Research Interests
Organic transformations and transport in the subsurface, granular iron reactivity for groundwater remediation, hydrogeological assessment of natural attenuation, and bioremediation of chlorinated solvents, petroleum hydrocarbons and nitrate.

Honors and Awards
Ontario Graduate Scholarship (3 years), Pearson Medal for Ph.D. Dissertation, NSF Career Award, Kemper Award for Teaching Excellence (2010)

Society Memberships
National Ground Water Association, American Chemical Society, ACS Environmental Division, Geochemical Society, Geological Society of America, American Geophysical Union

Recent Professional Publications
Professional Presentations.


David A. Fowle

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F +1-785-864-5276
fowle@ku.edu
http://web.mac.com/fowle

EDUCATION
2000 - Ph.D. - Civil Engineering and Geological Sciences, University of Notre Dame, USA
1999 - MSc. - Civil Engineering and Geological Sciences, University of Notre Dame, USA.
Thesis: Competitive adsorption of multiple metal cations onto two gram positive bacteria. Supervisor: J.B. Fein
1996 - BSc. - Chemistry and Environmental Science, University of Western Ontario, Canada.
Thesis: Comparison of the structures of the metal-thiolate binding site in Zn(II)-, Cd(II), (Hg)-metallothioneins using molecular modeling techniques. Supervisor: M. Stillman

EXPERIENCE
Associate Professor - 2009 -University of Kansas, Department of Geology, Lawrence, KS, USA.
Adjunct Professor - 2006 - University of Windsor, Department of Earth Sciences, Great Lakes Institute, Windsor, ON, Canada.
CANADA RESEARCH CHAIR - 2002 – 2006 University of Windsor, Department of Earth Sciences, Great Lakes Institute, Windsor, ON, Canada.
ASSISTANT PROFESSOR 2001 – 2006 University of Windsor, Department of Earth Sciences, Great Lakes Institute, Windsor, ON, Canada.

RESEARCH
Publications

Abstracts
Peltier E, Haring B & Fowle D, Biogenically Formed Metal Sulfide Phases, Goldschmidt 2010, Knoxville, TN.
Roberts J, Kenward P, Fowle D & Kinnebrew N. The Role of Archaea in Low Temperature Dolomite Formation. Goldschmidt 2010, Knoxville, TN.
Biogeochemistry of Mn Oxidation in Lake Matano, Indonesia. Goldschmidt 2010, Knoxville, TN.


Grant Support
Letter of Agreement with Anglo American PI, Anglo American, $265,000, Total Award Period Covered: 1/01/08 – 12/31/10

Collaborative Research: Actualistic Calibration of the Sphaerosiderite Paleoclimate Proxy Co-PI, National Science Foundation, $254,680

Project/Proposal Title: Site Characterization of Ozark Plateau Aquifer and Petroleum System in the Greater Sedgwick Basin, South-Central Kansas CO-PI Department of Energy, $4,974,299

Collaborative Research: Lake Matano Indonesia: A modern observatory of ancient ocean biogeochemistry

PI - National Science Foundation, $ 102,325

GRADUATE STUDENTS
Arne Sturm, PhD; Karla Leslie, PhD; Charity Lander, PhD (co-advised); Ben Haring, MS; Mark Villareal, MS (co-advised); Breanna Huff (co-advised)
Dr. Ezra Kulczycki, PhD (co-advised) – Graduated 2010.

STAFF
Dr. Masato Ueshima
EDUCATION
Ph.D. - Geology, 1989, University of Wisconsin-Madison
M.S. - Geology, 1985, University of Wisconsin-Madison
B.S. - With Distinction, 1981, Major in Geology, University of Wisconsin-Madison

EMPLOYMENT
2007-present  Professor, Geology Dept., The University of Kansas
2005-present  Section Chief, Kansas Geological Survey
2001-present Senior Scientist, Kansas Geological Survey
2002-2007  Courtesy Professor, Geology Dept., The University of Kansas
1995-2001  Associate Scientist, Kansas Geological Survey
1995-2001  Courtesy Associate Professor, Geology Dept., The University of Kansas
1991-1995  Courtesy Assistant Professor, Geology Dept., The University of Kansas
1989-1995  Assistant Scientist, Kansas Geological Survey

RESEARCH INTERESTS
Sedimentology, sequence stratigraphy, and diagenesis of carbonate and siliciclastic strata. Integration of outcrop and subsurface studies to better discern variables that control carbonate and siliciclastic systems and reservoirs.

SOCIETY MEMBERSHIPS
Member, American Association of Petroleum Geologists; Member, SEPM (Society for Sedimentary Geology; Member, International Association of Sedimentologists

THESIS SUPERVISION DURING PREVIOUS YEAR
MS:  Karen Ohmes, University of Kansas (active - M.Sc. Candidate); Anya Hess, University of Kansas (active - M.Sc. Candidate); Nicholas Welsh, University of Kansas (active - M.Sc. Candidate); Erin Young, University of Kansas (active - M.Sc. Candidate); Lindsay Walters, University of Kansas (active - M.Sc. Candidate); Chris Lipinski, University of Kansas (completed M.Sc. 2009); Justin Fairchild, University of Kansas (active - M.Sc. Candidate); Rachel Dvoretsky, University of Kansas (completed M.Sc. 2009); Katharine Knoph, University of Kansas (active - M.Sc. Candidate); Rafferty Sweeney, University of Kansas (active - M.Sc. Candidate).
PhD: Zhaoqi Li, University of Kansas (active – Ph.d. Candidate); Diana Ortega-Ariza, University of Kansas (active – Ph.d. Candidate);

ACTIVE PROFESSIONAL SERVICE DURING PREVIOUS YEAR
KU Geology Department:
Chair – Ritchie Chair in Sequence Stratigraphy Search Committee
Member – Promotion and Tenure Committee

Kansas Geological Survey:
Member – Joint KGS/Geology Dept. LIDAR committee; Stratigraphic Nomenclature Committee; Management Team; Editorial Board for Current Research on Kansas Geology Bulletin; Kansas Geologic Mapping Advisory Committee

External Professional Service
SEPM Sedimentology Councilor; Associate Editor, PALAIOS; Member – NSF Carbonate Focused Research Group, Community Modeling

RESEARCH GRANTS ACTIVE DURING PREVIOUS YEAR
ExxonMobil – Co-PI: $255,000 ($85,000 in 2010), Diagenesis in Upper Miocene Carbonate Systems Saudi DOE – Co-PI: $4,974,352, Modeling CO2 Sequestration in Saline Aquifer & Depleted Oil Reservoir to Evaluate Regional CO2 Sequestration Potential of Ozark Plateau Aquifer System, Kansas.
ConocoPhillips, BHP Billiton – Co-PI: $90,000, Kansas Interdisciplinary Carbonates Consortium (KICC): A fully integrated research and training program in carbonate systems
RPSEA – Co-PI: $607,704, Characterization of Potential Sites for Near Miscible CO2 Applications to Improve Oil Recovery in Arbuckle Reservoirs
PROFESSIONAL PRESENTATIONS DURING PREVIOUS YEAR


PROFESSIONAL PUBLICATIONS DURING PREVIOUS YEAR


AWARDS DURING PREVIOUS YEAR

• SEPM 2010 Excellence of Poster Presentation Award, Annual AAPG/SEPM Meeting (E. Young et al).
• 1st Place Poster Presentation, Rocky Mountain Rendezvous (K. Knoph et al.)
• 2nd Place Poster Presentation, Rocky Mountain Rendezvous (A. Hess et al.)
Robert H. Goldstein

PROFESSIONAL PREPARATION:

University of Wisconsin, Geology, M.S., 1981.
University of Wisconsin, Geology, Ph.D., 1986.

APPOINTMENTS:

2004-2009  Department Chair, University of Kansas
2000 - pres.  Haas Distinguished Professor, University of Kansas
1996 - 2000  Full Professor, University of Kansas
1991 - 1996  Associate Professor with tenure, University of Kansas
1985 - 1991  Assistant Professor, University of Kansas

RESEARCH:

Goldstein’s research specialties include sequence stratigraphy of carbonates, diagenesis, and fluid-inclusion research. Current research focuses on the following: (1) sea-level, paleotopographic, oceanographic, and climate controls on depositional sequence architecture of the Spanish Miocene; (2) modeling reservoir-analog architecture in deep-water and shallow water carbonates; (3) predicting porosity in reservoirs from new conceptual models of carbonate diagenesis; (4) effect of hydrothermal fluids on carbonate and sandstone reservoir rocks; (5) origin and distribution of early and late dolomite; (6) new fluid inclusion techniques for constraining thermal evolution of sedimentary systems; and (6) new fluid inclusion techniques for evaluating history of fluid composition. Currently, he and his students are working on a variety of projects dealing with upstream fossil fuel energy supply including both conventional and unconventional oil and gas resources.

AWARDS AND HONORS:

• SEPM Society for Sedimentary Geology 2010 National Excellence Award for Poster
• AAPG Rocky Mountain Rendezvous 2010 Best student poster award
• University of Kansas Center for Teaching Excellence 2010 Celebration of Teaching Award – For major beneficial impact on students in the Department of Geology
• SEPM Society for Sedimentary Geology 2006 Journal of Sedimentary Research best paper award
• Geotimes (2003) Listed paper as one of the Highlights of Discoveries in the Earth Sciences for 2002
• SEPM Society for Sedimentary Geology 2003 Finalist, Best Paper in Journal of Sedimentary Research
• SEPM Society for Sedimentary Geology 2002 Honorable mention, Best Paper in Journal of Sedimentary Research
• SEPM Society for Sedimentary Geology 2002 National Excellence Award for Poster
• SEPM Society for Sedimentary Geology 2001 Honorable mention National Excellence Award for Poster
• University of Kansas Center for Teaching Excellence 2000 Award for excellence in classroom teaching
• SEPM Society for Sedimentary Geology 1998 National Excellence Award for Poster
• University of Kansas, Dept. of Geol. 1998 Van Sant Excellence Award - for excellence in teaching and research in sedimentary geology
• University of Kansas 1997 W.T. Kemper Fellowship for Teaching Excellence
• SEPM Society for Sedimentary Geology 1997 Honorable mention National Excellence Award for Poster
• SEPM Society for Sedimentary Geology 1996 National Excellence Award for Poster
• University of Kansas, Dept. of Geol. 1994 Van Sant Excellence Award - for excellence in teaching and research in sedimentary geology
• SEPM Society for Sedimentary Geology Honorable Mention 1993 for Best Poster at National Meeting
• University of Kansas Silver Anniversary Award for Excellence in Classroom Teaching 1991
• SEPM Society for Sedimentary Geology 1988 Honorable Mention for Best Poster at National Meeting

SOME RECENT PAPERS:


Buijs, G. and Goldstein, R.H. (in press) Sequence architecture and palaeoclimate controls on diagenesis related to subaerial exposure of icehouse cyclic Pennsylvanian and Permian carbonates: in, Marcelo Ketzer and Sadoon Morad (eds.), Linking Diagenesis to Sequence Stratigraphy IAS Special Publication


Laura González-Acebrón, R. H. Goldstein, Ramón Mas, and José Arribas, 2010, Criteria for recognition of localization and timing of multiple events of hydrothermal alteration in sandstones illustrated by petrographic, fluid inclusion, and isotopic analysis of the Tera Group, Northern Spain: Int J Earth Sci (Geol Rundsch) DOI 10.1007/s00531-010-0606-2


Luis A. Gonzalez

Education
Ph.D. The University of Michigan, Ann Arbor, Michigan. (December 1989).
M.S. The University of Michigan, Ann Arbor, Michigan. (December 1983).
B.S. University of Puerto Rico, Mayagüez, Puerto Rico. (June, 1978-Cum Laude).

Employment
Associate Professor: Dept. of Geology, University of Kansas, Lawrence, Kansas (1/2003 - present).
Associate Professor: Dept. of Geoscience, University of Iowa, Iowa City, Iowa. (7/1995 - 12/2002).
Assistant Professor Dept. of Geology, University of Iowa, Iowa City, Iowa. 8/1989-6/1995.

MEMBERSHIP IN PROFESSIONAL AND LEARNED SOCIETIES
AAAS, AGU, AMQUA, Sigma Xi, SEPM, SACNAS, GSA.

TEACHING
Geol 171 Earthquakes and Natural Hazards, Geol 791 Paleoclimatology, Geol 718 Isotope Geochemistry, Geol 761 Regional Field Geology (Caribbean), Geol 932 Carbonate Petrology and Geochemistry

Students Supervised
Ph.D. Candidates (post-comps): Alvin Bonilla (Fall 2007)
Ph.D. Candidates (completed): Vionette De-Choudens; Marina Suarez; Celina Suarez; Julie Retrum (co-chair with S. Hasiotis).
M.S. Candidates: Alejandra Rodriguez-Delgado
M.S. Candidates (completed): Stacy Rosner, Aisha Al-Suwaidi

PUBLICATIONS - REFEREED


ABSTRACTS OF PRESENTATIONS REFEREEED


GRANTS - EXTERNAL


INVITED LECTURES, CONFERENCE PRESENTATIONS, AND WORKSHOP/PANEL DISCUSSIONS

CANON CITY GEOLOGY CLUB: Lecture: The use of speleothems in paleoenvironmental and paleoclimatic reconstructions. August 9, 2010, Canon City, CO.

UNIVERSITY OF NEVADA LAS VEGAS: Lecture: The role of saturation in controlling CaCO₃ mineralogy, crystal morphology, and carbonate fabrics: new insights into an unsolved enigma. November 10, 2020, Las Vegas, NV.


SERVICE AT UNIVERSITY OF KANSAS

University Wide

Kansas Geological Survey Director Search Committee: Office of the Provost (2010-2011)
Multidisciplinary Research Building “Neighborhood Association” Steering Committee (2005 - present)

Service to Profession

Editorships

Associate Editor, Geosphere: Geological Society of America Online Journal (2004-present)

Professional Societies Committees and other Duties

American Quaternary Association. Denise Gaudreau Award Selection Committee (2010)
Geological Society of America. Diversity in Geoscience Committee Chair (2010-2012).
Geological Society of America. Bromery Award Selection Committee (2010)
Stephen T. Hasiotis

EDUCATION
University of Colorado, Boulder Geology PhD degree granted 5/97
University of Buffalo, NY Geology MS degree granted 2/91
University of Buffalo, NY Geology BS degree granted 5/85

CURRENT STATUS & SERVICE
1) Associate Professor in the Department of Geology, University of Kansas, appointed 8/05
2) Adjunct Senior Research Fellow (status level B), Department of Archaeology, Flinders University, Adelaide, Australia, appointed 8/05; Assistant Professor from 12/01/08-12/01/11
3) Coeditor of PALAIOS, an international peer-reviewed journal published by SEPM (Society of Sedimentary Geologists); appointment from 4/06 to 4/12.
4) Editorial Board member for the professional, peer-reviewed journal University of Kansas Paleontological Contributions, New Series, published by the Paleontological Institute, University of Kansas, Lawrence, Kansas.
7) Board member of the SEPM Foundation, Lawrence, Kansas, 2008 to 2012.
8) Chair of the Academic Liaison Committee for the American Association of Petroleum Geologists (AAPG).
9) Curatorial Affiliate, Peabody Museum of Natural History, Yale University, New Haven, CT. 5-year appointment with the Invertebrate Paleontology Section; up for renewal this year.

RECENT AWARDS, HONORS, AND GRANTS
2010: NSF Award for “Paleoenvironmental and Paleoclimatic Analysis of the Beacon Supergroup, Beardmore Glacier Area, Central Transantarctic Mountains, Antarctica”; $399,640, funded for 3 years
2009: Elected as a Fellow of the Geological Society of America (GSA) for a distinguished research and international reputation in Ichnology, recognized as a leading expert in Continental Ichnology. Confirmed July 1, 2009; recognized at the GSA meeting in Portland, Oregon, October 18, 2009.

RECENT PUBLICATIONS


Conference Abstracts

Diane L. Kamola

Department of Geology
University of Kansas
1475 Jayhawk Blvd
Lawrence, Kansas 66045
785-864-2724
fax 785-864-5276
kamola@ku.edu

Current Position:
Associate Professor

Research Interests:
Sedimentology, Sequence Stratigraphy, Sedimentary Basin Analysis. Current research includes controls on stratal patterns in sedimentary basins; high frequency sequence stratigraphy of shallow marine strata.

Degrees Awarded:
B.S., Allegheny College. Geology Major, Biology Minor.
M.S., University of Georgia. M.S. in Geology.
Ph.D., University of Georgia.

Work History (Professional):
2000-present  Associate Professor, Department of Geology, University of Kansas.
1999, 2001 Education Program Specialist, Geology Field School, Department of Geology, University of Georgia.
1997-1999 Research Associate Professor, Center for Research, Inc., University of Kansas.
1995-1996  Assistant Professor, Department of Oceanography, Old Dominion University.
1991-1997 Assistant Professor, Geology Field School, Department of Geology, University of Georgia.
1990-1995  Assistant Professor, Department of Geological Sciences, Old Dominion University.
1989-1990  Assistant Professor, Departs. of Geology and Environmental Science, Allegheny College.
1986  Terra Tek, Geological Consultant.

Current Grants (2010):
Geological / Thermochronologic Investigations at Eastern Lava Mountains, Almond Mountain, and Southern Slate Range, Naval Air Weapons Station, China Lake CA. DOD, J. Douglas Walker, Daniel F. Stockli, Diane L. Kamola, and Jeffrey Unruh

Current Graduate Students:
Ece Gurler, Using LiDAR to analyze reservoir properties in a complex stratigraphic succession, Book Cliffs, Utah
Kathryn Hoffmeister, Orientation of Incised Valleys within the Mancos Shale Focusing on the Castlegate Lowstand Units
Nazim Louni, Sediment emplacement in a river-dominated delta – the Upper Cretaceous Panther Tongue, Star Point Member, Mancos Shale, Utah.

82
Rebekah Ost, Stratal Patterns of the Upper Cretaceous Hunter Canyon (Williams Fork) Formation, Piceance Basin, Colorado (Defended, Spring 2010)
Fatma Ouaichouche, in progress, Sequence stratigraphy of the Rollins Member of the Mount Garfield Formation, Book Cliffs, Colorado.
Jesse Thompson, Sequence Stratigraphy of the Cretaceous Rollins Sandstone and Cameo-Wheeler Coal Zone, Piceance Basin, Colorado
Christine Frasca, first year MS student. Thesis topic not yet selected.

Outside Service:
   Associate Editor, Geosphere 2007-present
   Secretary and Treasurer, SEPM 2010-2012
   Board of Editors, STRATA Website (http://sepmstrata.org), SEPM

Published Abstracts in 2010:
Kamola, D.L., and K. E. Hoffmeister: Decoupling of the Sevier Foreland Basin from the Cretaceous Western Interior Seaway During Lowstand Events, AAPG 2010 Annual Convention & Exhibition (ACE)
Thompson, J., and D.L. Kamola, Hydrodynamic Interpretation of high energy wave-dominated shoreface successions, Cretaceous Mount Garfield/Illies Fm, Colorado, AAPG 2010 International Convention & Exhibition (ICE)
*Hoffmeister, K.E., and D. L. Kamola, Forebulge Influence on Deposition of the Castlegate Sandstone, Book Cliffs, Utah, USA, AAPG 2010 International Convention & Exhibition (ICE) (* - Best poster award)

Courses Taught in 2009-2010:
   Sedimentology and Surface Processes, Basin Analysis, Regional Field Geology – Sedimentary Basins and Tectonics of the Colorado Plateau (with Danny Stockli), Field Camp (Geology 562);
   Field Investigation (Geology 360)(with Tony Walton); Geology Fundamentals Laboratory Coordinator.

Department Service 2009-2010:
Undergraduate Studies Committee, Search Committee – Clastic Sequence Stratigrapher (Ritche Chair)
Bruce Smith Lieberman

A. PROFESSIONAL PREPARATION
1996-1998    Harvard University, NSF Postdoctoral Fellowship in the Earth Sciences
1994-1995    Yale University, Postdoctoral Fellow
1991-1994    Columbia University, Geological Sciences, Ph.D.
             1989-1991 Columbia University, Geological Sciences, M.A.
1984-1988    Harvard University, Geological Sciences, B.A. Summa Cum Laude

B. APPOINTMENTS
2007-present   Professor, Department of Geology, University of Kansas
2007-present   Senior Curator, Division of Invertebrate Paleontology, Biodiversity Institute, University of Kansas
2002-2007   Associate Professor with tenure, Department of Geology and Courtesy Associate Professor, Department of Ecology and Evolutionary Biology, University of Kansas
1998-2002   Assistant Professor, Department of Geology and Courtesy Assistant Professor, Department of Ecology and Evolutionary Biology, University of Kansas

C. PUBLICATIONS


D. SYNERGISTIC ACTIVITIES
Co-author of a book on evolution and paleontology for undergraduate non-majors and a booklet published by the Kansas Geological Survey intended for a popular audience that describes evidence for evolution in
the fossil record. Various interviews on radio and television describing evidence for evolution in the fossil record including a *National Geographic Channel* program on mass extinctions that first aired November, 2006, and two different episodes of the series “Evolve” on the *History Channel* that first aired in July and August of 2008. Awarded Schuchert Medal by Paleontological Society, Fall 2002: given to a scientist under 40 whose research and career have shown promise. Led short course on paleobiogeography at University of the Azores, Portugal. Editorial board *Lethaia, Evolution: Education and Outreach*, Associate Editor *Journal of Paleontology*. National Science Foundation panelist in Systematic Biology; participant in NSF Future Directions in Biodiversity and Systematics Workshop.

E. COLLABORATORS, CO-AUTHORS AND CO-EDITORS

Collaborators and co-authors in last 48 months: J. Adrain (U. Iowa); D. Briggs (Yale); A. Collins (Smithsonian); M. Coniglio (U. of Waterloo); K. Dilliard (Wayne St. College); N. Eldredge (American Museum of Natural History); S. Halgedahl (U. Utah); S. Hasios (Univ. Kansas); J. Hendricks (San Jose State); R. Jarrard (U. Utah); T. Karim (Univ. Colorado); A. Marques (U. of Sao Paolo); Joe Meert (Univ. Florida); A. Melott (U. Kansas); W. Miller (Humboldt State); R. Moore; M. Pope (Texas A&M); A. Stigall Rode (Ohio Univ.).

F. GRADUATE AND POST-DOCTORAL ADVISORS

N. Eldredge (Graduate, American Museum of Natural History); E. Vrba (Postdoctoral, Yale University); A. Knoll (Postdoctoral, Harvard University)

G. THESIS ADVISOR SPONSOR AND POST-DOCTORAL FELLOWS

F. Abe (Ph.D., 2010, now at LSU); C. Congreve (M.S., 2008 and Ph.D., current); J. Cornette (M.S., 2002, now at Iowa State); Ian Wes Gapp (M.S., 2010 and Ph.D. current); Corinne Myers (Ph.D., current); Erin Saupe (Ph.D., current); A. Stigall (M.S., 2001 and Ph.D., 2004, now at Ohio University) (total of 7 students)

R. Moore (now at Wiley-Blackwell); and J. Hendricks (now at San Jose State University) (total of 2 post-docs)
Gwen Macpherson

Professional Preparation

Syracuse University  Geology  B.S., magna cum laude, 1975
The University of Texas at Austin  Geology  M.A., 1982
The University of Texas at Austin  Geology  Ph.D., 1989

Appointments

1995 – present Associate Professor, The University of Kansas
1989 – 1995 Assistant Professor, The University of Kansas
Jan. 1989 – Nov. 1989 Acting Assistant Professor, The University of Kansas

Research Interests

Hydrogeochemistry, origin of dissolved trace elements, groundwater and the global carbon cycle.

Society Memberships, Affiliations

American Geophysical Union  The Geochemical Society
International Association for Geochemistry and Cosmochemistry  International Association of Hydrogeologists
Association for Women Geoscientists  Associate Member, Penn. State Astrobiology Research Center

Student Advisory Committees

Supervisor, Ph.D., Geology: Michael Robbins (entered program August 2009)
Supervisor, M.S., Geology: Misha Tsypin (entered program August 2009)
Carla Whisner (entered program August 2009)

Professional Service:
Manuscripts reviewed for Environmental Earth Sciences, Environmental Research Letters, Vadose Zone
Journal, Applied Geochemistry, Geochimica Et Cosmichimica Acta.
Textbook proposal review, Drever and Maurice, Geochemistry of Aquatic Environments
Research grant proposal reviews: NSF-MRI Program (single proposal); NSF Panelist, Geobiology & Low-
Temperature Geochemistry Program, November 2009

Research Grants Active or In Review, 2010

Active research grants:
Konza Prairie LTER VI: Grassland dynamics and long-term trajectories of change (2008-2014). National
Science Foundation, Long-Term Ecological Research Program. Award: $5,640,000; my annual
subcontract $25,000.
University of Kansas Research and Educational Support for U.S. Army Programs and Initiatives at Fort
FY10 Funding for University of Kansas Research and Educational Support for U.S. Army Programs and
and budget: $323,056.

Grant proposals, in review:
Acquisition of Equipment for Field CO2 Measurements and Upgrade of ICP-MS and IC for Laboratory
Measurement of Geologic, Aqueous, and Biologic Materials: proposal submitted to the NSF-EAR-
Instrumentation and Facilities Program, July 2010. Lead PI: Macpherson. Co-PI’ s: Brunsell, Hirmas,

86
Recent Professional Presentations (2009-2010)
Macpherson, G. L., 2010, Chemical weathering rate increasing at the Konza Prairie LTER Site, NE Kansas, USA: GSA Abstracts with Programs Vol. 42, No. 5.
Huff, B. L. and G. L. Macpherson, 2009, Reforestation or response to rising atmospheric CO₂: investigating two possible mechanics for the increase in groundwater CO₂ at the Konza Prairie, northeastern Kansas: GSA Abstracts with Programs Vol. 41, No. 7, p. 664.

Recent Professional Publications (2008-2010)
Peer-reviewed, published or in press
1. Professional Preparation:
The University of Technology, Sydney     Chemistry and Geology B.App.Sc(Hons)     1997
The University of Technology, Sydney     Chemical Spectroscopy Ph.D.                      2001
The University of Technology, Sydney     Post-Doc Nanotechnology                            2001

2. Appointments:
Assistant Professor - Geospectroscopy 2008-continuing (The University of Kansas), Australian Research Council (ARC) Queen Elizabeth II (QEII) Fellow 2007, ARC APD Fellow 2005-2006 (The University of Sydney), Visiting Assistant Professor (The University of Texas at San Antonio UTSA) 2005, ARC APD Fellow (Macquarie University) 2004, Visiting Scientist (Massachusetts Institute of Technology MIT) 2003-2004, Macquarie University Research Fellow MURF (Macquarie University) 2002-2003.

3. Publications:
4. Synergistic Activities
2. Australian Synchrotron Proposal Reviewer 2009 - continuing
4. Invited Special Guest Editor, for special issue in Vibrational Spectroscopy – ACOVS6 Conference 2006
5. Conference Organizing Committee, 6th Australian Conference on Vibrational Spectroscopy (ACOVS6), Sydney, NSW, Australia 2005

5. Collaborators and other Affiliations
i) Collaborators and Co-Editors (projects or publications)
Collaborators and Co-Editors (or Co-Authors) Co-Editors: None. Dr. Brendan P. Burns (University of New South Wales), Dr. Emmanuelle J. Javaux (University of Liege), Prof. Andrew Knoll (Harvard University), Dr. Gordon Love (Massachusetts Institute of Technology), Prof. Brett Neilan (University of New South Wales), Prof. Roger Summons (Massachusetts Institute of Technology), Prof. Malcolm Walter (Macquarie University), Dr. Martin Van Kranendonk (Geological Survey of Western Australia).

ii) Graduate and Postdoctoral Advisors
Graduate and Postdoctoral Advisors Prof. Michael A. Wilson CSIRO Energy Transformed Flagship, Riverside Life Science Centre, 11 Julius Avenue, North Ryde, NSW, 2113 AUSTRALIA

iii) Graduate and Postdoctoral Advisees
Dr. Abigail Allwood NASA Jet Propulsion Laboratory/ California Institute of Technology Postdoctoral Fellow (Ph.D. Thesis advisor) Mr. Patrick Mahony Honors Student The University of Sydney, NSW Australia, Ms Julienne Emry Ph.D. advisor 2009 – present, Mr Randol Wehrbein M.S. advisor 2010 - present

Total number of graduate students advised: 4; Total number of post-docs advised: 0
Alison Olcott Marshall

Assistant Professor of Paleobiogeochemistry; Department of Geology; University of Kansas; Lindley Hall, Rm 121; Email: olcott@ku.edu

(a) PROFESSIONAL PREPARATION:
The University of Chicago Geology/Paleontology BS (Honors), 1999
The University of Southern California Geobiology Ph.D., 2006
Woods Hole Oceanographic Institute Organic Geochemistry 2006-2007

(b) APPOINTMENTS:
The University of Kansas, Assistant Prof. of Paleobiogeochemistry, 01/08-now
Woods Hole Oceanographic Institute, Postdoctoral Scholar, 2006-2007

(c) PUBLICATIONS:

(d) SYNERGISTIC ACTIVITIES:
Treasurer, Division of Geobiology and Geomicrobiology, Geological Society of America

Journal Reviewer: Geology; Journal of Raman Spectroscopy; Organic Geochemistry; Palaeogeography, Palaeoclimatology, Palaeoecology; Palaios; PLoS ONE; Precambrian Research, Journal of Sedimentology


Instructor, Agouron USC International Geobiology Course

Smithsonian Institution National Museum of Natural History (1999-2001)
Worked building new Triceratops exhibit then organizing, curating, and
digitizing ostracod collection

Worked in the Hand on Science Lab, teaching students 6 and up science

(e) COLLABORATORS AND OTHER AFFILIATIONS:

(a) Collaborators and Co-Editors (or Co-Authors)
Corien Bakermans, Michigan State University; Steven Benner, University of Florida; Will Berelson, University of Southern California; Matthew Carrigan, University of Florida; Frank Corsetti, University of Southern California; Eugene Domack, Hamilton University; Timothy Eglinton, Woods Hole Oceanographic Institute; Alan Jay Kaufman, University of Maryland; Bruce Lieberman, The University of Kansas; Craig Marshall, The University of Kansas; Malgorzata Moczydlowska, University of Uppsala; Chris Reddy, Woods Hole Oceanographic Institute; Alonso Ricardo, Harvard University; Alex Sessions, California Institute of Technology; Roger Summons, Massachusetts Institute of Technology; Sebastian Willman, University of Uppsala

No co-editors

(b) Graduate and Postdoctoral Advisors
Frank Corsetti, University of Southern California
Alex Sessions, California Institute of Technology
Timothy Eglinton, Woods Hole Oceanographic Institute
Chris Reddy, Woods Hole Oceanographic Institute

(c) Graduate Students and Postgraduate-Scholars
Vincent Nowaczewski (Masters student) 2009-present
Julianne Emry (Ph.D. student) 2009-present
Randol Wehrbein (Masters student) 2010-present
Total: 3 students
Eugene Carlton Rankey

Professional Preparation
Augustana College, Illinois, Geology (B.S., 1991)
University of Tennessee, Knoxville (M.S., Geological Sciences, 1993)
M.S. Thesis: Carbonate platform response to tectonism and eustasy: The Middle Cambrian carbonates of
the lower and middle Conasauga Group, East Tennessee.
University of Kansas (Ph.D., Geology, 1996)
Ph.D. Dissertation: Isolating tectonic, eustatic, climatic, and autogenic controls on sedimentation: Spatial
and temporal changes in Upper Virgilian - Lower Wolfcampian (Pennsylvanian - Permian) strata,
western North America.

Appointments
2008 – present – University of Kansas – Assistant Professor
2002-2008 – University of Miami, Rosenstiel School of Marine and Atmospheric Sciences – Assistant
Professor
2000-2002 – Iowa State University – Assistant Professor
1996-2000 - ExxonMobil Upstream Research Company - Senior Research Geologist

Publications
1. Related to the proposed project
Rankey, E.C., and Reeder, S.L., 2011, in press, Tidal sands of the Bahamian Archipelago, in Davis, R and
Rankey, E.C., and Reeder, S.L., 2011, in press, Holocene oolitic marine sand complexes of the Bahamas:
Journal of Sedimentary Research.
Rankey, E.C., and Reeder, S.L., 2010, Controls on platform-scale patterns of surface sediments, shallow
Holocene platforms, Bahamas: Sedimentology, 57, 1545-1565.
Reeder, S.L., and Rankey, E.C., 2009, Controls on morphology and sedimentology of carbonate tidal
Rankey, E.C., Riegl, B., and Steffen, K., 2006, Form, function, and feedbacks in a tidally dominated ooid
shoal, Bahamas: Sedimentology, 53, 1191-1210.

2. Other publications
Rankey, E.C., 2002, Spatial patterns of sediment accumulation on a Holocene carbonate tidal flat,
west Of Andros Island, Bahamas: Journal of Sedimentary Research, 72, 591-601. [JSR Outstanding
Paper Award, 2002]
Rankey, E.C., and Ruzek, M., 2006, Symphony of the Spheres: Perspectives on Earth System Science
Reeder, S.L., and Rankey, E.C., 2008, Relations between sediments and tidal flows in ooid shoals,
Bahamas: Journal of Sedimentary Research, 78, 175-186. [JSR Outstanding Paper Award,
Honorable Mention, 2008]
heterogeneity along a Holocene shelf margin, Caicos Platform: Journal of Sedimentary Research, 79,
440-456.

Synergistic Activities:
• Co-Editor: Journal of Sedimentary Research, 2008-present.
KU Geology Department Self Study

• AAPG Distinguished Lecturer, 2008-2009

Collaborators and Other Affiliations
Collaborators (last 4 years): Falk Amelung (University of Miami), Andrew Berkeley (Manchester Metropolitan); Sarah Duguid (Shell), Gregor Eberli (University of Miami), Evan Franseen (Kansas Geological Survey), Rodrigo Garza-Perez (UNAM), Humberto Guarin (Bert Instruments, Inc.), Sean Guidry (ExxonMobil), Mitch Harris (Chevron), Noel James (Queens University), Kurt Keyser (Queens University), Marge Levy (Chevron), Andrew Moore (unknown), Stacy Reeder (Schlumberger), Scott Ritter (BYU), Toni Simo (ExxonMobil), Peter Swart (University of Miami), Lynn Watney (Kansas Geological Survey), Jim Weber (ExxonMobil), Brigitte Vlaswinkel (Shell), Kabure Yeeting (MFMRD, Kiribati)
Co-Editors: Paul McCarthy (University of Alaska), Martin Ruzek (USRA)
Advisors: Bob Goldstein (University of Kansas), Ken Walker (University of Tennessee), Lynn Watney (Kansas Geological Survey)
Graduate and Post-Doctoral Advisees: Andrew Berkeley, Eduardo Cruz, Daniel Doolittle, Kelly Jackson, Jonathan Knapp, Michelle Mary, Stacy Reeder, Andrew Sparks, Kelley Steffen, Brigitte Vlaswinkel, Rodrigo Garza (Total: 2 post-docs, 7 graduate students)
Jennifer A. Roberts

Department of Geology, University of Kansas, 1475 Jayhawk Blvd., Lawrence, KS 66045-7613
Ph (785) 864-4997 Fax (785) 864-5276; Email: jenrob@ku.edu

Fields of Specialization:
Microbial geochemistry, geomicrobiology, aqueous geochemistry

Education:
Ph.D. (2000) The University of Texas at Austin, Austin, TX; Geology/Geomicrobiology.
B.S., cum laude (1995) Trinity University, San Antonio, TX; Geology.

Professional Appointments:
Associate Professor, University of Kansas, Dept. of Geology (8/07-present)
Assistant Professor, University of Kansas, Department of Geology (8/01-present)
NSF Graduate Research Trainee, University of Texas at Austin, Dept. Geological Sciences (8/95-8/00).

Professional Memberships:
Geological Society of America, Member; American Geophysical Union, Member; International Committee for the International Symposia on Environmental Biogeochemistry, Member;
Editorial Board, Geobiology

Publications:
Peer-reviewed articles (2007-present) * designates advisee; J.R. Rogers is J.A. Roberts


Selected Abstracts (2010)


Funding (current)


Collaborative Research: Actualistic Calibration of the Sphaerosiderite Paleoclimate Proxy, NSF, $373,647, 6/1/07-5/31/10 (PI-G. Ludvigson, Co-Is, González and Fowle (KU), S. Driese (Baylor)), current.


Courses Taught (2010-11)

Geology 171    Earthquakes and Natural Disasters
Geology 552    Introduction to Hydrogeology
Geology 753    Chemical and Microbial Hydrogeology

Students Supervised

MS: Brian Hughes, 2005; Amanda Wilson, 2005; Melissa Marietta, 2006-present; Mason Burgess, 2009-present; Neil Kinnebrew, 2008-present; Breanna Huff, 2010-present;
Paul Selden

PROFESSIONAL PREPARATION

University of Manchester, UK  
B.Sc. 1975  
Geology and Zoology  

University of Cambridge, UK  
Paleobiology  
Ph.D. 1979

APPOINTMENTS

University of Kansas  
Distinguished Professor of Invertebrate Paleontology, Department of Geology  2007–present  
Director, Paleontological Institute  2007–present

Natural History Museum, London, UK  
Honorary Research Fellow, Department of Palaeontology  2007–present  
Scientific Associate, Department of Palaeontology  2005–2006

University of Manchester, UK  
Reader in Palaeontology, School of Earth, Atmospheric and Environmental Sciences  2003–2005  
Senior Lecturer Palaeontology, Department of Geology  1991–2003  
Senior Staff Tutor in Earth Sciences, Department of Extra-Mural Studies  1990–1991  
Staff Tutor in Earth Sciences, Department of Extra-Mural Studies  1981–1990

University of London, Goldsmiths’ College, UK  
Demonstrator, Department of Geology  1979–1981

PUBLICATIONS (10 LATEST – AVAILABLE AT HTTP://HOMEPAGE.MAC.COM/PAULSELDEN/HOME)


**SYNERGISTIC ACTIVITIES**

**i. Education.** I have long experience teaching undergraduate and graduate students and in outreach activities with the public. During my own graduate years and, later, as Demonstrator in the Geology Department, Goldsmiths’ College, London, I organized and taught undergraduate laboratory and field classes. I directed and taught undergraduate lectures, laboratory and field classes in paleobiology and related subjects for many years as Senior Lecturer / Reader in the University of Manchester, where I directed the Honours School of Biology and Geology. I supervised graduate students in Manchester and Kansas and have employed a number of postdoctoral fellows in my laboratory. During my own graduate student days, then as Staff Tutor / Senior Staff Tutor in the Department of Extra-Mural Studies, and to this day, I have been deeply involved in organizing and teaching courses for the public. I directed the University of Manchester’s outreach activities in Earth and Physical Sciences, particularly developing field-based courses and worldwide study tours; I continue to run latter (through other providers). My outreach teaching is in the fields of geology and biology, as well as specialist courses, e.g. in Arachnology and Cladistic Methods.

**ii. Service.** I am Director of the Paleontological Institute, and Editor of the *Treatise on Invertebrate Paleontology*, *Paleontological Contributions* and *Treatise Online*. The Paleontological Institute has published the *Treatise* for over 50 years, and my present mission is to take this invaluable fossil database and encyclopedia online for the benefit of the worldwide paleontological community. I have served as President of the International Society of Arachnology, the British Arachnological Society, and the Manchester Geological Association, as Vice-President of the Palaeontological Association and the Paleontographical Society, and have held many offices on the Councils of these societies and the Systematics Association. I am Overseas Representative of the Palaeontological Association. I have been Editor of *Palaeanontology*, and presently serve on the editorial boards of *Journal of Arachnology*, *PALAIOS* and *Alavesia*. I have organized national and international conferences and workshops: European Arachnological Congress, Palaeontological Association Annual Meeting, Earth Science Teachers Association Annual Conference.

**iii. Public.** Outreach teaching has been outlined above. In addition, I regularly interact with the public through questions and identification requests which come through the Paleontological Institute website.

**COLLABORATORS LAST 48 MONTHS**

**Collaborators.** J. A. Anderson (National Botanic Garden, Pretoria, South Africa), A. S. Baker (Natural History Museum, London), R. Beattie (Australian Museum), X. Delclòs (Universidad de Barcelona, Spain), J. A. Dunlop (Humboldt Museum, Berlin), M. S. Engel (University of Kansas), K. Y. Eskov (Paleontological Institute, Moscow), Huang Diying (Nanjing Institute of Geology and Palaeontology, China), J.-C. Gall (Université Louis Pasteur, Strasbourg, France), R. Huys (Natural History Museum, London), J. R. Nudds (University of Manchester, UK), D. Penney (University of Manchester, UK), G. L. Pillola (University of Sardinia), J. E. Pollard (University of Manchester, UK), Ren Dong (Beijing Normal University, China), A. J. Ross (National Museums, Scotland), A. Schmidt (Georg-August-Universität Göttingen, Germany), W. A. Shear (Hampden-Sydney College, VA), M. Stephenson (British Geological Survey), M. D. Sutton (Imperial College, London), V. M. Ortuño (Universidad de Alcalá, Spain), F. Vollrath (University of Oxford, UK).

**Graduate adviser.** H. B. Whittington, Department of Earth Sciences, University of Cambridge, UK.

**Students and postdoctoral fellows.** S. Heads (University of Manchester, Ph.D.), E. Saupe (University of Kansas, M.S. & Ph.D.), M. Simmons (University of Kansas, M.S.), J. Lamsdell (University of Kansas, Ph.D.), R. dePalma (University of Kansas, M.S. & Ph.D.), V. Perrichot (University of Kansas, postdoctoral fellow), M. Stein (University of Kansas, postdoctoral fellow).

97
A. PROFESSIONAL PREPARATION
- The Ohio State University, M.S. in Geological Sciences: Columbus, OH, 2002.

B. APPOINTMENTS
- The University of Kansas, Lawrence, KS.
  2009–present: Assistant Professor; Geology Department.
- The University of Maine, Orono, ME.
  2004–2005: NSF GK-12 Teaching Fellowship (at the University of Maine).
- The Ohio State University, Columbus, OH.

C. RESEARCH INTERESTS
- Ice, climate & sea level: glaciology, ice dynamics, snow accumulation, numerical modeling
- Geomatics: satellite remote sensing, image processing, geodetic GPS surveying
- Climate education: climate science outreach and education

D. RESEARCH FUNDING

E. FIVE RECENT PEER-REVIEWED PUBLICATIONS


**F. SYNERGISTIC ACTIVITIES**

a. Panelist/Editor
   - NSF OPP/ANT review panel (October 2008)
   - NASA Cryosphere (Operation IceBridge) review panel (March 2010)
   - Associate Editor (Annals of Glaciology, vol. 59, Aug. 2010)

b. Professional Leadership
   - NASA Operation IceBridge Science Working Group Member
   - IRIS/UNAVCO Polar Observing Science Committee Member
   - National Snow and Ice Data Center (NSIDC) Polar Data Users Working Group
   - AGU Climate Media Q&A Member
   - McMurdo Users Area Group – Glaciology Representative
   - International Glaciology Society session convener (Oslo, Norway: 2010)
   - International Glaciology Society meeting convener (Columbus, OH: 2010)
   - West Antarctic Ice Sheet meeting – external reviewer (Raystown, PA: 2010)

**G. LIST OF COLLABORATORS, ADVISORS AND STUDENTS**

- **Collaborators**: Morten Langer Andersen (Geological Survey of Denmark and Greenland, GEUS), James Davis (Smithsonian Astrophysical Observatory), Pedro Elósegui (Spanish Institute for Space Studies), David Finnegan (US Army Cold Regions Research and Engineering Lab), Ken Jezek (The Ohio State University), Shfaqat Abbas Kahn (Danish National Space Center), Meredith Nettles (Lamont Doherty Earth Observatory), Niels Reeh (Technical University of Denmark), Benjamin Smith (University of Washington), Lars Stenseng (Danish National Space Center), Fiammetta Straneo (Woods Hole Oceanographic Institution), David Sutherland (Woods Hole Oceanographic Institution), John Wahr (University of Colorado).

- **Graduate and Postdoctoral Advisors**: Postdoctoral and PhD: Gordon S. Hamilton (University of Maine); Master’s: Ian M. Whillans (The Ohio State University, deceased), Ken C. Jezek (The Ohio State University), C.J. Van der Veen (now at KU).

- **Graduate Students and Post-scholar sponsor**: Brandon Gillette (Ph.D. KU Geography)
Current position: 
McGee Distinguished Professor of Geophysics, Dept. of Geology, University of Kansas, 1993-present

Relevant Experience: 
Senior Vice Provost for Scholarly Support, University of Kansas, 2003-2010
U.S. Army Officer, Corps of Engineers, Ft. Wainwright, Alaska, 1970-72

Research and Business Activities: 
My research effort since 1977 has centered on developing new techniques and novel applications for shallow-reflection seismology. Primary emphases have been on improving efficiency, data-collection and equipment. This effort has resulted in scores of publications and receipt of funding from more than three dozen different agencies and companies, mostly for environmental geophysics and for tunnel detection beneath international borders. Recent support includes a 9-year competitive grant from U. S. Department of Energy for $2.2 million. I have been author or co-author of more than 100 publications and more than 100 published abstracts. I have done consulting for more than 50 companies and government agencies through Great Plains Geophysical, Inc., my wholly owned consulting company. With my brother, I operate a 2200-acre wheat farm at Palco, Kansas.

Elected Offices, National and International 
President, Near-Surface Geophysics Section of the Society of Exploration Geophysicists, 1993-94
President, National Association of College and University Residence Halls, 1966-1967

Editorial Positions
Geotimes Editorial Board, 1993-1997; Chair, 1996-1997
Editor, GEOPHYSICS, 1989-1991
Associate Editor for Engineering and Groundwater, GEOPHYSICS, 1984-1989
Guest Editor, Shallow Reflection Seismology Issue, GEOPHYSICS, July-August, 1998

Recent Teaching Experience:
Geology 171 “Earthquakes and Natural Disasters” This has become a popular course at KU; more than 700 students enroll each semester. I truly enjoy teaching that course. I also teach graduate courses including Environmental Geophysics and Near-Surface Seismology.

Education:
Ph.D., Geophysics, Stanford University, 1975
M.S., Geophysics, Stanford University, 1973
M.S., Geology, Kansas State University, 1970
B.S., Physical Science, Kansas State University, 1969

Recent honors:
Society of Exploration Geophysicists Distinguished Lecturer, Fall 2007

Recent publications:
Sloan, Steven D., Don W. Steeples, and Peter Malin, 2008, Acquisition and processing pitfall associated with
the clipping of near-surface seismic reflection traces, Geophysics, 73(1), W1–W5.


For a complete publications list, email srhayden@ku.edu
Daniel F. Stockli

Current Status:
Department of Geology
University of Kansas
Lawrence, Kansas 66045-2124
phone: 785-864-4995
e-mail: stockli@ku.edu

Professional Preparation:
Swiss Federal Institute of Technology (ETH), Zurich  Geology   B.S., 1993
Swiss Federal Institute of Technology (ETH), Zurich  Structural Geology   M.S., 1995
Stanford University  Tectonics   Ph.D., 1999

Appointments:
2007 Visiting Professor University of Lausanne
2006 – Present Associate Professor at University of Kansas
2005 – Present Adjunct Professor at Dalhousie University, Halifax, Canada
2005 – Present Editorial Board of Geology
2003 – Present Co-Director of KU Isotope Geochemistry Laboratories
2001 – 2005 Assistant Professor at University of Kansas
1999 – 2001 Divisional Postdoctoral Scholar at California Institute of Technology
1995 – 1999 Teaching and Research Assistant at Stanford University
1994 – 1995 Teaching and Laboratory Assistant, ETH Zurich

Recent Publications:


**Synergistic Activities:**
1) Organization of short-courses, Penrose conference, and EarthScope workshops, 2) organizer and leader for undergraduate, graduate, and post-doctoral field trips and field classes, 3) organizer of KU undergraduate and graduate geology research symposia (KU G-Hawk Student Research Symposium), 4) Mineralogy and Natural Symmetry short-course for Laban Dance movement class, and 5) contribution to development of laser (U-Th)/He dating of apatite and other accessory phases.

**Collaborators and Co-Editors (Additional Collaborators Not Identified in Publication Lists, last 4 years):**
- G. Axen (NM Tech); J. Davidson (Univ. of Leeds), J. Faulds (UNR), J. Geissman (Univ. of New Mexico), U. Glassmacher (Univ. of Heidelberg); J. Gosse (Univ. of Dalhousie), B. Grasseman (Univ. of Vienna), M. Grove (UCLA), M. Harrison (UCLA), J. Hassanzadeh (Univ. of Tehran), M. Heizler (NM Tech), B. Horton (UT Austin), P. Kapp (Univ of Arizona), S. Kelly (NM Tech), R. Ketcham (UT Austin), J. Lee (Univ. of Central Washington), J, Oldow (University of Texas - Dallas), M. Oskin (University North Carolina), J. Pederson (Utah State), M. Roy (Univ. of New Mexico), A. Schmitt (UCLA), T. Tagami (Univ. of Kyoto), M. Taylor (KU), M. Villeneuve (CGS), J.D. Walker (KU), Wells, M. (UNLV), A. Yin (UCLA), T. Zack (Univ. of Heidelberg).
- Co-Editors: None.

**Graduate and Postdoctoral Advisors:**
- M.S. advisors: N. Mancktelow, D. Seward (ETH-Zurich); Ph.D. advisors; E. Miller, T. Dumitru (Stanford University); Post-doctoral advisor: K. Farley (Caltech)

**Thesis Advisor and Postgraduate-Scholar Sponsor:**
- T. Blackburn, N. Winters, K. Wooten, A. Kueker, M. Hadley, J. Desmond, A. Waggoner (KU undergraduate students); E. Bargnesi, T. Blackburn, D. Bradley, J.P. Centeno, J. Dewane, S. Evans, T. Glausier, K. Gorynski, C. Hager, M. Hoffman, J. Lee, E. Pujols, J. Schroeder, C. Shirvell, E. Szymanski, C. Tincher, M. Wolfe (KU graduate students); B. Guest (UCLA), J.L. Antinao (Dalhousie), C v, Hageke (Potsdam), M. Sehn (Heidelberg), Y. Roman (UPRM); S. Brichau, R. Kislitsyn, Badr Gorbal, Charles Verdel, and Junheng Nie (KU post-doctoral scholar). Total number of graduate students advised: 19; Total number of postdoctoral scholars advised:  5
Michael H. Taylor

EDUCATION
2004 Ph.D., Geology, University of California, Los Angeles
2000 M.S., Geology, University of California, Los Angeles
1996 B.S., Geology, University of North Carolina, Wilmington

EMPLOYMENT HISTORY
2009- Affiliate Faculty – Center for East Asian Studies, University of Kansas
2007- Co-Director - Cosmogenic Nuclide Extraction Laboratory, University of Kansas
2005- Assistant Professor, Department of Geology, University of Kansas
2004-05 Postdoctoral Scholar, California Institute of Technology
1998-04 GRA/TA, University of California, Los Angeles
1996-98 Geophysicist, United States Geological Survey, Woods Hole, MA

TEN MAJOR PUBLICATIONS
Yin, A. and Taylor M. 2010, A paired-simple-shear-zone model for the formation of conjugate strike-slip faults: An alternative to the classic Anderson fault theory, Accepted, Bulletin of the Geological Society of America
Taylor M., P. Kapp, B. Horton, 2010, Basin response to active extension and strike-slip deformation in the hinterland of the Tibetan plateau, Accepted, Invited Book Chapter in, C. Busby and A. Azor, Recent Advances in Tectonics of Sedimentary Basins.
*Styron, R., M. Taylor, and *K. Okoronkwo, 2010, Database of Active Structures from the Indo-Asian Collision, news article in EOS v.91, n.20, pg. 181
Kapp, P., Taylor, M., Stockli, D., Lin, D., 2008, Active development of low-angle normal fault systems during orogenic collapse: Insight from Tibet, Geology, v. 36; no. 1; p. 7–10; doi: 10.1130/G24054A.1 (11)

HONORS AND AWARDS FOR RESEARCH
2010 Faculty Career Development Award, University of Kansas
2009 BIG 12 Faculty Fellowship with UT-Austin
2006 Faculty Career Development Award, University of Kansas
2004 University of California Regents Fellowship
SERVICE RECORD

Reviewer for Book Chapters in:
Recent Advances in Tectonics of Sedimentary Basins, and The Geological Society of London Special Publications

Reviewer of Manuscripts for:

Reviewer of Proposals to:
NSF - Career, Geomorphology, EarthScope, and Tectonics; Petroleum Research Fund; University of Houston internal grants (GEAR)

EXTERNAL FUNDING

Grants, Awards, and Contracts

Ecopetrol-ICP Contract: 2010 Low-temperature thermochronological and neotectonic constraints from the Middle Magdalena Valley, Llanos basin, and Eastern Cordillera of Colombia (Phase 3). $616,635. (co-PI with D. Stockli as lead PI)

NSF-SCEC 04/12/10: Rapidly quantifying surface rupture for the Laguna Salada Earthquake, Mexico using terrestrial lidar $5,729. (KU portion) (PI, Taylor).


Ecopetrol-ICP Contract: 08/2009-08/2010: Low-temperature thermochronological and neotectonic constraints from the Middle Magdalena Valley, Llanos basin, and Eastern Cordillera of Colombia, Phase 2, $817,476.00 (co-PI with D. Stockli as lead PI)

Midland Valley, 2009-2010, Structural Geology 2D, 3D, and 4D soft ware totaling over $250,000 in licenses (Sole PI, Taylor)

Ecopetrol-ICP Contract: 08/2008-08/2009: Low-temperature thermochronological and neotectonic constraints from the Middle Magdalena Valley, Llanos basin, and Eastern Cordillera of Colombia, Contract with, $110,000 (KU portion), (co-PI with D. Stockli as lead PI)

NSF-Tectonics, 08/08–08/10: Collaborative Research: Development of extensional systems in regions of hot, thick crust: Insight from Tibet, $154,019 (KU portion), (PI, Taylor), refereed.

American Chemical Society, Petroleum Research Fund, 1/1/08-1/31/10: Investigating active extensional basins in the hinterlands of continental collisions: Implications for petroleum research, $50,000 (Sole PI, Taylor), refereed.

Georgios Padelis Tsoflias

RESEARCH INTERESTS
Development of high-resolution ground-penetrating radar (GPR) and seismic methods for characterization of subsurface properties and active processes; Quantitative characterization of fractures; Development of automated 3D seismic methods; Imaging of active faults; Hydrogeophysical investigation of aquifer flow properties; Biogeophysical monitoring of subsurface bacterial activity; Imaging of ice sheets.

EDUCATION
Ph.D. Geological Sciences, The University of Texas at Austin, Austin, TX, 1999
M.S., Geophysics, Virginia Polytechnic Institute and State University, Blacksburg, VA, 1991
B.S., Geophysics, Virginia Polytechnic Institute and State University, Blacksburg, VA, 1989
Languages: English, Greek, French

PROFESSIONAL EXPERIENCE & APPOINTMENTS
I) Research:
Visiting Professor of Hydrogeophysics, Politecnico di Torino, Italy, December 2009 to June 2010
Visiting Professor, Herbette Fellow, University of Lausanne, Switzerland, August to November 2009.
Associate Professor, Geophysics, The University of Kansas, Department of Geology, 2009 to present
Assistant Professor, Geophysics, The University of Kansas, Department of Geology, 2003 to 2009

II) Teaching at the University of Kansas:
Geol 771: Advanced Geophysics, Ground Penetrating Radar; GEOL 791: Advanced Topics in Geology; GEOL 577: Environmental Geophysics; GEOL 171: Earthquakes and Natural Disasters

III) Professional:
Exploration Geophysicist, Mobil Oil, New Orleans LA, 1991-1995

SERVICE
2010 – 2012 Council Member, American Geophysical Union (AGU)
2010 – 2012 Vice-Chair, AGU Near-Surface Geophysics Focus Group
2010 Fellows Nominations Committee Member, AGU Joint Focus Group Section
2006 – present Associate Editor, Journal of Environmental and Engineering Geophysics (JEEG).
Dept. of Geology: Director of Undergraduate Studies; Student organization faculty advisor: SEG, SGE.

RECENT PEER REVIEWED PUBLICATIONS (* indicates advisees)


**ACTIVE RESEARCH GRANTS & PROJECTS**


2008 – 2013 **National Science Foundation**, Integrative Graduate Education and Research Training (IGERT) project: C-CHANGE: Climate Change, Humans, and Nature in the Global Environment. Participating Faculty.

2008 – 2010 **Hess Oil Company**, Stratigraphic and Hydrocarbon Reservoir-analog Character for Uppermost Miocene Oolitic, Thrombolitic, Stromatolitic, Coral Reef Systems, Ricardillo and La Molata, SE Spain, Co-PI.

**STUDENT RESEARCH SUPERVISION**

Current Ph.D.: Anthony Hoch, Brian Miller, Jose Velez

Current M.S.: Matt Baker, Blair Benson, Kwan Yee Cheng, Brooke Perini, Ayrat Sirazhiyev

Past: PhD: Ramzy Al-Zayer; MS: Robert Eslick, Michael Christie, Mike McGlashan, Gerard Czarnecki, Jon Jarvis, Anthony Hoch

Undergraduate Research Assistants: Annaria Nardone, Jose Velez, Edil A. Sepulveda Carlo, Karina Kervin, Alex O. Martinez, Jasmin Talbert, Kwan Yee Cheng, Javier de Palacios, Ryan Brumbaugh, Robert Eslick, Carlo Ossola, Stefano Iuliano

**PROFESSIONAL AFFILIATIONS**

Society of Exploration Geophysicists (SEG); Near Surface Section of SEG (NSG); Geological Society of America (GSA); American Geophysical Union (AGU); Environmental and Engineering Geophysical Society (EEGS); European Association of Geoscientists and Engineers (EAGE).
Educational History:
1980 B.S. in Geology, Massachusetts Institute of Technology.

Experience:
2008 Crosby Visiting Lecturer at Massachusetts Institute of Technology
1999 to 2004 Associate Chairman, Department of Geology, University of Kansas
1998 to 1999 Associate Vice Chancellor Fellow, University of Kansas
1995 to present Professor of Geology, University of Kansas
1994 Acting Co-Chairman, Department of Geology, University of Kansas
1991 to 1992 Associate Chairman, Department of Geology, University of Kansas
1990 to 1995 Associate Professor of Geology (Tenured), University of Kansas
1985 to 1990 Assistant Professor of Geology, University of Kansas.

Grants, Awards, and Contracts (amount awarded to home institution)
2008 National Science Foundation. "Toward Developing a National Geoinformatics System (NGS)." $90,231.
2007 National Science Foundation. "Collaborative Research: How is Strain of the Eastern California Shear Zone Transferred Across the Garlock Fault?". $113,979.

Professional Activities
Geological Society of America:
Councilor, 2009-2013; Editor, Map and Chart Series, 2004-present
Advisory Board Member for EarthScope Committee on CyberInfrastructure 2009 - present
Invited Lectures and Short Courses:
2010 University of Oklahoma; 2008 Massachusetts Institute of Technology.
Conferences and Workshops Organized:
Publications and Presentations

Refereed Papers and Reports († indicates current or former advisee, * for invited):

Widga, C., Walker, J.D., and Stockli, L.D., 2010, Bison Diet and Mobility in the Great Plains during the Middle Holocene: $^{87}$Sr/$^{86}$Sr, $\delta^{13}$C, and $\delta^{18}$O Analyses: Quaternary Research, v. 73, p. 449-463.


Books:


Electronically Distributed Information:

NAVDAT and EarthChem data portals for geochemistry (navdat.org and earthchemportal.org). These provide a great deal of visibility: each receives around 5,000 visits and 45,000 page views per year. Developing automated uploading of geochronological data. Reports for U-Pb, (U-Th)/He, U-series, LA-ICPMS, and Ar-Ar methods can be found in the reports section of the EarthChem site – earthchem.org. Data population is starting at geochronportal.org.

Presentations and Abstracts (speaker underlined, * for invited, † indicates speaker is current or former advisee):


Graduate Students and Post-Doctoral Associates Supervised

Anthony W. Walton

**Education**

B.A. Geology  Lafayette College, Easton, PA  1965  
M.A. Geology  The University of Texas at Austin  1968  
Ph.D. Geology  The University of Texas at Austin  1972  

**Employment**

1987 - 1999  Chairman, Department of Geology, The University of Kansas  
1975 - Present  Assistant, Associate Professor of Geology, The University of Kansas, Lawrence, Kansas  
Summer, 1984, 1986  Research Associate, Kansas Geological Survey  
Summer, 1974  Geologist, Minerals Exploration, Continental Oil Company, Casper, Wyoming  
Summer, 1973, 1975, 1976  Research Scientist Associate, Bureau of Economic Geology, University of Texas at Austin  
1972-1975  Assistant Professor of Geology, Vanderbilt University, Nashville, Tennessee  
1968-1971  Teaching Assistant, The University of Texas at Austin  

**Research Interests:**

Deposition and post-depositional alteration of sedimentary rock, especially siliciclastic rock and volcaniclastic rock. Interest includes microbial alteration of hyaloclastite. Petroleum geology of Kansas.  

**Society memberships:**

Geological Society of America (Fellow), International Association of Sedimentologists, SEPM (The Society for Sedimentary Geology), American Association of Petroleum Geologists, Kansas Geological Society, American Geophysical Union.  

**Theses and Dissertations Supervised, current:**

None completed in 2009-2010  
Alan Byrnes, Ph.D. Mr. Byrnes terminated his studies owing to expiration of his allotted time and commitments to his employer.  
Peter Senior, M.S. Entered, fall 2009. Completing course requirements and working on project.  

**Active Professional Service**

DOSECC (Drilling, Observation, and Sampling of the Earth’s Continental Crust)  
KU member representative  
Member of Board of Directors 1988 —  
Member of Executive Committee 1990—  
Chairman, Board of Directors, 11/03—  

**Research Grants Active in 2009-2010**
2008-2011  Bridging the Gap between Chemical Flooding and Independent Oil Producers DE-NT0005679 PI: Stan McCool, Co-I: Paul Willhite, Mark Ballard, A.W. WALTON.  Total project budget: $1,427,006


Recent Presentations (2009-2010)

Recent Publications (2009-2010)
VIII. Department of Geology Strategic Plan 2007

(Note that document follows format proscribed by College of Liberal Arts and Sciences)

I. Why are we here? The mission of the Department of Geology is to advance higher learning, serve society, and have a leadership role among Geoscience programs through the discovery, dissemination, and application of knowledge. The Department of Geology educates undergraduate and graduate students, provides education to the University and its cooperating institutions, does exemplary basic and applied research in the geological sciences and collaborates with other segments of the University and its cooperating institutions.

II. What do we hope to be?
We envision a Department of Geology with the following attributes:
• a major leadership role among Geoscience programs in key areas concentrating on areas of excellence but not excluding breadth
• all in one building with excellent facilities and support
• balance between fundamental and applied research and teaching
• diverse in ethnicity and gender
• successful in training future leaders in both academia and industry
• international and national recognition for research
• well funded through grants and other resources
• interdisciplinary research within the department and university as well as outside of the university
• an increasing impact through increased size of faculty and student body

III. How do we get there?
Future actions of the Department of Geology largely focus on keeping programs strong and building on its areas of strength. These are research areas in which the Department has achieved or may achieve national and international recognition. The Department also focuses on expansion into new areas where those new areas are interdisciplinary in nature, strongly complement its current areas of strength, or where program expansion is in a research area capable of achieving a national and international leadership role. Typically, the Department does not grow into new areas without assuring leadership continuity in its already strong ones, as long as continuing in those areas of strength make sense. The Department must maintain strength in training students in the fundamentals of the Geosciences while conducting research on the most important areas for the future development of the field. Effective fundraising through the Geology Associates program, external grants, and peer-reviewed publications are of great importance to its future success.

A. Some guiding principles
1. What are the intellectual opportunities that should exist in the Geosciences over the next 5-20 years?
   • Understanding Earth systems that relate to the environment including deep time, present and future (Including water resources, hazards, climate, linked biological/climate/environment systems)
   • Where will future energy resources come from and how will that affect the environment? (Including linked energy/environment/biological systems, CO₂ sequestration, and unconventional/conventional energy resources)
Understanding processes that shape the solid earth (geodynamics/geophysics, studies in deep time)

2. What are some emerging trends and major growth areas for research opportunities in the geological sciences?
   - energy resources
   - water resources
   - geobiology
   - environment
   - global change
   - climate
   - materials science and industrial minerals
   - geoinformatics
   - integrated solid earth sciences

3. What will be future employment opportunities for graduates? An excellent prognosis given 1,200 M.S. and Ph.D. graduates each year nationally
   - Very strong need in oil and gas/energy industries (50% will be eligible for retirement in next ten years (40,000 scientists needed even without growth of the industry)
   - Environmental, engineering, non-energy resources, industrial minerals industry should all remain strong and are predicted to grow
   - Government (including science, regulatory, and public policy), education, and research should all continue, although at a lower level.

B. What are our areas of strength or potential strength, and what are the current and future needs for maintaining continuity in or attaining a leadership position? (no particular order; these areas relate directly to I, II, and IIIA above) *italics are for potential future actions not already in process*

1. Paleontology already has a leadership position. With the hiring of the new Distinguished Professor in invertebrate paleontology, this program should be able to maintain its leadership role. *It will also be strengthened by future interdisciplinary research within and outside of the Department that may involve future hiring in complementary fields (sed/strat faculty members in Department of Geology, paleobiogeochemistry faculty member coming on board in Department of Geology, faculty already in EEB and Biodiversity/Museum). Biodiversity has in its strategic plan, a second half-time curator hire in invertebrate paleontology. This could allow for expansion of the program. Work in informatics in the program is broadly complementary across the University. Complementary expansion in areas of informatics in other programs in the University may strengthen this area.*

2. Tectonics already has a leadership position, especially in the area of rates of processes. It has expanded recently with the hire in neotectonics (Mike Taylor) and it needs to make a strong hire in geochronology this year to replace the gap left by Randy Van Schmus, who will retire in 2007 after a period as Department Chair and phased retirement. With that hire, the program should be in a strong position to maintain its leadership role in working on rates of tectonic processes. It is already complemented by the Geophysics program in the Department and GIS/informatics programs at the KGS. *It will also be strengthened by future interdisciplinary research within and outside of the Department, some of which may require future hiring in complementary fields. For example, this program may be aided by the CReSIS glaciology position; this will depend on the area of emphasis of the hire. If the glaciology hire complements this program it will likely deal with cosmogenic dating in addition to modeling of glacial processes, but the hire could also go more in the direction of climate. If any further faculty expansion were to be possible after program*
maintenance hiring, a solid earth geophysicist or geodynamicist faculty member would add depth and breadth in the program and improve its impact on the field of tectonics. This hire could be off in the future given a significant expansion of the Department. The tectonics program has become strong in geoinformatics. Complementary positions already existing in other Departments and at the KGS in informatics complement this program, and new hires could be pursued in other departments and at the KGS to capitalize on opportunities growing in this field.

3. Sedimentology/Stratigraphy already has a leadership role. The program has developed its strongest reputation in the areas of carbonate rocks and petroleum geology. Maintaining and/or building on its strength will capitalize on opportunities for energy research and linkage to climate and environment. It already benefits by having interactions with the KGS and Engineering (TORP). With the retirement of Enos, and with Goldstein serving as chair, the program has needs for a leadership continuity faculty hire in carbonates. Hiring of González has helped with this problem, and especially added complementary expertise in carbonate geochemistry and paleoclimate. A process-oriented carbonate sedimentologist is still needed to maintain leadership continuity after Enos’ retirement. This should be a new hire from outside (could bolster climate response to carbonate sedimentation). In addition a half-time hire from KGS, which has already been funded as an expansion position through tuition enhancement, could bolster opportunities related to energy research. A strong hire for the Ritchie Chair will expand an already strong reputation in stratigraphy and complement research in siliciclastics relative to petroleum geology. If future significant expansion were to be possible at some time in the future, a faculty hire in clastic sedimentology could bolster multiple areas of strength in the Department. The necessity of this will depend on the Ritchie Chair hire and the research directions chosen by current faculty. The program will also be strengthened by future interdisciplinary research within and outside of the Department that may require future hiring in complementary fields.

4. Geophysics has developed a leadership role in high-resolution near-surface geophysics, strongly complementary to environmental programs within and outside of the Department and complementing tectonics and sedimentology/stratigraphy. With Steeples serving as vice-provost, research and teaching in this field are not as strong as they could be. More opportunities for research and teaching in energy-related fields are needed. The hiring of the Ritchie Chair could help this program as a complementary hire. Leadership continuity hiring will be needed as a new hire from outside to fill the gap left by Steeples when he retires. This hire could enhance the program’s abilities in energy research. The program should also be bolstered with a half-time hire from the KGS that was funded as a program expansion position through tuition enhancement. It will also be strengthened by future interdisciplinary research within and outside of the Department that may require future hiring in complementary fields.

5. Hydrogeology has expanded over the years and has a reasonable number of core faculty, and some recent faculty hires in the Department’s programs in geobiology and geophysics that complement it strongly. Over the past few years, the program has improved its impact significantly. There is potential for a very strong reputation and a leadership role with time. Expanded active recruiting of students, increased coordination of existing resources, and increased involvement of the KGS should help this program attain its potential. Upcoming retirement of McElwee will create a need in field hydrogeology and modeling that should be filled by a new hire from outside of the University. In addition, the program can be expanded by making a half-time hire of a person from the KGS, that was funded as a program expansion position through tuition enhancement. The modeling and
field components are the most important to pursue and basin-scale modeling may be of interest.

6. Geobiology is a new program, funded by a successful tuition enhancement proposal. It represents a significant expansion of the Department into a new area. This action has put our Geobiology program ahead of many others nationally in this new field. Geobiology is strongly interdisciplinary in nature. Recent hires and the incoming faculty member in paleobiogeochemistry have allowed this program to reach critical mass. It is strongly complemented by other areas of strength in the Department and in the University and currently interacts strongly across several programs in the Department. It will need time to develop its reputation in this very new field of research. If expansion were to occur someday, it could be a position either in geology, biology, engineering, or shared, concentrating on new geologic time constraints (via genomics) or expanding expertise in biological processes in modern natural settings as they relate to the research opportunities cited above.

7. Geochemistry is a program that is strongly interdisciplinary in nature and includes most of our faculty members either directly or peripherally. Developing the Department’s reputation as a leader in this area will depend on maintaining or building strength in the aforementioned areas and marketing the Department’s program more effectively.

C. What areas are not as strong and what do we do to achieve our goals relative to those areas?

1. Facilities. Through active fundraising and some institutional support, we intend to build an addition on to Lindley Hall, remodel parts of old Lindley, and move all faculty and students into an excellent facility. Technical support situation has improved, but as we develop more sophisticated laboratories and instrumentation, increased technical support may be necessary. As the Department grows, increased clerical support is likely to be needed.

2. To accommodate the growth that has already occurred, the Department needs to expand funding for graduate students. To do this, we will need institutional support to expand the number of GTA positions to 18. We will continue fundraising efforts with the goals of increasing the number of full-ride scholarships to 5-10. Grant acquisition has been successful and has increased, but we will continue to diversify our funding base and seek opportunities to expand funding of GRA positions from federal and other grants. Special efforts will continue to be made to expand funding for students underrepresented in our field to increase diversity. As the program continues to expand, these goals will also have to increase.

3. Improving student learning at the undergraduate level could be improved by having faculty track student progress and modify the undergraduate curriculum accordingly. Regular conversations among faculty will expose gaps in the curriculum and allow for modification. We should reinstitute discussions among faculty in prerequisite strings and evaluate student retention.

4. The size of the faculty in the Department of Geology is not as large as the most influential programs in the Geosciences. The program has had remarkable success despite its small size. If it were to increase its size, it would increase its impact and be regarded as among the top Geology programs nationally. There are programs totally lacking in the Department at this point. Among them are programs in materials science/industrial minerals and hazards. The Department could expand into those areas by making key hires in the Department of Geology and other programs. These would be interdisciplinary programs. Expansion into materials science/industrial minerals could be a valid direction complemented by faculty in physics and by one search currently taking place at the KGS.
Hazards in the geosciences could also be an important area of emphasis which could include interactions with EEB, engineering, and the KGS.
IX. Attached CD

CD Included in back pocket of binder.

Department of Geology Bylaws

Faculty Full CVs