AY 2006 – 2007
Program Review

Physical Sciences
A. Introduction

1. Overview

The Bachelor of Science in Physical Sciences is the degree awarded to students who complete programs in chemistry, physics, and geology. Chemistry and physics are the study of matter and energy. Chemistry focuses on the structure, properties, and reactions of matter at the atomic and molecular level, while physics focuses on the behavior of matter and energy over a wider scale, from subatomic interactions to the structure and motion of the universe. Both chemistry and physics provide the foundation for many other sciences, including biology, geology, engineering, environmental science, and the health sciences. Geology focuses on the processes that have shaped the earth, and how these processes affect human endeavors. Geology plays a key role in locating and developing energy, mineral, and water resources, protecting against natural hazards, and restoring and protecting the environment.

Students seeking the Physical Sciences degree must complete one of the following five concentrations:

- Chemistry
- Physics
- Geology
- Environmental Geology
- Geology, Secondary Teaching

Although we offer concentrations in each of these disciplines rather than stand-alone degrees, the requirements of each concentration are no different than one would find at other colleges and universities across the nation.

The following minors are also maintained by faculty in chemistry, physics, and geology:

- Chemistry
- Physics
- Geology
- Geographic Information Systems (GIS)
- Watershed Science

2. History

Prior to 1993, geology and physics were areas of emphasis along with mathematics and computer science under the Bachelor of Science in Physical and Mathematica Sciences. There was no degree that included chemistry. The Bachelor of Science in Physical Sciences was first offered in the fall of 1993. The degree initially included concentrations in only geology and physics. With the implementation of a concentration in chemistry in the fall of 1995, the degree took on the basic framework that it has today.

Additional concentrations related to physics and geology were added later. Environmental geology was implemented in 1995 in order to provide a more specific program of study for geology majors planning to work in the environmental profession. In order to provide and promote opportunities in the sciences for secondary teaching candidates, geology and physics implemented their concentrations in secondary teaching in the fall of 1997. A concentration in
applied physics was also implemented in that year to provide a track for physicists interested in careers in engineering and applications of physics. However, the concentrations in applied physics and secondary teaching in physics were deleted, effective in the fall of 2004. The College’s decision to delete its Associate of Science degree in engineering removed an important component of the applied physics program. The physics faculty also found that it was unable to devote the time required to maintain the certification of its secondary teaching concentration.

B. Program goals and objectives

The mission assigned to the College by the Colorado Legislature includes the statement “Mesa State College shall offer liberal arts and sciences programs”. Our B.S. in Physical Sciences is a direct fulfillment of this mandate. Chemistry, physics, and geology (sometimes in the form of earth science) are found in the vast majority of U.S. colleges and universities that share the liberal arts and sciences mission.

The College’s philosophy of a baccalaureate education enumerates seven emphases (2006-2007 Mesa State College Catalog, p. 38), at least three of which are directly supported by the B.S. in Physical Sciences. We strive to convey “the scientific perspective” in all of our courses (those for general education as well as those for majors), with attention to “its impact on society” when appropriate (e.g., in GEOL 107 Natural Hazards and Environmental Geology). Our courses for majors are clearly devoted to “advanced competencies within a specific discipline”. We strive to equip students not just with facts, but with “the competencies needed for self-directed, ongoing learning”.

The goals of the Physical Sciences programs are:

1. To prepare students for professional or technical careers in chemistry, physics, geology, and related disciplines.

2. To prepare students for graduate study in chemistry, physics, geology, or related disciplines.

3. To prepare students for careers as teachers.

4. To provide students with a liberal arts education which, while focused on scientific disciplines, includes tools for critical and creative thinking as well as important perspectives on our culture.

To accomplish these goals, the Physical Sciences faculty requires students to: 1) demonstrate a mastery of the body of knowledge that defines the essence of one of the concentrations; 2) develop analytical problem-solving and critical reasoning skills that are essential to define and solve scientific problems and conduct scientific research; 3) demonstrate proficiency in the use of relevant technology; and 4) develop oral and written communication skills. As a means of enabling student success, we promote student participation in independent studies and structured research projects outside of normal classroom activities. We find this approach to be highly
effective in developing the breadth of student abilities, and it creates a sense of energy and vitality that excites and motivates students.

C. Need for program

1. General considerations

Why should Mesa State College offer a degree in Physical Sciences?

Perhaps the most fundamental reason is to fulfill the College's liberal arts and sciences mission. Whether it is manifested through degree programs, general education courses taught by Physical Sciences faculty, brown bag seminars, committee work, or informal conversation, the presence of a strong scientific mindset is one of the key elements of intellectual life in the liberal arts and sciences environment. Our Physical Sciences degree allows the College to retain a highly educated, accomplished faculty for general education courses who can provide not only a specialist's insight but also a well-developed perspective on the larger scientific endeavor and its impact on our society.

However, the most important reason for having a Physical Sciences program may be to contribute to efforts to maintain our nation's expertise in science and technology. Reports from government agencies, think tanks, professional associations, and researchers point to an apparent decrease in the number of American students pursuing degrees in science, and perhaps a decrease in the abilities of the graduates as well. We believe that our role in reversing this trend is to attract students to science with programs displaying great vitality, and to produce top-notch graduates through rigor and challenge.

Still more justification for our program lies in demographics. A significant number of students from our service region who are interested in science have economic or family constraints that limit their ability to pursue science degrees at other Colorado colleges and universities. Providing science degree opportunities for these students is part of the College's mandate from the Colorado legislature.

As detailed in a later section, our Physical Sciences graduates do find employment in their discipline. Our program thus plays a role in meeting the needs of business and industry—locally, regionally, and nationally. The success of our graduates provides recognition for the college and enhances its standing both within and outside of the service region.

2. Enrollment and graduation rates (Note: Data found in Appendix 1):

The number of Physical Sciences majors demonstrates that there is demand for this degree. There are currently 56 majors in chemistry, 23 in physics, and 68 in geology for a total of 147. This is an increase of 51 over the total from the fall 2000 semester. The annual number of Physical Sciences graduates has fluctuated between 11 and 17 in the period from 2001-2002 through 2005-2006, averaging 13.5. In the context of colleges and universities nation-wide, these are respectable numbers for an institution of our size and nature.
D. Resources  (Note: Budget data found in Appendix 2)

1. Unique characteristics influencing the need for resources

Both theory and experiment are essential components of any science curriculum, and experimental work requires specialized scientific equipment. The need for current, often expensive equipment may be strongest in chemistry, but is significant for physics and geology as well. With complex instruments come costs for operation and maintenance. For example, chemistry’s nuclear magnetic resonance spectrometer requires about $5,000 per year in liquid helium and liquid nitrogen. The cost of bringing a service person from the manufacturer to campus for this and other instruments can easily go as high as $2,000 or more. We also have special needs in the area of computer technology. Courses in geographic information systems require computers and servers that are especially fast and have unusually large storage capacities, along with expensive software. On a different note, as a science that is largely conducted in the field, geology needs the ability to transport students safely to a variety of field locations, some quite rugged.

2. Faculty and staff (Note: Faculty vitae found in Appendix 3):

All of our tenured and tenure track faculty as well as many of our full-time temporary faculty have Ph.D.’s in chemistry, physics, or geology or closely related disciplines. At this time, we have two tenured professors in chemistry and two full-time temporary instructors. (We are in the process of proposing to fill the latter two positions with tenure-track professors.) Chemistry also has a full-time laboratory coordinator who teaches up to three sections of chemistry lab sections. In physics, we have two tenured professors (one retiring at the end of this semester), two tenure-track professors, and one full-time temporary instructor. Geology includes four tenured professors, one tenure-track professor, and three full-time temporary instructors. A listing of full-time faculty present during the review period is shown below with dates of service and status.

**Chemistry**

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Years</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craig Dodson</td>
<td>Ph.D.</td>
<td>1995-present</td>
<td>Tenured</td>
</tr>
<tr>
<td>Joe Richards</td>
<td>Ph.D.</td>
<td>1995-present</td>
<td>Tenured</td>
</tr>
<tr>
<td>Larry Madsen</td>
<td>Ph.D.</td>
<td>1988-2006</td>
<td>Tenured</td>
</tr>
<tr>
<td>John Dogbe</td>
<td>Ph.D.</td>
<td>2006-present</td>
<td>Temporary</td>
</tr>
<tr>
<td>Harmony Voorhies</td>
<td>Ph.D.</td>
<td>1999-2003</td>
<td>Tenure track</td>
</tr>
<tr>
<td>Sue Kenney</td>
<td>M.S.</td>
<td>2006-present</td>
<td>Temporary</td>
</tr>
<tr>
<td>Tim Flynn</td>
<td>Ph.D.</td>
<td>2003-2004</td>
<td>Temporary</td>
</tr>
<tr>
<td>Allison Flynn</td>
<td>M.S.</td>
<td>2004-2006</td>
<td>Temporary</td>
</tr>
</tbody>
</table>

**Physics**

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Years</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gordon Gilbert</td>
<td>Ph.D.</td>
<td>1980-present</td>
<td>Tenured</td>
</tr>
<tr>
<td>Bill Tiernan</td>
<td>Ph.D.</td>
<td>1997-present</td>
<td>Tenured</td>
</tr>
<tr>
<td>Prasanta Misra</td>
<td>Ph.D.</td>
<td>1988-2005</td>
<td>Tenured</td>
</tr>
<tr>
<td>David Collins</td>
<td>Ph.D.</td>
<td>2006-present</td>
<td>Tenure-track</td>
</tr>
</tbody>
</table>
Chad Middleton  Ph.D.  2006-present  Tenure-track
Hasson Tavossi  Ph.D.  2000-2006  Temporary
Alexander Gurshtein  Ph.D.  2001-present  Temporary

**Geology**
Verner Johnson  Ph.D.  1984-present  Tenured
Rex Cole  Ph.D.  1995-present  Tenured
Rick Livaccari  Ph.D.  1997-present  Tenured
Andres Aslan  Ph.D.  1999-present  Tenured
Gigi Richard  Ph.D.  2002-present  Tenure-track
Harold Hase  M.S.  1992-present  Temporary
Tony Kovschak  M.S.  2004-present  Temporary
Donn Lohrhammer  M.S.  2006-present  Temporary
Larry Jones  Ph.D.  2003-2006  Temporary

3. Physical facilities

Classroom-based coursework is conducted mostly in Wuben Hall, which was renovated in 1998. All classrooms are outfitted with computers containing CD drives, network and internet access, videocassette players, data projectors, and large projection screens. DVD players are available on request through Media Services. These classrooms are shared with other programs. Laboratory work is conducted in Wuben Hall and the adjoining Science Laboratory Building, which was completed and occupied in 1997. Each discipline has its own dedicated space.

The laboratory facilities for the chemistry program are located on the third floor of the Science Laboratory Building. A stockroom and prep room is situated in between the general chemistry and organic chemistry laboratories, which are each designed for twenty-four students. A smaller lab designed for fifteen students is used for quantitative analysis and advanced labs. Each of the labs is equipped with fume hoods. Student research occupies its own small lab with bench and hood space for up to six students. Major instrumentation such as the nuclear magnetic resonance spectrometer is located in a separate room.

The physics program has several laboratory spaces on the second floor of Wuben Hall. The freshman laboratory accommodates twenty students at a time in introductory physics courses. The advanced laboratory is where sophomore and junior laboratory courses are held. It also houses the low temperature facility, which is used for independent study and senior research projects in superconductivity. Two smaller laboratories accommodate student and faculty projects.

The geology program has laboratory facilities on the first floor of the Science Laboratory Building. These include a general geology lab that accommodates twenty-four students, a smaller advanced geology lab, a prep room, the John Scholes X-Ray Diffraction Laboratory, and an equipment storage room. A new computer laboratory was established in 2005 on the second floor of Wuben Hall to support computer applications in geology and GIS. This room
accommodates twelve students working individually. In addition, geology conducts considerable “lab” work in the field.

4. Instructional equipment

The general chemistry lab is outfitted with computers and interfaces for computerized data collection and analysis. The program is well equipped with standard glassware and other apparatus (e.g., balances, melting point apparatus) needed in general chemistry and organic chemistry courses. It is also very well equipped with instrumentation that is used in quantitative analysis, instrumental analysis, and research. Its holdings include: a 300-MHz Fourier transform nuclear magnetic resonance spectrometer with dual carbon and hydrogen probes; an inductively-coupled plasma atomic emission spectrometer; an atomic absorption spectrometer; a high-pressure liquid chromatograph with UV-visible and fluorescence diode array detectors; a spectrocolorimeter; an ion chromatograph; an x-ray fluorescence spectrometer; an infrared spectrometer; and a centrifuge. (Some of these instruments are shared with the environmental science program.) All chemistry majors have the opportunity to use any of these instruments.

The freshman physics lab includes ten computers with interfaces to a variety of sensors that are used in the experiments. The advanced lab includes three computers that are used in conjunction with experiments. The physics program has a wide variety of equipment that is used in labs at all levels as well as research. This includes a cryostat, Cavendish balance, Franck-Hertz apparatus, radioactivity counter and spectrometer, electron spin resonance apparatus, spectrosopes, a monochromator with CCD sensors, a multichannel analyzer, oscilloscopes, power supplies, function generators, and telescopes.

Equipment holdings in geology include: an x-ray diffractometer, a number of binocular polarizing microscopes, an automated weather station with digital telemetry, and many geographic positioning system units of differing complexity. The computer resources of the geology program were upgraded in 2006 using a grant from the Colorado Energy Research Institute (funded by the State of Colorado through the Colorado School of Mines). The lab has been upgraded with twelve fast, high-memory capacity computers for students and one for the instructor, a dedicated server, and a high-quality plotter. Participation in statewide license agreement now allows for GIS software to be used in this lab and throughout campus.

5. Library (Note: Data found in Appendix 4)

Overall, both the library staff and the faculty find that our print collections provide adequate support for undergraduate coursework, but are dated to an undesirable degree in chemistry and physics. On-line access to current scholarship is generally considered as a strength, although the physics faculty find that the physics journals we can access are not a good match for their needs. We will revisit the physics journals (both print and on-line) with the library staff to see if we can improve the applicability of our journal access.

The print collection in geology is especially large because of our collection of government documents and maps. The faculty and students are pleased to use this collection, but desire to have access to a wider range of geology journals.
The analysis of library holdings conducted by the library staff is shown in Appendix 3.

6. Unique sources of revenue and expenditures

We have no large, on-going unique sources of revenue. We are funded primarily by funds the College receives from the state and student tuition, and funds we collect in the form of lab fees. From time to time, the Mesa State College Foundation has funded equipment purchases, such as chemistry’s nuclear magnetic resonance spectrometer and geology’s x-ray diffractometer, both of which are used by students. Grant money often has a direct impact on instruction. Funds from the Colorado Energy Research Institute were used in 2006 to upgrade the computers and server used for GIS courses and geology computer application courses. The geology program has taken in a modest amount by charging outside organizations for use of its x-ray diffractometer. Professor Rex Cole has earned money for geology by charging Kerr-McGee for field trips he conducts in the nearby Bookcliffs for company personnel.

Unusual (if not unique) expenditures include approximately $5,000 per year for liquid helium and nitrogen for the nuclear magnetic resonance spectrometer and $6,000 per year for a GIS software license. Current funding of the chemistry and geology programs is adequate to cover these costs, but it is critical that this level of support be maintained. We hope to make GIS software costs more sustainable through fees from one to three day GIS workshops designed for working professionals. Repair costs that sometimes arise for any of our large instruments are also unusual relative to most other campus programs.

E. Effectiveness

1. Accreditations

The possibility of accreditation of the chemistry program by the American Chemical Society (ACS) exists, but we feel the accreditation is unobtainable at this time, primarily because of the limited number of faculty. While ACS accreditation could attract students, enhance opportunities for graduates, and give the College additional prestige, the lack of accreditation is not a fatal flaw. Graduates of our program and other non-accredited programs around the country are successful in chemistry careers and graduate school.

Neither physics nor geology have bodies that accredit undergraduate degree programs.

2. Changes since the last program review

Two areas of weakness in chemistry (inorganic and analytical) were identified through having students take the Major Field Achievement Test. The weakness in analytical chemistry was addressed by adding instrumental analysis to the curriculum as an elective. This provides two semesters of analytical chemistry just as there are two semesters of organic and physical chemistry. Students who have taken the course have shown improved scores. Addressing the problems with inorganic chemistry will require additional faculty.
The physics program developed a new course, Intermediate Laboratory, that reinforces the knowledge and skills learned in the initial round of physics courses for majors, and provides the students with a firmer foundation for going on to the advanced courses. A new course in Electronics for Scientists was implemented with the goal of enhancing students’ practical knowledge and skills in doing lab work. Students from other sciences have signed up for this course as well as physics majors. A course in Physics by Inquiry, based on a curriculum developed elsewhere, was implemented to enhance the understanding of science by future elementary and middle school teachers.

Geology and Environmental Geology curricula were revised in 2005 to eliminate outdated elements and to improve sequencing of classes so that students move more logically through lower-division to upper-division geology courses. A new sequence of 200-level, gateway classes in field methods and computer applications were added to better prepare students for the upper-division geology courses. A restricted electives section was added that allows students to further focus their studies in geology, or to take additional math, physics or chemistry in preparation for graduate school. The Environmental Geology curriculum was modified to make it more distinct from the geology concentration by changing the required core courses and adding a restricted electives section with a greater environmental focus. An additional tenure-track position was successfully added in 2002 so as to expand expertise in hydrology. All of these changes continue to develop and cultivate a curriculum focused on modern trends in the Earth Sciences and the overall employment market for entry-level geologists.

3. Assessment of student achievement (Note: Supplementary materials in Appendix 5):

Our formal efforts in assessment began only in 2003 and thus we don’t have a long track record to serve as a basis for evaluation. Our efforts center on three desired outcomes:

1. Students show a strong foundation in understanding chemistry, geology, environmental geology, or physics (depending on their concentration) and related disciplines.

2. Graduates will be successful in post-baccalaureate experiences with regard to education and employment.

3. Graduates will demonstrate critical and creative thinking as well as effective communication skills.

Our approach to the first outcome is to evaluate student performance on comprehensive exams taken in their senior year and student feedback from an exit survey on the effectiveness of courses for majors. Student success in chemistry and physics as measured by the Major Field Achievement Tests is judged to be good, with nearly all of recent students scoring above the target score of 130. Two areas of weakness in chemistry were identified by the exam, as described above under Section E.2, Changes since last program review. Geology has used its own internal exit exam for a number of years. Recent students have performed above the target score. Graduating seniors from all three programs have consistently rated their courses above the target score of 3.5 (on a 5 point scale).
Our approach to the second outcome is to track for two years the success of our graduates in gaining admission to graduate school and finding employment in their field. The results of this effort are described below under Section E.5. Student success. The main problem here is that we do lose track of many graduates rather quickly, so that we need to improve our monitoring efforts. We are pleased that the large majority of students that we do track successfully are being admitted to graduate school or finding employment related to their major.

Our latest approach to the third outcome is to evaluate the performance of graduating seniors on presentations and papers that they do in their senior year. We have not yet obtained conclusive information from this effort.

In spite of a short track record in formal assessment, the faculty of each program talk frequently about their observations regarding student performance, teaching practices, and curriculum. We have always made adjustments based on these observations, with examples being those that are described above under Section E.2. Changes since last program review.

4. Faculty success

In the last five years, several of our professors have received Mesa’s distinguished faculty awards, which are determined by faculty campus-wide. Professors Richards (chemistry) and Johnson (geology) have received the award for Outstanding Achievement in Teaching. Professors Dodson (chemistry), Aslan (geology), and Cole (geology) have received the award for Outstanding Achievement in Scholarship. Professor Gilbert (physics) received the overall Distinguished Faculty award twelve years ago. Our professors have also been recognized by the local Chamber of Commerce, whose award decisions are based on student input. Professors Richards (chemistry) and Aslan (geology) have received Educator of the Year awards from the Chamber.

Nearly all current members of our faculty routinely receive median scores of 4.5 or 5 (out of 5) in their student evaluations. Eight of the eleven tenured/tenure track faculty have published papers in peer-reviewed journals during the review period; nine of the eleven have given presentations at conferences. Professor Cole and a co-author received the best paper award in 2005 from the Rocky Mountain Association of Geologists. Chemistry and geology faculty received funding from the National Science Foundation for research involving their undergraduate students.

The faculty is active in campus affairs and takes on positions of responsibility—Professor Richards is in his second year as chair of the Curriculum Committee, and Professor Tierman (physics) is the vice president of the Faculty Senate. Professor Aslan organizes the MSC Student Scholars Symposium each year. The geology program organized and hosted the annual Rocky Mountain regional meeting of the Geological Society of America in 2005, which is a major event. Well over 300 people attended the numerous technical sessions and field trips.
5. Student success

The best measure of success is the ability of our graduates to gain admission to graduate school or land positions in their chosen profession.

Four of the chemistry graduates over the last six years have gone on to graduate school in chemistry, environmental engineering, and biomedical science (Arizona State University, University of Denver, University of Utah, and Colorado State University). Another three graduates are in medical school and one is in pharmacy school. Four others have found employment in the chemical industry, and one is a high school chemistry teacher.

During the last five years three physics graduates have gone to physics graduate schools (Colorado State University, Colorado School of Mines, University of Nevada at Las Vegas), and at least three have gone to engineering and other graduate schools. Another graduate has entered the Navy Nuclear Engineering program. Several others are working in industry with firms such as Lockheed Martin and Honeywell, and one has started his own company. Still others are teaching physics.

Forty-five geology majors have graduated during the review period. At least seven have gone on to graduate school, studying at Purdue, Colorado State University, Colorado School of Mines, Penn State, Northern Arizona University, New Mexico Tech, and the University of Utah. Several have worked for government agencies including the U.S. Geological Survey, Indiana Geological Survey, Bureau of Land Management, U.S. Army Intelligence, Colorado State Patrol, Colorado Oil and Gas Conservation Commission, Delta County, and Mesa County. At least sixteen are known to have worked in industry, primarily for firms involved in natural gas development. At least four are secondary science teachers.

F. Program strengths

First and foremost, we have a fully qualified, energetic faculty committed to undergraduate education. All of our tenured/tenure track faculty have a Ph.D. Many of our full-time temporary faculty members also have a Ph.D.; the rest have an M.S. Six of our faculty have received rewards for distinguished teaching, scholarship, or overall performance. Building on a solid foundation of class-room based instruction, they provide opportunities for any interested student to participate in research and other project-based frameworks for learning. Our graduates are successful in gaining admission to graduate school and in starting careers in their disciplines.

The chemistry program has instrument holdings as good or better than peer programs both state-wide and nationally. All students have opportunities to use each of these instruments, through coursework in lab sections or research projects. The faculty provides research opportunities for all interested students. Grants obtained by faculty frequently provide stipends for student participation in research. Students have been co-authors with the faculty on publications.

The physics program gives students a strong background in physics in a small school setting, providing them with preparation for graduate school in physics and certain engineering
disciplines. Students who are interested have ample opportunity to collaborate with faculty on independent study and research projects. We have a strong track record of placing students in graduate schools and in scientific/technical careers.

The geology program can boast of being located in one of the most diverse and spectacular geological areas in North America. Thus, since geology is primarily a field science, Mesa is an exceptional place to study. Curriculum revisions in 2005 eliminated outdated elements, improved the course sequence, added flexibility to accommodate different student goals (graduate school versus professional employment), and accentuated the distinction between the concentrations in geology and environmental geology. All of these changes continue to develop and cultivate a curriculum focused on modern trends in the earth sciences and the overall employment market for entry-level geologists.

Several members of the geology faculty are regionally recognized in their specialties, which are diverse. All of the faculty members have held professional employment (from 1 to 18 years) outside academia at some point in their careers. The majority of the geology faculty is directly involved in high-quality research, with emphasis on projects that include undergraduate student involvement. A major grant from the National Science Foundation for a center in the Research Experience for Undergraduates program was received in 2005 to support research efforts on landform evolution in western Colorado. All of the tenured/tenure-track faculty and one non-tenure-track professor have contributed to this three-year program. Geology faculty and students frequently present papers and posters at regional and national meetings of the Geological Society of America. Geology students usually dominate the annual MSC Student Scholars Symposium.

The geology program oversees two specialized minors in addition to a geology minor. The Minor in Geographical Information Systems (GIS) is popular with students in biology and environmental science as well as geology. Recently, a new Minor in Watershed Science was developed. It is starting to attract a significant number of students.

G. Program weaknesses

All three programs within the B.S. in Physical Sciences have unused capacity in the sense that they could readily accommodate more majors with current staffing. Just how many additional majors varies with the program.

In chemistry and physics, there are practical limits on the number of students that can be accommodated in each upper division lab section without compromising educational quality, and there is a limit to the number of lab sections that can be accommodated within the workloads of the existing faculty. Similar considerations apply to being able to support student participation in research and other projects. Thus the upper limit for any cohort of chemistry majors (i.e., the number of graduates per year) may be in the range of 16 to 20 if chemistry returns to a staffing level of four tenured/tenure track professors. The upper limit for any cohort of physics majors may be lower, in the range of 12 to 15, because the physics faculty includes just three people that teach courses for majors.
In geology, the practical limit on upper division lab sizes takes on two additional confounding factors. How many students at one time can be effectively supervised at field locations? The instructor is responsible for safety and being available to help students who have questions. The logistical constraints of doing this over a physical area much larger than the size of an on-campus laboratory can be substantial. An upper limit for any cohort of geology majors for the existing staffing level may be in the range of 20 to 25.

The second factor affecting geology is a problem brewing with transportation to field sites. The College currently owns 15-passenger vans that are used for field work. It is well-known that there are serious concerns nationally about the safety of these vans. When a lab section is large enough to require a second van, a student must drive that van. Through conversations with the Assistant Vice President for Auxiliary Services, we understand that student drivers may not be allowed in the near future because of the safety concerns associated with these vans. This would put a practical limit of fourteen on the number of students per lab section. If there are more than 14 students, additional lab sections would need to be offered, but that would create a larger number of lab sections that may not be accommodated within the workloads of the existing faculty. We would like to work with the Assistant Vice President and other affected programs (biology, environmental science) to evaluate alternatives, such as safer vehicles that students would be allowed to drive (e.g., perhaps bare-bones models of vehicles in the Ford Explorer class, for example, or 12-person vans).

Increasing the number of majors in each program is no small task. We can start with some of the more obvious tactics, such as improving each program’s Web site, and updating and distributing more widely a brochure for each program. Developing a relationship with more high school science teachers in the College’s service region is likely to help. Targeting certain pools of potential majors outside the service area may also be important. We will need to create the time to accomplish these efforts. Release time from teaching may be appropriate, but may be problematic.

An on-going problem has been our ability to fill full-time and part-time temporary positions when they are needed. Our success has been hit-or-miss. Sometimes well-qualified, enthusiastic people seek us out, and they are an asset for as long as other factors in their lives allow them to participate. On other occasions we have to do a search and embrace whoever can be convinced to give the position a try; the success rate here is roughly 50-50. On still other occasions (e.g., this year in chemistry for a part-time position, and last year in physics for a full-time position) we come up empty handed and are forced to give overloads to existing faculty. We hope to work with the administration to improve this. Better pay would be a plus, but is irrelevant when qualified people are not even available. We would like to explore ways to use senior majors to help cover lab sections. The relative roles of students and faculty in lab instruction fall on a continuum; we need to work out with the administration what sections of that continuum we can take advantage of.

Our performance in the area of program assessment needs improvement. We’ve adjusted our assessment plan each year as we gain experience. Our current plan is basically sound, but we are still working out some implementation difficulties, such as setting meaningful target scores,
tracking the success of our graduates, and implementing a workable system for evaluating the
critical thinking and communication abilities of our graduating seniors.

In chemistry, two of four positions are currently filled with full-time temporary staff. In order to
improve our ability to cover inorganic and physical chemistry and eliminate the uncertainty and
instability created by frequent searches for temporary faculty, we need for both of these positions
to be tenure-track. We also need to determine a sustainable way to cover the 100-level chemistry
lab sections that fall outside of the standard faculty workload.

Physics may suffer from the loss of its applied physics program. This loss was a result of the
deletion of the two-year engineering program, which functioned in effect as a recruiting tool for
physics. Many students who came to Mesa for the two-year engineering degree would stay on
and get an applied physics degree. Physics also terminated its concentration in physics for
secondary teaching. This was largely due to difficulties with this small program finding time to
keep up with accreditation requirements. The physics faculty believes that we should attempt to
revive this program if possible.

The geology program is hindered because it has only two small laboratories devoted strictly to
geology. Because the geology concentration is part of the B.S. in Physical Sciences, visibility is
a problem in recruitment of new students. The undergraduate geology curriculum at Mesa State
is as robust as any in the Colorado, including the University of Colorado and Colorado State
University. It is hard to get this point across to the public, however. A change in the department
name may fix this problem. The geology faculty would like to develop a broader network of
contacts to assist students in finding pre-graduation and post-graduation employment. A similar
network would be established to assist students wishing to attend graduate school.

Currently, geology faculty and students are in saturation mode, thus, few opportunities exist for
social interaction. To improve this situation, we would like to re-introduce our alumni newsletter
and reactivate the Geology Club. Most importantly, we need to improve our website to make it
more dynamic.

H. Vision

Our vision is to be an enhanced version of what we already are—a great place for students to
major in chemistry, physics, and geology. We see an excellent faculty devoted to undergraduate
education in all its forms, not just in-class learning but hands-on, project-based or research-based
learning in the lab and field as well. We see a curriculum that is responsive to new
developments and society’s needs. We envision greater numbers of majors and graduates, who
continue to be successful in professional work and graduate school.

1. Proposals for strengthening the programs

The chemistry faculty envisions adding a concentration in biochemistry, which would appeal to
many students, particularly those headed for graduate and professional schools. It would provide
a focus that is popular elsewhere but missing from Mesa. It would also provide a simpler
transition for students with a biology background that decide on a chemistry major late in their academic journey. This option can be accommodated in the mandated 120 credit hours and will be designed to include relevant biology courses as well as provide a rigorous chemistry background. This program could begin tomorrow without requiring any additional resources.

The physics faculty would like to revise certain aspects of its curriculum, filling gaps at the sophomore level in mechanics and thermodynamics, and reevaluating upper division requirements in quantum theory. They advocate exploring the potential for developing a 3+2 engineering program with another school. (Students would spend three years at Mesa and two years at an engineering school to receive bachelor degrees in both physics and engineering.)

Over the next 20 years, the industrial world will sink into an ever-deepening series of crises related to natural resources. First and foremost will be the decline of energy resources (crude oil and natural gas), followed by water resources. Because earth scientists play critical roles in the utilization of natural resources, it is very likely that the demand for geologists will rapidly expand. Parts of the geology curriculum will be modified to more clearly support the study of natural resources. A Minor in Watershed Science was implemented in 2005, and in 2006 funding from the Colorado Energy Research Institute was obtained to create a curriculum pertinent to energy-resources training. Work is underway to develop a geotechnology minor that focuses on energy-workforce employment. Additional funding for energy-workforce development will be pursued.

The majority of faculty members teaching the general-education geology courses have embraced multi-media technology. An opportunity thus exists to expand into a distance-learning format that would support the regional-education-provider role of Mesa State College.

2. Priorities requiring additional resources

Because of the unique geological resources in western Colorado and eastern Utah, plus the outstanding qualifications of the faculty, the Mesa State geology program could certainly move to the next academic level and offer a graduate degree. One faculty member frequently serves on M.S. committees at the University of Colorado.

Growth in the GIS program is expected and will require continuing improvements in hardware, software, and technical support. A certificate program for Geographic Information Systems and Technology is being developed.

Our efforts to make improvements in chemistry, physics, and geology often require more time than we can provide. A modest amount of release time from teaching is one way of creating time that has been used on occasion. However, release time can be difficult to absorb when other complications are also occurring—covering for faculty on sabbatical leave, or covering courses that need instructors because of failed efforts to find part-time or full-time temporary faculty. When circumstances create a number of courses that need to be covered, a possible solution may be a visiting professorship. This position could take the form of a one-year appointment at an attractive salary. Such a position may be very appealing to highly qualified people who are working toward landing a tenure-track position, or who are seeking sabbatical
opportunities. The program hosting the visiting professor would benefit from the infusion of that individual’s experience and knowledge. We will explore the possibilities of this idea both internally within the programs and with the administration.
Appendix 1

Program Statistics for Past Five Years
### Baccalaureate in Physical Science Awarded by Major Code, Academic Years 2001 - 2005
Mesa State College

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</tbody>
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Table 2. HEADCOUNT AND CREDIT HOUR DISTRIBUTION BY COURSE LEVEL BY TERM AY 2006

<table>
<thead>
<tr>
<th>Level/Course Level</th>
<th>Summer Headcount</th>
<th>Summer Credit Hours</th>
<th>Fall Headcount</th>
<th>Fall Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remedial - 000</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Lower - 100</td>
<td>90</td>
<td>100.0%</td>
<td>1,499</td>
<td>80.2%</td>
</tr>
<tr>
<td>Lower - 200</td>
<td>0</td>
<td>0.0%</td>
<td>60</td>
<td>3.2%</td>
</tr>
<tr>
<td>Upper - 300</td>
<td>0</td>
<td>0.0%</td>
<td>269</td>
<td>14.4%</td>
</tr>
<tr>
<td>Upper - 400</td>
<td>0</td>
<td>0.0%</td>
<td>41</td>
<td>2.2%</td>
</tr>
<tr>
<td>Subtotal Undergraduates</td>
<td>90</td>
<td>100.0%</td>
<td>1,869</td>
<td>100.0%</td>
</tr>
<tr>
<td>Graduate</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Graduate - 500</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Subtotal Graduates</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100.0%</td>
<td>1,869</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>249.0</td>
<td>4,768</td>
<td>100.0%</td>
</tr>
<tr>
<td>Level/Course Level</td>
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<td></td>
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</tr>
<tr>
<td>-------------------</td>
<td>--------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undergraduate</td>
<td>Graduate</td>
<td>Subtotal Graduates</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>Spring Headcount</td>
<td>Spring Credit Hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
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<td>0</td>
<td>1,761</td>
</tr>
<tr>
<td>Remedial - 000</td>
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<td>24</td>
<td>205</td>
<td>1,761</td>
</tr>
<tr>
<td>Lower - 100</td>
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<td>670</td>
<td>4380</td>
<td>45190</td>
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<td>1.4%</td>
<td>11.6%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Upper - 400</td>
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<td>0</td>
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</tr>
<tr>
<td>Gradate - 500</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1,761</td>
<td>45190</td>
<td>9,536</td>
<td>100.0%</td>
</tr>
<tr>
<td>Level/Tuition Classification</td>
<td>Headcount</td>
<td>Credit Hours</td>
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<tr>
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</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Undergraduate</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>In-State</td>
<td>3,365</td>
<td>8,606</td>
<td>286.9</td>
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<tr>
<td>Out-of State</td>
<td>355</td>
<td>930</td>
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<tr>
<td><strong>Subtotal</strong></td>
<td>3,720</td>
<td>9,536</td>
<td>317.9</td>
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<tr>
<td>In-State</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
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<tr>
<td>Out-of State</td>
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<td>0</td>
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</tr>
<tr>
<td><strong>Subtotal</strong></td>
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# Headcount and Credit Hour Distribution by Course Level by Term AY 2005

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<th>Level/Course Level</th>
<th>Summer Headcount</th>
<th>Summer Credit Hours</th>
<th>Fall Headcount</th>
<th>Fall Credit Hours</th>
<th>Spring Headcount</th>
<th>Spring Credit Hours</th>
<th>Total Headcount*</th>
<th>Total Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Lower Division</td>
<td>43 69.4%</td>
<td>118 54.1%</td>
<td>1,737 81.1%</td>
<td>4,536 84.4%</td>
<td>1,744 81.6%</td>
<td>4,663 84.3%</td>
<td>3,524 81.2%</td>
<td>9,317 83.8%</td>
</tr>
<tr>
<td>Upper Division</td>
<td>19 30.6%</td>
<td>100 45.9%</td>
<td>404 18.9%</td>
<td>836 15.6%</td>
<td>394 18.4%</td>
<td>869 15.7%</td>
<td>817 18.6%</td>
<td>1,605 16.2%</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>62 100.0%</td>
<td>218 100.0%</td>
<td>2,141 100.0%</td>
<td>5,372 100.0%</td>
<td>2,138 100.0%</td>
<td>5,532 100.0%</td>
<td>4,341 100.0%</td>
<td>11,122 100.0%</td>
</tr>
<tr>
<td><strong>Graduate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
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* Headcount is duplicated across terms so will not match FTE headcount.
### HEADCOUNT AND FULL-TIME EQUIVALENT PHYSICAL SCIENCE ENROLLMENTS AY 2005

<table>
<thead>
<tr>
<th>Level/Tuition Classification</th>
<th>Unduplicated Headcount</th>
<th>Credit Hours</th>
<th>FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Undergraduate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-State</td>
<td>3,887 89.5%</td>
<td>9,947 89.4%</td>
<td>331.6 89.4%</td>
</tr>
<tr>
<td>Out-of State</td>
<td>454 10.5%</td>
<td>1,175 10.6%</td>
<td>39.2 10.6%</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>4,341 100.0%</td>
<td>11,122 100.0%</td>
<td>370.7 100.0%</td>
</tr>
<tr>
<td><strong>Graduate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-State</td>
<td>0 -</td>
<td>0 -</td>
<td>0.0 -</td>
</tr>
<tr>
<td>Out-of State</td>
<td>0 -</td>
<td>0 -</td>
<td>0.0 -</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>0 -</td>
<td>0 -</td>
<td>0.0 -</td>
</tr>
</tbody>
</table>

*Students who are exclusively cash funded are excluded.*
# Headcount and Average Cumulative Credit Hours to Degree for Physical Science Students Graduating AY 2005

<table>
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<tr>
<th>Type of Entry into MSC</th>
<th>Headcount</th>
<th>Average Cumulative Credit Hours to Degree</th>
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<tr>
<td>Began at MSC</td>
<td>7</td>
<td>53.8%</td>
</tr>
<tr>
<td>Transferred in to MSC</td>
<td>6</td>
<td>46.2%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>100.0%</strong></td>
</tr>
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### ONE-YEAR RETENTION RATE FOR FIRST-TIME PHYSICAL SCIENCE STUDENTS, FALL 2003 - FALL 2004
#### Mesa State College

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<th>Level</th>
<th>Code</th>
<th>Program Name</th>
<th>Retained Fall 2004</th>
<th>Not retained fall 2004, No degree awarded</th>
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</tr>
</thead>
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<td></td>
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<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td><strong>BACCALAUREATE</strong></td>
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<tr>
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<td>66.7%</td>
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<tr>
<td>3461</td>
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<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>3462</td>
<td>Geology, Environmental</td>
<td>-</td>
<td>-</td>
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<tr>
<td>3463</td>
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<td>0.0%</td>
</tr>
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<td>Physics, Teacher Certification</td>
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<td>2</td>
<td>40.0%</td>
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<tr>
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<tr>
<td><strong>TOTAL</strong></td>
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</tr>
<tr>
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<td>1 - FT/PT Total</td>
<td>3 - FT Temp Total</td>
<td>5 - Admin Total</td>
<td>6 - PT Total</td>
</tr>
<tr>
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<td>-----------------</td>
<td>-----------------</td>
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<td>-----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>PHYS Total</td>
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<td>293,000</td>
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<tr>
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(A) Includes department head salaries and support staff.
(B) Includes course fees and travel.
(C) Allocated by % of total credit hours.
(D) Allocated by % of full-time faculty FTE.
(E) Includes institutional scholarships.
Appendix 3

Faculty Vitae
ANDRES ASLAN
Dept. of Physical and Environmental Sciences
Mesa State College
1100 North Ave.
Grand Junction, CO 81501
(970) 248-1614, aaslen@mesastate.edu

FIELD OF EXPERTISE & RESEARCH INTERESTS

Fluvial and Soils Geomorphology
Sedimentology of Siliciclastic Sedimentary Systems
Modern and Ancient Depositional Systems (especially big rivers and deltas)
Sea Level, Climatic, and Tectonic Influences on Stratigraphic Architecture
Paleosols and Paleoclimate Records
Geoarcheology

EDUCATION

Ph.D. Geology (1994) University of Colorado-Boulder
M.S. Geology (1990) University of Colorado-Boulder
B.S. Geology (1986) Brown University

PROFESSIONAL AND TEACHING EXPERIENCE

Mesa State College Associate Professor of Geology, 2002-present
Assistant Professor of Geology, 1999-2002.


Mary Washington College, Senior Lecturer, 1997-1998.

Virginia Wesleyan College, Visiting Assistant Professor, 1996-1997.

Oberlin College, Visiting Assistant Professor, 1995-1996.


RESEARCH AND WORK EXPERIENCE

Mesa State College, From 1999-2006 have led field investigations of Pleistocene Mississippi River deposits in LA and AR and geoarcheologic studies of Holocene sediments in western Colorado. Currently involved in study of the long-term evolution of the Colorado River.


University of Nebraska, Sedimentologic consultant summers of 1995 and 1996. Conducted field, mineralogic, and petrographic studies of Quaternary fluvial deposits and alluvial paleosols of the Colorado River, Texas Coastal Plain. Collaborator: Dr. M.D. Blum (L.S.U.).


Shell Oil Co. Houston, TX, Geologist in Gulf Coast Tertiary Exploration summer of 1990. Conducted a regional study of deltaic sandstones of the Eocene Wilcox Fm. in south Texas using electric well logs. Designed a computer database that was used to construct stratigraphic cross sections and sand isopach maps.


GRANTS

$12,000 – Geoarcheology of the Little Dolores River Valley, BLM grant. Current.
$362,000 – NSF REU-Site (3 yr) – REU PI; Current; currently in 2nd year of REU project
$15,000 – Geoarcheologic study of Sieber Canyon, Uncompahgre Plateau, BLM grant, 2003-2004
$29,081 – Grand Valley Selenium Task Force Coordinator, EPA non-point source grant, 2003-2005
$25,000 – American Chemical Society Petroleum Research Fund Grant, 2001
$4,800 – OSC Joint Activities Grant, 2000
$2,500 – OSC Trustees Boards Goals and Objectives Award, 2000
$3,500 - Oberlin College Grants-in-Aid, 1995
AWARDS AND SELECTED PROFESSIONAL ACTIVITIES

2002-2003 Mesa State College Outstanding Achievement in Scholarship Award

2005 – Technical Program Co-Chair, GSA Rocky Mt Section meeting

2005 Field Trip Leader, GSA Rocky Mountain Section Meeting

2005 Technical Session Co-Chair, GSA Rocky Mountain Section Meeting

2001 Field Trip Co-Leader 7th International Fluvial Sedimentology Conference, Lower Mississippi Valley and Texas Coastal Plain.

1999 Society for Economic Paleontologists and Mineralogists: Honorable mention for Outstanding Paper Award (Journal of Sedimentary Research)

CLASSES TAUGHT

Introductory level
- Physical Geology + lab
- Historical Geology + lab
- Environmental Geology + lab
- Oceanography + lab
- Natural Hazards

Upper level
- Geomorphology + lab
- Fluvial Geomorphology and Hydrology
- Soil Properties and Characterization + lab
- Senior Seminar
- Structured Research – numerous topics
- Geology Field Camp
- Sedimentology lab

PEER-REVIEWED JOURNALS & BOOK CONTRIBUTIONS:


GUIDEBOOKS AND GUIDEBOOK ARTICLES:


UNPUBLISHED REPORTS:


ABSTRACTS:


* Awarded Outstanding Student Paper at the 2006 Rocky Mountain Section of the Geological Society of America meeting, Gunnison, Colorado.


Baker, G. and Aslan, A. 2005. Integrating geology and geophysics to determine the origin of Unaweep Canyon and Late Cenozoic fluvial incision in the Colorado Plateau-Rocky Mountain region. GSA Abstracts with Programs.


Aslan, A., Autin, W.J. and Blum, M.J. 2001. Responses of the Mississippi and Texas Coastal Plain Rivers to Late Quaternary Sea-Level Rise, 7th International Fluvial Sedimentology Conference, Abstract with Programs p. 49.


Aslan, A., Riley, A., and Blum, M.D. 1997. Late Quaternary incised valley fills and alluvial paleosols of the Colorado River, Texas Coastal Plain, GSA Abstracts with Programs, v. 29, n. 6, p. 113.


Kraus, M.J. and Aslan, A. 1993. Using Alluvial Paleosols to Interpret Floodplain Processes,


PROFESSIONAL VITAE

REX D. COLE, Ph.D., P.G.
Professor of Geology
Mesa State College

June, 2008

PERSONAL INFORMATION

Born in Delta, Colorado

EDUCATION

Ph.D. in Geology (1975) University of Utah, Salt Lake City, UT
B.S. in Geology (1970) Colorado State University, Fort Collins, CO
A.S. in Geology (1968) Mesa Junior College, Grand Junction, CO
High School Diploma (1966) Delta High School, Delta, CO

PROFESSIONAL REGISTRATION

Registered Professional Geologist (Wyoming) since 1992; Number PG-463

SUMMARY OF PROFESSIONAL EXPERIENCE

1999- Professor of Geology; Department of Physical and Environmental Sciences, Mesa State College, Grand Junction, CO
1995-99 Associate Professor of Geology; Department of Physical and Environmental Sciences, Mesa State College, Grand Junction, CO
1983-95 Sr. Advising Geologist; Unocal Corp., Production and Development Technology Group, Brea, CA
1982- Consulting Geologist; R.D. Cole and Associates, Grand Junction, CO
1980-82 Manager of Geotechnical Operations; Multi Mineral Corp., Grand Junction, CO
1978-80 Staff Geoscientist IV; Bendix Field Engineering Corporation, Grand Junction, CO
1975-77 Assistant Professor of Geology; Department of Geology, Southern Illinois University, Carbondale, IL
1973-75 Exploration Geologist; American Smelting and Refining Company, Salt Lake City, UT (part time)
1970-73 Teaching Fellow and Research Assistant; Department of Geology and Geophysics, University of Utah, Salt Lake City, UT (academic months)
1971 Exploration Geologist; Inspiration Development Company, Spokane, WA (Summer)
1970 Exploration Geologist; Duval Corporation, Salt Lake City, UT (Summer)
1968 Assistant Geologist; Petro-Nuclear Ltd., Naturita, CO (Summer)

EXPERTISE

Sedimentology, stratigraphy, energy resources, mineral resources, stable-isotope geochemistry, field geology, geotechnical writing/editing, project management, and administration.
ANALYTICAL QUALIFICATIONS AND SKILLS

Petrographic microscope, gas-source mass spectrometer, x-ray diffractometer, scanning-electron microscope, gamma-ray spectrometers (surface and down-hole), GIS/GPS, database management, and bore-hole imaging techniques.

PROFESSIONAL AFFILIATIONS

Geologic Society of America (since 1975); chair of Rocky Mountain Section (2005)
Sigma Gamma Epsilon (since 1995) -- National Geoscience Honorary Society
Sigma Xi, the Scientific Research Society: Vice President of Mesa State College Chapter (1996-1997); President of Mesa State College Chapter (1997-1998); currently inactive.

HONORS AND AWARDS

2006  Received Outstanding Achievement in Scholarship Award from Mesa State College.
2005  Received Best Paper of the Year (2005) Award from the Rocky Mountain Association of Geologists (Denver) for paper with Steve Cunella in the Mountain Geologist.
2004  Elected Chair (President) of the Rocky Mountain Section of the Geological Society of America.
2004  Selected as General Chair for the 57th Meeting (2005) of the Rocky Mountain Section of the Geological Society of America.
2004  Nominated for a distinguished faculty award (overall) at Mesa State College.
2003  Nominated for a distinguished faculty award (overall) at Mesa State College.
2003  Invited speaker for the monthly meeting of the Rocky Mountain Association of Geologists (Denver).
2002  Nominated for a distinguished faculty award (research) at Mesa State College.
1994  Nominated for a creativity award from Unocal Corporation for geological research.
1993  Nominated for a creativity award from Unocal Corporation for geological research.
1992  Invited speaker at Department of Geosciences, New Mexico Institute of Mining and Technology, Socorro
1992  Received special commendation from Unocal Corporation for participation in a special business venture in New Mexico.
1992  Received creativity award from Unocal Corporation for geological research.
1991  Invited speaker at Department of Geology and Geophysics, Louisiana State University, Baton Rouge.
1990  Invited speaker at Colorado School of Mines, Golden.
1985  Invited speaker at University of Colorado, Denver.
1977  Elected chairman of the Graduate Admissions Committee, Department of Geology and Geophysics, Southern Illinois University.
1977  Received $1,500 grant from the Office of Research and Projects, Southern Illinois University.
1976  Elected to the College of Science's Molecular Science Faculty (interdepartmental Ph.D.-granting program) at Southern Illinois University.
1976  Received $9,000 grant from the American Chemical Society (Petroleum Research Fund).
1976  Received $29,140 grant from the Coal Research Center, Southern Illinois University.
1973  Received $450 grant from Sigma Xi to partially fund graduate research program.
GRADUATE STUDENT INVOLVEMENT

2005- Nick Sommers (M.S. in Geology) at University of Colorado, Boulder (pending outside committee member).
2004- Quinten German (M.S. in Geology) at University of Colorado, Boulder (outside committee member).
2002-04 Amanda Ellison (M.S. in Geology) at University of Colorado, Boulder (outside committee member).
1999-03 Matt Stikes (M.S. in Geology) at Northern Arizona University (outside committee member).
1996-97 Jeffery Klein (M.S. in Geology) at New Mexico Tech. (outside committee member).
1990-93 Mark Lambert (M.S. in Geology) at New Mexico Tech. (outside committee member).
1989-92 Paul Knox (M.S. in Geology) at Long Beach State University (research advisor).
1977-79 David Boyer (M.S. in Geology) at Southern Illinois University (committee chair).
1977-79 Alcn Ochs (M.S. in Geology) at Southern Illinois University (committee chair).

SHORT COURSES, RESEARCH SYMPOSIA AND SUPPLEMENTAL TRAINING

1995 Invited participant in a sequence stratigraphy research/field conference conducted by the Society of Sedimentary Geology (SEPM) American Association of Petroleum Geologists (five days, Wyoming).
1995 Reservoir characterization and geostatistics computer workshop, conducted by the R3 Group, in Brea CA (five days).
1992 Reservoir characterization and geostatistics computer workshop, conducted by Mohan Kelkar in Brea, CA (three days).
1991 Invited participant in a sequence stratigraphy research/field conference conducted by the American Association of Petroleum Geologists (seven days, Utah and New Mexico).
1988 Sequence stratigraphy and sea-level changes (field trip and workshop), conducted by Working Group I of Global Sedimentary Geology Program (three days).
1988 Seismic stratigraphic and seismic facies analysis of deep-water siliciclastic systems, (short course), conducted by Geoquest International, Inc. (one week).
1988 Sequence stratigraphy of Tertiary strata in Mississippi, Alabama, and Georgia (field symposium), conducted by P.R. Vail (one week).
1987 Sequence stratigraphy (short course), conducted by P.R. Vail (two days).
1986 Shelf sands and strandline systems (short course), conducted by the American Association of Petroleum Geologists (two days).
1986 Depositional sequences and shelf sandstones in Cretaceous strata of the San Juan basin, New Mexico (field symposium), conducted by Gulf Coast Section of Society of Economic Paleontologists and Mineralogists (three days).
1985 Seismic facies analysis (short course), conducted by Geoquest International, Inc. (one week).
1978 Depositional and ground-water flow systems in the exploration for uranium (short course), conducted by the Bureau of Economic Geology, University of Texas at Austin (two days).
1976 Carbonate depositional environments (short course), conducted by G. Friedman (one day).

- 60 -
ARTICLES PUBLISHED (All peer-reviewed, except where noted)


ABSTRACTS PUBLISHED


1979 D.L. Boyer and R.D. Cole, Total-sulfur content and morphology of iron-disulfide minerals in the Parachute Creek Member of Green River Formation, Picance Creek basin, Colorado: Geological Society of America Abstracts with Programs, v. 11, no. 6, p. 267.


2001 R.D. Cole and A. Aslan, Late Cenozoic erosional evolution of Grand Mesa, western Colorado: Geological Society of America Program with Abstracts (Rocky Mountain Sectional meeting).

2001 J. Petersen and R.D. Cole, Petrographic and petrophysical characteristics of the McCracken Sandstone Member of Elbert Formation, Lisbon Field, Paradox Basin, Utah: Geological Society of America Program with Abstracts (annual meeting).


2003  A. Ellison, M. Pranter, R. Cole, and P. Patterson, Stratigraphic architecture of the Upper Cretaceous Williams Fork Formation, Piceance Basin, western Colorado through outcrop studies and high-resolution Lidar imaging: Geological Society of America Program with Abstracts (annual meeting).


2005  R. Cole, Characterization of fluvial sand bodies in the lower Williams Fork Formation (Campanian), Coal Canyon Area, Colorado: Rocky Mountain Section of Geological Society of America Program with Abstracts, p. 44.

2005  C. Betton, A. Aslan, and R. Cole, Late Cenozoic erosional history and major drainage changes of the Colorado-Gunnison River systems, western Colorado: Rocky Mountain Section of Geological Society of America Program with Abstracts, p. 35.


2006  R. Cole, A geomorphic approach for predicting reservoir volumes in high-sinuosity fluvial sand bodies in the lower Williams Fork Formation, southwest Piceance Basin, Colorado: Rocky Mountain Section of Geological Society of America Program with Abstracts.

CONSORTIUM PROCEEDINGS


BOOK REVIEWS PUBLISHED (Journal of Sedimentary Petrology, J.S.P. or Journal of Sedimentary Research, J.S.R.)

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David Collins

*Department of Physics, Bucknell University,*
*Lewisburg, PA 17837, USA*

Voice: (570) 577-3536 (W)  (570) 523-4912 (H)
email: dcollins@bucknell.edu

**Personal**

- Birth date: 9 October 1966.
- Place of Birth: Worcester, South Africa.
- Citizenship: South Africa (legal permanent resident of the USA).

**Education**

- **PhD,** December 1997, University of Texas at Austin.
  - Supervisor: Prof. Cécile DeWitt-Morette.
  - Specialization: Mathematical Physics, Functional Integration.
- **BSc (Hons),** April 1989, Rhodes University, Grahamstown, South Africa.

**Theses**

- **The Use of Groups in Physics with Special Reference to SO(3) and the Euclidean Group,** Honours thesis, Rhodes University (1989).

**Work Experience**

- **Visiting Assistant Professor,** Physics, Bucknell University, August 2003 - present.
  - Taught various undergraduate physics courses.
  - Supervised undergraduate research and independent study.
- **Postdoctoral Research Associate,** Physics, Carnegie Mellon University, August 2000 - July 2003.
  - Faculty Supervisor: Prof. R. B. Griffiths.
  - Investigated theoretical quantum computation and quantum information.
  - Faculty Supervisors: Prof Ki Wook Kim, Prof William C. Holton.
  - Investigated theoretical quantum computation and experimental NMR quantum computation.
  - Devised an algorithm for the computation of the point transfer function of an optical system.
Teaching Experience

- **Visiting Assistant Professor**, Physics, Bucknell University, 2003 - present.
  - Physics 332: Upper division quantum mechanics course.
  - Physics 222: Sophomore level modern physics course.
  - Physics 141: Introductory level physical science course for non-majors.
  - Physics 329: Upper division physics laboratory.
  - Astronomy 101 Laboratory: Freshman level astronomy laboratory for non-majors.
  - Physics 211/212 Laboratory: Freshman level physics laboratory.
  - Physics 211/212 Problem Session: Discussion sessions for freshman level physics course.
  - Independent Study and Undergraduate Research: Supervised undergraduate students in independent study and research in quantum information.

  - Quantum Information and Quantum Computation: Upper division undergraduate/graduate physics elective course.
  - Supervisor: Prof. R. B. Griffiths (course organizer).

  - Supervised undergraduate physics research projects in pulse sequence design for NMR quantum computation.

- **Assistant Instructor**, Physics, University of Texas, 1993 - 1997.
  - Courses: Physical Science 303, 304: Introductory level physical science for non-science majors.
  - Supervisor: Prof. Peter R. Antoniewicz.

- **Teaching Assistant**, Physics, University of Texas, 1991 - 1993.
  - Courses: Physics 102M, 102N Laboratories: Freshman level for science (non-physics) majors.
  - Supervisors: Prof. J. David Gavenda (Phy 102M), Prof. Thomas A. Griffy (Phy 102N).

  - Course: Physics IP/II Tutorials: Discussion sessions for freshman level course for science (non-physics) majors.

Research Interests

My primary research area is quantum computation and quantum information. In particular, I investigate implementations of quantum algorithms on ensembles of quantum systems, such as those used in solution state nuclear magnetic resonance (NMR). My work is mostly theoretical, although I have conducted NMR experiments demonstrating quantum information processing. Other research interests include aspects of the foundations of quantum mechanics.
Publications


Conference Presentations


Conference Posters


Workshops Attended

1. 15th Waterloo NMR Summer School, University of Waterloo, Waterloo, Ontario, Canada, June 1999.

2. Quantum Computations Tutorial, APS March Meeting, Los Angeles, USA, March 1998.

3. NATO ASI Functional Integration: Basics and Applications held at Cargese, Corsica, France, September 1996. Funding provided by Collectivité Territorial de Corse.

Professional Organizations

1. Member: American Physical Society.

References

Prof. David C. Schoepf  
Department of Physics  
Bucknell University  
Lewisburg, PA 17837, USA  
Phone: (570) 577-3107  
email: schoepf@bucknell.edu

Prof. Robert B. Griffiths  
Department of Physics  
Carnegie Mellon University  
Pittsburgh PA 15213, USA  
Voice: (412) 268-2765  
email: rgrif@cmu.edu

Prof. Jeffrey M. Bowen  
Department of Physics  
Bucknell University  
Lewisburg, PA 17837, USA  
Phone: (570) 577-1314  
email: jbowen@bucknell.edu
Lois Davidson  
4668 Lands End Road  
Whitewater, Colorado 81527  
970.242.2879

Experience:

2003 – Present  
Department of Physical and Environmental Sciences, Mesa State College, Grand Junction, Colorado  
**Chemistry Lab Coordinator**  
Coordinate chemistry labs, manage chemical stockroom and inventory, order supplies, set up and take down labs and manage chemical waste.

2000 – 2003  
Sartomer Company, Grand Junction, Colorado  
**Quality Control Technician**  
Analyze polymers for molecular weight, viscosity, percent vinyl content and non-volatile material using GC, FTIR, ATR, SEC/HPLC and viscometry.

1994 – 2000  
Saccomanno Research Institute, St Mary’s Hospital & Medical Center, Grand Junction, Colorado  
**Research Technologist**  
Perform research using molecular biology, biochemical and tissue culture techniques, order supplies, and train high school and college interns.

1992 – 1994  
Department of Chemistry and Biochemistry, University of Texas, Austin, Texas  
**Research Associate**  
Perform research using protein purification, DNA sequencing and HPLC techniques, order supplies, train undergraduate and graduate students.

1991 – 1992  
Department of Chemical Engineering, University of Texas, Austin, Texas  
**Research Assistant**  
Teach graduate students biochemical and HPLC techniques and perform research in oil spill cleanup.

1971 -1991  
Department of Chemistry and Biochemistry, University of Texas, Austin, Texas  
**Research Assistant**  
Perform biochemical research, train undergraduate, graduate and summer high school students, order supplies and track grant expenditures.

1970 – 1971  
Department of Entomology, Oregon State University, Corvallis, Oregon  
**Technician**  
Perform insect physiology research using biochemical techniques.

1967 – 1969  
Department of Zoology, Oregon State University, Corvallis, Oregon  
**Technician**  
Perform research in radiation biology and physiology.
Education: B. S. in General Science, emphasis in chemistry and biology, Oregon State University, 1967.

Publications:


Abstracts:


GB Kitto, F Mauri, L Davidson, G McDonald, M Hackert. (1987) Multiple hemoglobins of a marine invertebrate. 63rd Annual meeting of the American Association for the Advancement of Science, Southwestern and Rocky Mountain Division, Abstract.


CURRICULUM VITAE

Craig D. Dodson Ph.D.

Addresses:
Work: Dept. of Physical and Environmental Sciences
   Mesa State College
   1100 North Ave
   Grand Junction, CO
   81501
   Phone: (970) 248-1595, Fax: 248-1700
   e-mail: cddodson@mesastate.edu

Home: 623 33 Road
   Clifton, CO
   81520
   Phone: (970) 523-5926

Education:
Postdoctoral Research Fellow 1986-87, University of Colorado School of Pharmacy
Ph.D. 1987, Analytical Chemistry, Colorado State University
B.S. 1982, Chemistry, University of Idaho; cum laude

Graduate Advisors:
Postdoctoral, Dr. John Thompson
Ph.D., Dr. Frank R. Stermitz

Current Position:
Professor of Chemistry, Mesa State College, 2000-present

Previous Positions Held:
Associate Professor of Chemistry, Mesa State College, 1995-2000
Assistant Professor of Chemistry, University of Nebraska at Kearney, 1992-1995
Visiting Assistant Professor of Chemistry, Whitman College, Walla Walla, WA, 1991-1992
Part-Time Lecturer in Chemistry and Math., Western State College, Gunnison, CO, 1990-91
C.C. Johnson and Malhotra Inc., Environmental Data Audit, 1990-91
US Department of Justice, Consultant, Charles George Superfund Site, 1990
Analytical Chemist, US Environmental Protection Agency, National Enforcement Investigation
   Center, Lakewood, CO, 1987-1990, GS-13

Awards, Fellowships and Honors:
Distinguished Faculty Award in the Area of Scholarship, Mesa State College, 2002
U of Nebraska at Kearney, Graduate Faculty Status, 1992
U of Nebraska at Kearney, University Wide Departmental Award for Excellence in
   Undergraduate Teaching, 1992
Special Achievement Award, USEPA, 1990
Achievement Award for a Special Act or Service, USEPA, 1990
NSF Pre-Doctoral Fellowship, CSU, 1982-85
Colorado Fellowship, CSU, 1983
DuPont Fellowship, CSU, 1982
William Cone Award, U of ID, 1982
Mines and Metallurgy Scholarship, U of ID, 1978-79
Research Interests: My research interests are in the general areas of natural products chemistry, the application of "green" technologies to natural product isolation and the use of liquid CO$_2$ for the removal of anionic pollutants from water. Specific examples from current projects are listed below.

Chemical Ecology: 1) Measurement of the variation in concentrations of defensive secondary metabolites across a variety of ecological conditions.
2) The role of phytochemicals in ant/plant mutualisms in neotropical Piper species.
3) The development and use of insect feeding preference bioassay techniques for the discovery of plant secondary metabolites with insect behavior modification properties.

Natural products isolated from cryptobiotic soil crusts and lichenized soil cyanobacteria of the Colorado Plateau.

Hepatotoxic unsaturated pyrrolizidine alkaloids from range plants of the western USA.

The development of "green" methods for use in natural products isolation. Currently we are exploring the use of carbon dioxide (sub, near and supercritical fluid) as a general extraction medium for natural products and the use countercurrent chromatography to separate the compounds in those extracts. Together these methods have cut our solvent use by at least 25 to 50% and CCC has allowed us to completely eliminate the use of halogenated solvents.

The development of methods that use liquid CO$_2$ and a countercurrent flow device to remove perchlorate, arsenate/ite and selenate/ite from water.

Research Grants Funded:
1) NSF Grant, “Plant Secondary Metabolites as Mediators of Trophic Interactions in a Tropical Forest II” 2003, with Dyer and Richards, $200,000; $70,000 subcontract to MSC

2) NSF Grant, “Acquisition of Supercritical Fluid Extraction and Countercurrent Chromatography Equipment for the Development of a “Green” Natural Products Isolation Laboratory”, 2002, received $77,742, Major Research Instrumentation Program

3) NSF Grant, “Plant Secondary Metabolites as Mediators of Trophic Interactions in a Tropical Forest Community”, 2000, with Dyer, Richards and Letourneu, received $170,000; $60,000 subcontract for Dodson and Richards at Mesa State College

4) Office of State Colleges Grant, Professional Development Funds, “Phytochemical Investigation of Cryptobiotic Crusts and their Alleged Allelopathic Interaction with Non-Native Grasses”, 2000, received $1,300

5) Office of State Colleges Grant, Joint Activities Funds, “Phytochemistry of Neotropical Piper Species Related to Piper cenocladum and their Role in Defense Against Atta Species”, 2000, received $4,550
6) MSC Professional Development Fund, 1999, received $1,000

7) Office of State Colleges Grant, Joint Activities Fund, "Ongoing Collaborative Study of the Phytochemistry of an Ant/Plant Mutualism", 1998, with Richards, received $9,755

8) Office of State Colleges Grant, Professional Development Funds, "Ongoing Collaborative Study of the Phytochemistry of an Ant/Plant Mutualism", 1998, with Richards, received $5,000

9) Mesa State College Lathrup Foundation Funds, "Trifluralin, Interactions in Alfalfa Fields", 1998, with Dyer, McKenney, Rechel, Werman and McVean Waring, received $12,000

10) MSC Council of Chairs Grant, 1996, with Dyer, received $900

11) MSC Academic Enrichment Fund, 1996, received $500

12) NSF, REU Grant, 1996, with Dyer and Letourneau, received $4800

13) U of Nebraska Research Services Council, "Phytochemical Studies of Nebraska Native Flora II", 1993, received $6,450

14) NSF, Major Infrastructure Improvement Grant with other UNK Chemistry Faculty, 1993, received several hundred thousand dollars

15) U of Nebraska Research Services Council, "Phytochemical Studies of Nebraska Native Flora I", 1992, received $2,000

**Publications:**


"Cenocladamide, A Dihydropyridone Alkaloid from Piper cenocladam".  
Phytochemistry 53(1) 51-54

between Piper marginatum Jacq. (Piperaceae) and a coccinellid beetle". Journal of  
Tropical Biology, 15:841-846

Ocotea veraguensis Seeds". Phytochemistry, 26(7), 2037

"Mystery Root Ingestion; Two Cases of Probable Henbane, Hyoscyamus niger,  
Poisoning". Journal of Emergency Medicine, 5, 5

Flowers". Journal of Natural Products, 49(4), 727

Cannabispirenone-A: Synthesis and Absolute Configuration". Synthetic  
Communications, 14(7), 599

Presentations:
Sept. 1999, "Natural Products Chemistry at the Western Colorado Center for Tropical  
Research", 25th Annual Guild of Rocky Mountain Population Biologists Meeting at  
the CU Mountain Research Station, Abstracted

July 1999, “The Role of “Piper” Amides in the Ecology of a Neotropical Ant-Plant Mutualism  
formed between Piper cenocladam and Pheidole bicorneus”, Joint Meeting of the  
ASP, AFERP, GA and PSE, Amsterdam, the Netherlands, Abstracted  
(presentations chosen on a competitive basis)

Sept. 1998, “Piper Chemistry and The Use of the Paraponera Bioassay as a Means of  
Identifying Plants with Significant Insect Antifeedant Behavior”, Colorado State  
University, Chemical Ecology Discussion Group, Invited

Seventy Fourth Annual SWARM meeting at MSC, Invited and abstracted

April 1998, “Chemical Ecology in a Tropical Rain Forest: The Latest Research Efforts from  
the Western Colorado Center for Tropical Research”, Sigma Xi Lecture, Late  
Spring Meeting, Invited
Feb. 1998, “The Role of Phytochemistry in a Tropical Ant/Plant Mutualism”, Western State College, Gunnison CO, Invited

July 1996, “Approaches to Chemical Ecology Problems; A Chemists Perspective”, 1996 OTS Graduate Level Tropical Ecology Course at La Selva Biological Research Station


April 1995, “Pyrrolizidine Alkaloids from the Genus Liatris”, Research Services Council Annual Meeting, University of Nebraska at Kearney

April 1994, “Pyrrolizidine Alkaloids of Liatris aspera”, Nebraska Academy of Sciences Annual Meeting, Lincoln NE, abstracted

Presentations/Posters given by my research students:
August 2002, "Causes and Consequences of Variation in Piper Chemistry" presented by R.M. Brauner at the Annual Meeting of the Ecological Society of America. Abstracted

March 2002, "An Improved Total Synthesis of Piper Amides Isolated from Piper cenocladum" presented by Wesley Pidcock at the MSC student research symposium. Abstracted

March 2002, "Isolation of Secondary Metabolites from Soil Cyanobacteria of the Colorado Plateau Specially from a Lichenized Nostoc Species" poster by Laura Mutter at the MSC student research symposium. Abstracted

March 2002, "Extraction and Isolation of Possible Insect Deterrent Compounds from the Tropical Tree, Lonchocarpus Oliganthus" poster by Angela Smilanich at the MSC student research symposium. Abstracted

March 2002, "Development of a Bioassay for use in the Isolation of Herbicidal Compounds from Myrmelachista Ants" poster by Ed Brotsky at the MSC student research symposium. Abstracted


April 1995, “Isolation of Iridoids from the Nebraska Endemic, *Penstemon haydenii*”, presented by Dale Zaruba, Nebraska Academy of Sciences Annual Meeting, Lincoln NE, student section, abstracted

April 1995, “Isolation of Iridoids from the Nebraska Endemic, *Penstemon haydenii*”, poster presentation by Dale Zaruba, RSC Annual Meeting at UNK

April 1994, “Isolation of Catalpol from *Penstemon haydenii*”, presented by Kevin Reichmuth, NAS Annual Meeting, Lincoln NE, abstracted

Oct. 1994, “Isolation of a Rare Hastaneicine Base Containing Pyrrolizidine alkaloid from *Liatris scariosa*”, presented by Christopher Meyer, NU System Undergraduate Research Symposium, UNL, abstracted


**Committees and Campus Service:**
Academic Policies and Procedures, 2005/6
Member of Graduate Committee for Tulane University Ph.D. candidate, Malia Fincher, 2003
Chemistry Search Committee, Chair, 2003, 1999, 1997
Tenure Committee, 2003 to present
Promotion Committee, 2001 to present
Graduate Council, 2000, 2001
Courtyard Utilization Committee, Chair, 2000 to present
Biology Search Committee, member, 2001
Hearing and Grievance Committee, member, 1999
PES Program Review Committee, member, 1999
Outdoor Program Director Search Committee, member, 1999
Research at Undergraduate Institutions Panel Discussion, panel member, 1999
Half Day of Demonstrations for 3rd Grade “Matter” Curriculum, 1999
Campus Recycling Committee, member, 1998
Discipline Committee, member, 1996-1999
Who’s Who Committee, 1996
Masters of General Science Committee, 1996
Chemistry Demonstration Show, High School Science Fair, 1996 and 1997
Advisor for the American Chemical Society Student Affiliate at UNK, 1992-95
Chemistry Search Committees at UNK, Biochem. and Organic, 1994 and 1995
Deans’ Advisory Committee at UNK, 1994-95
Teaching Experience: 15 years full time teaching experience at four undergraduate institutions
Specific courses I have taught/developed are listed below.
1) Chemistry and Society: a liberal arts, nonmathematical, introduction to chemistry
2) Principles of Chemistry Lecture and Laboratory: a one semester general chem. course
3) Principles of Organic Chemistry Lecture and Laboratory: a one semester organic chem. course
4) General Chemistry I and II Lecture and Laboratory: a "majors" general chem. course
5) Quantitative Analysis Lecture and Laboratory: a one semester introduction to analytical chem.
6) Environmental Chemistry: a one semester course that I have taught at various times and places at the 300, 400 and graduate level
7) Advanced Organic Chemistry II: a qualitative organic spectroscopy course; NMR, MS, UV/Vis, & IR
8) Advanced Laboratory I and II: MSC's version of physical chem. lab.
9) Advanced Environmental Sampling and Analytical Methods Lecture and Laboratory: a course for environmental restoration majors
10) Instrumental Analysis: a typical senior level instrumentation course
11) Introduction to Inorganic Chemistry: similar to #2 but taught at Western State College
12) Algebra I and II: taught at WSC

Professional Affiliations
American Chemical Society, member since 1981
Sigma Xi, member since 1992
American Society of Pharmacognosy, member since 1992
Phytochemical Society of North America, member since 1992
John Kofi Dogbe
13750 Lear Blvd. Apt. 21 · Reno, NV 89506
Tel: (775)-972-7246 · Fax: (775)-972-7246 · E-mail: dogbe@chem.unr.edu

Objective

My objective is to pursue excellence in teaching of Chemistry (Physical), Mathematics and Physics at undergraduate level and to engage in undergraduate research in Surface Science, Materials Science and/or Electronics.

Education


October, 1996 BSc. Mathematics, University of Cape Coast, Cape Coast, Ghana.

October, 1996 Diploma in Education, University of Cape Coast, Cape Coast, Ghana.

Work Experience

Fall, 2002 - Present Graduate Research Assistant, Department of Chemistry, University of Nevada, Reno.

- Investigation of surface geometries of adsorbate covered single crystal Si(100)-2x1 using experimental and computational low-energy electron diffraction techniques.
- Maintaining the ultra-high vacuum chamber
- Building and maintaining group computational computer cluster.
- Maintaining computational software.
- Responsible for laboratory safety.

June 2003-January 2005 Laboratory Assistant, American Assay Laboratory. Sparks, Nevada.

- Use of atomic adsorption spectroscopy to determine precious minerals (Au, Cu, Pt, etc) in soil samples.
- Use of GC/ICP mass spectrometry to determine precious mineral content of soil samples.

Fall, 1999 - Spring 2002 Teaching Assistant, University of Nevada, Reno. Department of Chemistry.

Lower Division Chemistry

- CHEM 101 (201) (General Chemistry I) Laboratory & Recitation.
- CHEM 102 (202) (General Chemistry II) Laboratory

Upper Division Chemistry

- CHEM 355 Physical Chemistry: Laboratory session - Teaching and supervision.

Fall, 1999-Spring 2003 Assistant Systems & Networking Administrator, University of Nevada, Reno.
Department of Chemistry.


January, 1997- July 1999 Senior Research Assistant, University of Cape Coast, Ghana.

September, 1996-Dec.,1996 Teaching Assistant (National Service), University of Cape Coast, Ghana.
Computer Center.


Relevant Computer Skills

Extensive and working knowledge in computing and systems administration.
- Working knowledge in the following operating systems: UNIX, Linux, MacOS and MS-Windows operating systems.
- Extensive working knowledge of PC and non-PC hardware.
- Working knowledge of the following programming languages: FORTRAN, Visual Basic and C++.
- Working knowledge and administration experience in the following networking environments: TCP/IP and IPX implemented in UNIX, Linux and MS-Windows operating systems. Working knowledge of several standard scientific/mathematical packages, e.g., GAUSSIAN, CPMD, MOLDEN, GAUSSVIEW, MAPLE, MATHEMATICA, MINITAB, SIGMA PLOT and many others.

Publications

1. J. K. Dogbe, S. M. Casey “The Si(100)-2x1-NH(CH2)3-x (0 ≤ x ≤ 3) adsorption geometric structures, a combined tensor LEED and DFT and investigation.” (publication in preparation)

2. J. K. Dogbe, S. M. Casey “Investigation of methanol covered Si(100)-2x1 surface using computational tensor LEED analysis.” (publication in preparation)

3. J. K. Dogbe, S. M. Casey “Comparing DFT and LEED analysis of Si(100)-2x1-C4H4.” (publication in preparation)

4. J. K. Dogbe, S. M. Casey “Relativistic considerations and its effect on surface geometry optimization of Si(100)-2x1 obtained from (tensor) LEED computations.” (publication in preparation)

Presentations

September, 2005 Poster presentation at the 16th Annual Symposium of the Pacific Northwest Chapter of the American Vacuum Society in Troutdale, OR on “Comparing Geometries obtained from LEED-IV of clean and adsorbate covered Si(100)-2x1 and results from DFT calculations.”

November, 2004 Poster presentation at the 51st International American Vacuum Society Symposium in Anaheim, CA on “Analysis of low-energy electron diffraction images to obtain surface geometries of amines and alcohols adsorbed on Si(100)-2x1 surface.”

November, 2003 Poster presentation at the 50th International American Vacuum Society Symposium in Baltimore, MD on “Quantitative image analysis of low-energy diffraction patterns to obtain surface geometries of amines adsorbed on the Si(100)-2x1 surface.”

June, 1996 Presented a project work to the Department of Mathematics, University of Cape Coast, Ghana entitled: “Analysis of University of Cape Coast Hospital Attendance Using Time Series Methods.”

Ongoing Research Using low-energy electron diffraction techniques to investigate the surface geometry of adsorbate covered silicon surfaces.

Professional Affiliations
- American Vacuum Society
- American Chemical Society
Awards/Certificates

November, 2004
Received a second place award in poster presentation competition: Applied Surface Science Division - at the 51st International American Vacuum Society Symposium in Anaheim, CA.

Fall 2004
Recipient of GSA Travel Award; University of Nevada, Reno

Fall 2004
Recipient of "AVS Dorothy and Earl S. Hoffman Travel Scholarship"

Fall, 2003
Recipient of the Graduate Students Association (GSA) Travel Award. University of Nevada, Reno.

February, 19 1999
Received a certificate of participation in the "2nd ICTP-URSI-ITU/BDT School on the use of Radio for Computer Networking," held at the Abdus Salam International Center for Theoretical Physics, Trieste, Italy from February 1 to February 19 1999.

September, 11 1998
Received a certificate of participation in the "Regional Workshop on the Use of Radio for Computer Networking," held at the University of Cape Coast, Ghana from August 31 to September 11 1998.

September, 1995
Certificate of Honor as a Founding Member of the Oguaa Hall Fire Cadet Corps.

1994-1995
Received Certificates of Honor as a Member of Oguaa Hall Welfare Committee during the 1994/1995 academic year. University of Cape Coast Ghana.

1993-1994
Received Certificates of Honor as a Member of Oguaa Hall Welfare Committee during the 1993/1994 academic year. University of Cape Coast Ghana.

Extracurricular Activities

2001-2003
Secretary General of the African Students & Scholars Association at the University of Nevada, Reno.

1993-1995
Member of the Welfare Committee of the Hall of Residence (Oguaa Hall) at the University of Cape Coast, Ghana.
References

Dr. Sean M. Casey
Dept. of Chemistry, MS. 216
Reno, NV 89557
email: scasey@chem.unr.edu
Ph.: 775-784-4133

Dr. Joseph I. Cline
Dept. of Chemistry, MS. 216
Reno, NV 89557
email: cliae@chem.unr.edu
Ph.: 775-784-4376

Dr. Katherine McCall
Dept. of Physics, MS. 220
Reno, NV 89557
email: mcall@physics.unr.edu
Ph.: 775-784-4991
Synopsis of Resume of:
Harold W. Hase

2080 1/2 Broadway
Grand Junction, Colorado
81503
Phone 1- 970-243 – 7680

Employment

Fall 1995 – Present
Full Time Temporary – Lecturer in Geology
Mesa State College

Spring 1994 – Spring 1995
Part Time - Lecturer in Geology
Mesa State College

Independent Consulting Geologist

Inspiration Development Company,
Inspiration Consolidated Copper Company
Exploration Geologist, Senior Geologist,
District Geologist.

Michigan Technological University
Houghton, Michigan
Research – Geological & Geophysical

Calumet Division, Universal Oil Products
Calumet, Michigan
Mining Geologist, Exploration Geologist

Education

1955 – 1959
West Milwaukee High School

University of Wisconsin – Milwaukee
Milwaukee, Wisconsin

Degree: B. S. in Geology

Michigan Technological University
Houghton, Michigan

Degree: M. S. in Geology
VITA

- Gordon R. Gilbert -

FACULTY POSITION

Professor of Physics
Department of Physical and Environmental Sciences
Mesa State College

ACADEMIC BACKGROUND

B.S., Electrical Engineering, MIT (1962)
M.S., Electrical Engineering, MIT (1964)
Ph.D., Physics, MIT (1972)

PROFESSIONAL EXPERIENCE

Astronomy Faculty, The University of Arizona
Lecturer, 1972-1974
Assistant Professor, 1974-1979

Physics Faculty, Mesa State College
Associate Professor, 1980-1984
Professor, 1984-present

SELECTED PAST PROFESSIONAL ACTIVITIES

NASA Apollo Program, 1962-1964
Chair, London Conference on Astronomical Instrumentation, 1974
Hubble Space Telescope Instrument Design Team, 1974-1977
Director, Summer Chemistry and Physics Program,
Navajo Community College, 1978-1979
Visiting Professor of Mathematics and Physics,
Deep Springs College, 1980
SELECTED PUBLICATIONS


CURRENT RESEARCH INTERESTS

Astrophysics: the formation of structure in the early universe

Quantum Theory Foundations: decoherence and consistent histories

PROFESSIONAL SOCIETIES

American Association of Physics Teachers
American Physical Society
Sigma Pi Sigma National Honor Society
Sigma Xi National Honor Society

SELECTED PROFESSIONAL ACTIVITIES

Member-at-Large, American Association of Physics Teachers, 1990-1992

Vice President, Rocky Mountain Section, American Association of Physics Teachers, 1988-1989


"The Hubble Space Telescope," invited talk, University of Colorado, NASA Space Grant Center (November, 1990)
SELECTED PROFESSIONAL ACTIVITIES (continued)

"The Irrational World," Honors Banquet Address, Northwest Community College (April, 1990)

Keynote Address, AAAS Meeting (March, 1999)

SELECTED COLLEGE ACTIVITIES

Chair, Department of Chemistry and Physics (1985-1994)

Various Committees (e.g., General Education, Promotion, Tenure, Who's Who, SOAR, Graduate Council)

MSC Faculty Colloquium Moderator (1982-1987)

"Quasars," Faculty Colloquium (March, 2003)


AWARD

Distinguished Faculty Award (1993)
Harold (Skip) Hase

Education
1960-1967
B.S., Geology
Univ Wisconsin-Milwaukee Milwaukee WI
1971-1973
M.S., Geology
Michigan Tech University Houghton MI

Academic Positions
1994-Present
Lecturer in Geology, Mesa State College

Courses Taught
Survey of Earth Science, Physical Geology, Physical Geology Lab.

Work Experience
1967-1971
Underground Mine Geologist, Exploration Geologist Calumet, Michigan
1973-1982
Exploration Geologist, Senior Exploration Geologist, Inspiration, Arizona
District Geologist, Grand Junction, CO
1982-1993
Consulting Geologist, Grand Junction, CO

Professional Organizations
Grand Junction Geological Society
Rocky Mountain Association of Geologists
Amplified Resume:

Employment

Spring 1994 – Present
Mesa State College  Part Time – Lecturer in Geology to Full Time Temporary – Lecturer in Geology

Started out as replacement for faculty member on sabbatical with a class of approximately thirty students and that load has increased to totals that are consistently run at two hundred or more. From these classes a number of students have continued on as Geology majors.

October 1982 – Spring 1994
Independent Consulting Geologist

During this period I was involved in various exploration projects for massive sulfides in Colorado and Wisconsin, limestone replacement deposits in Colorado, gold projects in Nevada, a gold project in Utah which was successful and became a mine.

October 1973 – October 1982
Inspiration Development Company, Inspiration Consolidated Copper Company

  Initiated regional exploration programs for base and precious metals using:

  a. Regional field mapping

  b. Regional geochemical and geophysical surveys.

  c. Site specific evaluation through mapping, detailed geochemistry and geophysics, and diamond drilling.

  d. Prospect Evaluations.

  e. Supervision of one to eight people.

  Remained as supervisor of the above operations. Supervision of from one to twelve people including three to four professionals. Work resulted in geologic discovery of three massive sulfide bodies and one porphyry copper. Was transferred in December 1975 to work directly under Vice – President Exploration where the work involved economic evaluation and investment decisions, patent proceedings, governmental regulations, etc.
In charge of all Inspiration Development Company’s exploration work conducted in Colorado, Utah, northern New Mexico, Wyoming, eastern Nevada and others, including work on base and precious metals uranium and coal properties. Position included supervising four full time professionals and supportive personnel with seasonal additions of up to twelve additional people. Direct involvement in land acquisition, including claim staking, lease contract negotiations, etc. Work included evaluation on all scales ranging from grassroots exploration to predevelopment drilling and feasibility. Work resulted in evaluation and development of reserves on a Utah coal property resulting in its profitable sale, geologic discovery of uranium in the southern Front Range of Colorado, and geologic discovery of a porphyry moly deposit also in the Front Range of Colorado.

June 1973 – October 1973 – Michigan Technological University, Houghton Michigan
Worked on a depth to bedrock study using seismic, resistivity, and drilling data in support of a government contract.

January 1967 – December 1971 – Calumet Division, Universal Oil Products,
Calumet, Michigan


Underground Mine Geologist with supervision of underground diamond and long steel drilling, stope and drift mapping, grade control, underground geophysical surveys, and ore reserve calculations.


Exploration work included field mapping, geochemical surveys, geophysical surveys, and exploration diamond drilling. These operations were done at a very early stage in massive sulfide exploration in northern Wisconsin.

Personal

Birthplace: Milwaukee, Wisconsin
Citizenship: United States
Martial Status: Married
RESUME

Name: Verner C. Johnson
Professor of Geology and GIS Coordinator

BACKGROUND SUMMARY: My background is teaching in any of my specialized areas including GIS/GPS, geophysics, hydrogeology, computer applications in geology, environmental geology, and engineering geology. I have more than thirty years of geophysical, geological, and GIS/GPS related experiences includes: proposing and organizing plans for research and teaching, acquiring and interpreting data, problem solving, and preparing verbal and written communication.


EMPLOYMENT HISTORY:

Sept., 1984 - Present
MESA STATE COLLEGE
Grand Junction, CO
Professor (1995 - Cont) -- tenured since 1995
Geology Program Coordinator (Jan., 1997 - Jan., 1999)
GIS/GPS Coordinator (Aug., 1999 – continued)
Geology Teacher Licensure Coordinator (Aug., 2000 – continued)
Internship and Supervisor GIS Coordinator (Aug. 2000 – continued)
Associate Professor (1989 - 1995)
Instructor (1984 - 1989)
Adjunct Faculty (1976 – 1984)

Geoscience Courses Delivered:


Additional Courses Delivered:


Major Accomplishments:

1) Received Outstanding Teacher Award from Mesa State College for 2002-2003 academic year.

2) Recipient of the $364K grant from the National Science Foundation for the Undergraduate Research with Drs. Aslan, Cole, Jones, and Livaccari to study landform evolution of part of the Colorado Plateau—three year program from 2005 - 2008.
3) Introduced and developed GIS workshops and seminars for K-12 teachers in April 2003 and August 2003.

4) Introduced, developed, and coordinated GIS/GPS program (courses, curriculum, and equipment) for the Department of Physical and Environmental Sciences (1999).

5) Initiated a student chapter (Zeta Nu) with the Sigma Gamma Epsilon, the national honor society for the earth scientists (1990).


Jan., 1977 - BENDIX FIELD ENGINEERING CORPORATION
July, 1983 Grand Junction, CO
Staff Geoscientist

Compiled and interpreted geophysical and geological data to identify subsurface structures and stratigraphy, investigated and evaluated the selected sites to determine favorable geological environment for mineral deposits, identified subsurface features for ground water, prepared proposals for radioactive waste projects, prepared 8 reports for publications and 5 file reports, and supervised up to 8 geologists. Project areas included Colorado, Utah, Kansas, Missouri, Iowa, Arizona, Wyoming, New Mexico, and California.

Jan. - March, WALTER FEES AND ASSOCIATES (an independent gas company), 1983
Grand Junction, CO
Consultant (part-time)

Interpreted reflection seismic, gravity, and magnetic data of the Piceance Creek Basin, northwest Colorado, to identify structures in the oil and gas fields. The paper was presented orally to the Chinese and American delegates in People's Republic of China in August 1987.

Sept., 1974 - GULF RESEARCH AND DEVELOPMENT COMPANY
Jan., 1976 Houston, TX
Project Geophysicist

Interpreted geophysical and geological data to determine subsurface structures and stratigraphy that would provide lead to hydrocarbon deposits. Prepared 3 file reports.

Sept., 1972 - CALIFORNIA STATE UNIVERSITY AT NORTH RIDGE
Aug., 1974 Northridge, CA
Instructor

Taught physical geology, environmental geology, and geophysics. Developed two new courses in geophysics and prepared proposals for a BS degree in geophysics and for the National Science Foundation to purchase geophysics instruments.
Sept., 1969 - UNIVERSITY OF TENNESSEE
Aug., 1972  Knoxville, TN
Graduate Assistant

Taught physical and historical geology.

Summer, 1971 - TENNESSEE VALLEY AUTHORITY
Knoxville, TN
Geologist

Performed gravity and refraction seismic surveys and structural analysis of the proposed power plant sites.

Jan., 1968 - SOUTHERN ILLINOIS UNIVERSITY
Aug., 1969  Carbondale, IL
Graduate Assistant

Taught earth science laboratories and developed several exercises for the laboratory manual.

SCHOLARSHIPS, HONORS, AND AWARDS

Distiguished Faculty Award in Teaching from Mesa State College, 2003. $1000 award.

GIS Internship program with Forest Service, $10,000 per year since 2000.

~co-authored with Kathleen Tower and Valerie Horton, Organization of State College Grant of $2500 to purchase computer and ArcView GIS software for the library, 1999

Co-authored with Tim Novony and Karl Topper, Mesa State College Foundation ($22,000) to purchase 4 Geoeplorer and ProXR GPS instruments, 1998

School of Natural Sciences and Math/Mesa State College Foundation ($5000) to purchase 20 licenses of ArcView GIS software, 1997

Technology Enhanced Education Grant, 1997, ($999) to participant Techbase Workshop

Mesa State College, Sabbatical Leave, Fall, 1996

American Association of Petroleum Geologists Grants to participant the following short course: Computer Contouring of Geologic Data School, 1994 ($1500)

National Ground Water Association Grants to participant the following short courses:

• MODFLOW (USGS Modular Flow Model) for Simulation of Ground Water Flow and Advective Transport, 1993 ($1400)
• IBM Applications in Ground Water Pollution and Hydrology, 1992 ($1400)
• Introduction to Ground Water Geochemistry, 1991($1400) - NOTE: I was one the first recipients of the Faculty Training Fellowships for my dedication to ground water education.
Mesa State College Foundation Grant to participate in Outdoor Action Conference, 1991 ($1000)

Graduate Assistantships-University of Tennessee, 1969 - 1972

Graduate Assistantships-Southern Illinois University, 1968 - 1969

Illinois Division of Vocational Rehabilitation Scholarships, 1962 - 1969

Dean's List, 1962
PUBLICATIONS AND REPORTS

theses

Doctoral Dissertation:

* Geophysical Survey of the Yellow Creek Area, Mississippi* (completed: May 1975).

Gravity and refraction seismic surveys successfully revealed the locations of structures not recognized by drill holes alone.

Master degree thesis:

* Fracture Patterns Along the Pomona Fault in Jackson County, Illinois* (completed: November, 1969)

The relationship between the joint patterns and the Pomona Fault had indicated the northeast trending fault is a reversed type, not a normal one as believed by earlier investigators.

Published Papers

Johnson, V.C., 1975, Fracture Patterns in the Yellow Creek Area, Mississippi: Southeastern Geology, Vol. 16, no. 3, p. 173-177.


Johnson, V.C. and Dabyk, S.W., 1977, Preliminary study of the geology and uranium favorability of the Forest City Basin in Kansas, Missouri, Iowa, and Nebraska: Energy Research and Development Administration Open-File Report GJBX-83 (77).


UNPUBLISHED FILE REPORTS, LAB MANUALS, AND WORKBOOKS

Mesa State College, Grand Junction, Colorado


TerraStation training manual for GEOL 390 (Computer Applications in Geology), first edition was prepared in 1994 and made several revisions.

Computer Applications in Geology Lab Manual for GEOL 390 (Computer Applications in Geology) covering on GEO-EAS, Sulfur, and Stratigraphic software.

Uncompahgre Canyon Roads for Survey of Earth Science and Geology of Colorado students.

Department of Energy/Bendix Field Engineering Corporation, Grand Junction, CO


Walter Fees and Associates (independent gas company), Grand Junction, CO


**Gulf Research & Development, Houston, TX**


**California State University, Northridge, CA**

Johnson, V.C., 1972, Proposed Bachelor of Science Degree for Geophysics Option in the Department of Geology.

Johnson, V.C., 1972, Proposed National Science Foundation grant for purchasing geophysics equipment.

**ORAL PRESENTATIONS**

"Mesa State College GIS Program" to Western Slope GIS User Group Meetings in Grand Junction, CO, July 26, 2002.

"GIS (Geographic Information Systems) and Mesa State College" to the Faculty Colloquium, Mesa State College, Oct. 6, 1999.

"GIS" to the faculty and students in the Mathematics Brown Bag Seminar, March 6, 1998.


"Geophysical Investigation of the Uncompahgre Uplift" to Western Slope Field Conference, October 20, 1991.


"Interpretation of a Seismic Section across the Hunter Canyon Anticline in Central Western Colorado" to the Nanhai East Oil Corporation, Guangzhou, China, August 22, 1987.

"Interpretation of a Seismic Cross Section in Central Western Colorado" to Ministry of Petroleum Industry, Beijing, China, August 10, 1987.

"Geophysical Investigation of the Uncompahgre Region in West-Central Colorado" to Stephen F. Austin State University Geology Department, December 12, 1984.

"Geophysical Survey of the Yellow Creek Area" to California State University, Northridge Geology Department, April, 1973.

"Geophysical Survey of the Yellow Creek Area" to California State University, Northridge Physics Department, September 28, 1973.

ADDITIONAL EXPERIENCE AND INFORMATION

Short Courses and Workshops:
Conduct 3-day GIS for Educators in August 4-6, 2003.


Algebra Project Workshop (as observer), sponsored by Glassboro State College, Glassboro, New Jersey, and trip sponsored by Metropolitan State College, Denver, Colorado, August 7 - 10, 1989.


"Technical writing class for scientists and engineers" (March, 1980).


"Seismic Interpretation for Geologists" (October 1974).

**Computer Experience:**

ArcView, Techbase, TerraStation, MODFLOW, AquiferTest, Sulfer, FORTRAN, Front Page (for making web pages), internet, WordPerfect, MS Word, PowerPoint, MS Excell, Photostyler, and Pathfinder for Trimble GPS.

**Administrative Experience:**

- GIS Internship Supervisor (2000 – con’t)
- GIS/GPS Coordinator (1997 – con’t)
- Geology Program Coordinator (1997-1999)
  Curriculum Committee(1992 - 1994)
- Faculty Search Committees
  Geology, 1994 - 1995 (Chair and Affirmative Action Representative)
  Math, 1995 - 1996 (Affirmative Action Representative)
  Math, 1994 - 1995 (Affirmative Action Representative)
  Biology, 1997 - 1998 (Affirmative Action Representative)
  Geology, 1996 - 1997 (also Affin-native Action Representative)
  Geology, 1998 - 1999 (Chair and Affirmative Action Representative)
  Geology, 2000 – 2001
  Geology, 2001 - 2002
- Nursing, 1997 - 1998 (Affirmative Action Representative)
- School of Natural Sciences and Mathematics General Education (Chair, 1994 - 1995)
- School of Natural Sciences and Mathematics Tenure Committee
- Human Relation Council (Selected by the Faculty Senate)
- Geographic Information Systems
- Liaison to the Geology Advisory Board (1993 - 1995)
- Scholarship Foundation for Students with Disability (Founder, President - 1985 - 1995)
- Advisory Board Member of the Physically and Learning Disabled (1993 - 1995)
- School of Natural Sciences and Mathematics Scholarship (1995 - con’t)
- Associate of Science in Geology Program Review (1998-1999)
  Geology Teacher Licensure Program Review for the National Council for Accreditation of Teacher Education (1999-2000)
HOBBIES AND INTERESTS

Reading, hiking, bowling, roller blading, rock collection, and travel.

PROFESSIONAL AFFILIATIONS

American Association of Professional Geologists
American Geophysical Union
Society of Exploration Geophysicists
National Ground Water Association
Grand Junction Geological Society
  President (1996)
  Vice-President (1997)
  Past-President (since 1998)
Sigma Gamma Epsilon
  Initiated in U. of Tennessee in 1972
  Faculty Advisor of the Zeta Nu Chapter (Mesa State) since 1990
Geological Society of America
International Association of Mathematical Geology
SUZANNE C. KENNEY  
603 N. 6th Street  
Grand Junction, CO 81501  
(970) 985-2200  
skenney@mesastate.edu

Work Experience:

Mesa State College – Physical and Environmental Sciences Department (Grand Junction, CO)  
Chemistry Lecturer (8/06 – present)  
• Teach Principles of Chemistry and Chemistry and Society

St. Lawrence University – Chemistry Department (Canton, NY)  
Hazardous Waste Manager, Chemical Hygiene Officer and Director of Chemical Stockroom (7/04-5/06)  
• Environmental Health and Safety Trainer  
• Directed the Environmental Health and Safety Compliance Team (strategic planning and implementation of programs to meet OSHA, EPA, DOT, and other federal, state and local regulations)  
• Data analysis and trending of safety metrics  
• Implemented Lab Safety and Hazardous Waste Management programs and tracking systems  
• Completed engineering proposal and permitting for waste reduction project  
• Supervised and trained employees  
• Conducted EHS inspections; Radiation Safety Officer (in training); Prepared reagents

Alcoa East Plant – Environmental Services Department (Massena, NY)  
Senior Process Engineer (3/02-4/04)  
• Managed numerous environmental projects  
• Led water discharge, Title V permit compliance and waste reduction teams  
• Implemented process improvements to reduced O&M costs, process downtime and reduced waste  
• Developed operational sampling programs and designed data tracking systems that contributed to substantial cost savings and reduction in environmental impact of smelting process  
• Data management/analysis/trending; Developed mathematical models of scrubber and WWTP efficiencies  
• Implemented instrumentation calibration program for three environmental process control systems  
• Conducted extensive process sampling, jar testing and full scale testing to improve fume treatment and wastewater treatment plant performance  
• ISO14001 core team member that achieved successful certification  
• Wrote regulatory agency compliance reports

Corning, Incorporated – Specialty Materials Division Engineering (Canton, NY)  
Senior Process Engineer (6/98-2/02)  
• Led development team that successfully implemented new production process; Ran weekly team meetings and presented monthly updates to senior staff  
• Developed preventive maintenance program and production tracking database; Implemented daily production meetings that improved plant communication and planning; Wrote SOPs that reduced operator-to-operator variability; Successfully designed and ran many experiments that significantly improved process yields; Statistical data analysis; Wrote development reports  
• Worked with external customers and manufacturing to produce new product from existing process

Clarkson University – Civil Engineering Department (Potsdam, NY)  
Research and Teacher Assistant (8/96-6/98)  
• Master’s Thesis: Biodegradation of Coal Tar Polycyclic Aromatic Hydrocarbons by Pseudomonas Stutzeri in the Presence of Nonionic Surfactants  
• Lectured and taught lab on point source (wastewater) impact on biological oxygen demand in river
SUZANNE C. KENNEY

Eastman Kodak (Rochester, NY)
  Synthetic Chemicals Department Co-op (5/96-8/96)
  • Determined bioreactor performance for degrading multiple VOCs from batch processes
  Environmental Technology Department Co-op (9/94-12/94 & 5/95-8/95)
  • Hazardous waste sampling, respirometry lab, air pollution modeling, Access database design

Education:
  Masters of Science Civil/Environmental Engineering; Clarkson University May 2000
  Bachelors of Science Chemical Engineering and Concentration in Math; Clarkson University May 1996

Certifications:
  Engineering in Training (EIT), Six Sigma Green Belt, DOT hazardous materials, RCRA hazardous waste,
  OSHA 40 hr HAZWOPER, OSHA Excavation Competent Person, OSHA Confined Space Competent
  Person, First Aid/CPR, 40 hr Radiation Safety Officer Training

Skills:
  Learn new skills quickly, Project Management (scope, schedule, budget), Communication, Problem
  Solving, Data Analysis, Excel, Word, Access, PowerPoint, Dream Weaver, MS Project, Minitab

References are available upon request
OBJECTIVE: Secure a responsible position utilizing my professional geologic work background, which emphasizes the integration of conceptual and regional geology, project generation, and the opportunity to test targets. Teamwork is emphasized and encouraged.

EDUCATION: University of Texas, Arlington, Texas
B.S. in Geology, 1971 with full minors in both Mathematics and Chemistry

EXPERIENCE:

01/2006 – Present
Consultant Geologist. Uranium industry consultant to Homeland Energy a Canadian energy company involved in coal (my experience in Turkey and Raven Ridge Resources) and in uranium exploration in the continental USA (my experience with Union Carbide, Energy Fuels Nuclear). Work summers and part-time during the school year.

01/2003 - Present
Lecturer of Geology. Mesa State College, Grand Junction, Colorado. Teach: Physical Geology Lecture and Labs; Geology of Colorado; Geologic Hazards and Environmental Geology; Introduction to Dinosaurs; Computer Applications in Geology; Basic Engineering Drafting (AutoCAD) for the Engineering Department.

04/2003 - 08/2003
Adjunct Professor. Colorado Christian University, Grand Junction, Colorado. Taught accelerated, normal semester length courses titled: An Introduction to Geology and Scientific Thought and Discover. Both courses included 40 hours of instruction, and the geology course included two field trips to local areas of geologic interest.

10/2001 – 06/2002
Consulting Geologist. Prepared initial geologic evaluations of basins favorable for the development of coalbed methane resources in the Rocky Mountain area. Evaluations included regional and local geologic interpretation and compilation of sedimentary, structural, and basin analysis data. Calculation of gas-in-place gas resources where applicable.

01/2001 – 06/2001
Consulting Geologist. Prepared detailed well logs combining numerous geochemical water measurements, groundwater discharge, geophysical logs, and detailed core lithology descriptions for a major oil company’s oil shale drilling programs in the Piceance Basin of northern Colorado.
10/2000 – 12/2006  **Consulting Geologist.** Trip to Turkey to ascertain the general requirements of several parties concerning the parameters of reports summarizing the Joint Venture’s drilling project. Participated in general discussions regarding new marketing and strategies for domestic and foreign companies. Presentations of new geologic maps and interpretations for Joint Venture partners.

06/1998 – Present  **Consulting Geologist.** Project Geologist as a consultant to a Joint Venture exploring the coalbed methane potential of three structurally complex coal basins in NW Turkey on the Black Sea coast. Leases were granted by the Turkish government. Weekly interface with geologists and management of TTK and MTA (Turkish equivalent of USGS). Initial responsibility was to assess the CMB potential of the coal basins by compiling all geologic information including well logs, mine plans, water data and regional geologic data. The data included TPAO well logs and several hundred coal drilling logs, x-sections, regional geologic maps, mine details and production schedules. A report was constructed providing a cogent geologic view of the basins with maps, new x-sections and isopach maps. Trained several national geologists to aid in this endeavor. Maps and x-sections were produced using AutoCAD, CorelDraw, and RockWare software. In-place gas reserves were calculated using this information. Reports detailing multiple favorable drilling sites for each basin over the 120 km strike length were written. Supervised the drilling of a 2000-meter deep exploration well.

06/1995 – 06/1998 RAVEN RIDGE RESOURCES, Grand Junction, CO

**Senior Geologist.** Responsible for the geologic model, detailed stratigraphic correlation and drilling of underground coal gasification project in Wyoming. Began developing plans for a joint venture with ECNZ on coal gasification project near Auckland, NZ for summer 1996. Extensive work with geologic database developed in MS Access for use in China, Japan and New Zealand. Project Geologist for the Turkish coalbed methane Joint Venture in northern Turkey. Personally made the initial data gathering and on-site appraisals of the geology and infrastructure of the area. Spent over one year on-site.

06/1994 – 04/1995 ENERGY FUELS NUCLEAR, Grand Junction, CO

**Senior Geologist.** Initial responsibility was the compilation of geochemical, radiometric and lithologic data from the Irkutsk, Siberia headquarters of the Russian Government Uranium Group and formulating a genetic-geologic model of the uranium occurrences for use in exploration on a regional basis in Mongolia. Project involved American, Russian and Mongolian geologists and engineers. Spent several months on-site in the Gobi Desert of southern Mongolia during the drilling season.


**Manager of Geology and Mine Engineering.** Supervised the layout of mine development plans to re-open several large mines coupled with the permitting and total surface reclamation of several older mines. Responsible for 12-man crew of geologists, engineers and field crew. Conducted exploration drilling program over several years. Discovered one new ore body near Monticello, UT.
01/1986 – 10/1990  AMERICAN EXPRESS, Grand Junction, CO

Financial Planner, Fully Licensed Stockbroker.

04/1977 – 03/1985  UNION CARBIDE CORPORATION, Grand Junction, CO

Regional Geologist. 1980-1985 – Responsible for precious metals exploration and an aggressive acquisition program in the western USA, Chile and Mexico. Supervised domestic and national geologists.
1977-1980 – Responsible for uranium exploration in the southern half of the USA. Supervised three offices with 50 employees. Responsible for genetic-geologic modeling of a variety of deposits. Worked on-site on exploration projects in Republic of South Africa, Europe and Canada.


Manager of Exploration Colorado Plateau. Supervised a crew of underground and surface geologists involved in uranium exploration. Compiled regional geochemical and sedimentological data to develop recognition criteria to aid exploration for deep targets.

05/1971 – 09/1971  SOUTHERN UNION GAS COMPANY, Dallas, TX

Geologist. Summer work mapping volcanic rocks and vein structures for precious metals in the San Juan Mountains of CO. Worked alone and above timberline near Lake City, Silverton and Telluride, CO.

PUBLICATIONS:


Dr. Samuel S. Adams is the past chairman of the department of Geology and Geological Engineering at the Colorado School of Mines, Golden, Colorado.

HONORS:

Biography of Record in Marquis Who’s Who in the West, 1986.
Currently included in Geology Experts Section, International Atomic Energy Agency (IAEA), Vienna, Austria.
Served on Executive Search Committee for Mesa State College during the hiring of two Geology professors.
Member of Sigma Xi, and on the Sigma Xi Board for Mesa State College, The Scientific Research Society
2006 Curriculum Vitae

Dr. Richard F. Livaccari

EDUCATION

Ph.D. 1994, University of New Mexico, Albuquerque, NM, Geology
M.Sc. 1980, State University of New York at Albany, Albany, NY, Geology
B.Sc. 1977, University of New Mexico, Albuquerque, NM, Geology/Math

PROFESSIONAL EXPERIENCE

Mesa State College, Department of Physical & Environmental Sciences, Grand Junction, CO
Associate Professor
1997 - current
Responsible for teaching Introduction to Physical Geology, Structural Geology, Mineralogy, Igneous & Metamorphic Petrology, Remote Sensing & Structured Research.

Santa Fe Pacific Gold Corporation, Albuquerque, NM (through GeoTemps in Tucson, AZ)
1996 - 1997
Assistant Geologist
Compiled precious metal production and reserves data in GIS format (for Australia, Papua New Guinea, and Canada). Prepared presentation graphics of geologic data from current exploration projects.

Department of Earth & Planetary Sciences, University of New Mexico, Albuquerque, NM
1994 - 1996
Post-Doctorate Researcher
Conducted paleomagnetic field sampling, mapping and structural analysis of metamorphic core complexes in western Arizona and southeastern California (Harquahala, Harcuvar, Buckskin, and Whipple Mountains). Managed budget ($110,000) of NSF research grant. Supervised undergraduate research assistants. Organized and instructed graduate level courses in Cordilleran tectonics (with Prof. Karl E. Karlstrom).

Department of Earth & Planetary Sciences, University of New Mexico, Albuquerque, NM
1990 - 1994
Teaching and Research Assistant
Prepared and instructed Introduction to Physical Geology labs and performed paleomagnetic experiments.

MagmaChem Exploration, Phoenix, AZ & Evergreen, CO
1985 - 1990
Senior Geologist
Conducted tectonic analysis, regional mineral assessment and compilation of metallic ore production data in the western U.S. and South American Cordilleras. Performed field mapping, mineral sampling, well logging, and evaluation of assay data for mineral exploration projects in central Nevada and western Arizona.

Earth Satellite Corporation, Chevy Chase, MD
1981 - 1984
Staff Geologist
Conducted tectonic analysis and hydrocarbon exploration with Landsat imagery, photogrammetry and field mapping.
GRANTS AND AWARDS

U.S. Geological Survey EDMAP program (Educational Component of the National Cooperative Geologic Mapping Program) 2005-2006 Academic year: "Evaluation of Quaternary-Age Faulting and Laramide-Age Fault Kinematics along the Northern Uncompahgre Plateau, Western Colorado". $6,375

U.S. Geological Survey EDMAP program (Educational Component of the National Cooperative Geologic Mapping Program) 2004-2005 Academic year: "Evaluation of Quaternary Faulting along the East-Central Uncompahgre Plateau, Western Colorado". $6,000

Mesa State College Professional Development Monies (OSC) 2000-2001 Academic year: $450.00 for the purchase of petroglyphic thin sections for the Geology Program.

Mesa State College Professional Development Monies (OSC) 1999-2000 Academic year: $850.00 for the purchase of a digital camera for the Geology Program.

National Science Foundation proposal entitled (1995): “Footwall deformation and regional crustal structure of ‘deep’-type metamorphic core complexes, western Arizona and southeastern California: Evaluation with paleomagnetism” (with Dr. J.W. Geissman; Award # EAR-92-06524 for $160,000)

National Science Foundation proposal entitled (1992): “A paleomagnetic assessment of footwall tilting during large magnitude extensional deformation: A case study of the Miocene South Mountains metamorphic core complex, south central Arizona”. (with Dr. J.W. Geissman; Award # EAR-92-05893 for $62,000)

PUBLICATIONS


**RECENT PAPERS PRESENTED AT PROFESSIONAL MEETINGS**


Nelson, M., Hodge, J. and Livaccari, R.F., 2006, Laramide and Quaternary-Age Faulting along the northern Uncompaghre Plateau, western Colorado, Geological Society of America Abstracts with Programs, Rocky Mt. Section, 58th annual meeting, field trip guide.

Livaccari, R.F., and Hodge, J., 2005, Laramide and Quaternary-Age Faulting along the northern Uncompaghre Plateau, western Colorado, Geological Society of America Abstracts with Programs, Rocky Mt. Section, 57th annual meeting, field trip guide.

Livaccari, R.F., and Hodge, J., 2005, Laramide and Quaternary-Age Faulting along the Cactus Park-Bridgeport fault of the northern Uncompaghre Plateau, western Colorado, Geological Society of America Abstracts with Programs, Rocky Mt. Section, 57th annual meeting.


Curriculum Vitae
Mr. Donn Lorhammer

Address: 3090 Cedar Drive
Grand Junction, CO 81504

Office phone: 970.248.1077
Home phone: 970.523.1363
email: dlorham@mesastate.edu

Education
- M.S. Naval Postgraduate School, Monterey, CA 1989 Mechanical Engineering
  Master Thesis: An Experimental Study of an Acoustic Ranging System for AUV Obstacle Avoidance
  Advisor: Anthony J. Healey
- B.S. The University of Utah, Salt Lake City, UT 1975 Meteorology Cum Laude

Academic Positions
- 1995-present Lecturer
  Department Of Computer Science, Mathematics and Statistics
  Department of Physical and Environmental Science
  Mesa State College, Grand Junction, Colorado

Courses Taught
- Mesa State College: Elementary Algebra, Intermediate Algebra, College Algebra, Precalculus,
  College Mathematics, Weather and Climate, Oceanography, Physical Geology Laboratory

Prior Work History
- 1958-1995 U.S. Navy: Electrician’s Mate, Submarine Division Officer, Nuclear Training Officer, Submarine Operations and Navigation Officer, Nuclear Repair Officer, Trident Repair Officer
  Qualified for Operation and Maintenance of Nuclear Reactors, Qualified Nuclear Engineer, Qualified in Submarines, Qualified for Command of Submarines, Qualified as Engineering Duty Officer
  Responsible for all aspects of nuclear reactor operation and maintenance, nuclear weapon safety and employment, explosive ordnance safety and employment, electronic sensors, computer systems, communication systems, fire control systems, nuclear waste disposal, hazardous material disposal and environmental compliance.
  Highest rank achieved: Officer-Commander
  Enlisted-Petty Officer Second Class
  Highest Award: Meritorious Service Medal (2)

Professional Organizations:
- 1997-Present Sigma Gamma Epsilon
  Zeta Nu Chapter-Mesa State College
Chad A. Middleton, Ph.D.
Rhodes College · Department of Physics
2000 N. Parkway · Memphis, TN 38112-1690
Office: (901)843-3914 · Fax: (901)843-3117
Email: MiddletonC@rhodes.edu
www.physics.rhodes.edu/physics/middleton/home.htm

Education

Doctor of Philosophy in Physics, University of Tennessee, Knoxville, December 2005
Research Advisor: Dr. George Siopsis
Bachelor of Science in Physics/Minor in Mathematics (cum laude), Eastern Illinois University, May 1998

Scholarships and Awards

• GGR Topical Group in Gravitation Best Student Presentation, 8th ECGM, Spring 05
• 2002 University of Tennessee Outstanding Graduate Teaching Assistant
• SARIF Graduate Research Assistant Research Grant, Summer 05
• SARIF Graduate Research Assistant Research Grant, Summer 03
• DPF Travel Award Recipient, APS April 2005 Meeting, Spring 05
• DPF Travel Award Recipient, APS April 2004 Meeting, Spring 04
• Science Alliance Fellowship, Fall 99-Spring 01
• Glenn Leifer Physics Scholarship, Fall 96
• College of Sciences Undergraduate Investigator Award, Spring 97
• Certificate of Achievement for Contributions to the Undergraduate Research, Spring 97
• College of Sciences Dean's List: Fall 95, Spring 96, Spring 97, Fall 97, Spring 98

Academic Experience

Assistant Professor of Physics, Rhodes College Dept of Physics, 8/05-present.
- Instructed Quantum Physics, Modern Physics, Introductory Physics - Life Sciences, and Introductory Physics/Astronomy Labs
- Co-designed four-part lecture series entitled “An Introduction to General Relativity and Differential Geometry” with math department colleague

**Research Assistant**, University of Tennessee Dept of Physics and Astronomy, 8/01-8/05.
- Theoretical work focusing primarily on General Relativistic calculations of a 3-brane embedded in a flat $D$-dimensional, infinite-volume bulk (DGP Model).

**Teaching Assistant**, University of Tennessee Dept of Physics and Astronomy, 8/99-8/05.
- Instructed freshman honors lab/recitation and introductory physics/astronomy labs and recitations.
- Guest lectured for Elements of Physics, Honors Fundamentals of Physics and undergraduate and graduate level Classical Mechanics.

- Computational work examining nuclear structure through Mean-Field Theory interactions.

- Experimental work examining the $^8B$ solar neutrino spectrum and the alpha decay of $^8Be$

**Courses Taught**

- PHY 212 - *Modern Physics*, Spring 06
- PHY 109-110 - *Introductory Physics - Life Sciences*, Fall 05 - Spring 06
- PHY 101L - *Astronomy Lab*, Spring 06
- PHY 401 - *Quantum Physics*, Fall 05
- PHY 113L - *Introductory Physics Lab*, Fall 05
- PHY 221-222 - *Elements of Physics Lab*, Spring 05, Fall 99 - Fall 02
- PHY 231-232 - *Fundamentals of Physics Lab*, Fall 03 - Fall 04
- PHY 138 - *Honors Fundamentals of Physics Lab*, Spring 03
- AST 161 - *Astronomy Lab*, Fall 99
Other Experience

Undergraduate Research

- Theoretical cosmological research of the superstring corrected Einstein field equations of an adiabatically expanding Robertson-Walker universe extended to 10D.
- Theoretical plasma research of a uniformly magnetized, homogeneous plasma with species described by drifting bi-Maxwellian distribution functions.

Graduate Studies Committee, Graduate Student Representative, Fall 03-Spring 04

Graduate Student Liaison Committee, Committee designed to advise the Department Head on issues related to the graduate program, Fall 03-Spring 04

Member of Society of Physics Students, Eastern Illinois University, Fall 95-Spring 98, Elected vice-president, Spring 98

Professional Affiliations

- Member, Sigma Pi Sigma
- Member, American Physical Society
- Member, APS Topical Group in Gravitation
- Member, APS Division of Particles and Fields
- Member, American Association of Physics Teachers
- Elected associate member of Sigma Xi, Scientific Research Society, 1998

Teaching Evaluations

- Quantitative scores nearly always exceed 4 on a 5-point scale in which 5 is top score.
- Teaching/Course Evaluations can be found at this URL:
  http://ecommerce.cas.utk.edu/tn101online/selectcolorinstructor.asp
Research Papers

“Constrained Perturbative Expansion of the DGP Model”, C. Middleton and G. Siopsis,

“The Schwarzschild Solution in the DGP Model”, C. Middleton and G. Siopsis,

“Fat Branes in Infinite-Volume Extra Space”, C. Middleton and G. Siopsis, hep-th/0210033

Presentations

C. Middleton and G. Siopsis, “Constrained Perturbative Expansion in the DGP Model”,
AFS April 2005 Meeting, April 16-19, 2005, Tampa, FL

C. Middleton and G. Siopsis, “Constrained Perturbative Expansion in the DGP Model”,
8th East Coast Gravity Meeting, March 19, 2005, Wake Forest University

C. Middleton, “Gravity, D-branes, and Large Extra Dimensions”,
Physics Department Colloquium, February 21, 2005, Rhodes College

C. Middleton and G. Siopsis, “The Schwarzschild Solution in the DGP Model”,
APS April 2004 Meeting, May 1-4, 2004, Denver, CO

C. Middleton and G. Siopsis, “Fat Branes in Infinite-Volume Extra Space”,
19th Pacific Coast Gravity Meeting, March 1, 2003, University of Utah

C. Middleton, “Why Branes?”, Physics Department Colloquium Series, March 24, 2003,
Eastern Illinois University

Polytropic Equation of State Applied to the First Order Classical Superstring Corrections
to the Einstein Field Equations”, Joint Meeting of The Illinois Section of AAPT and The
Society of Physics Students, April 11, 1997, Illinois State University
Gigi A. Richard, Ph.D.

Associate Professor of Geology  
Department of Physical and Environmental Sciences  
Mesa State College  
1100 North Avenue  
Grand Junction, CO 81501  
E-mail: grichard@mesastate.edu  
+1-970-248-1689

ACADEMIC QUALIFICATIONS

Colorado State University, Fort Collins, Colorado  
Ph.D. in Civil Engineering, 2001, Area of Specialization: Environmental River Hydraulics and Fluvial Geomorphology  
M.S. in Civil Engineering, 1997, Hydraulic Engineering Program

Massachusetts Institute of Technology, Cambridge, Massachusetts  
B.S. in Civil Engineering, 1989, concentration in Water Resources and Environmental Engineering

CURRENT POSITION

Mesa State College, Associate Professor of Geology, Department of Physical and Environmental Sciences, Aug. 2002 – present.

RESEARCH EXPERIENCE

Channel-forming discharge on the Yampa River, CO and Dolores River, CO and Historic Channel Stability of the Yampa River, CO, Colorado Division of Wildlife, October 2002 – present.


Lateral Movement of the Río Grande, NM, Post-doctoral research, Civil Engineering Department, Colorado State University, March –June 2002.

Braided River Response to Lateral Confinement, Waio River, NZ, Post-doctoral research funded by Fulbright Fellowship, Natural Resources Engineering Department, Lincoln University, Canterbury, New Zealand, 2001.

Quantification and prediction of lateral channel adjustments downstream from Cochiti Dam, Río Grande, NM, Ph.D. Research, Civil Engineering Department, Colorado State University, 1997–2000.


PROFESSIONAL EXPERIENCE

Beaton and Associates  
Project Engineer  
Dillon, Colorado  

Project engineer for small environmental consulting firm specializing in solid waste management. Project responsibilities included solid waste research, cost estimating, and computer data management. Assisted in recycling planning for rural communities, including a construction and demolition recycling project being conducted in western Colorado and a waste characterization study for the Town of Vail, Colorado.
U.S. Geological Survey
Field Technician
Montezuma, Colorado
Responsible for collection, filtration, and analysis of surface water samples collected from the Snake River and Deer Creek as part of an ongoing study of the water quality and hydrology in the upper Snake River valley.

Pearson-Richard, Inc.
Partner/Project Engineer
Frisco, Colorado
Designed and planned several major developments in Summit County, Colorado and surrounding communities. Responsibilities included septic system design, water and sewer line design, road and street design, subdivision planning, financial management of Pearson-Richard, Inc. and construction management. All design work was performed using AutoCAD R12 and SoftDesk/DCA civil engineering design packages.

COMMUNITY SERVICE

- Representative on local government commission whose goal was to protect water quality.

- Served as representative on eight member regional planning and zoning commission.

ACCRREDITATIONS

SELECTED PUBLICATIONS


JOSEPH LAWRENCE RICHARDS

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Mesa State College
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Grand Junction, CO 81501
Office: 970.248.1574  Home: 970.243.5129
richards@mesastate.edu

Personal

Born  August 25, 1964, Kwajalein, Marshall Islands
Married  August 31, 1990, Susan B. Richards, two daughters (Kathryn JoAnn and Fiona Grace)

Education

Postdoctoral Fellow, University of California, San Diego (1991-1993)
Ph.D. (Organic Chemistry), University of North Carolina, Chapel Hill (1991)
B.A. (Chemistry and Biology), University of San Diego (1986)

Teaching Experience

Professor (Tenured), Chemistry (PES)
   Mesa State College  (1995-present)
Assistant Professor, Chemistry
   Grand Valley State University  (1993-1995)
Visiting Professor, Chemistry
   University of San Diego  (1993)
Supervisor of Graduate and Undergraduate research projects
   University of California, San Diego  (1991-1993)
Development of Honors Microscale Laboratory
   University of North Carolina, Chapel Hill (1990-1991)
Head Teaching Assistant, Chemistry
   University of North Carolina, Chapel Hill (1990-1991)
Teaching Assistant, Chemistry
   University of North Carolina, Chapel Hill (1986-1991)

Research Experience

Synthesis of multidentate ligands as models for the active site of galactose oxidase
   Mesa State College  (2003-present)
Synthesis of natural products isolated from *Piper* plants
   Mesa State College  (1998-present)
Synthesis of imidazole-based macrocycles
   Mesa State College  (1995-present)
Synthesis of dimeric porphyrin systems as models for biological electron transport
   Grand Valley State University  (1993-1995)
Synthesis of multidentate imidazole-based ligands as models for metalloprotein active sites
   University of California, San Diego  (1991-1993)
Synthesis and characterization of metalloporphyrins as models for hemeproteins
   University of California, San Diego  (1991-1993)
Synthesis and characterization of copper complexes as models for dinuclear copper proteins
   University of North Carolina, Chapel Hill (1986-1991)
Synthesis of selectively functionalized cavatands
   University of North Carolina, Chapel Hill (1986-1991)
Synthesis of non-symmetric macrocycles as molecular receptors
   University of San Diego  (1985-1986)
Awards and Honors

Mesa County Educator of the Year
  Mesa State College (2006)
Mesa State College Distinguished faculty Award – Teaching
  Mesa State College (2004)
N.I.H. Postdoctoral Trainee
  University of California, San Diego (1991-1993)
U.S. Department of Education Fellowship
  University of North Carolina, Chapel Hill (1990-1991)
Graduate Teaching Fellowship
  University of North Carolina, Chapel Hill (1987)
Reilly Fellowship
  University of North Carolina, Chapel Hill (1986-1987)
American Institute of Chemists Outstanding Senior
  University of San Diego (1986)
Departmental Honors in Chemistry
  University of San Diego (1986)
Departmental Honors in Biology
  University of San Diego (1986)

Grants Awarded

National Science Foundation, $69,685 (Awarded 2004)
Collaborative Research: Plant Secondary Metabolites as Mediators of Trophic Interactions in a Tropical Forest
Community, Craig Dodson and Joseph L. Richards

OSC Special Incentive Funds: Board Goals and Objectives, $1,250 (awarded 2000)
The Synthesis of Imidazole-Containing Porphyrin Analogs
Joseph L. Richards

OSC Special Incentive Professional Development Funds, $1,300 (awarded 2000)
The Synthesis of Imidazole-Containing Porphyrin Analogs
Joseph L. Richards

National Science Foundation – Ecological Studies Unit, $172,288 (awarded 2000)
Plant secondary metabolites as mediators of top-down and bottom-up forces in a tropical forest community, Lee A.
Dyer, Craig Dodson, Deborah Letourneau and Joseph L. Richards

Office of State Colleges Faculty Development Grant, $5,000 (awarded 1998)
Study of the Phytochemistry of an Ant/Plant Mutualism
Craig D. Dodson and Joseph L. Richards

Office of State Colleges Joint Activity Grant, $9755 (awarded 1998)
Collaborative Study of the Phytochemistry of an Ant/Plant Mutualism
Craig D. Dodson and Joseph L. Richards

MSC Council of Chairs Research Grant, $670 (awarded 1996)
Porphyrrms: The Synthesis of Imidazole-Containing Porphyrin Analogs
Joseph L. Richards

Michigan Space Grant Consortium Grant, $5000 (awarded 1995)
Joseph L. Richards

Grand Valley State University Science and Mathematics Division Summer Undergraduate
Research Award, $5000 (awarded 1995)
Joseph L. Richards
Recent Presentations and Publications


Improved synthesis of pipistartine, 4'-desmethylpipistartine, and cenocladamide: Three compounds isolated from Piper cenocladium, Joseph L. Richards, Julie I. Jay, Wesley C. Pidcock, and Silja Ran Agustsdottir, presented at the 57th Northwest Regional Meeting of the American Chemical Society, June, 2002.


Experience

2002-now  Mesa State College, Grand Junction, CO
Associate Professor

Physics Coordinator, 2000 to present
Faculty Senate, Fall 2005 to present
Assessment Committee, 2004/2005
Distinguished Faculty Committee 2002-2004

1999-2002  Mesa State College, Grand Junction, CO
Assistant Professor

1996-1999  Mesa State College, Grand Junction, CO
Lecturer

1996  Greenfield Community College, Greenfield, MA
Adjunct Assistant Professor

1992-1995  Trinity College, Hartford CT
Visiting Assistant Professor

1989-1992  University of Massachusetts, Amherst, MA
Research Assistant

1986-1989  University of Massachusetts, Amherst, MA
Teaching Assistant

1979-1986  Colby College, Waterville, ME
Lab Instructor

1978  Lawrence High School, Fairfield, ME
Science Teacher
Educational History

Dissertation: “Studied of the Superconducting Behavior of Polycrystalline YBCO”, Robert B. Hallock, advisor

1973-1978 Colby College B.A. June 1978

Refereed Publications


Recent Presentations


EXPERIENCE

1995-Present  Mesa State College, Grand Junction, CO
  • Visiting Professor; Lecturer of Astronomy, Physics and History of Science

1981-Present  Institute for History of Science & Technology, Russian Academy of Sciences, Moscow, Russia
  • Vice Director for Research Affairs (1994-1997)
  • Head of Department of Post-Graduates (1990-1997)
  • Senior Researcher. Editor-in-Chief for an annual on History of Astronomy & Space, Russian Academy of Sciences (1984-2000)

1967-1980  Institute for Space Research, USSR Academy of Sciences, Moscow
  • Head of Division, planning and coordinating robot missions (1973)
  • Deputy Chief of a delegation at the Soviet Academy – NASA negotiations on Lunar cartography collaboration
  • Deputy Chief of Comparative Planetology Department (1970)
  • Senior Scientific Member (1967). Principal Investigator. Participant of the international Intercosmos program

1964-1966  Korolev Space Design Bureau, near Moscow, Russia
  • A space engineer. Interpreting of photos of the Far side of the Moon. Coordinating of scientific programs for lunar spacecrafts

1959-1962  Shternberg State Astronomical Institute, Moscow University
  • Teaching and research in astronomy
EDUCATION

Pulkovo Astronomical Observatory, Academy of Sciences, St. Petersburg, Russia
Doctor of Science (Physics & Mathematics) Degree, 1980. (Officially recognized as an equal to Ph.D. in the USA)

Moscow Lomonosov University Physics Faculty, Moscow, Russia
Candidate of Science (Physics & Mathematics) Degree, 1966

State University for Geodesy & Cartography, Moscow, Russia
Engineering degree, 1959 (Graduated with major in astronomy)

SELECTED PROFESSIONAL ACTIVITIES

• Holder of five Russian patents on inventions

• Contributor to numerous international congresses and conferences (COSPAR, International Union on Geodesy & Geophysics, INSAPs, World Space Congress, Oxford Series, European Society on Astronomy in Culture, International Astronomical Union, etc.)

• Editor-in-Chief for many translations of textbooks and scientific books from English into Russian

• Lecturer on four scientific tours throughout the USA (1992-1995)

• Recipient of fellowship from Deutsches Museum, Munich, Germany, 1993

• Deputy Editor-in-Chief for Nature, the monthly magazine of the Russian Academy of Sciences (1992-1999)


• Deputy Head of the Council for Astronomers’ Training, Russian Academy of Sciences (1988-1996)

• Representative of the Russian Academy of Sciences at the Supreme Council on Stamps for Russian Ministry of Communications (1987-1999)

• Member of Editorial Board for The Earth and the Universe (bimonthly magazine of Russian Academy of Sciences), and some other journals (1985-Present)

ADDITIONAL INFORMATION
US citizen, 2003

Member of the American Astronomical Society, 1995

Member of Sigma Xi, the Scientific Research Society, 1995

Member of the International Astronomical Union (IAU), 1973; member of the Organizing Committee of the 41 IAU Commission (History of Astronomy), 1994-Present; C41 Vice President, 2000-2003; C41 President, 2003-2006; C41 Past President, 2006-

Vice President of the European Society for Astronomy in Culture, 1993-1999

Elected as a Representative to the People’s Council in Moscow, 1990-1994

Awarded by the Governmental Medal “For Labor Valor”, 1970

Native Russian Speaker. Fluent in English.
Appendix 4

Library Assessment
1. Collection Assessment

a. Reference Support:

b. Monographic Sources
The circulating collection contains 1,322 titles addressing the field of Chemistry; 290 of these were published after 1990.
More specific areas are as follows:
  Analytic Chemistry—189 (43 published after 1990)
  Organic Chemistry—258 (58 published after 1990)
  Inorganic Chemistry—119 (22 published after 1990)
  Biochemistry—147 (52 published after 1990)
  Physical Chemistry—508 (116 after 1990)

c. Periodicals
The Library has access to 42 current periodicals covering Chemistry; 40 of these are available online (Please see attached list).

d. Electronic Resources
The Library subscribes to the ACS Publications database, which covers over 30 journals and magazines from the American Chemical Society. The Science Direct database also provides access to Chemistry literature. Through Oxford Reference Online, the Library also has access to several online reference titles: the Oxford Dictionary of Chemistry, Dictionary of Scientists, and Science, Technology, and Society.
2. Evaluation of the total collection

a. Strengths
The indexing and full text provided by the Science Direct and ASC databases allow access to much of the current scholarship in the field and strengthen the Library’s support of Chemistry research. While not extensive, the Library’s reference and circulating collections sufficiently support coursework for undergraduate Chemistry majors.

b. Weaknesses
The present print collections are weighted by older materials (80% of materials in specified areas were published before 1990).

3. Recommendations
The purchase of newer titles in this area should continue, and the current scope of electronic resources should be maintained. Weeding of older materials by the liaison librarian, in close consultation with faculty, should be considered.

Library Director: [Signature]
Date: 10/13/2006
CHEMISTRY

- Accounts of Chemical Research
- Analytical Chemistry
- Biochemistry
- Bioconjugate Chemistry
- Bioorganic Chemistry
- Chemical & Engineering News
- Chemical Research in Toxicology
- Chemical Reviews
- Chemistry of Materials
  - Elements
- Energy & Fuels
- Experimental & Molecular Pathology
- Industrial & Engineering Chemistry Research
- Inorganic Chemistry
- Journal of Agricultural & Food Chemistry
- Journal of Catalysis
- Journal of Chemical & Engineering Data
  - Journal of Chemical Education
- Journal of Chemical Information & Modeling
- Journal of Chemical Thermodynamics
- Journal of Colloid & Interface Science
- Journal of Food Composition and Analysis
- Journal of Medicinal Chemistry
  - E-journal
  - Print subscription and E-journal
CHEMISTRY

- Journal of Molecular Spectroscopy
- Journal of Natural Products
- Journal of Organic Chemistry
- Journal of Physical Chemistry A
- Journal of Physical Chemistry B
- Journal of Solid State Chemistry
- Journal of the American Chemical Society
- Langmuir
- Macromolecules
- Microchemical Journal
- Molecular & Cellular Probes
- Nitric Oxide
- Organic Process Research & Development
- Organometallics
- Photochemistry and Photobiology
- Proceedings of the National Academy of Sciences of the USA
- Solid State Nuclear Magnetic Resonance
- Superlattices & Microstructures
1. Collection Assessment

   a. Reference Support:
   The Reference collection contains 82 titles covering Physics and Astronomy

   b. Monographic Sources
   The circulating collection contains 1,701 titles covering Physics (485 of these published after 1990) and 425 titles covering Astronomy (79 published after 1990). Specific areas are as follows:

   Mathematical Physics—200 (68 published after 1990)
   Treatises/Handbooks—181 (44 published after 1990)
   Descriptive and Experimental Mechanics—28 (5 published after 1990)
   Atomic Physics—259 (97 published after 1990)
   Thermal Physics—61 (13 published after 1990)
   Optics—98 (36 published after 1990)
   Electricity and Magnetism—157 (60 published after 1990)
   Nuclear and Particle Physics—173 (35 published after 1990)
   Astronomy—425 (79 published after 1990)

   c. Periodicals
   The Library has access to 20 current Physics journals, 15 of these are available online (Please see attached list).

   d. Electronic Resources
   Indexing to literature in Physics is available through the Science Direct database and additionally through MathSciNet. The Library also has access to several online reference titles: the Oxford Dictionary of Physics, Dictionary
2. Evaluation of the total collection
   
   a. Strengths
   The Electronic resources available for Physics provide access to the current research in the field. The print resources available are sufficient to support undergraduate coursework in the Physics program.

   b. Weaknesses
   The present print collection is weighted by older materials (74 % published before 1990).

3. Recommendations
The purchase of newer titles in this area should continue. Weeding of outdated materials by the liaison librarian, in close consultation with faculty, should be considered. The current scope of the electronic resources should be maintained.

Library Director: [Signature]  Date: 10/2/2006
PHYSICS

Ad Astra

✓ American Journal of Physics

• Annals of Physics

Astronomy

• Atomic Data & Nuclear Data Tables

Bulletin of the Atomic Scientists

• Icarus

• Journal of Computational Physics

• Journal of Magnetic Resonance

• Journal of Molecular Spectroscopy

• Journal of Research of the National Institute of Standards & Technology

• Journal of Sound & Vibration

• Nuclear Data Sheets

• Optical Fiber Technology

✓ Physics Teacher

Physics Today

• Radiation Research

✓ Reviews of Modern Physics

Sky & Telescope

• Superlattices & Microstructures

6/06

* E-journal
✓ Print subscription and E-journal

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Library Program Assessment
John U. Tomlinson Library
Mesa State College

Date of Assessment: __September 2006______________________________

Purpose of Assessment: __Assessment of Library Support_______________

Program under review: __Physical Sciences--Geology_________________

Program Level/s: __Bachelor of Science_____________________________

Liaison Signature: ____________________

1. Collection Assessment

a. Reference Support:
The Reference collection contains 171 titles covering Geology.

b. Monographic Sources
The circulating collection contains 18,628 titles concerning the Geological Sciences, including 11,294 government documents and 5,672 maps. Specific areas of the monographic collection (outside of government publications) are as follows:
- General works (History, handbooks…)—461
- Geology of North America—172
- Geology of western states—4,606
- Mineralogy—328
- Petrology—412
- Dynamic and Structural Geology—725
- Stratigraphy—358
- Paleontology—315
- Crystallography—68

c. Periodicals
The Library has access to 56 current periodicals in the Geological Sciences, 21 of them available online (Please see attached list).

d. Electronic Resources
The Library supports research in Geology with strong online resources. The GEORef, GEBASE, and Science Direct databases offer substantial indexing and full text access to periodical literature in Geology. Other electronic
resources include the online Oxford Dictionary of Earth Sciences, the Oxford Companion to the Earth, and the Oxford Dictionary of Weather.

2. Evaluation of the total collection

   a. Strengths
   The Library has an extensive and growing collection of print resources in Geology. Electronic resources also provide excellent access to current scholarship in the field. The full text and indexing offered by these databases greatly expand the Library’s support of research in Geology.

   b. Weaknesses
   Because of the breadth of resources for Geology, weaknesses in the library resources in this area are not evident. We will continue to work with faculty to identify areas of need.

3. Recommendations
   The acquisition of current materials in the field should continue, particularly in areas of program concentration, and the scope of electronic resources should be maintained.

Library Director: [Signature]  Date: 10/2/2006
Geology

AAPG Bulletin
American Journal of Science
American Mineralogist
Annual Review of Energy & the Environment (TJ 163.2 A55)
Antarctic Journal of the United States
Arctic, Antarctic, & Alpine Research
Climatological Data Colorado
Compass
Council on Undergraduate Research Quarterly
Cretaceous Research
Daily Weather Maps (Weekly Series)
Economic Geology
Engineering & Mining Journal
Environment
Environmental & Engineering Geoscience
Environmental Geosciences
Environmental Science & Technology
EOS
Estuarine, Coastal & Shelf Science
Geographical Analysis
Geological Society of America Bulletin
Geology
Geophysics
Geoscience Canada
Geospatial Solutions
Geotimes
GeoWorld
GPS World
Ground Water
Ground Water Monitoring & Remediation
GSA Today
Hydrogeology Journal
Journal of Geology
Journal of Geoscience Education
Journal of Glaciology
Journal of Paleontology
Journal of Sedimentary Research
Leading Edge
Mineralogical Record
Mining Annual Review (on fiche with Mining Journal)
Mining Engineering
Mining Journal (fiche only)
Mining Magazine
Monthly Energy Review
Mountain Geologist
Mountain Research & Development

Natural Hazards Observer

Oceanus

Oil & Gas Journal

Pacific Science

Quarterly (Colorado School of Mines)

Water Well Journal

Weatherwise

Woods Hole Currents

Zeitschrift fur Geomorphologie

Zeitschrift fur Geomorphologie Supplements
Appendix 5

Assessment Plan and Results
Mesa State College Assessment Report
for B.S. in Physical Sciences

Assessment Period Covered: September 2004 to May 2005

Date Submitted: October 10, 2005

Degree Program: B.S. in Physical Sciences

___________________________
Russ Walker (Head, Department of Physical and Environmental Sciences)

Submitted by
Mesa State College Assessment Report

Degree Program: B.S. in Physical Sciences

Assessment Period Covered: September 2004 to May 2005
Date Submitted: October 10, 2005

Institutional Mission Reference:
Mesa State College shall offer programs leading to baccalaureate degrees in sciences.

College/University Goal(s) Supported:
The college develops the intellectual, ethical, and aesthetic sensibilities that enable a student to pursue a rewarding career and assume a responsible and logical goal in society. The college seeks to liberate persons from narrow interests and prejudices, to help them observe reality precisely and events critically, to think logically, and to communicate effectively.

Intended Education (Student) Outcomes

1. Students show a strong foundation in understanding chemistry, geology, environmental geology, physics, and applied physics (depending on the concentration) and related disciplines.

2. Graduates will be successful in post-baccalaureate experiences with regard to education and employment.

3. Graduates will demonstrate critical and creative thinking as well as effective communication skills.
Mesa State College Assessment Report

Degree Program: B.S. in Physical Sciences

Assessment Period Covered: September 04 to May 05
Date Submitted: October 10, 2005

Intended Educational (Student) Outcome:

1. Students show a strong foundation in understanding chemistry, geology, environmental geology, physics, and applied physics (depending on the concentration) and related disciplines.

First Means of Assessment

Means of Program Assessment and Criteria for Success

All physics and chemistry majors have to take the MFT exam and MFT scores are recorded. Geology majors are required to take exit exams for their concentrations. The criteria for success will be that physics and chemistry majors should score at least 65% (interpreting this to mean a score of 130) in the total MFT and 50% of geology majors will score in the upper 50th percentile on their exit examination.

Summary of Assessment Data Collected

Chemistry—All three students scored above 130 on the MFT (i.e., 153, 153, and 160).

Geology—All three students scored in the upper 50th percentile on the geology exit exam (i.e., 63%, 63%, and 69%).

Physics—Three of four students scored above 130 on the MFT (i.e., 124, 136, 139, 150). The student who scored lowest was also weak in overall performance in physics courses.
Use of Results to Improve Instructional Program

MFT scores do not suggest changes need to be made.

Second Means of Assessment

Means of Program Assessment and Criteria for Success

An exit survey will be used to measure overall student satisfaction in chemistry, geology, and physics. This survey will be administered to all graduating seniors during their final semester and will be specific to their degree concentrations. Questions on the survey will deal with the major topic areas in the designated degree program. For each question, students can select five responses: 5 = significant knowledge, 4 = moderate knowledge, 3 = some knowledge, 2 = little knowledge, and 1 = no knowledge. Based on the total scores from the surveys, a comprehensive physical science data base will be established. From this combined data base, the criterion for success will be that 50% of the students have summary scores of 3.5 or greater.

Summary of Assessment Data Collected

On the basis of records left by the preceding department chair, it appears that only two surveys were received from graduating students! (Clearly, our plan for next year needs to include a mechanism for ensuring that we receive a survey from every graduating student.) The summary score for the two surveys were 4.2 and 4.0.

Use of Results to Improve Instructional Program

No changes to course content are warranted on the basis of this year's data.
Mesa State College Assessment Report

Degree Program: B.S. in Physical Sciences

Assessment Period Covered: September 04 to May 05
Date Submitted: October 10, 2005

Intended Educational (Student) Outcome:

2. Graduates will be successful in post-baccalaureate experiences with regard to education and employment.

First Means of Assessment

Means of Program Assessment and Criteria for Success

Students will be tracked (when possible) during the application process for graduate school. The goal is to monitor 75% of the recent graduates for a minimum of two years following graduation. Each concentration will establish a database that includes: (1) names of students requesting letters of recommendations for graduate school; (2) graduate schools that students are contacting; and (3) the prospective entry dates. The tracking data will allow the success rate of prospective graduate students to be monitored, at least at the entry level.

Summary of Assessment Data Collected

Chemistry—One graduate has been accepted to medical school while another is still applying.

Geology—The database was established in spring 2005. During the 2004-05 year, one student applied to grad school. The outcome of their application is not known.

Physics—Of the eight students who graduated in the past two years, one is in grad school and three others are applying to grad school.
Use of Results to Improve Instructional Program

More data needs to be collected before we can reliably identify any possible areas for program improvements.

Second Means of Assessment

Means of Program Assessment and Criteria for Success

Physical Science students will be tracked for two years following graduation to determine employment success. A mail and/or internet survey will be used to collect the data. The expectation (criterion for success) is that 50% of the graduates in the Physical Sciences will be employed in their selected disciplines or closely related fields.

Summary of Assessment Data Collected

Chemistry—Of the three graduates from May 2005, one has sought and obtained chemistry-related employment. (The others are pursuing graduate school.)

Geology—Six graduates from fall 2003 through spring 2005 were known to be employed.

Physics—Of the eight students who graduated in the last two years, two have physics-related permanent employment and two have temporary physics-related jobs. (The other graduates are pursuing grad school and other interests.)

Use of Results to Improve Instructional Program

No changes are warranted on the basis of the data collected this year.
Mesa State College Assessment Report

Degree Program: B.S. in Physical Sciences

Assessment Period Covered: September 04 to May 05
Date Submitted: October 10, 2005

Intended Educational (Student) Outcome:

3. Graduates will demonstrate critical and creative thinking as well as effective communication skills.

First Means of Assessment

Means of Program Assessment and Criteria for Success

Students in the Physical Science concentrations must meet all the basic general education requirements for the baccalaureate degree regarding basic communication skills. These basics are expanded in the majority of the 400-level chemistry, geology, and physics courses by requiring students to perform scientific research, write technical papers, and/or give oral presentations in class or laboratory. The goal is to have 90% of the graduating Physical Science students complete at least one 400-level class that requires advanced critical and creative thinking tasks and effective communication. Since these requirements are formally met as part of the course content, they will be graded by the appropriate faculty member. Thus, students not meeting these requirements will not be able to graduate. Students are also encouraged to make presentations at national and regional professional meetings in the Physical Sciences, as well as the annual MSC Student Scholars Symposium.

Summary of Assessment Data Collected

Chemistry—Two of three chemistry graduates (67%) completed CHEM 431 Instrumental Analysis. The student who did not take this course did present a 20-minute talk in CHEM 315 Biochemistry. One student also gave a talk on a chemistry topic in a math department seminar.
Geology—All geology grads completed either GEOL 490 Seminar or a senior honor’s thesis.

Physics—All physics graduates gave presentations in PHYS 494 Seminar.

Use of Results to Improve Instructional Program

We believe that the intent of this criterion was met in chemistry. The criterion was formally met in geology and physics.

Second Means of Assessment

Means of Program Assessment and Criteria for Success

Each discipline has a seminar, laboratory, or field class that requires students to solve applicable technical programs and to present and/or discuss their results. In physics the required “capstone” course is PHYS 494 Seminar, whereas in chemistry the equivalent course is CHEM 341 Advanced Laboratory. In geology, the capstone course is GEOL 380 Field Studies. The criteria for success is to have 90% completion rate for physical sciences students taking the capstone courses.

Summary of Assessment Data Collected

Chemistry—All graduates completed CHEM 341 Advanced Laboratory.

Geology—All geology graduates complete GEOL 380 Field Studies.

Physics—All physics graduates completed the PHYS 494 Seminar.

Use of Results to Improve Instructional Program

No changes are warranted on the basis of this year’s data.
Description of the College
Located in Grand Junction, Colorado, Mesa State College (MSC) is charged with a mission to deliver a liberal arts and science curriculum. As a regional education provider (REP), MSC is charged with offering general baccalaureate and specialized graduate curricula with moderately selective admission. The philosophy and goals of a MSC baccalaureate education include an emphasis on the: origin and structure of modern society; enduring ideas that have historically inspired humanity; scientific perspective and its impact on society; expression of the creative spirit; importance of becoming a contributing citizen; competencies required for self-directed, on-going learning; and advanced competencies within specific disciplines. Administratively, the structure consists of a president, three vice presidents, various associate and assistant vice presidents, and twelve (main campus) academic department chairs. In 2003, there were 5,784 students enrolled at MSC.

The Department of Physical and Environmental Sciences
From all appearances, the Department of Physical and Environmental Sciences (PES) is a solid unit with an effective administration and faculty. The department includes chemistry, physics, geosciences, and environmental science programs. This program review, however, does not include an evaluation of the environmental science program. The department, housed in the Wubben Hall, offers a physical science baccalaureate degree with five concentrations (chemistry, physics, geology, environmental geology, and geology-secondary teaching). There are also five minors offered in the physical sciences (chemistry, physics, geology, geographic information systems (GIS), and watershed science).

Programs: Chemistry, Physics, Geosciences
Department: Physical and Environmental Science
Date: Campus Visit November 29-December 1, 2006
Report Date: December 18, 2006

1. Program Strengths, Weaknesses, and Recommendations for change (if necessary):
   a. Strengths: (1) Terminally qualified tenured and tenure-track faculty, (2) Undergraduate research opportunities for interested students, (3) Faculty garner awards for teaching, scholarship, and overall performance, (4) Curriculum reflects current standards of content, (5) Program provides important service courses for other academic areas, (6) Assessment plans
are in place and some assessment data have been gathered, (7) Program graduates are obtaining admission to post-baccalaureate programs, (8) Library support is excellent, (9) Instructional technology (IT) support is good, and improving due to planned replacement of faculty computers on a regular rotation.

Chemistry: (1) Outstanding instrumentation available for student and instructional use, (2) Undergraduate research opportunities have led to shared publication with faculty members.

Physics: (1) Placement rates for program graduates in post-baccalaureate programs are good.

Geoscience: (1) Geologically diverse location utilized for field-based studies, (2) Faculty are professionally and academically qualified, (3) Recent NSF grant received, (4) Active undergraduate research, (5) New equipment and software to GIS minor, (6) Placement rates for program graduates in post-baccalaureate programs are good.

b. Weaknesses: (1) The use of temporary full-time (0.8) faculty disrupts academic continuity and challenges content quality, (2) Teaching space (both lecture and laboratory) is tight, creating challenges in preparation and the availability of instruction materials, (3) There is “unused capacity” in the programs, that is, more majors could be accommodated, (4) Low salaries may be effecting the ability of programs to attract and retain qualified faculty members, (5) Assessment activities require more diligent follow-up, analysis of data, and implementation of indicated changes, (6) Funding to support undergraduates research activities is generally limited, (7) Program graduate acceptance rates into graduate programs is barely at, or below, the national average, (8) Students enrolled in physical science programs indicated conflicts between required courses in physical science and mathematics.

Chemistry: (1) Too great a use of temporary full-time faculty members in this area, (2) Curriculum needs closer alignment with national standards, such as those provided by the American Chemical Society (ACS), (3) Current curriculum is weak in inorganic chemistry because no faculty member with that specialty has been retained, (4) Supporting curricular requirements (mathematics) do not meet national (ACS) standards, (5) Aging analytical equipment with no funding for replacement and maintenance.

Physics: (1) Without a dedicated classroom and preparation area, important demonstrations are not presented at appropriate junctures in the curriculum.
Geoscience: (1) Transportation for field-based curriculum is limited and difficult to arrange. (2) Supporting curricular requirements (chemistry, physics, and mathematics) do not meet national standards, such as those provided by the American Geological Institute (AGI) in their 1999 "Report on the Status of Academic Geoscience Departments" (attached). (3) Laboratory space is particularly limited requiring simultaneous laboratory instruction in the same space. (4) Program graduate acceptance to post-baccalaureate schools is (15% by my calculation from the data supplied) very low.

c. Recommendations:

(1) Where possible, the use of temporary full-time faculty should not exceed 15% of program instruction (national best practices are 10-20% adjunct faculty).
(2) Adequate access to dedicated teaching and laboratory space needs to be addressed with each program in the department. With space at a premium, some sharing will undoubtedly occur, however preparation areas in close proximity to instructional space are a critical need.
(3) Marketing of degree programs and recruiting efforts need to increase, including efforts to attract science students already attending MSC.
(4) Website development is critical, current webpages are hopelessly out of date and generally not helpful. Web development and maintenance is a responsibility that should be shared by program faculty members.
(5) Funding for salaries and support of equipment and undergraduate research is inadequate and may reduce the department's ability to attract and retain qualified faculty members.
(6) Assessment can be a great asset to academics as they make strategic decisions, a serious effort to compile and use assessment data is indicated.
(7) Coordinate course offerings so fewer conflicts exist between required curricula, including support curricula.
(8) Physical science programs need to support each other by creating a shared core of courses in all three physical science disciplines (for example common physics and chemistry requirements in all three areas).
(9) In an analysis of course offerings in the geosciences, I noted that 7/12 required majors' courses were offered in the fall (2006) and 8/12 were offered in the spring (2006). It would be advantageous for physical science programs and faculty members to consolidate scheduling and reduce the number of course preparations each semester. One way to address this is to look at alternate year offerings for upper division majors' courses. There is a critical period for implementing this type of change, but once students receive proper advisement, and a pattern is established, alternate year offerings pose no challenges for timely graduation of majors.
(10) Some advisement issues were raised by both students and physical science faculty members. Better communication between centralized advising and the sciences is indicated. Advisement in the sciences,
particularly the physical sciences, is somewhat unique. If students are advised to complete general education requirements before starting their majors they are already at least one year behind in degree completion. Physical Science faculty members need to assume primary advisement responsibility.

Chemistry:
(1) ACS has not only prescribed a national curriculum for chemistry, it provides nationally normed examinations for each course in the curriculum. Chemistry should take advantage of this and assess its students, curriculum, and faculty by purchasing and administering these exams.
(2) While ACS accreditation/approval of MSC's chemistry program is a distant dream at this point, the chemistry faculty needs to acknowledge that goal and take the steps necessary to build toward it. The first step is to hire tenure-track faculty members with specializations in physical and inorganic chemistry.
(3) Decisions need to be made regarding a compromise between quality and quantity of graduates. Attracting students to chemistry by reducing the requirements in mathematics is NOT a good practice and will ultimately harm the chemistry program. One way this can be addressed, to the benefit of all the physical sciences, is to level the supporting curriculum "playing field" between all of the sciences. Nationally, biology students are required to take a full year of calculus, not a one-semester course developed specifically for biology students. Although I did not specifically evaluate the biology program, some equity in supporting curriculum requirements in the sciences is indicated. At a minimum discussion between biology and PES should take place to address this and other issues.
(4) There is an opportunity for chemistry to provide an alternative pre-healthcare curriculum at MSC. Many students recognize that a major in something besides life science gives them a competitive edge in medical or dental school acceptance. Chemistry is a natural discipline to offer a more rigorous preparation opportunity for these students. An alternative curriculum, specifically directed at pre-healthcare students needs to be developed, approved, and offered.

Physics: (See general recommendations above)

Geosciences:
(1) Field transportation is a national concern, particular because of the safety issues associated with 15-passenger vans. However, field exploration is critical to learning in the geosciences. Field transportation must be available to support a geoscience curriculum. Two 15-passenger vans will not meet the needs of the entire MSC campus. If the transportation costs are directly borne by the users, it should be a simple matter to provide sufficient field transportation.
(2) Decisions need to be made regarding a compromise between quality and quantity of graduates. Attracting students to the geosciences by reducing the requirements in mathematics, physics and chemistry is NOT a good practice and will ultimately harm the geoscience program. I realize that this is not a simple issue, but discussion needs to occur to determine the program's strategic direction in this area. One possible solution is offering an emphasis in the geosciences directed at students interested only in post-baccalaureate employment. The purpose of this emphasis would need to be clearly articulated to students who choose it, because it would not provide adequate graduate school preparation.

(3) Greater effort needs to be expended to identify and prepare geoscience students for graduate studies. We have found that clear articulation of post-baccalaureate prerequisites and their inclusion in the baccalaureate curriculum is critical.