MESA STATE COLLEGE

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 Mathematical 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

Craig Dodson	Ph.D.	1995-present	Tenured
Joe Richards	Ph.D.	1995-present	Tenured
Larry Madsen	Ph.D.	1988-2006	Tenured
John Dogbe	Ph.D.	2006-present	Temporary
Harmony Voorhies	Ph.D.	1999-2003	Tenure track
Sue Kenney	M.S.	2006-present	Temporary
Tim Flynn	Ph.D.	2003-2004	Temporary
Allison Flynn	M.S.	2004-2006	Temporary

Physics

Gordon Gilbert	Ph.D.	1980-present	Tenured
Bill Tiernan	Ph.D.	1997-present	Tenured
Prasanta Misra	Ph.D.	1988-2005	Tenured
David Collins	Ph.D.	2006-present	Tenure-track

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 Lorhammer	M.S.	2006-present	Temporary
Larry Jones	Ph.D.	2003-2006	Temporary

3. Physical facilities

Classroom-based coursework is conducted mostly in Wubben 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 Wubben 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 Wubben 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 Wubben 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, spectroscopes, 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 Tiernan (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 included 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

Level	Major Code	Program Name	Degree Attainment				
			2001	2002	2003	2004	2005
Baccalaureate							
	3460	Geology	8	2	4	3	3
	3461	Geology, Teacher Certification	0	1	1	0	0
	3462	Geology, Environmental	2	1	3	1	2
	3463	Physics	2	3	1	2	4
	3464	Physics, Teacher Certification	0	0	0	0	0
	3465	Chemistry	3	1	2	3	2
	3466	Applied Physics	2	4	2	2	2
TOTAL			**17**	**12**	**13**	**11**	**13**

(No. of MAJORS)

Table 1A.1. Undergraduate Physical Science Enrollment by Major Code, Summer Terms 2001 - 2005
Mesa State College

Level	Major Code	Program Name	2001	2002	2003	2004	2005
Baccalaureate							
	3460	Geology					
		New Majors	1	0	1	0	0
		Continuing Majors	5	2	3	14	5
	Sub-Total		**6**	**2**	**4**	**14**	**5**
	3461	Geology, Teacher Certification					
		New Majors	0	0	0	0	0
		Continuing Majors	1	2	0	1	1
	Sub-Total		**1**	**2**	**0**	**1**	**1**
	3462	Geology, Environmental					
		New Majors	0	0	0	2	0
		Continuing Majors	1	5	0	2	0
	Sub-Total		**1**	**5**	**0**	**4**	**0**
	3463	Physics					
		New Majors	0	0	0	0	0
		Continuing Majors	2	0	0	2	1
	Sub-Total		**2**	**0**	**0**	**2**	**1**
	3464	Physics, Teacher Certification					
		New Majors	0	0	0	0	0
		Continuing Majors	0	0	0	1	1
	Sub-Total		**0**	**0**	**0**	**1**	**1**
	3465	Chemistry					
		New Majors	0	0	0	1	1
		Continuing Majors	2	1	0	2	1
	Sub-Total		**2**	**1**	**0**	**3**	**2**
	3466	Applied Physics					
		New Majors	0	0	0	0	0
		Continuing Majors	2	0	0	1	0
	Sub-Total		**2**	**0**	**0**	**1**	**0**
	3490	Undeclared Nat Sci/Math					
		New Majors	1	0	1	0	0
		Continuing Majors	1	2	2	0	1
	Sub-Total		**2**	**2**	**3**	**0**	**1**
	All Physical Sciences						
		New Majors	**2**	**0**	**2**	**3**	**1**
		Continuing Majors	**14**	**12**	**5**	**23**	**10**
Grand Total			**16**	**12**	**7**	**26**	**11**

(NO. OF MAJORS)

Table 1A.2. Undergraduate Physical Science Enrollment by Major Code, Fall Terms 2001 - 2005
Mesa State College

Level	Major Code	Program Name	2001	2002	2003	2004	2005
Baccalaureate							
	3460	Geology					
		New Majors	5	7	13	8	12
		Continuing Majors	13	14	12	17	21
	Sub-Total		**18**	**21**	**25**	**25**	**33**
	3461	Geology, Teacher Certification					
		New Majors	2	1	0	2	1
		Continuing Majors	4	4	3	2	4
	Sub-Total		**6**	**5**	**3**	**4**	**5**
	3462	Geology, Environmental					
		New Majors	5	4	2	3	3
		Continuing Majors	6	8	4	4	7
	Sub-Total		**11**	**12**	**6**	**7**	**10**
	3463	Physics					
		New Majors	2	11	6	5	6
		Continuing Majors	9	6	11	7	6
	Sub-Total		**11**	**17**	**17**	**12**	**12**
	3464	Physics, Teacher Certification					
		New Majors	2	1	2	0	1
		Continuing Majors	2	0	0	2	1
	Sub-Total		**4**	**1**	**2**	**2**	**2**
	3465	Chemistry					
		New Majors	10	9	13	8	16
		Continuing Majors	6	8	11	12	16
	Sub-Total		**16**	**17**	**24**	**20**	**32**
	3466	Applied Physics					
		New Majors	1	3	1	1	0
		Continuing Majors	9	7	8	4	2
	Sub-Total		**10**	**10**	**9**	**5**	**2**
	3490	Undeclared Nat Sci/Math					
		New Majors	8	10	6	16	14
		Continuing Majors	12	9	1	1	4
	Sub-Total		**20**	**19**	**7**	**17**	**18**
	All Physical Sciences						
		New Majors	**35**	**46**	**43**	**43**	**53**
		Continuing Majors	**61**	**56**	**50**	**49**	**61**
Grand Total			**96**	**102**	**93**	**92**	**114**

(NO. OF MAJORS)

Table 1A.3. Undergraduate Physical Science Enrollment by Major Code, Spring Terms 2002 - 2006
Mesa State College

Level	Major Code	Program Name	2002	2003	2004	2005	2006
Baccalaureate							
	3460	Geology					
		New Majors	9	2	13	6	10
		Continuing Majors	13	16	12	21	26
	Sub-Total		**22**	**18**	**25**	**27**	**36**
	3461	Geology, Teacher Certification					
		New Majors	2	1	1	3	1
		Continuing Majors	6	2	3	3	1
	Sub-Total		**8**	**3**	**4**	**6**	**2**
	3462	Geology, Environmental					
		New Majors	2	1	3	3	3
		Continuing Majors	8	7	3	6	6
	Sub-Total		**10**	**8**	**6**	**9**	**9**
	3463	Physics					
		New Majors	1	1	6	5	6
		Continuing Majors	9	11	10	7	12
	Sub-Total		**10**	**12**	**16**	**12**	**18**
	3464	Physics, Teacher Certification					
		New Majors	0	0	2	1	0
		Continuing Majors	2	1	0	2	2
	Sub-Total		**2**	**1**	**2**	**3**	**2**
	3465	Chemistry					
		New Majors	4	4	14	16	4
		Continuing Majors	14	11	8	8	27
	Sub-Total		**18**	**15**	**22**	**24**	**31**
	3466	Applied Physics					
		New Majors	2	3	3	0	0
		Continuing Majors	8	10	7	3	1
	Sub-Total		**10**	**13**	**10**	**3**	**1**
	3490	Undeclared Nat Sci/Math					
		New Majors	6	2	7	1	0
		Continuing Majors	13	5	0	7	9
	Sub-Total		**19**	**7**	**7**	**8**	**9**
	All Physical Sciences						
		New Majors	**26**	**14**	**49**	**35**	**24**
		Continuing Majors	**73**	**63**	**43**	**57**	**84**
Grand Total			**99**	**77**	**92**	**92**	**108**

(No. of majors)

Undergraduate Physical Science Enrollment by Major Code, Fall Terms 2000-2004
Mesa State College

Level	Major Code	Program Name	2000	2001	2002	2003	2004
Baccalaureate							
	3460	Geology	28	18	21	25	25
	3461	Geology, Teacher Certification	3	6	5	3	4
	3462	Geology, Environmental	10	11	12	6	7
	3463	Physics	17	11	17	17	12
	3464	Physics, Teacher Certification	4	4	1	2	2
	3465	Chemistry	20	16	17	24	20
	3466	Applied Physics	14	10	10	9	5
TOTAL			**96**	**76**	**83**	**86**	**75**

(NO. OF MAJORS) AND LEVEL

Undergraduate Physical Science Enrollment by Major Code, Fall Terms 2000-2004
Mesa State College

Level	Major Code	Program Name	2000	2001	2002	2003	2004
Freshman							
	3460	Geology	5	4	6	5	7
	3461	Geology, Teacher Certification	1	1	1	0	1
	3462	Geology, Environmental	1	4	1	1	3
	3463	Physics	8	2	10	5	2
	3464	Physics, Teacher Certification	2	2	1	2	0
	3465	Chemistry	8	6	5	9	10
	3466	Applied Physics	4	1	3	0	1
TOTAL			**29**	**20**	**27**	**22**	**24**
Sophomore							
	3460	Geology	2	5	3	4	6
	3461	Geology, Teacher Certification	0	2	2	1	0
	3462	Geology, Environmental	2	1	2	0	1
	3463	Physics	1	4	0	5	3
	3464	Physics, Teacher Certification	1	1	0	0	1
	3465	Chemistry	3	6	3	5	2
	3466	Applied Physics	2	2	1	5	0
TOTAL			**11**	**21**	**11**	**20**	**13**
Junior							
	3460	Geology	6	3	4	8	3
	3461	Geology, Teacher Certification	0	0	0	1	0
	3462	Geology, Environmental	4	1	2	2	2
	3463	Physics	2	1	4	3	2
	3464	Physics, Teacher Certification	0	0	0	0	0
	3465	Chemistry	1	2	5	5	3
	3466	Applied Physics	2	3	2	1	1
TOTAL			**15**	**10**	**17**	**20**	**11**
Senior							
	3460	Geology	15	6	8	8	9
	3461	Geology, Teacher Certification	2	3	2	1	3
	3462	Geology, Environmental	3	5	7	3	1
	3463	Physics	6	4	3	4	5
	3464	Physics, Teacher Certification	1	1	0	0	1
	3465	Chemistry	8	2	4	5	5
	3466	Applied Physics	6	4	4	3	3
TOTAL			**41**	**25**	**28**	**24**	**27**
All Levels							
	3460	Geology	28	18	21	25	25
	3461	Geology, Teacher Certification	3	6	5	3	4
	3462	Geology, Environmental	10	11	12	6	7
	3463	Physics	17	11	17	17	12
	3464	Physics, Teacher Certification	4	4	1	2	2
	3465	Chemistry	20	16	17	24	20
	3466	Applied Physics	14	10	10	9	5
TOTAL			**96**	**76**	**83**	**86**	**75**

COURSES BY COURSE LEVEL BY TERM AY 2006

Level/Course Level	Summer Courses		Fall Courses		Spring Courses		Total Courses	
Undergraduate								
Remedial - 000	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Lower - 100	7	100.0%	57	55.9%	51	49.0%	115	54.0%
Lower - 200	0	0.0%	5	4.9%	3	2.9%	8	3.8%
Upper - 300	0	0.0%	28	27.5%	25	24.0%	53	24.9%
Upper - 400	0	0.0%	12	11.8%	25	24.0%	37	17.4%
Subtotal Undergraduates	**7**	**100.0%**	**102**	**100.0%**	**104**	**100.0%**	**213**	**100.0%**
Graduate								
Graduate - 500	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Subtotal Graduates	**0**	**0.0%**	**0**	**0.0%**	**0**	**0.0%**	**0**	**0.0%**
Total	**7**	**100.0%**	**102**	**100.0%**	**104**	**100.0%**	**213**	**100.0%**

Table 2. HEADCOUNT AND CREDIT HOUR DISTRIBUTION BY COURSE LEVEL BY TERM AY 2006

Level/Course Level	Summer Headcount		Summer Credit Hours		Fall Headcount		Fall Credit Hours	
Undergraduate								
Remedial - 000	0	0.0%	0.0	0.0%	0	0.0%	0	0.0%
Lower - 100	90	100.0%	249.0	100.0%	1,499	80.2%	3,938	82.6%
Lower - 200	0	0.0%	0.0	0.0%	60	3.2%	150	3.1%
Upper - 300	0	0.0%	0.0	0.0%	269	14.4%	608	12.8%
Upper - 400	0	0.0%	0.0	0.0%	41	2.2%	72	1.5%
Subtotal Undergraduates	**90**	**100.0%**	**249.0**	**100.0%**	**1,869**	**100.0%**	**4,768**	**100.0%**
Graduate								
Graduate - 500	0	0.0%	0.0	0.0%	0	0.0%	0	0.0%
Subtotal Graduates	**0**	**0.0%**	**0.0**	**0.0%**	**0**	**0.0%**	**0**	**0.0%**
Total	**90**	**100.0%**	**249.0**	**100.0%**	**1,869**	**100.0%**	**4,768**	**100.0%**

Level/Course Level	Spring Headcount		Spring Credit Hours		Total Credit Hours	
Undergraduate						
Remedial - 000	0	0.0%	0.0	0.0%	0	0.0%
Lower - 100	1,420	80.6%	3768.0	83.4%	7,955	83.4%
Lower - 200	24	1.4%	67.0	1.5%	217	2.3%
Upper - 300	205	11.6%	438.0	9.7%	1,046	11.0%
Upper - 400	112	6.4%	246.0	5.4%	318	3.3%
Subtotal Undergraduates	**1,761**	**100.0%**	**4519.0**	**100.0%**	**9,536**	**100.0%**
Graduate						
Graduate - 500	0	0.0%	0.0	0.0%	0	0.0%
Subtotal Graduates	**0**	**0.0%**	**0.0**	**0.0%**	**0**	**0.0%**
Total	**1,761**	**100.0%**	**4519.0**	**100.0%**	**9,536**	**100.0%**

Table 3. HEADCOUNT AND FULL-TIME EQUIVALENT PHYSICAL SCIENCE ENROLLMENTS AY 2006

Level/Tuition Classification	Headcount		Credit Hours		FTE	
Undergraduate						
In-State	3,365	90.5%	8,606	90.2%	286.9	90.2%
Out-of State	355	9.5%	930	9.8%	31.0	9.8%
Subtotal	**3,720**	**100.0%**	**9,536**	**100.0%**	**317.9**	**100.0%**
Graduate						
In-State	0	-	0	-	0.0	-
Out-of State	0	-	0	-	0.0	-
Subtotal	**0**	**0.0%**	**0**	**0.0%**	**0.0**	**0.0%**

HEADCOUNT AND CREDIT HOUR DISTRIBUTION BY COURSE LEVEL BY TERM AY 2005

Level/Course Level	Summer Headcount		Summer Credit Hours		Fall Headcount		Fall Credit Hours		Spring Headcount		Spring Credit Hours		Total Headcount*		Total Credit Hours	
Undergraduate																
Lower Division	43	69.4%	118	54.1%	1,737	81.1%	4,536	84.4%	1,744	81.6%	4,663	84.3%	3,524	81.2%	9,317	83.8%
Upper Division	19	30.6%	100	45.9%	404	18.9%	836	15.6%	394	18.4%	869	15.7%	817	18.8%	1,805	16.2%
Subtotal	**62**	**100.0%**	**218**	**100.0%**	**2,141**	**100.0%**	**5,372**	**100.0%**	**2,138**	**100.0%**	**5,532**	**100.0%**	**4,341**	**100.0%**	**11,122**	**100.0%**
Graduate																
Graduate	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Subtotal	**0**	-	**0**	-	**0**	-	**0**	-	**0**	-	**0**	-	**0**	-	**0**	-

* Headcount is duplicated across terms so will not match FTE headcount

HEADCOUNT AND FULL-TIME EQUIVALENT PHYSICAL SCIENCE ENROLLMENTS AY 2005

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

*Students who are exclusively cash funded are excluded.

Headcount and Average Cumulative Credit Hours to Degree for Physical Science Students Graduating AY 2005

Type of Entry into MSC	Headcount		Average Cumulative Credit Hours to Degree
Student Type			
Began at MSC	7	53.8%	129.7
Transferred in to MSC	6	46.2%	145.8
Total Subtotal	**13**	**100.0%**	**137.2**

ONE-YEAR RETENTION RATE FOR FIRST-TIME PHYSICAL SCIENCE STUDENTS, FALL 2003 - FALL 2004
Mesa State College

Major									
Level	Code	Program Name	Retained Fall 2004		Not retained fall 2004, No degree awarded		Total		
			#	%	#	%	#	%	
BACCALAUREATE									
	3460	Geology	1	33.3%	2	66.7%	3	100.0%	
	3461	Geology, Teacher Certification	-	-	-	-	-	-	
	3462	Geology, Environmental	-	-	-	-	-	-	
	3463	Physics	1	100.0%	0	0.0%	1	100.0%	
	3464	Physics, Teacher Certification	-	-	-	-	-	-	
	3465	Chemistry	3	60.0%	2	40.0%	5	100.0%	
	3466	Applied Physics	-	-	-	-	-	-	
TOTAL			**5**	**55.6%**	**4**	**44.4%**	**9**	**100.0%**	

PHYSICAL SCIENCE WORKLOAD 2005 - 06 BY PROGRAM

INSTRUCTOR TYPE	PROGRAM	TRACK	COURSE CREDIT HOURS	HEADCOUNT ENROLLME	STUDENT CREDIT HOURS	FTEF	FTES	FTES/ FTEF
		A Total	63.000	646	1,772.00			
		B Total	8.000	7	10.00			
	CHEM Total		**71.000**	**653**	**1,782.00**	**2.96**	**59.40**	**20.08**
		A Total	125.000	655	1,523.00			
		B Total	26.000	14	33.00			
	GEOL Total		**151.000**	**669**	**1,556.00**	**6.29**	**51.87**	**8.24**
		A Total	63.000	441	1,141.00			
		B Total	8.000	6	10.00			
	PHYS Total		**71.000**	**447**	**1,151.00**	**2.96**	**38.37**	**12.97**
1 - T/TT Total			**293.000**	**1,769**	**4,489.00**	**12.21**	**149.63**	**12.26**
		A Total	20.000	263	851.00			
	CHEM Total		**20.000**	**263**	**851.00**	**0.83**	**28.37**	**34.04**
		A Total	33.000	610	1,640.00			
	GEOL Total		**33.000**	**610**	**1,640.00**	**1.38**	**54.67**	**39.76**
		A Total	55.000	524	1,541.00			
	PHYS Total		**55.000**	**524**	**1,541.00**	**2.29**	**51.37**	**22.41**
3 - FT Temp Total			**108.000**	**1,397**	**4,032.00**	**4.50**	**134.40**	**29.87**
		A Total	5.000	98	98.00			
	CHEM Total		**5.000**	**98**	**98.00**	**0.21**	**3.27**	**15.68**
5 - Admin Total			**5.000**	**98**	**98.00**	**0.21**	**3.27**	**15.68**
		A Total	4.000	79	79.00			
	CHEM Total		**4.000**	**79**	**79.00**	**0.17**	**2.63**	**15.80**
		A Total	35.000	287	589.00			
	GEOL Total		**35.000**	**287**	**589.00**	**1.46**	**19.63**	**13.46**
6 - PT Total			**39.000**	**366**	**668.00**	**1.63**	**22.27**	**13.70**
	CHEM Total		100.000	1,093	2,810.000	**4.17**	**93.67**	**22.48**
	GEOL Total		219.000	1,566	3,785.000	**9.13**	**126.17**	**13.83**
	PHYS Total		126.000	971	2,692.000	**5.25**	**89.73**	**17.09**
Grand Total			**445.000**	**3,630**	**9,287.00**	**18.54**	**309.57**	**16.70**

TERM	RANK	COURSE	COURSENAME		NAME	TRACK	CRHR	ENROLLED	STDHRS
200502	1 - T/TT	GEOL 402L	Appl/Geomorphology Lab	Aslan	, Andres	A	1	6	6
200502	1 - T/TT	GEOL 402	Appl of Geomorphology	Aslan	, Andres	A	3	6	18
200502	1 - T/TT	GEOL 111	Prin of Physical Geology-GTSC1	Aslan	, Andres	A	3	21	63
200504	1 - T/TT	GEOL 490	Seminar	Aslan	, Andres	A	3	5	15
200504	1 - T/TT	GEOL 111	Prin of Physical Geology-GTSC1	Aslan	, Andres	A	3	31	93
200504	1 - T/TT	GEOL 107	Nat Haz & Env Geology	Aslan	, Andres	A	3	20	60
						A Total	16	89	255
200502	1 - T/TT	GEOL 497	Structured Research	Aslan	, Andres	B	2	1	2
200504	1 - T/TT	GEOL 497	Structured Research	Aslan	, Andres	B	3	2	6
						B Total	5	3	8
				Aslan	**, Andres Total**		21	92	263
200502	1 - T/TT	GEOL 305	Cartography for GIS	Brock	, James	A	1	9	9
200504	1 - T/TT	GEOL 305	Cartography for GIS	Brock	, James	A	1	17	17
						A Total	2	26	26
				Brock	**, James Total**		2	26	26
200502	1 - T/TT	GEOL 105	Geology of Colorado	Cole	, Rex	A	3	50	150
200502	1 - T/TT	GEOL 105	Geology of Colorado	Cole	, Rex	A	3	27	81
200502	1 - T/TT	GEOL 359	Surv Energy-Rel Nat Resour	Cole	, Rex	A	3	9	27
200502	1 - T/TT	GEOL 112	Prin of Historical Geol-GTSC1	Cole	, Rex	A	3	7	21
200502	1 - T/TT	GEOL 112L	Prin of Hist Geol Lab-GTSC1	Cole	, Rex	A	1	7	7
200504	1 - T/TT	GEOL 105	Geology of Colorado	Cole	, Rex	A	3	59	177
200504	1 - T/TT	GEOL 112L	Prin of Hist Geol Lab-GTSC1	Cole	, Rex	A	1	11	11
200504	1 - T/TT	GEOL 112	Prin of Historical Geol-GTSC1	Cole	, Rex	A	3	11	33
200504	1 - T/TT	GEOL 444	Sedimentology & Stratigraphy	Cole	, Rex	A	3	15	45
200504	1 - T/TT	GEOL 444L	Sediment/Stratigraphy Lab	Cole	, Rex	A	1	16	16
200504	1 - T/TT	GEOL 112	Prin of Historical Geol-GTSC1	Cole	, Rex	A	3	1	3
200504	1 - T/TT	GEOL 444	Sedimentology & Stratigraphy	Cole	, Rex	A	3	1	3
200504	1 - T/TT	GEOL 444L	Sediment/Stratigraphy Lab	Cole	, Rex	A	1	1	1
						A Total	31	215	575
200502	1 - T/TT	GEOL 497	Structured Research	Cole	, Rex	B	1	1	1
200502	1 - T/TT	GEOL 497	Structured Research	Cole	, Rex	B	3	1	3
200504	1 - T/TT	GEOL 497	Structured Research	Cole	, Rex	B	3	2	6
						B Total	7	4	10
				Cole	**, Rex Total**		38	219	585
200502	1 - T/TT	CHEM 131	General Chemistry-GTSC1	Dodson	, Craig	A	4	48	192
200502	1 - T/TT	CHEM 131	General Chemistry-GTSC1	Dodson	, Craig	A	4	46	184

200502	1 - T/TT	CHEM 211	Quantitative Analysis	Dodson	, Craig	A	3	15	45
200502	1 - T/TT	CHEM 211L	Quantitative Analysis Lab	Dodson	, Craig	A	1	15	15
200504	1 - T/TT	CHEM 122	Principles/Org Chem-GTSC1	Dodson	, Craig	A	4	19	76
200504	1 - T/TT	CHEM 122L	Prin/Org Chem Lab-GTSC1	Dodson	, Craig	A	1	6	6
200504	1 - T/TT	CHEM 132	General Chemistry-GTSC1	Dodson	, Craig	A	4	48	192
200504	1 - T/TT	CHEM 122L	Prin/Org Chem Lab-GTSC1	Dodson	, Craig	A	1	12	12
						A Total	22	209	722
200504	1 - T/TT	CHEM 397	Structured Research	Dodson	, Craig	B	2	1	2
						B Total	2	1	2
				Dodson	**, Craig Total**		24	210	724
200502	1 - T/TT	PHYS 311	Electromagnetic Theory I	Gilbert	, Gordon	A	3	2	6
200502	1 - T/TT	PHYS 231	Modern Physics	Gilbert	, Gordon	A	3	9	27
200502	1 - T/TT	PHYS 321	Quantum Theory I	Gilbert	, Gordon	A	3	2	6
200502	1 - T/TT	PHYS 101	Elementary Astronomy	Gilbert	, Gordon	A	3	101	303
200502	1 - T/TT	PHYS 352	History/Phil of Physics	Gilbert	, Gordon	A	3	11	33
200504	1 - T/TT	PHYS 101	Elementary Astronomy	Gilbert	, Gordon	A	3	66	198
200504	1 - T/TT	PHYS 232	Modern Physics II	Gilbert	, Gordon	A	3	9	27
200504	1 - T/TT	PHYS 100	Concepts of Physics-GTSC2	Gilbert	, Gordon	A	3	71	213
200504	1 - T/TT	PHYS 312	Electromagnetic Theory II	Gilbert	, Gordon	A	3	2	6
						A Total	27	273	819
200502	1 - T/TT	PHYS 495	Independent Study	Gilbert	, Gordon	B	3	1	3
						B Total	3	1	3
				Gilbert	**, Gordon Total**		30	274	822
200502	1 - T/TT	GEOL 332	Intro to GIS	Johnson	, Verner	A	2	3	6
200502	1 - T/TT	GEOL 432	Advanced GIS	Johnson	, Verner	A	2	4	8
200502	1 - T/TT	GEOL 432L	Advanced GIS Lab	Johnson	, Verner	A	1	4	4
200502	1 - T/TT	GEOL 332L	Intro to GIS Lab	Johnson	, Verner	A	1	3	3
200502	1 - T/TT	GEOL 375	GPS for GIS	Johnson	, Verner	A	2	5	10
200502	1 - T/TT	GEOL 375L	GPS for GIS Lab	Johnson	, Verner	A	1	5	5
200502	1 - T/TT	GEOL 396	Topics	Johnson	, Verner	A	1	2	2
200502	1 - T/TT	GEOL 100	Survey of Earth Science	Johnson	, Verner	A	3	22	66
200502	1 - T/TT	GEOL 396	Topics	Johnson	, Verner	A	2	2	4
200504	1 - T/TT	GEOL 332	Intro to GIS	Johnson	, Verner	A	2	7	14
200504	1 - T/TT	GEOL 332L	Intro to GIS Lab	Johnson	, Verner	A	1	7	7
200504	1 - T/TT	GEOL 404	Geophysics	Johnson	, Verner	A	3	1	3
200504	1 - T/TT	GEOL 404L	Geophysics Laboratory	Johnson	, Verner	A	1	1	1
200504	1 - T/TT	GEOL 432	Advanced GIS	Johnson	, Verner	A	2	4	8

200504	1 - T/TT	GEOL 432L	Advanced GIS Lab	Johnson	, Verner	A	1	4	4
200504	1 - T/TT	GEOL 332	Intro to GIS	Johnson	, Verner	A	2	1	2
200504	1 - T/TT	GEOL 332L	Intro to GIS Lab	Johnson	, Verner	A	1	1	1
						A Total	28	76	148
200504	1 - T/TT	GEOL 497	Structured Research	Johnson	, Verner	B	2	1	2
200504	1 - T/TT	GEOL 493	Co-operative Education	Johnson	, Verner	B	3	1	3
						B Total	5	2	5
				Johnson	**, Verner Total**		33	78	153
200502	1 - T/TT	GEOL 301	Structural Geology	Livaccari	, Richard	A	3	19	57
200502	1 - T/TT	GEOL 301L	Structural Geology Lab	Livaccari	, Richard	A	1	19	19
200502	1 - T/TT	GEOL 331	Crystallography/Mineralogy	Livaccari	, Richard	A	3	18	54
200502	1 - T/TT	GEOL 331L	Crystal/Mineralogy Lab	Livaccari	, Richard	A	1	18	18
200502	1 - T/TT	GEOL 113	Field-Based Intro Phys Geology	Livaccari	, Richard	A	3	14	42
200502	1 - T/TT	GEOL 113L	Fld-Based Phys Geol Lab	Livaccari	, Richard	A	1	14	14
200504	1 - T/TT	GEOL 340	Igneous/Metamorph Petrology	Livaccari	, Richard	A	3	8	24
200504	1 - T/TT	GEOL 340L	Ign/Metamorph Petro Lab	Livaccari	, Richard	A	1	10	10
200504	1 - T/TT	GEOL 321	Intro Remote Sensing	Livaccari	, Richard	A	2	13	26
200504	1 - T/TT	GEOL 321L	Intro Remote Sensing Lab	Livaccari	, Richard	A	1	13	13
200504	1 - T/TT	GEOL 113	Field-Based Intro Phys Geology	Livaccari	, Richard	A	3	10	30
200504	1 - T/TT	GEOL 113L	Fld-Based Phys Geol Lab	Livaccari	, Richard	A	1	10	10
						A Total	23	166	317
200502	1 - T/TT	GEOL 497	Structured Research	Livaccari	, Richard	B	3	1	3
200504	1 - T/TT	GEOL 497	Structured Research	Livaccari	, Richard	B	1	2	2
200504	1 - T/TT	GEOL 497	Structured Research	Livaccari	, Richard	B	3	1	3
						B Total	7	4	8
				Livaccari	**, Richard Total**		30	170	325
200502	1 - T/TT	CHEM 131L	General Chemistry Lab-GTSC1	Madsen	, Lawrence	A	1	22	22
200502	1 - T/TT	CHEM 131L	General Chemistry Lab-GTSC1	Madsen	, Lawrence	A	1	23	23
200502	1 - T/TT	CHEM 131L	General Chemistry Lab-GTSC1	Madsen	, Lawrence	A	1	20	20
200502	1 - T/TT	CHEM 131	General Chemistry-GTSC1	Madsen	, Lawrence	A	4	45	180
200502	1 - T/TT	CHEM 321	Physical Chemistry I	Madsen	, Lawrence	A	3	8	24
200504	1 - T/TT	CHEM 132	General Chemistry-GTSC1	Madsen	, Lawrence	A	4	42	168
200504	1 - T/TT	CHEM 132L	General Chemistry Lab-GTSC1	Madsen	, Lawrence	A	1	22	22
200504	1 - T/TT	CHEM 132L	General Chemistry Lab-GTSC1	Madsen	, Lawrence	A	1	24	24
200504	1 - T/TT	CHEM 132L	General Chemistry Lab-GTSC1	Madsen	, Lawrence	A	1	22	22
200504	1 - T/TT	CHEM 322	Physical Chemistry II	Madsen	, Lawrence	A	3	7	21
						A Total	20	235	526

200504	1 - T/TT	CHEM 495	Independent Study	Madsen	, Lawrence	B	1	1	1
						B Total	1	1	1
				Madsen	**, Lawrence Total**		21	236	527
200502	1 - T/TT	GEOL 396	Topics	Richard	, Gigi	A	1	7	7
200502	1 - T/TT	GEOL 107	Nat Haz & Env Geology	Richard	, Gigi	A	3	23	69
200502	1 - T/TT	GEOL 250	Environmental Geology	Richard	, Gigi	A	3	18	54
200502	1 - T/TT	GEOL 396	Topics	Richard	, Gigi	A	1	1	1
200502	1 - T/TT	GEOL 396	Topics	Richard	, Gigi	A	3	1	3
200504	1 - T/TT	GEOL 415	Introduction to Ground Water	Richard	, Gigi	A	3	5	15
200504	1 - T/TT	GEOL 415L	Intro Ground Water Lab	Richard	, Gigi	A	1	5	5
200504	1 - T/TT	GEOL 375	GPS for GIS	Richard	, Gigi	A	2	3	6
200504	1 - T/TT	GEOL 375L	GPS for GIS Lab	Richard	, Gigi	A	1	3	3
200504	1 - T/TT	GEOL 396	Topics	Richard	, Gigi	A	3	6	18
200504	1 - T/TT	GEOL 396	Topics	Richard	, Gigi	A	1	6	6
200504	1 - T/TT	GEOL 455	River Dynamics	Richard	, Gigi	A	3	5	15
						A Total	25	83	202
200504	1 - T/TT	GEOL 497	Structured Research	Richard	, Gigi	B	2	1	2
						B Total	2	1	2
				Richard	**, Gigi Total**		27	84	204
200502	1 - T/TT	CHEM 311	Organic Chemistry	Richards	, Joseph	A	4	52	208
200502	1 - T/TT	CHEM 311L	Organic Chemistry Lab	Richards	, Joseph	A	1	25	25
200502	1 - T/TT	CHEM 311L	Organic Chemistry Lab	Richards	, Joseph	A	1	22	22
200502	1 - T/TT	CHEM 315	Biochemistry	Richards	, Joseph	A	3	15	45
200502	1 - T/TT	CHEM 315L	Biochemistry Laboratory	Richards	, Joseph	A	1	6	6
200504	1 - T/TT	CHEM 312	Organic Chemistry	Richards	, Joseph	A	4	40	160
200504	1 - T/TT	CHEM 312L	Organic Chemistry Lab	Richards	, Joseph	A	1	12	12
200504	1 - T/TT	CHEM 312L	Organic Chemistry Lab	Richards	, Joseph	A	1	20	20
200504	1 - T/TT	CHEM 341	Advanced Laboratory I	Richards	, Joseph	A	2	4	8
200504	1 - T/TT	CHEM 421	Adv. Organic Chemistry I	Richards	, Joseph	A	3	6	18
						A Total	21	202	524
200502	1 - T/TT	CHEM 397	Structured Research	Richards	, Joseph	B	3	1	3
200502	1 - T/TT	CHEM 397	Structured Research	Richards	, Joseph	B	1	1	1
200504	1 - T/TT	CHEM 397	Structured Research	Richards	, Joseph	B	1	3	3
						B Total	5	5	7
				Richards	**, Joseph Total**		26	207	531
200502	1 - T/TT	PHYS 482	Senior Research	Tiernan	, William	A	1	5	5
200502	1 - T/TT	PHYS 494	Seminar	Tiernan	, William	A	1	7	7

200502	1 - T/TT	PHYS 111L	General Physics Lab-GTSC1	Tiernan	, William	A	1	5	5
200502	1 - T/TT	PHYS 131	Fundamental Mechanics-GTSC1	Tiernan	, William	A	4	26	104
200502	1 - T/TT	PHYS 131L	Fundamental Mechanic Lab-GTSC	Tiernan	, William	A	1	20	20
200502	1 - T/TT	PHYS 331	Advanced Laboratory I	Tiernan	, William	A	2	1	2
200502	1 - T/TT	PHYS 112L	General Physics Lab-GTSC1	Tiernan	, William	A	1	13	13
200502	1 - T/TT	PHYS 251	Electronics for Scientists	Tiernan	, William	A	3	3	9
200502	1 - T/TT	PHYS 131L	Fundamental Mechanic Lab-GTSC	Tiernan	, William	A	1	6	6
200504	1 - T/TT	PHYS 112L	General Physics Lab-GTSC1	Tiernan	, William	A	1	20	20
200504	1 - T/TT	PHYS 482	Senior Research	Tiernan	, William	A	1	6	6
200504	1 - T/TT	PHYS 494	Seminar	Tiernan	, William	A	1	6	6
200504	1 - T/TT	PHYS 132	Electromagnetism/Optics-GTSC1	Tiernan	, William	A	4	11	44
200504	1 - T/TT	PHYS 132L	Electromagn/Optics Lab-GTSC1	Tiernan	, William	A	1	11	11
200504	1 - T/TT	PHYS 112L	General Physics Lab-GTSC1	Tiernan	, William	A	1	8	8
200504	1 - T/TT	PHYS 252	Intermediate Laboratory	Tiernan	, William	A	2	5	10
200504	1 - T/TT	PHYS 342	Advanced Dynamics	Tiernan	, William	A	3	10	30
200504	1 - T/TT	PHYS 132	Electromagnetism/Optics-GTSC1	Tiernan	, William	A	4	1	4
						A Total	33	164	310
200502	1 - T/TT	PHYS 395	Independent Study	Tiernan	, William	B	1	2	2
200504	1 - T/TT	PHYS 395	Independent Study	Tiernan	, William	B	1	2	2
200504	1 - T/TT	PHYS 395	Independent Study	Tiernan	, William	B	3	1	3
						B Total	5	5	7
				Tiernan	**, William Total**		38	169	317
200502	1 - T/TT	PHYS 473	Modern Optics	Wu	, Zhong	A	3	4	12
						A Total	3	4	12
				Wu	**, Zhong Total**		3	4	12
	1 - T/TT Total						293	1,769	4489
200502	3 - FT Ter	CHEM 121	Principles of Chemistry-GTSC1	Flynn	, Allison	A	4	39	156
200502	3 - FT Ter	CHEM 121	Principles of Chemistry-GTSC1	Flynn	, Allison	A	4	27	108
200502	3 - FT Ter	CHEM 121L	Prin of Chem Lab-GTSC1	Flynn	, Allison	A	1	20	20
200502	3 - FT Ter	CHEM 100	Chemistry & Society-GTSC1	Flynn	, Allison	A	3	48	144
200502	3 - FT Ter	CHEM 121L	Prin of Chem Lab-GTSC1	Flynn	, Allison	A	1	15	15
200504	3 - FT Ter	CHEM 121	Principles of Chemistry-GTSC1	Flynn	, Allison	A	4	66	264
200504	3 - FT Ter	CHEM 100	Chemistry & Society-GTSC1	Flynn	, Allison	A	3	48	144
						A Total	20	263	851
				Flynn	**, Allison Total**		20	263	851
200502	3 - FT Ter	PHYS 100	Concepts of Physics-GTSC2	Gurshtein	, Alexander	A	3	69	207
200502	3 - FT Ter	PHYS 101	Elementary Astronomy	Gurshtein	, Alexander	A	3	58	174

200502	3 - FT Ter	PHYS 101	Elementary Astronomy	Gurshtein	, Alexander	A	3	18	54
200502	3 - FT Ter	PHYS 100	Concepts of Physics-GTSC2	Gurshtein	, Alexander	A	3	21	63
200504	3 - FT Ter	PHYS 100	Concepts of Physics-GTSC2	Gurshtein	, Alexander	A	3	38	114
200504	3 - FT Ter	PHYS 101	Elementary Astronomy	Gurshtein	, Alexander	A	3	58	174
200504	3 - FT Ter	PHYS 496	Topics	Gurshtein	, Alexander	A	3	17	51
200504	3 - FT Ter	PHYS 100	Concepts of Physics-GTSC2	Gurshtein	, Alexander	A	3	13	39
200504	3 - FT Ter	PHYS 496	Topics	Gurshtein	, Alexander	A	3	3	9
						A Total	27	295	885
				Gurshtein	**, Alexander Total**		27	295	885
200502	3 - FT Ter	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Hase	, Harold	A	1	17	17
200502	3 - FT Ter	GEOL 100	Survey of Earth Science	Hase	, Harold	A	3	52	156
200502	3 - FT Ter	GEOL 111	Prin of Physical Geology-GTSC1	Hase	, Harold	A	3	21	63
200502	3 - FT Ter	GEOL 111	Prin of Physical Geology-GTSC1	Hase	, Harold	A	3	28	84
200502	3 - FT Ter	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Hase	, Harold	A	1	8	8
200502	3 - FT Ter	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Hase	, Harold	A	1	6	6
200504	3 - FT Ter	GEOL 100	Survey of Earth Science	Hase	, Harold	A	3	49	147
200504	3 - FT Ter	GEOL 111	Prin of Physical Geology-GTSC1	Hase	, Harold	A	3	57	171
200504	3 - FT Ter	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Hase	, Harold	A	1	21	21
200504	3 - FT Ter	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Hase	, Harold	A	1	19	19
200504	3 - FT Ter	GEOL 100	Survey of Earth Science	Hase	, Harold	A	3	34	102
200504	3 - FT Ter	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Hase	, Harold	A	1	24	24
						A Total	24	336	818
				Hase	**, Harold Total**		24	336	818
200502	3 - FT Ter	GEOL 103	Weather and Climate	Lorhammer	, Donn	A	3	106	318
200504	3 - FT Ter	GEOL 103	Weather and Climate	Lorhammer	, Donn	A	3	88	264
200504	3 - FT Ter	GEOL 104	Oceanography	Lorhammer	, Donn	A	3	80	240
						A Total	9	274	822
				Lorhammer	**, Donn Total**		9	274	822
200502	3 - FT Ter	PHYS 111	General Physics-GTSC1	Tavossi	, Hasson	A	4	34	136
200502	3 - FT Ter	PHYS 111L	General Physics Lab-GTSC1	Tavossi	, Hasson	A	1	15	15
200502	3 - FT Ter	PHYS 111L	General Physics Lab-GTSC1	Tavossi	, Hasson	A	1	18	18
200502	3 - FT Ter	PHYS 111	General Physics-GTSC1	Tavossi	, Hasson	A	4	24	96
200502	3 - FT Ter	PHYS 112	General Physics-GTSC1	Tavossi	, Hasson	A	4	14	56
200502	3 - FT Ter	PHYS 111L	General Physics Lab-GTSC1	Tavossi	, Hasson	A	1	19	19
200504	3 - FT Ter	PHYS 112	General Physics-GTSC1	Tavossi	, Hasson	A	4	28	112
200504	3 - FT Ter	PHYS 111	General Physics-GTSC1	Tavossi	, Hasson	A	4	29	116
200504	3 - FT Ter	PHYS 111L	General Physics Lab-GTSC1	Tavossi	, Hasson	A	1	21	21

200504	3 - FT Ter	PHYS 100	Concepts of Physics-GTSC2	Tavossi	, Hasson	A	3	20	60
200504	3 - FT Ter	PHYS 111L	General Physics Lab-GTSC1	Tavossi	, Hasson	A	1	7	7
						A Total	28	229	656
				Tavossi	**, Hasson Total**		28	229	656
	3 - FT Temp Total						108	1,397	4032
200502	5 - Admin	CHEM 131L	General Chemistry Lab-GTSC1	Hrncir	, Duane	A	1	22	22
200502	5 - Admin	CHEM 121L	Prin of Chem Lab-GTSC1	Hrncir	, Duane	A	1	9	9
200502	5 - Admin	CHEM 131L	General Chemistry Lab-GTSC1	Hrncir	, Duane	A	1	22	22
200502	5 - Admin	CHEM 131L	General Chemistry Lab-GTSC1	Hrncir	, Duane	A	1	21	21
						A Total	4	74	74
				Hrncir	**, Duane Total**		4	74	74
200504	5 - Admin	CHEM 132L	General Chemistry Lab-GTSC1	Olson	, Gretchen	A	1	24	24
						A Total	1	24	24
				Olson	**, Gretchen Total**		1	24	24
	5 - Admin Total						5	98	98
200502	6 - PT	CHEM 121L	Prin of Chem Lab-GTSC1	Davidson	, Lois	A	1	16	16
200504	6 - PT	CHEM 121L	Prin of Chem Lab-GTSC1	Davidson	, Lois	A	1	20	20
200504	6 - PT	CHEM 121L	Prin of Chem Lab-GTSC1	Davidson	, Lois	A	1	24	24
200504	6 - PT	CHEM 121L	Prin of Chem Lab-GTSC1	Davidson	, Lois	A	1	19	19
						A Total	4	79	79
				Davidson	**, Lois Total**		4	79	79
200502	6 - PT	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Jones	, Lawrence	A	1	26	26
200502	6 - PT	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Jones	, Lawrence	A	1	24	24
200502	6 - PT	GEOL 111	Prin of Physical Geology-GTSC1	Jones	, Lawrence	A	3	25	75
200502	6 - PT	GEOL 103	Weather and Climate	Jones	, Lawrence	A	3	8	24
200504	6 - PT	GEOL 105	Geology of Colorado	Jones	, Lawrence	A	3	25	75
200504	6 - PT	GEOL 111	Prin of Physical Geology-GTSC1	Jones	, Lawrence	A	3	20	60
200504	6 - PT	GEOL 202	Introduction to Field Studies	Jones	, Lawrence	A	3	10	30
						A Total	17	138	314
				Jones	**, Lawrence Total**		17	138	314
200502	6 - PT	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Kovschak	, Anthony	A	1	21	21
200502	6 - PT	GEOL 111	Prin of Physical Geology-GTSC1	Kovschak	, Anthony	A	3	32	96
200502	6 - PT	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Kovschak	, Anthony	A	1	14	14
200502	6 - PT	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Kovschak	, Anthony	A	1	8	8
200502	6 - PT	GEOL 196	Topics	Kovschak	, Anthony	A	3	14	42
200504	6 - PT	GEOL 390	Computer Applic In Geology	Kovschak	, Anthony	A	3	8	24
200504	6 - PT	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Kovschak	, Anthony	A	1	22	22

200504	6 - PT	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Kovschak	, Anthony	A	1	6	6
200504	6 - PT	GEOL 111L	Prin of Phys Geol Lab-GTSC1	Kovschak	, Anthony	A	1	15	15
200504	6 - PT	GEOL 196	Topics	Kovschak	, Anthony	A	3	9	27
						A Total	18	149	275
				Kovschak	**, Anthony Total**		18	149	275
	6 - PT Total						39	366	668
	Grand Total						445	3,630	9287

Appendix 2

Finance and Budget

MESA STATE COLLEGE
Physical Sciences

CAMPUS	DISCIPLINE	LEVEL	CH'S	TOTAL FACULTY COMPENSATION	(A) TOTAL OTHER COMPENSATION	(B) OTHER CURRENT EXPENDITURES	(C) OTHER INSTRUCTION	(D) ACADEMIC SUPPORT	(C) STUDENT SERVICES	(C) (E) INSTITUTIONAL SUPPORT	(C) PLANT	TOTAL COSTS	COSTS/ CREDIT HOUR
2004 Main	CHEM	LOWER	2,190	$ 160,086	$ 25,012			$ 48,587	$ 41,061	$ 37,519	$ 50,740	$ 363,005	$ 166
2004 Main	CHEM	UPPER	291	82,478	3,324			8,456	5,456	4,985	6,742	109,441	376
2004	CHEM	TOTAL	2,481	$ 242,564	$ 28,336	$ -	$ -	$ 55,043	$ 46,517	$ 42,504	$ 57,482	$ 472,446	$ 190
2004 Main	GEOL	LOWER	3,552	$ 217,914	$ 1,139	$ 50,288		$ 70,131	$ 66,596	$ 60,853	$ 82,297	$ 549,220	$ 155
2004 Main	GEOL	UPPER	498	99,801	160	7,051		9,833	9,337	8,532	11,538	146,252	294
2004	GEOL	TOTAL	4,050	$ 317,715	$ 1,299	$ 57,339	$ -	$ 79,964	$ 75,935	$ 69,385	$ 93,835	$ 695,472	$ 172
2004 Main	PHYSICS	LOWER	2,517	$ 162,068	$ 813	$ 29,818		$ 49,685	$ 47,192	$ 43,121	$ 58,317	$ 391,014	$ 155
2004 Main	PHYSICS	UPPER	159	87,984	51	1,884		3,139	2,981	2,724	3,684	102,447	644
2004	PHYSICS	TOTAL	2,676	$ 250,052	$ 864	$ 31,702	$ -	$ 52,824	$ 50,173	$ 45,845	$ 62,001	$ 493,461	$ 184
2004 Main	ENGR	LOWER	237	$ 55,205	$ 849	$ 1,986		$ 7,780	$ 4,444	$ 4,060	$ 5,491	$ 79,815	$ 337
2004 Main	ENGR	UPPER										-	
2004	ENGR	TOTAL	237	$ 55,205	$ 849	$ 1,986	$ -	$ 7,780	$ 4,444	$ 4,060	$ 5,491	$ 79,815	$ 337
2004 Main	ENVS	LOWER	558	$ 84,256	$ 112	$ 10,064		$ 13,513	$ 10,462	$ 9,560	$ 12,928	$ 140,895	$ 253
2004 Main	ENVS	UPPER	490	85,198	99	8,838		11,866	9,187	8,395	11,353	134,936	275
2004	ENVS	TOTAL	1,048	$ 169,454	$ 211	$ 18,902	$ -	$ 25,379	$ 19,649	$ 17,955	$ 24,281	$ 275,831	$ 263
2005 Main	CHEM	LOWER	2,413	$ 156,256	$ 31,096	$ 21,349	$ 8,554	$ 43,931	$ 44,407	$ 34,377	$ 49,970	$ 388,939	$ 161
2005 Main	CHEM	UPPER	508	102,024	6,547	4,495	1,801	9,249	9,349	7,237	10,520	151,222	298
2005	CHEM	TOTAL	2,921	$ 257,279	$ 37,643	$ 25,844	$ 10,355	$ 53,180	$ 53,756	$ 41,614	$ 60,490	$ 540,161	$ 185
2005 Main	GEOL	LOWER	3,496	$ 238,052	$ 11,632	$ 33,401	$ 12,393	$ 62,363	$ 64,337	$ 49,806	$ 72,397	$ 544,381	$ 156
2005 Main	GEOL	UPPER	515	124,560	1,714	4,920	1,826	9,187	9,478	7,337	10,665	169,687	329
2005	GEOL	TOTAL	4,011	$ 362,612	$ 13,346	$ 38,321	$ 14,219	$ 71,550	$ 73,815	$ 57,143	$ 83,062	$ 714,068	$ 178
2005 Main	PHYSICS	LOWER	2,642	$ 151,877	$ 8,791	$ 10,920	$ 9,365	$ 42,628	$ 48,621	$ 37,639	$ 54,712	$ 364,351	$ 138
2005 Main	PHYSICS	UPPER	239	138,485	795	988	847	3,856	4,398	3,405	4,949	157,723	660
2005	PHYSICS	TOTAL	2,881	$ 290,162	$ 9,586	$ 11,908	$ 10,212	$ 46,482	$ 53,019	$ 41,044	$ 59,661	$ 522,074	$ 181
2005 Main	ENGR	LOWER	134	$ 51,339	$ 448	$ 2,296	$ 475	$ 6,089	$ 2,466	$ 1,909	$ 2,775	$ 67,795	$ 506
2005 Main	ENGR	UPPER										-	
2005	ENGR	TOTAL	134	$ 51,339	$ 448	$ 2,296	$ 475	$ 6,089	$ 2,466	$ 1,909	$ 2,775	$ 67,795	$ 506
2005 Main	ENVS	LOWER	489	$ 33,757	$ 1,627	$ 6,871	$ 1,733	$ 12,088	$ 8,999	$ 6,967	$ 10,126	$ 82,168	$ 168
2005 Main	ENVS	UPPER	443	115,024	1,474	6,225	1,570	10,950	8,153	6,311	9,174	158,861	359
2005	ENVS	TOTAL	932	$ 148,781	$ 3,101	$ 13,096	$ 3,303	$ 23,038	$ 17,152	$ 13,278	$ 19,300	$ 241,049	$ 259
2005 Main	TOTAL PHYS SCI	LOWER	9,689	$ 754,840	$ 55,308	$ 79,757	$ 34,346	$ 176,284	$ 178,308	$ 138,035	$ 200,645	$ 1,617,321	$ 167
2005 Main	TOTAL PHYS SCI	UPPER	5,716	842,705	23,876	54,949	20,283	104,792	105,193	81,433	118,370	1,351,581	236
2005	TOTAL PHYS SCI	TOTAL	10,879	$ 1,110,173	$ 84,122	$ 91,465	$ 38,564	$ 200,339	$ 200,208	$ 154,988	$ 225,288	$ 2,085,147	$ 192

(A) Includes department head stipends and support staff.
(B) Includes course fees and travel.
(C) Allocated by % of total credit hours.
(D) Allocated by % of total Faculty FTE.
(E) Includes institutional scholarships.

Appendix 3

Faculty Vitae

ANDRES ASLAN

Dept. of Physical and Environmental Sciences
Mesa State College
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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.

Bureau of Economic Geology, U. of Texas at Austin, Research Associate, 1998-1999.

Mary Washington College, Senior Lecturer, 1997-1998.

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

Oberlin College, Visiting Assistant Professor, 1995-1996.

University of Colorado, Teaching assistant 1987-1991.

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.

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Bureau of Economic Geology, U. of Texas at Austin, Project sedimentologist 1998 to 1999. Participated in a geo-environmental study of the Orinoco Delta in Venezuela. Used remote sensing (radar, Landsat TM) and field data (GPS surveys, shallow cores) to study depositional systems and active geologic processes of the Delta.

Howard University-Geological Survey of Pakistan, Project sedimentologist 1991 and 1997. Conducted field and petrographic studies of Eocene alluvial paleosols, coastal plain, and shallow marine deposits in the Kohat Basin, Pakistan as part of a study on whale evolution. Collaborator: Dr. Hans Thewissen (NEOUCOM).

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.).

University of Colorado, Research associate 1995-1996; Research assistant 1989-1994. M.S.: Used field, petrographic, and geochemical data to decipher depositional and hydrologic histories of alluvial paleosols in the Eocene Willwood Fm., WY. Ph.D.: used sediment cores, geologic mapping, and petrographic and geochemical data to investigate Holocene floodplain sedimentation and soil formation in the Lower Mississippi Valley.

Louisiana State University, Research associate 1992-1995. Collaborator on field mapping projects with Dr. W.J. Autin (Louisiana Geological Survey/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.

Smithsonian Institution, Research assistant in the Dept. of Paleobiology 1986-1987. Participated in field studies of bone accumulation in rivers in Colorado and Wyoming and established a computer database. Supervisor: Dr. A.K. Behrensmeyer.

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

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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:

Aslan, A. *in press*, Fluvial Sediments. In Elias, S. (ed.), Encyclopedia of Quaternary Science. Elsevier.

Aslan, A., Autin, W.J., Blum, M.D., *in press*, Reply to Comment - Late Holocene Avulsion History of the Mississippi River, south Louisiana, U.S.A. Journal of Sedimentary Research.

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Aslan, A., White, W.A., Warne, A.G., and Guevara, E.H. 2003. Holocene Evolution of the western Orinoco Delta, Venezuela. Geological Society of America Bulletin, v. 115, p. 479-498.

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Aslan, A. 2003, Floodplain Sediments. In Middleton, G.V. (ed.), Encyclopedia of Sediments and Sedimentary Rocks. Encyclopedia of Earth Sciences Series, Kluwer Academic Publishers, p. 285-287.

Aslan, A. 2003, Palaeosols. In Goudie, A.G. (ed.), Encyclopedia of Geomorphology. Routledge, London.

Aslan, A. 2003, Mud volcanoes. In Goudie, A.G. (ed.), Encyclopedia of Geomorphology. Routledge, London.

White, W.A., Warne, A.G., Guevara, E.H., **Aslan, A.**, Tremblay, T.A., and Raney J.A. 2002. Geo-Environments of the Northwest Orinoco Delta, Venezuela. Interciencia, v. 27. p. 521-528.

Warne, A.G., Guevara, E.H., and **Aslan, A.** 2002. Late Quaternary Evolution of the Orinoco Delta, Venezuela. Journal of Coastal Research, v. 18, p. 225-253.

Warne, A.G., Meade, R.H., White, W.A., Guevara, E.H., Gibeaut, J., Smyth, R.C., **Aslan, A.,** and Tremblay, T. 2002. Regional Controls on Geomorphology, Hydrology, and Ecosystem Integrity of the Orinoco Delta, Venezuela. Geomorphology, v. 44, p. 273-307.

Aslan, A., Warne, A.G., White, W.A., Guevara, E.H., Smyth, R.C., Raney, J.A., and Gibeaut, J.C. 2001. Mud Volcanoes of the Orinoco Delta, Eastern Venezuela. Geomorphology, v. 41, p. 323-336.

Autin, W.J. and **Aslan, A.** 2001. Alluvial Pedogenesis in Pleistocene and Holocene Mississippi River deposits: Effects of relative sea level change. Geological Society of America Bulletin, v. 113, p. 1456-1466.

Blum, M.D., Misner, T.J., Collins, E.S., Scott, D.B., Morton, R.A., and **Aslan, A.** 2001. Middle Holocene Sea-Level Rise and Highstand at +2 m, Central Texas Coast. Journal of Sedimentary Research, v. 71, p. 581-588.

Aslan, A. and Autin, W.J. 1999. Evolution of the Holocene Mississippi River Floodplain, Ferriday, Louisiana: Insights on the Origin of Fine-Grained Floodplains. Journal of Sedimentary Research, v. 69, p. 800-815.

Aslan, A. and Blum, M.D. 1999. Contrasting styles of Holocene avulsion, Texas Gulf Coastal Plain, U.S.A. In Smith, N.D. and Rogers, J., eds., Fluvial Sedimentology VI, International Association of Sedimentologists, Special Publication, v. 28, p. 293-308.

Kraus, M.J. and **Aslan, A.** 1999. Paleosol sequences in floodplain environments: a hierarchical approach. In Thiry, M., ed., Palaeoweathering, Palaeosurfaces and Related Continental Deposits, International Association of Sedimentologists, Special Publication, v. 27, p. 303-321.

Aslan, A. and Autin, W.J. 1998. Holocene Flood-plain Soil Formation in the Southern Lower Mississippi Valley: Implications for Interpreting Alluvial Paleosols. Geological Society of America Bulletin v. 110, p. 433-449.

Thewissen, J.G.M., Hussain, S.T., Arif, M., **Aslan, A.**, Madar, S.I., and Roe, L.J. 1998. New Localities of Eocene Vertebrates in Northern Pakistan and their Significance for the Origin of the Modern Orders of Mammals. In Ghaznavi, M.I., Raza, S.M., and Hasan, M.T. (eds.) Siwaliks of South Asia, Proceedings of the Third Geosas Workshop, Geological Survey of Pakistan, Islamabad, Pakistan, p. 19-34.

Aslan, A. and Autin, W.J. 1996. Depositional and pedogenic influences on the environmental geology of Holocene Mississippi River floodplain deposits near Ferriday, Louisiana. Engineering Geology, v. 45, p. 417-432.

Aslan, A. and Thewissen, J.G.M. 1996. Preliminary evaluation of paleosols and implications for interpreting vertebrate fossil assemblages, Kuldana Formation, northern Pakistan. Palaeovertebrata, v. 25, p. 261-277.

Aslan, A. and Behrensmeyer, A.K., 1996, Taphonomy and time resolution of bone assemblages in a contemporary fluvial system: The East Fork River, Wyoming. PALAIOS, v. 11, p. 411-421.

Kraus, M.J. and **Aslan, A.** 1993. Eocene hydromorphic paleosols: significance for interpreting ancient floodplain processes, Journal of Sedimentary Petrology, v. 63, p. 453-463.

Hasiotis, S., **Aslan, A.**, Bown, T.M. 1993. Origin, architecture, and paleoecology of the Early Eocene continental ichnofossil *Scaphicnium hamatum* - integration of ichnology and paleopedology. Ichnos, v. 3, p. 1-9.

GUIDEBOOKS AND GUIDEBOOK ARTICLES:

Aslan, A., Livaccari, R., Hood, W., Betton, C., and Garhart, A. 2005. Geological History of the Uncompahgre Plateau and Unaweep Canyon, 2005 GSA Rocky Mt Section Guidebook, Grand Junction, CO.

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UNPUBLISHED REPORTS:

Aslan, A. 1994. Holocene sedimentation, soil formation, and evolution of the Mississippi River floodplain, Ferriday, Louisiana, Ph.D. thesis, University of Colorado, Boulder, 260 p.

Aslan, A. 1990. Paleotopographic controls on hydromorphic paleosol development in the Willwood Formation, Bighorn Basin, Wyoming, M.S. thesis, University of Colorado, Boulder, 139 p.

ABSTRACTS:

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*Hudson, A.M., Kaproth, B., Kelley, S., Landman, R.L., and **Aslan, A**. 2006. Late Pleistocene gravel deposits of ancient Bostwick Creek in the Uncompahgre River Valley of southwestern Colorado. Abstracts with Programs, 2006 GSA Rocky Mountain Section meeting, Gunnison, CO.

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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.

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Aslan, A. and Blum, M. D. 1999. The Significance of Avulsion During Valley Filling (Transgressive and Highstand Systems Tracts), Louisiana and Texas Coast, AAPG Annual Meeting Abstracts with Programs, v. 8, p. A-7.

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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.

Aslan, A., Autin, W. J., and Blum, M. D. 1997. Holocene Mississippi River Avulsion: Insights from the Atchafalaya River. p. 13 in Rogers, J. J. (ed.) Abstracts, 6th International Conference on Fluvial Sedimentology. Postgraduate Conference Division, University of Cape Town.

Aslan, A. and Blum, M. D. 1997. Contrasting Styles of Holocene Colorado River Avulsion, Texas Coastal Plain. p. 14 in Rogers, J. J. (ed.) Abstracts, 6th International Conference on Fluvial Sedimentology. Postgraduate Conference Division, University of Cape Town.

Kraus, M.J. and **Aslan, A.** 1996. Variability in floodplain paleosols: a hierarchical approach, GSA Abstracts with Programs, v. 28, p. A472.

Aslan, A. and Autin, W.J. 1995. Holocene evolution of the Mississippi River floodplain, Ferriday, Louisiana, GSA Abstracts with Programs, v. 27, p. A213

Autin, W.J., **Aslan, A.**, and Saucier, R.T. 1995. Current issues in Lower Mississippi Valley (LMV) Research, GSA Abstracts with Programs, v. 27, p. A213.

Aslan, A. and Autin, W.J. 1994. Depositional controls on fluid migration and composition in the Mississippi River alluvial aquifer, Ferriday, Louisiana, GSA Abstracts with Programs, v. 26, no. 7, p. 205

Tornqvist, T.E., **Aslan, A.**, Autin, W.J. 1994. Holocene fluvial styles of the Lower Mississippi River - A preliminary assessment. Abstracts, 14th International Sedimentological Congress.

Aslan, A., Hasiotis, S., Autin, W.J. 1993. Holocene trace fossils and biofabrics of floodplain sediments and soils, GSA Abstracts with Programs Rocky Mt. section, v. 25, no. 5.

Aslan, A. and Autin, W.J. 1993. Holocene construction of the Mississippi River floodplain and the significance of crevassing, GSA Abstracts with Programs, v. 25, no. 6, p. 272.

Aslan, A., Kraus, M.J., and Autin, W.J. 1993. Holocene Floodplain Soils of the Mississippi River: Significance for the Interpretation of Alluvial Paleosols, *in* Follmer, L.R., Johnson, D.L., and Catt, J.A. (eds.) Revisitation of Concepts in Paleopedology; Transactions of the 2nd International Symposium on Paleopedology, Quaternary International, v. 51-52, p. 36-37.

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Aslan, A. and Autin, W.J. 1992. Holocene flood plain soil formation in the Lower Mississippi River Valley: implications for the interpretation of alluvial paleosols, GSA Abstracts with Programs, v. 24, no. 7, p. 228.

Autin, W.J. and **Aslan, A.** 1992. Late Pleistocene paleosols in the Lower Mississippi River Valley: documentation of regional base level change, GSA Abstracts with Programs, v. 24, no. 7, p. 228.

Aslan, A. and Kraus, M.J. 1990. Depositional control of chemical variations in alluvial paleosols, Willwood Fm., Bighorn Basin. GSA Abstracts with Programs, v. 22, no. 7, p. 317.

Aslan, A. 1989. Paleotopographic controls on mudstone sequence variations in the Willwood Formation, Bighorn Basin, Wyoming. GSA Abstracts with Programs, v. 21, no. 6, p. 127.

Aslan, A. and Behrensmeyer, A.K. 1987. Vertebrate taphonomy in the East Fork River, Wyoming. GSA Abstracts with Programs, v. 19, no. 7, p. 575.

PROFESSIONAL VITAE

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

June, 2006

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)
Grand Junction Geological Society: Vice President (1978-1980); President (1980-1981).
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 Receive Best Paper of the Year (2005) Award from the Rocky Mountain Association of Geologists (Denver) for paper with Steve Cumella 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 Awarded a Lifetime Membership in the Grand Junction Geological Society in recognition for prolonged service.
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, Soccoro
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.
1989 Invited speaker for Wyoming Geological Association, Casper.
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	Alan 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).

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

1975 **R.D. Cole**, Sedimentology and sulfur isotope geochemistry of the Green River Formation (Eocene) and associated rock units, eastern Uinta basin, Utah, and Piceance Creek basin, Colorado: Ph.D. dissertation, University of Utah, 274 p.

1975 **R.D. Cole** and M.D. Picard, Primary and secondary sedimentary structures in oil shale and other fine-grained sedimentary rocks, Green River Formation (Eocene), Utah and Colorado: Utah Geology, v. 2, p. 49-67.

1978 **R.D. Cole**, J.H. Liu, G.V. Smith, C.C. Hinckly, and M. Saporoschenko, Iron partitioning in oil shale of the Green River Formation, Colorado: A preliminary Mossbauer spectroscopy study: Fuel, v. 57, p. 514-520.

1978 **R.D. Cole** and M.D. Picard, Comparative mineralogy of nearshore and offshore lacustrine lithofacies, Parachute Creek Member of the Green River Formation, Piceance Creek basin, Colorado, and eastern Uinta basin, Utah: Geological Society of America Bulletin, v. 89, p. 1441-1458.

1981 R.G. Young and **R.D. Cole**, Scenic geology of the San Juan Mountains, Colorado (Guidebook): Grand Junction Geologic Society, 138 p. (no peer review)

1981 **R.D. Cole** and M.D. Picard, Sulfur-isotope variations in marginal-lacustrine rocks of the Green River Formation, Colorado and Utah, in Ethridge, F.G., and Flores, R.M., eds., Recent and ancient nonmarine depositional environments: Models for exploration: Society of Economic Paleontologists and Mineralogists Special Publication 31, p. 261-275.

1981 **R.D. Cole** and J.R. Sexton, Pleistocene surficial deposits of the Grand Mesa area, Colorado, in Epis, R.C., and Callender, J.F., eds., Western Slope Colorado (Guidebook): New Mexico Geological Society, 32nd Field Conference, p. 121-126.

1981 A.M. Ochs and **R.D. Cole**, Comparative petrology of Tertiary sandstones of the southern Piceance Creek basin, Colorado, in Epis, R.D. and Callender, J.F., eds., Western Slope Colorado (Guidebook): New Mexico Geological Society, 32nd Field Conference, p. 219-228.

1981 C.S. Goodknight, **R.D. Cole**, R.A. Crawley, B. Bartleson, and D. Gaskill, Road log from Grand Junction to Crested Butte via Delta, Montrose, and Gunnison, in Epis, R.C. and Callender, J.F., eds., Western Slope Colorado (Guidebook): New Mexico Geological Society, 32nd Field Conference, p. 29-47.

1982 **R.D. Cole**, G.J. Daub, and B.E. Weichman, Geology of the Horse Draw nahcolite and oil-shale mine, Piceance Creek basin, Colorado, in Proceedings of the 15th Oil Shale Symposium: Colorado School of Mines Press, p. 15-28.

1982 **R.D. Cole** and L.K. Weston, Road log from Glenwood Springs to Rifle, Colorado, via New Castle, Colorado, in Averett, W.R., ed., Southeastern Piceance basin (Guidebook): Grand Junction Geological Society, p. 35-43.

1983 **R.D. Cole** and G.J. Daub, Microcrystalline nahcolite on the 1840 level, Horse Draw mine, Piceance Creek basin, Colorado, in Proceedings of the 16th Oil Shale Symposium: Colorado School of Mines Press, p. 99-112.

1983 D.L. Boyer and **R.D. Cole**, Variations in sulfur mineralization in the Parachute Creek Member of Green River Formation, Colorado and Utah, in Proceedings of the 16th Oil Shale Symposium: Colorado School of Mines Press, p. 160-175.

1983 **R.D. Cole** and R.G. Young, Evidence for glaciation in Unaweep canyon, Colorado, in Averett, W.R. ed., Northern Paradox basin-Uncompahgre uplift (Guidebook): Grand Junction Geologic Society, p. 73-80.

1984 **R.D. Cole**, Sedimentological, mineralogical, and geochemical definition of oil-shale facies in the lower Parachute Creek Member of Green River Formation, Colorado, in Proceedings of the 17th Oil Shale Symposium: Colorado School of Mines Press, p. 143-158.

1985 **R.D. Cole**, Depositional environments of oil shale in the Green River Formation, Douglas Creek arch, Colorado and Utah, in Picard, M.D., ed., Uinta basin: Utah Geological Society (Guidebook), 210-218.

1987 **R.D. Cole**, Cretaceous rocks of the Dinosaur Triangle, in Averett. W.R., ed., Paleontology and geology of the Dinosaur Triangle: Grand Junction Geological Society (Guidebook), p. 21-35.

1989 **R.D. Cole**, and J.F. Friberg, Stratigraphy and sedimentation of the Book Cliffs, Utah, in Nummedal, D, and Remy, R.R., eds., Cretaceous shelf sandstones and shelf depositional sequences, Western Interior basin, Utah, Colorado and New Mexico: American Geophysical Union, Guidebook for 28th International Geological Congress, Field Trip T119, Chapter 2, p. 13-24.

1991 **R.D. Cole** and R.G. Young, Facies characterization and architecture of a muddy shelf-sandstone complex: Mancos B interval of Upper Cretaceous Mancos Shale, northwest Colorado-northeast Utah, in Miall, A.D., and Tyler, N., eds., Three-dimensional facies architecture of clastic sediments: Society of Economic Paleontologists and Mineralogists Concepts in Sedimentology Series, p. 277-287.

1991 **R.D. Cole** and G.H. Daub, Methane occurrences and potential resources in the lower Parachute Creek Member of Green River Formation, Piceance Creek basin, Colorado, in Gary, J. H., ed., 24th Oil Shale Symposium Proceedings: Colorado School of Mines Quarterly, v. 83, no. 4, p. 1-7.

1992 J.A. Curiale, **R.D. Cole**, and R.J. Witmer, Application of organic geochemistry to sequence stratigraphic analysis: Four Corners Platform, New Mexico, USA: Organic Geochemistry, v. 19, p. 53-75.

1992 **R.D. Cole** and C.E. Mullen Sedimentologic reservoir characterization of Tensleep Sandstone, South Casper Creek field, Wyoming, in Mullen, C.E., ed., Rediscover the Rockies: Wyoming Geological Association, p. 121-137.

1995 **R.D. Cole**, G.J. Daub, and L.K. Weston, Review of geology, mineral resources, and ground-water hydrology of Green River Formation, north-central Piceance Creek basin, Colorado, in Averett, W.R., ed., Green River Formation in Piceance Creek and eastern Uinta basins: Grand Junction Geological Society Guidebook, p. 63-81.

1996 **R.D. Cole** and G.E. Moore, Stratigraphic and sedimentologic characterization of McCracken Sandstone Member of Elbert Formation (Upper Devonian) at Lisbon Field, Paradox Basin, San Juan County, Utah, in Huffman, A.C., Lund, W.R., and Godwin, L.H., eds., Geology and resources of the Paradox Basin: Utah Geological Association Guidebook 25, p. 117-128.

1996 **R.D. Cole**, G.E. Moore, A.S. Trevena, R.A. Armin, and M.P. Morton, Lithofacies definition in Cutler and Honaker Trail Formations, northeastern Paradox Basin, by sedimentologic observations and spectral gamma-ray data, in Huffman, A.C., Lund, W.R., and Godwin, L.H., eds., Geology and resources of the Paradox Basin: Utah Geological Association Guidebook 25, p. 161-172.

1997 **R.D. Cole**, R.G. Young, and G. Willis, The Prairie Canyon Member, a new unit of the Upper Cretaceous Mancos Shale, west-central Colorado and east-central Utah: Utah Geological Survey Miscellaneous Publication 97-4, 23 p.

1997 M.R. Lambert, **R.D. Cole**, and P.S. Mozley, Controls on permeability heterogeneity in the Tocito Sandstone (Upper Cretaceous), northwest New Mexico, in Mesozoic geology and paleontology of the Four Corners Region: New Mexico Geological Society Guidebook (48th Field Conference), p. 217-228.

1998 **R.D. Cole**, Possible Milankovitch cycles in the lower Parachute Creek Member of Green River Formation (Eocene), north-central Piceance Creek basin, Colorado: an analysis, in J.K. Pitman and A. Carroll, eds., Modern and ancient Lake Systems: Utah Geological Association, p. 1-27.

1999 J.S. Kline, P. Mozley, A. Campbell, and **R. Cole**, Spatial distribution of carbon and oxygen isotopes in laterally extensive carbonate-cemented layers: implications for mode of growth and subsurface identification: Journal of Sedimentary Research, v. 69, p. 184-191.

2001 R.B. Scott, A.E. Harding, W.C. Hood, **R.D. Cole**, R.F. Livaccari, J.B. Johnson, R.R. Shroba, and R.P. Dickerson, Geologic map of Colorado National Monument and adjacent areas, Mesa County, Colorado: U.S. Geological Survey Geologic Investigations Series I-2740.

2001 D. Nummedal, **R. Cole** (editor), R. Young, K. Shanley, and M. Boyles, Book Cliffs sequence stratigraphy: the Desert and Castlegate sandstones: Grand Junction Geological Society Guidebook, 81 p. (prepared for the American Association of Petroleum Geologists 2001 Annual Meeting, Denver) (no peer review)

2002 **R. Cole**, S. Cumella, M. Boyles, and G. Gustason, 2002, Stratigraphic architecture and reservoir characteristics of the Mesaverde Group, northwest Colorado: Grand Junction Geological Society

Guidebook prepared for the 2002 annual meeting of the Rocky Mountain Section of the American Association of Petroleum Geologists, 109 p.

2003 K.W. Shanley, J.M. Boyles, J.R. Suter, D. Nummedal and **R.Cole**: Sedimentology and sequence stratigraphic response to changes in accommodation: predicting reservoir architecture, Book Cliffs, Utah: guidebook prepared for the 2003 annual meeting of the American Association of Petroleum Geologists. (no peer review)

2003 **R. Cole**, and S. Cumella, Stratigraphic architecture and reservoir characteristics of the Mesaverde Group, southern Piceance Basin, Colorado: Denver, Rocky Mountain Association of Geologists guidebook, p. 386-442.

2004 **R. Cole**, and S. Cumella, Stratigraphic architecture and reservoir characteristics of the Mesaverde Group, southern Piceance Basin, Colorado: Denver, Rocky Mountain Section of American Association of Petroleum Geologists guidebook, 60 p. Note: this guidebook is a revised edition of the preceding reference (Cole and Cumella, 2003).

2005 **R. Cole**, M. Kirschbaum, and R. Young, Stratigraphy, sedimentology, and energy resources of Cretaceous Rocks in the Book Cliffs area, Western Colorado and eastern Utah, in Guidebook for the Rocky Mountain Section of the Geological Society of America annual meeting: Grand Junction Geological Society, 76 p.

2005 **R. Cole** and S. Cumella, Sand-body architecture in the lower Williams Fork Formation (Upper Cretaceous), Coal Canyon, Colorado, with comparison to the Piceance Basin subsurface: The Mountain Geologist, v. 42, no. 3, p. 85-107.

ABSTRACTS PUBLISHED

1973 **R.D. Cole**, C.R. Williamson, M.D. Picard, and M.L. Jensen, Fractionation of stable oxygen isotopes in carbonate rocks of the Green River Formation, eastern Utah and western Colorado: Geological Society of America Abstracts with Programs, v. 5, no. 6, p. 472.

1973 **R.D. Cole**, M.D. Picard, M.L. Jensen, and C.R. Williamson, Stable oxygen isotopic composition of carbonate rocks in Green River Formation, eastern Utah and western Colorado: American Association of Petroleum Geologists Bulletin, v. 57, p. 956.

1974 **R.D. Cole** and M.D. Picard, Primary and secondary sedimentary structures in fine-grained lacustrine rocks of the Green River Formation (Eocene), Piceance Creek basin, Colorado: American Association of Petroleum Geologists Bulletin, v. 58, p. 912-913.

1974 **R.D. Cole** and M.D. Picard, Cyclical clastic-carbonate deposition in the lower Green River Formation (Eocene), Douglas Creek arch, Colorado: Geological Society of America Abstracts with Programs, v. 6, no 5, p. 435.

1975 **R.D. Cole**, M.L. Jensen, and M.D. Picard, Sulfur isotope geochemistry of the Green River Formation (Eocene), Piceance Creek basin, Colorado: Geological Society of America Abstracts with Programs, v. 7, no. 7, p. 1031-1032.

1976 **R.D. Cole** and M.D. Picard, Comparative X-ray mineralogy of nearshore and offshore lacustrine lithofacies, Green River Formation, Piceance Creek basin, Colorado, and eastern Uinta basin, Utah: Geological Society of America Abstracts with Programs, v. 8, no. 6, p. 817-818.

1977 **R.D. Cole** and J.L. Sexton, Rhythmic variations in oil-shale stratification: Green River Formation, Piceance Creek basin, Colorado: Geological Society of America Abstracts with Programs, v. 9, no. 5, p. 584.

1977 J.L. Sexton and **R.D. Cole**, Maximum entropy spectral analysis of varved oil shale, Green River Formation, Colorado: Geological Society of America Abstracts with Programs, v. 9, no. 5, p. 649-650.

1977 **R.D. Cole**, G.V. Smith, J.H. Liu, C.C. Hinckly, and M. Saporoschenko, A preliminary Mossbauer spectroscopy study of iron partitioning in oil shale, Green River Formation, Colorado: Geological Society of America Abstracts with Programs, v. 9, no. 5, p. 584.

1978 A.M. Ochs and **R.D. Cole**, Depositional lithofacies of Parachute Creek Member of the Green River Formation, Douglas Creek arch, Colorado: American Association of Petroleum Geologists Bulletin, v. 62, p. 550.

1978 **R.D. Cole** and D.L. Boyer, Iron-sulfide mineralogy and morphology in oil shale and marlstone, Green River Formation, Piceance Creek basin, Colorado: American Association of Petroleum Geologists Bulletin, v. 62, p. 505.

1979 **R.D. Cole**, M.D. Picard, and A.M. Ochs, Definition of depositional facies of the Parachute Creek Member of Green River Formation, Colorado: Evidence from sulfur isotopes and whole-rock mineralogical data: American Association of Petroleum Geologists Bulletin, v.63, p. 824-825.

1979 A.M. Ochs and **R.D. Cole**, Petrology of Tertiary sandstones of the southern Piceance Creek basin, Colorado: Implications for provenance and depositional processes: American Association of Petroleum Geologists Bulletin, v. 63, p. 836.

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, Piceance Creek basin, Colorado: Geological Society of America Abstracts with Programs, v. 11, no. 6, p. 267.

1985 **R.D. Cole** and J.R. Dyni, Origin of dolomite/ankerite in a low-sulfate lacustrine environment: Parachute Creek Member of Green River Formation, Piceance Creek basin, Colorado: Society of Economic Paleontologists and Mineralogists Mid-Year Meeting Abstracts, v. 2, p. 20.

1986 **R.D. Cole** and R.G. Young, "Mancos B" interval of Upper Cretaceous Mancos Shale, Douglas Creek arch, northwest Colorado: A "shelf-sand" complex: American Association of Petroleum Geologists Bulletin, v. 70, p. 1,035

1987 **R.D. Cole** and R.G. Young, Depositional model for a muddy shelf-sand complex and its relationship to reservoir development: "Mancos B" interval of Upper Cretaceous Mancos Shale, northwest Colorado and northeast Utah: American Association of Petroleum Geologists Bulletin, v. 71, p. 540.

1989 **R.D. Cole**, J.M. Allmaras, J.P. Zager, and G.E. Moore, Sedimentology, petrology and X-ray mineralogy of Coniacian-Santonian Niobrara Shale, Northeastern San Juan basin, New Mexico: American Association of Petroleum Geologists Bulletin, v. 73, p. 1152.

1990 **R.D. Cole** and C.E. Mullen, Reservoir characterization of Tensleep Sandstone (Pennsylvanian-Permian), South Casper Creek field, Wyoming: American Association of Petroleum Geologists Bulletin, v. 74, p. 1320.

1991 R.J. Witmer, J.A. Curiale, and **R.D. Cole**, Integration of palynofacies, geochemical, and sedimentological data in a sequence stratigraphic framework: progress report on a New Mexico Cretaceous section: American Association of Stratigraphic Palynologists Programs and Abstracts.

1992 **R.D. Cole** and G.J. Daub, Potential methane resources in nahcolitic oil shale: Green River Formation (Eocene), Piceance Creek basin, Colorado: American Association of Petroleum Geologists Bulletin, v. 76, p. 771.

1992 **R.D. Cole**, J.A. Curiale, R.J. Witmer, and E.G. Kauffman, Sequence stratigraphic analysis of the Greenhorn Cyclothem, Northwest New Mexico: Society for Sedimentary Geology (SEPM) Mid-Year Meeting.

1992 **R.D. Cole** and R.G. Young, Sequence-stratigraphic interpretation of Santonian-Campanian prodelta-plume deposits, eastern Utah and western Colorado: Society for Sedimentary Geology (SEPM) Mid-Year Meeting.

1992 D. Nummedal, G.W. Riley, **R.D. Cole**, and A.S. Trevena, The distribution of depositional systems within falling sea level and lowstand systems tracts -- Examples from the Gallup Sandstone: Society for Sedimentary Geology (SEPM) Mid-Year Meeting.

1992 **R.D. Cole** and C.E. Mullen Reservoir characterization of Tensleep Sandstone (Pennsylvanian-Permian), South Casper Creek field, Natrona County, Wyoming: American Association of Petroleum Geologists Bulletin, v. 76, p. 1257.

1993 D. Nummedal and **R.D. Cole**, Sequence stratigraphy of the Castlegate and Desert Sandstones, Utah: an alternate view: American Association of Petroleum Geologists Annual Convention Program, v. 2, p. 159.

1994 **R.D. Cole** and G.E. Moore, Sequence stratigraphy of Cedar Mountain-Dakota interval, western and southern Piceance Creek basin, Colorado: American Association of Petroleum Geologists Annual Convention Program, v. 3, p. 124.

1995 M.L. Lambert, P.S. Mozley, **R.D. Cole**, and G.W. Riley, Facies controlled permeability structure of a highly heterogeneous transgressive-marine complex: Tocito Sandstone, northwest New Mexico,

in Swift, D.J.P., Snedden, J.W., and Plint, A.G., conveners, Tongues, ridges and wedges; highstand versus lowstand architecture in marine basins: Society of Economic Paleontologists and Mineralogists (SEPM) Research Conference Program.

1995 D. Nummedal, S. Gupta, A.G. Plint, and **R.D. Cole**, The falling stage systems tract: definition, character and expression in several examples from the Cretaceous of the U.S. Western Interior, in Hunt, D., Gawthorpe, R., and Docherty, M., conveners, Sedimentary responses to forced regression: recognition, interpretation and reservoir potential: Symposium at University of Manchester, England.

1996 M.L. Lambert, **R.D. Cole**, P.S. Mozley, and G.W. Riley, Permeability structure of a highly heterogeneous transgressive marine complex: Tocito Sandstone, New Mexico: American Association of Petroleum Geologists 1996 Annual Convention Official Program (San Diego, CA), p. A-80.

1996 **R.D. Cole**, R.G. Young, and Willis, G.C., Stratigraphic context of the Prairie Canyon member (new) of Mancos Shale (Upper Cretaceous), western Colorado and eastern Utah: Geological Society of America Program with Abstracts (annual meeting), p. A-124.

1996 J.S. Klein, P.S. Mozley, A.R. Campbell, and **R.D. Cole**, Geochemical and petrographic correlation of laterally extensive carbonate cemented horizons in the Prairie Canyon Member of the Mancos Shale, western Colorado: Geological Society of America Program with Abstracts (annual meeting), p. A-432.

1997 **R.D. Cole**, Milankovitch cycles in the lower Parachute Creek Member of Green River Formation (Eocene), north-central Piceance Creek Basin, Colorado: Geological Society of America Program with Abstracts (annual meeting), p. A-414.

1999 **R.D. Cole**, W.C. Hood, and R.B. Scott, Sedimentologic reevaluation, high-resolution gamma-ray log, and landslide hazards of the stratigraphic section at Colorado National Monument, western Colorado: Geological Society of America Program with Abstracts (annual meeting), p. A-283.

1999 A.S. Trevena and **R.D. Cole**, Sequence stratigraphy of lacustrine, fluvial and eolian facies in the Tidwell Member of the Morrison Formation, western Colorado: Geological Society of America Program with Abstracts (annual meeting), p. A-284.

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. Petermen 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).

2001 R.B. Scott, C.A. Quesenberry, D. Van Sistine, B. Heise, J. Gregson, W.C. Hood, and **R. Cole**, An example of a multipurpose geologic map for the Parks -- Colorado National Monument: Geological Society of America Program with Abstracts (annual meeting).

2002 A. Aslan and **R. Cole**, Sedimentologic comparison of two new Lava Creek B ash occurrences in western Colorado: Geological Society of America Program with Abstracts (annual meeting).

2002 F. Baker, J. Rundell, K. Hasebi, **R. Cole**, and A. Aslan, Geomorphic evolution of Grand Mesa, western Colorado: Geological Society of America Program with Abstracts (annual meeting).

2002 R. B. Scott, T.A. Steven, C.W. Betton, **R.D. Cole**, A. Aslan, and W.C. Hood, Evidence for late Cenozoic uplift on the Uncompahgre Plateau, northeastern Colorado Plateau: Geological Society of America Program with Abstracts (annual meeting).

2002 **R. Cole**, G. Gustason, and S. Cumella, Outcrop characterization of fluvial sandbodies in lower Williams Fork Formation, Coal Canyon area, Colorado: Rocky Mountain Sectional Meeting of the American Association of Petroleum Geologists, Laramie, Wyoming (annual meeting).

2003 **R. Cole**, and S. Cumella, Facies-architecture of fluvial sand bodies in the Williams Fork Formation (Upper Cretaceous), southwestern Piceance Basin, Colorado: Rocky Mountain Association of Geologists Piceance Basin Field Symposium, October 5, 2003.

2003 A. Ellison, M. Pranter, **R. Cole**, P. Patterson, and S. Cumella, Analysis and modeling of stratigraphic architecture of the Upper Cretaceous Williams Fork Formation, Piceance Basin, Colorado through outcrop studies and Lidar imaging: Rocky Mountain Association of Geologists Piceance Basin Field Symposium, October 5, 2003.

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).

2004 **R. Cole**, and S. Cumella, Fluvial sand-body dimensions in the lower Williams Fork Formation (Upper Cretaceous), southwestern Piceance Basin, Colorado: Rocky Mountain Sectional Meeting of the American Association of Petroleum Geologists, in proceedings volume.

2004 A. Ellison, M. Pranter, **R. Cole**, and P. Patterson, Anatomy of a point bar: outcrop modeling using Lidar data for the Upper Cretaceous Williams Fork Formation, Piceance Basin, Colorado: Rocky Mountain Sectional Meeting of the American Association of Petroleum Geologists, in proceedings volume.

2004 A. Ellison, M. Pranter, **R. Cole**, and P. Patterson, Quantification of stratigraphic heterogeneity within a fluvial point-bar sequence, Williams Fork Formation, Piceance Basin, Colorado: application to reservoir modeling: Rocky Mount Sectional Meeting of the American Association of Petroleum Geologists, in proceedings volume.

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 N. Sommer, Q. German, M. Pranter, and **R. Cole**, Analysis of fluvial sand-body characteristics and dimensions in a high net-to-gross system, upper Williams Fork Formation, Main and Plateau Canyons, Piceance Basin, Colorado: Rocky Mountain Sectional Meeting of the American Association of Petroleum Geologists, in proceedings volume.

2006 Q. German, M. Pranter, and **R. Cole**, Analysis of fluvial sand-body characteristics and connectivity in a high net-to-gross system, Upper Williams Fork Formation, Plateau Creek Canyon, Piceance Basin, Colorado: American Association of Petroleum Geologists Annual (National) Meeting, in proceedings volume.

2006 K. Rider, A. Darling, J. Gloyd, and **R. Cole**, Relative ages and origins of late Cenozoic pediments on the south flank of Grand Mesa, Colorado: Rocky Mountain Section of Geological Society of America Program with Abstracts.

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

2006 M. Pranter, **R. Cole**, N. Hurley, Z. Riza, M. Kraus, Q. German, H. Panjaitan, and N. Sommer, Stratigraphic architecture, reservoir characteristics, and 3-D outcrop modeling using high-resolution laser imaging (lidar): Williams Fork Formation of the Mesaverde Group, Piceance Basin, Colorado: Proceedings from the Williams Fork Consortium, Reservoir Characterization and Modeling Laboratory, University of Colorado at Boulder, 200p. (CD)

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

1974 Strontium Isotope Geochemistry, by G. Faure and J.L. Powell: J.S.P, v. 44, p. 598.

1974 Stable Isotope Geochemistry, by J. Hoefs: J.S.P., v. 44, p. 971-972.

1974 Thermodynamics of Rock-Forming Crystalline Solutions, by S.K. Saxena: J.S.P., v. 44, p. 1329-1330.

1976 Apatite, by D. McConnell: J.S.P., v 46, p. 262.

1979 Microfacies and Microfossils of the Miocene Reef Carbonates of the Philippines, by A.V. Carozzi, M.V. Reyes and W.P. Ocampa: J.S.P., v. 49, p. 683.

1979 Principles of Isotope Geology, by G. Faure: J.S.P., v. 49, p. 340-341.
1980 Field Description of Coal, by R.R. Dutcher, ed.: J.S.P., v. 50, p. 320-321.
1999 Terrigenous Clastic Depositional Systems; Applications to Fossil Fuel and Groundwater Resources, by W.E. Galloway and D.K. Hobday: J.S.R., v. 69, p. 795.

David Collins

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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.
  Major: Physics Minor: Mathematics. Awarded with distinction.

Theses

- *Two-state Quantum Systems Interacting with Their Environments: A Functional Integral Approach*, PhD thesis, University of Texas at Austin (1997).
- *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.
- **Postdoctoral Research Associate**, Electrical and Computer Engineering, North Carolina State University, January 1998 - March 2000.
  - Faculty Supervisors: Prof Ki Wook Kim, Prof William C. Holton.
  - Investigated theoretical quantum computation and experimental NMR quantum computation.
- **Physicist**, Optical Engineering Section, Division of Production Technology, CSIR (formerly the Council for Scientific and Industrial Research), Pretoria, South Africa, January 1988 - March 1988.
  - 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.
- **Co-Instructor**, Physics, Carnegie Mellon University, 2001 - 2003.
  - *Quantum Information and Quantum Computation:* Upper division undergraduate/ graduate physics elective course.
  - Supervisor: Prof. R. B. Griffiths (course organizer).
- **Undergraduate Research Supervision**, Physics, Carnegie Mellon University, 2001 - 2002.
  - 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).
- **Tutor**, Physics, Rhodes University, 1989 - 1991.
  - Course: *Physics IP/IL 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

1. *Polarization requirements for ensemble implementations of quantum algorithms with a single bit output*, Brandon M. Anderson and David Collins, Phys. Rev. A. **72**, 042337 (2005).
2. *Scaling issues in ensemble implementations of the Deutsch-Jozsa algorithm*, Arvind and David Collins, Phys. Rev. A. **68**, 052301 (2003).
3. *Shortening Grover's search algorithm for an expectation value quantum computer*, David Collins, Proceedings of the Sixth International Conference on Quantum Communication, Measurement and Computing (QCMC'02), Eds J. H. Shapiro and O. Hirota, (Rinton Press, 2003).
4. *Modified Grover's algorithm for an expectation value quantum computer*, David Collins, Phys. Rev. A. **65**, 052321 (2002).
5. *Orchestrating an NMR quantum computation: the N=3 Deutsch-Jozsa algorithm*, David Collins, K. W. Kim, W. C. Holton, H. Sierzputowska-Gracz, and E. O. Stejskal, Preprint quant-ph/0105045 (2001).
6. *NMR quantum computation with indirectly coupled gates*, David Collins, K. W. Kim, W. C. Holton, H. Sierzputowska-Gracz, and E. O. Stejskal, Phys. Rev. A **62** 022304 (2000).
7. *Deutsch-Jozsa algorithm as a test of quantum computation*, David Collins, K. W. Kim, and W. C. Holton, Phys. Rev. A. **58**, 1633 (1998).
8. *A Rigorous Mathematical Foundation of Functional Integration*, Cartier, P., Dewitt-Morette, C., Wurm, A. and Collins, D. Contains an appendix on Functional Integration Over Complex Poisson Paths prepared by D. Collins. *Functional Integration: Basics and Applications*, Eds C. DeWitt-Morette, P. Cartier and A. Folacci, (Plenum Press, New York, 1997).

Conference Presentations

1. *Could Quantum Computing Aid Functional Integration?*, David Collins, Invited presentation at the MSRI workshop "The Feynman Integral Along with Related Topics and Applications," Berkeley, California (2002).
2. *NMR Quantum Computation with Indirectly Coupled Gates*, David Collins, W. C. Holton, K. W. Kim, H. Sierzputowska-Gracz, and E. O. Stejskal, APS March Meeting, Minneapolis, Minnesota (1999).
3. *Deutsch-Jozsa Algorithm on a NMR Quantum Computer: Issues and Progress*, David Collins, W. C. Holton, K. W. Kim, H. Sierzputowska-Gracz, and E. O. Stejskal, APS Centennial Meeting, Atlanta, Georgia (1999).
4. *Using NMR to Implement a Quantum Computer*, David Collins, H. Sierzputowska-Gracz, W. C. Holton, K. W. Kim and E. O. Stejskal, Triangle Magnetic Resonance Group meeting, Chapel Hill, North Carolina (1998).
5. *A Refinement of the Deutsch-Jozsa Algorithm*, David Collins, K. W. Kim and W. C. Holton, DARPA Ultrascale Computing principle investigators' meeting, Tuscon, Arizona (1998).
6. *Spinor Structures: A New Approach*, David Collins, F. A. M. Frescura, and G. Lubczonok, 26th Annual Seminar on Theoretical Physics, Bloemfontein, South Africa. Published in the conference proceedings (1991).
7. *Moving Frames and Accelerated Observers in Special Relativity*, David Collins and F. A. M. Frescura, 25th Annual Seminar on Theoretical Physics, Port Elizabeth, South Africa. Published in the conference proceedings (1990).

Conference Posters

1. *Scaling Issues in Ensemble Quantum Algorithms*, David Collins and Arvind, Quantum Information and Quantum Control Conference, Toronto, Canada (2004).
2. *Shortening Grover's Search Algorithm for an Expectation Value Quantum Computer*, David Collins, 6th International Conference on Quantum Communication, Measurement and Computing, Cambridge, Massachusetts (2002).
3. *NMR Quantum Computation with Indirectly Coupled Gates*, David Collins, W. C. Holton, K. W. Kim, H. Sierzputowska-Gracz, and E. O. Stejskal, 41st Experimental Nuclear Magnetic Conference, Pacific Grove, California (2000).
4. *Deutsch-Jozsa Algorithm on a NMR Quantum Computer*, David Collins, W. C. Holton, K. W. Kim, H. Sierzputowska-Gracz, and E. O. Stejskal, Triangle Magnetic Resonance Group meeting, Research Triangle Park, North Carolina (1999).
5. *Deutsch-Jozsa Algorithm on a NMR Quantum Computer: Issues and Progress*, David Collins, W. C. Holton, K. W. Kim, H. Sierzputowska-Gracz, and E. O. Stejskal, Conference on Quantum Information Processing and NMR, Cambridge. Massachusetts (1999).

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
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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:

M Olivera, D Carroll, L Davidson, C Momany, M Hackert. (1997) The GTP effector site of ornithine decarboxylase from *Lactobacillus 30a*: Kenetic and structural characterization. *Biochem.* 36:16147-16154.

R Michels, L Davidson, S Sladon Timm, E Reiniets, K Conwell II, G Saccomanno, J Wiest, M Anderson. (1997) Saccomanno smear slides and Megafunnel slides for sputum specimens. *Acta Cytol.* 41:1774-1780.

M Anderson, S Sladon, R Michels, L Davidson, K Conwell II, J Lechner, W Franklin, G Saccomanno, J Wiest. (1996) Examination of p53 alterations and cytokeratin expression in sputa from patients prior to histological diagnosis of squamous cell carcinoma. *J Cell. Biochem.* 64(25S): 185-190.

M Hackert, D Carroll, L Davidson, S Kim, C Momany, G Vaaler, L Zhang. (1994) Sequence of ornithine decarboxylase from *Lactobacillus* sp. Strain 30a. *J Bact.* 176:7391-7394.

A Heller, M Nair, L Davidson, Z-H Luo, J Schwitzgebel, J Norrell, J Brock, S-E Lindquist, J Ekerdt. (1993) Photoassisted oxidation of oil and organic spills on water. In *Proceeding of 1992 Conference on TiO2 Photocatalytic Purification and Treatment of Water and Air*, (DF Ollis and H al-Ekabi eds.), pp 139-153, Elsevier Science Publishers B. V., Amsterdam.

A Heller, M Nair, L Davidson, J Scheitzgebel, Z-H Luo, J Brock, J Eckerdt. (1993) Application of photocatalytic hollow glass microbeads in the cleanup of oil spills. In *Proceeding of the 1993 International Oil Spill Conference (Prevention, Preparedness, Response.)*, pp 623-627.

G McDonald, L Davidson, GB Kitto. (1992) Amino acid sequence of the coelomic C globin from the sea cucumber, *Caudina (Molpadia) arenicola. J Prot. Chem.* 11:29-37.

F Mauri, J Omnaas, L Davidson, C Whitfill, GB Kitto. (1991) Amino acid sequence of a globin from the sea cucumber, *Caudina (Molpadia) arenicola. Biochem. Biophys. Acta* 1078:63-67.

GB Kitto and L Davidson. (1990) HPLC scale-up for uracil-DNA glycosylase purification. In *Frontiers in Bioprocessing* (SK Sikdar, PW Todd and M Bier, eds.) pp 355-363, CRC Press, Inc.

GB Kitto, G Smith, T-Q Thiet, M Mason, L Davidson. (1979) Tumor inhibitory and ono-tumor inhibitory l-aspariginases from *Pseudomonas geniculata. J Bact.* 137:204-212.

L Davidson, R Brear, P Wingard, J Hawkins, GB Kitto. (1977) Purification and properties of an L-glutaminase-L-aspariginase from *Pseudomonas acidivorans. J Bact.* 129:1379-1386.

L Davidson, M Burkon, S Ahn, L-C Chang, GB Kitto. (1977) L-asparaginases from *Citrobacter freundii. Biochem. Biophys. Acta* 480:282-294.

JP Allison, L Davidson, A Guiterrez-Hartman, GB Kitto. (1972) Insolubilization of L-asparaginase by covalent attachment to nylon tubing. *Biochem. Biophys. Res. Comm.* 47:66-73.

Abstracts:

GB Kitto, E Broussard, J Lemberg, L Davidson, F Davidson, W Rubink, O Taylor. (1989) Malate dehydrogenase (MDH) profiles of Mexican trapline honey bees prior to Africanization. *Am. Bee J.* 129:816.

GB Kitto, G McDonald, L Davidson. (1988) The complex hemoglobin system of a marine invertebrate. *Isozyme Bulletin* 21:162.

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.

ML Cheng, L Davidson, GB Kitto. (1983) Biochemical adaptation of allozymes of the *Culex pipiens* complex. Joint meeting of the Genetics Society of America, Society of Evolution and the American Society of Naturalists, Abstract.

GB Kitto, ML Cheng and L Davidson (1983) Kenetic and structural characterization of allozymes showing clinal variation in the *Culex pipiens* complex. *Federation Proceedings* 42:2223.

ML Chheng, L Davidson, GB Kitto. (1982) Biochemical characterization of isozyme systems that show clinal variation in the *Culex pipiens* complex. *Isozyme Bulletin* 15.

GB Kitto, G Smith, TQ Thiet, L Davidson. (1975) Tumor inhibitory and non-tumor inhibitory L-asparaginases from *Pseudomonas geniculata*. *Isozyme Bulletin* 8:23.

GB Kitto, JP Allison, L Davidson, S Raleigh, M Christian. (1972) Covalent attachment of enzymes to nylon tubing. *Proceeding of the International Conference on Chemically Grafted and Cross-linked Proteins* 30.

CURRICULUM VITAE Craig D. Dodson Ph.D.

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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, "Tritrophic 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 Letourneu, 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:

1) Dyer, L.A., **Dodson, C.D.**, and J. Richards. 2004. Isolation, synthesis, and evolutionary ecology of Piper amides. Pages 117-139 in: Dyer, L.A. and A.N. Palmer (eds.). Piper. A model genus for studies of evolution, chemical ecology and trophic interactions. Kluwer Academic Publishers, Boston.

2) Dyer, L.A., Letourneau D.K., **Dodson, C.D.**, Tobler, M.A. and A. Hsu 2004. "Ecological Causes and Consequences of Variation in Defensive Chemistry of a Neotropical Shrub", Ecology, 85(10), 2795-2803

3) Dyer, L.A., **Dodson, C.D.**, Stireman III, J.O., Tobler, M.A., Smilanich, A.M., Fincher, R.M., and D.K. Letourneau 2003. "Synergistic Effects of Three *Piper* Amides on Generalist and Specialist Herbivores", J. of Chemical Ecology, 29(11), 2481- 2496

4) Dyer, L.A., **Dodson, C.D.** and G. Gentry 2003."A Bioassay for Insect Deterrent Compounds Found in Plant and Animal Tissues", Phytochemical Analysis, 14, 381-388

5) Dyer, L.A., **Dodson, C. D.,** Beihoffer, J., and D.K. Letourneu 2001. "Trade-offs in Anti-herbivore Defenses in *Piper cenocladum*: Ant Mutualists versus Plant Secondary

Metabolites", J. Chem. Ecology 27(3) 581 - 592

6) **Dodson, C.D.**, Wright, Z., Searcy, J., Letourneu, D.K. and L.A. Dyer 2000. "Cenocladamide, A Dihydropyridone Alkaloid from *Piper cenocladum*". Phytochemistry 53(1) 51-54

7) Dyer, L.A., Letourneu, D.K., Williams, W. and **C.D. Dodson** 1999. "A commensalism between *Piper marginatum* Jacq. (Piperaceae) and a coccinellid beetle". Journal of Tropical Biology, 15:841-846

8) **Dodson, C.D.**, Stermitz F.R., Castro C., O., and D.H. Janzen 1987. "Neolignans from *Ocotea veraguensis* Seeds". Phytochemistry, 26(7), 2037

9) Spoerke, D.G., Hall, A.H., **Dodson, C.D.**, Stermitz F.R., and B.H. Rumack. 1987. "Mystery Root Ingestion; Two Cases of Probable Henbane, *Hyoscyamus niger*, Poisoning". Journal of Emergency Medicine, 5, 5

10) **Dodson, C.D.** and F.R. Stermitz 1986. "Pyrrolizidine Alkaloids from Borage Seeds and Flowers". Journal of Natural Products, 49(4), 727

11) Natale, N.R., Marron, B.E., Evain, E.J., and **C.D. Dodson** 1984. "(+) 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 cenocladum* and *Pheidole bicornus*", 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

May 1998, "Finding New Natural Products in a Lowland Tropical Wet Forest in Costa Rica", 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

March 1996, "The Importance of Modern Instrumentation in Developing a Chemistry Program", FACT/Trustee Conference at Mt. Crested Butte

Feb. 1996, "Natural Products Chemistry", Biology Seminar Program, MSC

Oct. 1995, "CFC's and their Role in Stratospheric Ozone Destruction", Physics Seminar Program, MSC

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, *Lonchhocarpus 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 1998, "Isolation of Alkaloids from *Solanum adherens*" presented by Margot Rathbone, 1998 Tri-Beta meeting, Air Force Academy

Oct. 1996, "Summer Research in Costa Rica" presented by Sheri Klas and Jennifer Sorenson, Biology Seminar Program MSC

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 Hastanecine Base Containing Pyrrolizidine alkaloid from *Liatris scariosa*", presented by Christopher Meyer, NU System Undergraduate Research Symposium, UNL, abstracted

Oct. 1993, "Brine Shrimp Lethality Bioassay Guided Isolation of the Toxic Components of *Solanum rostratum*", presented by Craig Noe, NU System Undergraduate Research Symposium, UNK, 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
Chemistry Program Coordinator, 1997-1998, 2004-2006
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
Western Slope Science Fair Judge, 1997, 1998, 1999, 2000 and 2001
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

NU System High School Proficiency Committee, 1993

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

August, 1999 - July, 2006	University of Nevada, Reno. Chemical Physics (ABD.).
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 Part-time Systems Administrator & Hardware Technician, University of Cape Coast, Ghana. Computer Center.

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.

January, 1997-August 1998 Part-time Mathematics Teacher, Wesley Girls' High School, Cape Coast, Ghana.

Sept., 1990-Sept.,1991 Science Teacher (National Service), Ghana Education Service, Woe L.A. Junior Secondary School.

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-$NH_x(CH_3)_{3-x}$, $(0 \leq x \leq 3)$ 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-C_4H_4." *(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: cline@chem.unr.edu
Ph.: 775-784-4376

Dr. Katherine McCall
Dept. of Physics, MS. 220
Reno, NV 89557
email: mccall@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
Oct. 1982 – Spring 1994	Independent Consulting Geologist
Oct. 1973 – Oct. 1982	Inspiration Development Company, Inspiration Consolidated Copper Company Exploration Geologist, Senior Geologist, District Geologist.
June 1973 – Oct. 1973	Michigan Technological University Houghton, Michigan Research – Geological & Geophysical
Jan. 1967 – Dec. 1971	Calumet Division, Universal Oil Products Calumet, Michigan Mining Geologist, Exploration Geologist

Education

1955 – 1959	West Milwaukee High School
1960 – Jan. 1967	University of Wisconsin – Milwaukee Milwaukee, Wisconsin Degree: B. S. in Geology
Jan. 1972 – June 1973	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
NASA Sunblazer Solar Satellite Program, 1964-1967
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

1. "Photon Counting with an SEC Tube," in Astronomical Observations with Television-Type Sensors, Glaspey and Walker, eds., 1973.

2. "Initial Observations with a Photon Counting Spectrum Analyzer," (with G. Clark, C.R. Canizares, and J.E. McClintok), Bull, Am. Astron. Soc., 5: 422 (1973).

3. "Impact of TV Sensors on Astronomical Research," (with P.A. Strittmatter), Nature, 247: 251 (1974).

4. "Spectroscopic Observations of Objects Identified with Radio Sources," (with P.A. Strittmatter, R.F. Carswell, E.M. Burbidge), Ap. J., 190: 509, 1974.

5. "An SIT Television Camera Used in the Photon-Counting Mode," (with S. Grandi), Pub. A.S.P., 86: 600, 1974.

6. "A Digital Television System for Astronomy," (with J.R.P. Angel and S. Grandi), in Sixth Symposium on Photoelectronic Image Devices, Imperial College, 1974.

7. "A Pulse-Counting Television Detector with Digital Integration," (with J.R.P. Angel, R.H. Cromwell, S. Grandi), Imaging in Astronomy, W.B. Wetherell, ed., 1975.

8. "Astronomical Spectroscopy with a Self-Scanning Diode Array," (with J.C. Geary), Bull. Am. Astron. Soc., 7: 433 (1975).

9. "A Centroid-Finding Analyzer for Photon-Counting Imaging Sensors," (with S. Grandi and G. Schmidt), Bull. Am. Astron. Soc., 7: 442 (1975).

10. "TV Spectroscopy of Absorption Lines in the Far Red of PHL 957," (with J.R.P. Angel, S. Grandi, G. Coleman, P.A. Strittmatter, R.H. Cromwell, and E.B. Jensen), AP. J., 206: L129-L131 (1976).

11. "The Spectrum of the Quasar BL 1225+31," (with M.S. Wilkerson, P.A. Strittmatter, G. Coleman, and R.E. Williams), Ap. J., 223: 364 (1978).

12. "The Spectral Development of Nova Cygni 1975," (with P.A. Strittmatter, et al.), Ap. J., 216: 23 (1977).

13. "Rotated and Rotating Observers in Newtonian Physics," Bull. Am. Phys. Soc., 27: 24 (1981).

14. "Space, Time, and Newton's First Law," Bull. Am. Phys. Soc., 28: 1310 (1983).

15. "Models, Manifolds, and Mechanics," Jour. Co.-Wy. Acad. Of Sci. (1984).

16. "Galilean Relativity of Manifolds," AAPT Newsletter (April, 1986).

17. "Lagrangian Manifolds," MAA Bull. (April, 1987).

18. "The Fiber Bundle Approach to Classical Spin Dynamics," Jour. Co.-Wy. Acad. of Sci. (April, 1989).

19. "Connections, Curvature, and Newton's First Law," Jour. Co.-Wy. Acad. of Sci. (April, 1992).

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

"Extinction in the Universe," inaugural lecture for 1992, Museum of Western Colorado (January, 1992)

"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)

Physics Seminar Moderator (1988-1996)

AWARD

Distinguished Faculty Award (1993)

2080.5 Broadway
Grand Junction, CO 81503
970-243-7680
shase@mesastate.edu

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

Oct. 1973 – Feb. 1975 - Exploration Geologist

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.

Feb. 1975 – June 1976 – Senior Geologist

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.

June 1976 – October 1982 – District Geologist

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

January 1967 – December 1969 – Underground Mine Geologist

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.

December1969 – January 1972 – Exploration Geologist

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.

EDUCATION: BA (Geology) Southern Illinois University, Carbondale, Illinois, 1967, **MS** (Geology) Southern Illinois University, Carbondale, Illinois, 1970, **Ph. D.** (Geology) University of Tennessee, Knoxville, Tennessee, 1975.

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:

Exploration Geophysics, GIS/GPS, Environmental Geology, Computer Applications in Geology, Hydrogeology, Geologic Field Mapping, Engineering Geology, Physical Geology and Laboratory, Survey of Earth Science, and Geology of Colorado.

Additional Courses Delivered:

(1984 - 1989) FORTRAN programming language, College Algebra, Beginning Algebra, and Basic Math.

Major Accomplishments:

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

2) Receipient 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).

6) Developed new courses: Engineering Geology (1980), Introduction to Ground Water (1984), Introduction to GIS (1992), Introduction to Remote Sensing (1998), GPS for GIS (1999), and Advanced GIS courses (1999).

Jan., 1977 - July, 1983 **BENDIX FIELD ENGINEERING CORPORATION**
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, 1983 **WALTER FEES AND ASSOCIATES** (an independent gas company)
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 - Jan., 1976 **GULF RESEARCH AND DEVELOPMENT COMPANY**
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 - Aug., 1974 **CALIFORNIA STATE UNIVERSITY AT NORTHRIDGE**
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 Geoexplorer 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 participant 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

.'heses

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 northeasttrending 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.

'ohnson, V.C., (Contributor), 1983, Aerial geophysical survey, in Goodknight, C.S., Intermediate, - grade uranium resource assessment project for part of the Maybell District, Sand Wash Basin, Colorado: Department of Energy Open File Report GJBX-12 (83), p. 16-18.

Johnson, V.C., 1983, Preliminary Acromagnetic interpretation of the Uncompahgre Uplift and the Paradox Basin in east-central Utah and west-central Colorado: Grand Junction Geological Society Annual Fieldtrip Guidebook, p. 67-70.

Johnson, V. C., 1987, Interpretation of a seismic section across the Hunter Canyon Anticline in Central Western Colorado: Journal of People to People Petroleum Technology and Management Delegation to the People's Republic of China, appendix A.

Johnson, V. C., 1992, Interpretation of a seismic section across the Hunter Canyon Anticline in Central Western Colorado: Mesa State College Zeta Nu Chapter of the Sigma Gamma Epsilon Uncompaligria Journal, Vol. 1, p. 47 - 57.

Johnson, V.C. and Dubyk, 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).

Johnson, V.C. and Farley, W., 1983, Geophysical studies, in Sayala, D., and Ward D. (project coordinators), Multidiscliplinary studies of uranium deposit in the San Juan Basin, New Mexico: Department of Energy pen-File Report GJBX-2 (83), p. I 11- 134.

)hnson, V.C., McCarn, D.W., Kocis, D.E., Walker, B.W., and Reinhardt, W.R., 1982, Uranium resource evaluation, Trinidad I* x 20 Quadrangle, Colorado: Department of Energy Cpen-File Report PGJ/F-034 (82).

Johnson, V.C., and Trujillo, R., 1983, Geophysical studies, in Wayland, T. and Salaya, D. (project coordinators), Multidisplinary sites of uranium deposits in the Red Desert, Wyoming: Department of Energy Open-File Report GJBX- 1 (83), p. 210-25 8.

Kearl, P., Ludlam, J., Johnson, V.C., and Gonzalez, D.G., 1983, Preliminary hydrogeochemical characterization of the Durango, Colorado, tailings and Raffinate Ponds areas: Department of Energy Cpen-File Report GJ-03 (83), 79 p.

Maarouf, A., and Johnson, V.C., 1982, Uranium resource evaluation, Lamar 1* x 2* Quadrangle, Colorado: Department of Energy Open-File Report GJO-O 16 (82).

McCarn, D.W., Johnson, V.C., and Theis, N.J., 1982, Uranium resource evaluation, LaJunta I* x 2' Quadrangle, Colorado: Department of Energy Open-File PGJ/F-100 (82).

Staub, W.P. and Johnson, V.C., 1973, Geophysical survey of a power plant site (abs.): GSA Southeastern Section 22nd Annual Meeting (Ap. 11-14,1973), Knoxville, TN, p. 436.

Staub, W.P. and Johnson, V.C., 1973, Gravity survey of Knox County, Tennessee: Tennessee Division of Geology, Bulletin 70, p. 74-75.

UNPUBLISHED FILE REPORTS, LAB MANUALS, AND WORKBOOKS

Mesa State College, Grand Junction, Colorado

Geology of the Grand Canyon Workbook for GEOL 333, Spring, 1997.

Geology of the Canyon Country Workbook for GEOL333, Spring, 1998.

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 Statgraphic software.

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

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

Johnson, V.C., 1983, Geophysical survey in the Monticello, Utah, mill tailing site.

hnson, V.C., 1983, Gravity and reflection seismic interpretation of the Great Basin region for uranium.

Johnson, V.C., 1978, Uranium evaluation of the Colorado Front Range.

Johnson, V.C., and Walker, B., 1980, Uranium studies of the San Joaquin Valley, California: Site Report No. 2.

Walker, B., and Johnson, V.C., 1980, Uranium studies of the northwestern Arizona: Site Report No. 1.

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

Johnson, V.C., 1983, Reflection seismic interpretation of the Hunters, Canyon area in northwest Colorado: Geophysical Report No. 1.

Johnson, V.C., 1983 Gravity and magnetic interpretation of the southeastern Piceance Creek Basin, Colorado: Geophysical Report No. 2.

Gulf Research & Development, Houston, TX

Johnson, V.C., and Landau, J., 1976, Aeromagnetic interpretation of the Illinois Basin region.

Landau, J., and Johnson, V.C., 1976, Aeromagnetic interpretation of the Gulf of Alaska region.

Skow, D., and Johnson, V.C., 1975, Reflection seismic interpretation of the Lake Maracaibo, Venezuela region.

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.

"The Role of Mathematics in the Sciences" with Rob Wang, Lee Dyer, Steve Werman, and Kyle Beran in Mathematics Brown Bag Seminar, Sept. 12, 1997.

"Using Geophysical Methods in Ground Water Investigation" to Mesa State College Geology Club Wednesday Afternoon Seminar, November 13, 1991.

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

"Petroleum Technology in People's Republic of China" to Grand Junction Geological Society, Grand Junction, Colorado, February 15, 1988.

"China Report" to the Faculty Colloquium, Mesa State College, February 10, 1988.

"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.

Conduct successful GIS Workshop for K-12 teachers, April 5, 2003.

Techbase Workshop sponsored by Techbase, Inc. Denver, Co., June 8 - 10, 1999.

Computer Contouring of Geologic Data, sponsored by AAPG, Dallas, Texas, April 18 20, 1994.

Probability, Statistics, and Geostatistics for Environmental Professionals, sponsored by National Ground Water Association, Denver, Colorado, February 7 - 9, 1994.

Theory and Practice of Ground Water Monitoring and Sampling, sponsored by National Ground Water Association, Salt Lake City, Utah, August 24 - 26, 1993.

MODFLOW for Simulation of Ground Water Flow and Advective Transport, sponsored by National Ground Water Association, Atlanta, Georgia, April 26 - 30, 1993.

IBM PC Applications in Ground Water Pollution and Hydrology, sponsored by National Ground Water Association, Trenton, New Jersey, August 22 - 29, 1992.

Introduction to Ground Water Geochemistry, sponsored by National Water Well Association, Farmington, Connecticut, October 8 - 10, 1991.

Principles of Ground Water Hydrology, sponsored by National Water Well Association, Portland, Oregon, July 7 - 19, 1990.

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.

Mathematics Assessment Workshop, sponsored by Metropolitan State College, Denver, Colorado, June 29 - 30, 1989.

FACT Workshop, sponsored by Colorado Commission of Higher Education, Metropolitan State College, April 5 - 6, 1990.

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

"Fluvial Systems," sponsored by Colorado State University, Ft. Collins, Colorado (March 1978).

"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

'kiing, 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

ANTHONY A. KOVSCHAK, JR.
597 Rambling Road
Grand Junction, CO 81503
Ph: 970-245-4536 Fax: 970-245-4536
akovschakjr@qwest.net

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
M.S. in Geology, 1973. Mapped laccolith and surrounding area in West Texas. Thesis: "The Igneous and Structural Geology of the Grapevine Hills, Big Bend National Park, Brewster County, Texas."

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.

10/1990 – 06/1994 UMETCO MINERALS CORPORATION, Grand Junction, CO

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.
1983-1985 – Worked on-site with a Canadian work permit on an Archean gold deposit near Kenora, Ontario.
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.

12/1973 – 4/1977 UNION CARBIDE CORPORATION, Uravan, CO

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:

Kovschak, A.A., Jr., 1973, The Igneous and Structural Geology of the Grapevine Hills, Big Bend National Park, Brewster County, Texas: unpublished Masters Thesis, University of Texas, Arlington, Texas, 107 pp.

Kovschak, A.A., Jr., 1976, The Igneous and Structural Geology of the Grapevine Hills, Big Bend National Park, Brewster County, Texas, [abs.]: Geological Society of America Programs, v. 8, no. 1, p. 27.

Hall, J.B., and Kovschak, A.A., Jr., 1977, Geology and Exploration of Uravan Mineral Belt, [abs.]: American Assoc. Petroleum Geologists Bull., v. 61, p. 792.

Kovschak, A.A., Jr. and Nylund, R.L., 1981, General Geology of Uranium-Vanadium Deposits of the Salt Wash, La Sal Area, San Juan County, Utah: New Mexico Geological Society, Colorado Western Slope, 32nd Field Conference Guidebook, pp. 171-176.

Thamm, J.K., Kovschak, A.A., Jr., and Adams, S.S., 1981, Geology and Recognition Criteria for Sandstone Uranium Deposits of the Salt Wash Type, Colorado Plateau Province-Final Report: Grand Junction, Colorado, National Uranium Resource Evaluation, GJBX-6(81), 135 pp. Presented orally at USGS/DOE Uranium Symposium at the Colorado School of Mines, 1981 by Kovschak.

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, photogrammatry 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 petrographic 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

Jessup, M. J., Karlstrom, K. E., **Livaccari, R. F,** Connelly, J., Amanda, T., and **Rodgers, S.A., 2005,** Complex Proterozoic Crustal Assembly of Southwestern North America in an Arcuate Subduction System: The Black Canyon of the Gunnison, Southwestern Colorado: The Black Canyon of the Gunnison, southwestern Colorado, *American Geophysical Union Monograph,* Volume 154, p. 21 – 38.

Livaccari, R.F., and Geissman, J.W., 2001, Large-magnitude extension along metamorphic core complexes of western Arizona and southeast California: Evaluation with paleomagnetism: *Tectonics*, v. 20, p. 625 - 648.

Scott, R.B., Harding, A.E., Hood, W.C., Cole, R.D., **Livaccari, R.F.,** Johnson, J.B., and Dickerson, R.P., 2001, Geologic map of the Colorado National Monument quadrangle and the Colorado National Monument, Mesa County, Colorado: *U.S.G.S.*, Geologic Investigations Series, I-2740.

Campbell-Stone, E., John, B. E., Foster, D. A., Geissman, J. W., & **Livaccari, R. F.,** 2000, Mechanisms for accommodation of Miocene extension: Low-angle normal faulting, magmatism, and secondary breakaway faulting in the southern Sacramento Mountains, southeastern California: *Tectonics*, v. 19, p. 566-587.

Livaccari, R. F., Geissman, J. W., and Reynolds, S. J., 1995, Large-magnitude extensional deformation in the South Mountains metamorphic core complex, Arizona: Evaluation with paleomagnetism: *Geological Society of America Bulletin*, v. 107, p. 877-894.

Livaccari, R. F., 1994, Role of extensional deformation in the late Mesozoic and Cenozoic tectonic evolution of the western U.S. Cordillera: A regional tectonic model and paleomagnetic study of the South Mountains metamorphic core complex [Ph.D. dissertation]: *Univ. of New Mexico,* Albuquerque, New Mexico, 103p.

Perry, F. V., and **Livaccari, R. F,** 1994, Isotopic evidence for preservation of lithospheric mantle during the Sevier-Laramide orogeny, western U.S.: Comment and Reply: *Geology*, v. 22, p. 671-672.

Livaccari, R. F., and Perry, F. V., 1993, Isotopic evidence for preservation of lithospheric mantle during the Sevier-Laramide orogeny, western U.S.: *Geology*, v. 21, p. 719-722.

Livaccari, R. F., Geissman, J. W., and Reynolds, S. J., 1993, Paleomagnetic evidence for large-magnitude, low-angle normal faulting in a metamorphic core complex: *Nature*, v. 361, p. 56-59.

Livaccari, R. F., 1991, Role of crustal thickening and extensional collapse in the tectonic evolution of the Sevier-Laramide orogeny, western United States: *Geology*, v. 19, p. 1104-1107.

Livaccari, R. F., Burke, K., and Sengor, A. M. C., 1981, Was the Laramide orogeny related to subduction of an oceanic plateau?: *Nature*, v. 289, p. 276-278.

RECENT PAPERS PRESENTED AT PROFESSIONAL MEETINGS

Nelson, M., and **Livaccari, R.F.,** 2006, Laramide Strike-Slip deformation along the northern Uncompahgre Plateau, western Colorado: the Bull Canyon-Flume Creek fault system, *Geological Society of America Abstracts with Programs,* Rocky Mt. Section, 58th annual meeting.

Hodge, J. and **Livaccari, R.F.,** 2006, Laramide Strike-Slip deformation along the northern Uncompahgre Plateau, western Colorado: the Cactus Park and Glade Park fault systems, *Geological Society of America Abstracts with Programs,* Rocky Mt. Section, 58th annual meeting.

Nelson, M., Hodge, J. and **Livaccari, R.F.,** 2006, Laramide and Quaternary-Age Faulting along the northern Uncompahgre 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 Uncompahgre 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 Uncompahgre Plateau, western Colorado, *Geological Society of America Abstracts with Programs,* Rocky Mt. Section, 57th annual meeting.

Jessup, M. J., Karlstrom, K. E., Connelly, J., and **Livaccari, R. F.,** 2002, Complex Crustal Assembly of southwestern North America involving northwest and northeast-striking fabrics: The Black Canyon of the Gunnison, southern Colorado, *Geological Society of America Abstracts with Programs,* Rocky Mt. Section, 54th annual meeting.

Livaccari, R.F., Bowring, T.J., Farmer, E.T., Garhart, K.S., Hosack, A.M., Navarre, A.K., Peterman, J.S., Rollins, S.M., Williams, C.A., Kunk, M., Scott, R.B., Unruh, D., 2001, Proterozoic rocks of the Uncompahgre Plateau, western Colorado and eastern Utah:

Livaccari, R. F., Geissman, J. W., and Wawrzyniec, T., 1995, Study of continental extension with paleomagnetism: *Geological Society of America Abstracts with Programs*, v. 27, p. A-68.

Livaccari, R. F., Geissman, J. W., and Reynolds, S. J., 1994, Large-magnitude extensional deformation in the South Mountains metamorphic core complex, Arizona: Evaluation with paleomagnetism: *Geological Society of America Abstracts with Programs*, v. 26, p. 250-251.

Livaccari, R. F., Geissman, J. W., and Reynolds, S. J., 1991, Paleomagnetic evaluation of synkinematic footwall tilting along the Miocene South Mountains metamorphic core complex, Arizona: *Geological Society of America Abstracts with Programs*, v. 23, p. 189.

Livaccari, R. F. and Keith, S. B., 1990, Detailed structural analysis of the southern Cordillera from Trans-Pecos Texas to southwestern California: *Geological Society of America Abstracts with Programs*, v. 22, p. 37.

Keith, S. B., and **Livaccari, R. F.,** 1990, Laramide-age decretion as a cause for mid-Tertiary Cordilleran magmatism and deformation: *Geological Society of America Abstracts with Programs*, v. 22, p. 34.

Curriculum Vitae
Mr. Donn Lorhammer

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Grand Junction, CO
81504

Office phone: 970.248.1077
Home phone: 970.523.1363
email: dlorhamm@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

- 1968-1995 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

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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 Lefler 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
- Codesigned 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.

Science Alliance Internship, Theoretical Nuclear Physics Group, Oak Ridge National Lab, Summer 2000.

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

Research Experience for Undergraduates, University of Notre Dame, Summer 1997.

- 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, *Phys. Lett. B*, Vol. 613 (2005) pps. 189-196; hep-th/0502020

"The Schwarzschild Solution in the DGP Model", C. Middleton and G. Siopsis, *Mod. Phys. Lett. A*, Vol. 19 (2004) pps. 2259-2266; hep-th/0311070

"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", APS 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

C. Middleton, S. Ness, K. McGlynn, D. Pakey, J. Conwell, K. Andrew, "A Cosmological 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.

Historic Flash Flooding in the Colorado National Monument, CO, Geologist in the Park, Association of Women Geoscientists, August 2003 – January 2004

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

Braided River Response to Lateral Confinement, Waiho 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, Rio Grande, NM, Ph.D. Research, Civil Engineering Department, Colorado State University, 1997–2000.

North Fork Cache la Poudre River and Phantom Canyon Preserve Riparian Restoration, Volunteer, The Nature Conservancy, 1999-2001.

Evaluation of Proposed Surface Waste Remediation Alternatives French Gulch, Colorado, M.S. Research, Civil Engineering Department, Colorado State University, 1992–1997.

PROFESSIONAL EXPERIENCE

Beaton and Associates *September 1992 – December 1996*
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 *September 1992 – September 1996*
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. *January 1994 – September 1994*
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

Commissioner: Summit Water Quality Commission, Summit County, CO, 1994-1996.
- Representative on local government commission whose goal was to protect water quality.

Commissioner: Snake River Planning Commission, Summit County, CO, 1991-1996.
- Served as representative on eight member regional planning and zoning commission.

ACCREDITATIONS
- Engineer in Training, State of Colorado, 1990.

SELECTED PUBLICATIONS

Richard, G.A., Julien, P.Y. and Baird, D.C., 2005, "Statistical Methods of Modeling Lateral Movement of the Rio Grande, New Mexico", *Geomorphology*, v. 71, pp. 139-155.

Richard, G.A., Julien, P.Y. and Baird, D.C., 2005, "Case Study: Lateral Mobility Modeling of the Rio Grande below Cochiti Dam, New Mexico", *Journal of Hydraulic Engineering*, v. 131, n. 11, pp. 931-941.

Julien, P.Y., G. Richard and J. Albert, 2004. "Stream Restoration and Environmental River Mechanics", Proc. First International Conference on Managing Rivers in the 21st Century, Rivers '04, Universiti Sains Malaysia, Penang, Malaysia, September 21, 2004, pp. 62-78.

Richard, G., 2004. *Flash Flooding at the Colorado National Monument 1921-2003*. Final Report for Association of Women Geoscientists Geologist in the Park Program.

Richard, G.A. and Julien, P.Y., 2003, "Dam Impacts and Restoration on an Alluvial River – Rio Grande, New Mexico", Invited Paper at the U.S.-Chinese Joint Workshop on Sediment Transport and Environmental Studies, Milwaukee, WI, July 21-28, 2002, *International Journal of Sediment Research*, v. 18, n. 2, pp. 89-96.

Schmidt, J.C., Everitt, B. L. and Richard, G. A., 2003, "Hydrology and geomorphology of the Rio Grande and implications for river restoration", in *Aquatic Fauna of the Northern Chihuahuan Desert*, edited by G.P. Garrett and N. L. Allan: Museum of Texas Tech University, Special Publication Number 46, pp. 25-45.

Julien, P.Y. and G. Richard, 2002. "Reservoirs, Stream Restoration and Environmental River Mechanics", Invited Paper at the International seminar on instream flow and self-purification in urban stream, Korean Institute for Construction Technology, Seoul, Korea, May 9, 2002, pp. 3-26.

Richard, G., Leon, C., and Julien, P. 2000. *Rio Puerco Reach Geomorphic Analysis, Middle Rio Grande, New Mexico*, Colorado State University: Fort Collins, CO.

Bauer, T., Leon, C., Richard, G., and Julien, P. 1999. *Middle Rio Grande, Bernalillo Bridge to San Acacia - Hydraulic Geometry, Discharge and Sediment Data Base and Report*, Colorado State University: Fort Collins, CO.

Leon, C., Richard, G., Bauer, T., and Julien, P. 1999. *Middle Rio Grande, Cochiti to Bernalillo Bridge, Hydraulic Geometry, Discharge and Sediment Data Base and Report*, Colorado State University: Fort Collins, CO.

JOSEPH LAWRENCE RICHARDS

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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 cavitands
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)
Porphyr*ims*: 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

Grand Valley State University Science and Mathematics Division Summer Undergraduate Research Award, $2500 (awarded 1994)
Joseph L. Richards

Grand Valley State University Project Initiation Award, $1000 (awarded 1993)
Joseph L. Richards

Recent Presentations and Publications

Isolation, Synthesis, and Evolutionary Ecology of *Piper* amides, Lee Dyer, Joe Richards, and Craig Dodson, in *Piper* A Model Genus for Studies of Phytochemistry, Ecology, and Evolution, Dyer and Palmer, Eds., Kluwer Academic/Plenum Publishers (2004).

Improved synthesis of piplartine, 4'-desmethylpiplartine, and cenocladamide: Three compounds isolated from *Piper cenocladum*, 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.

Total synthesis of piplartine, 13-desmethylpiplartine, and cenocladamide: Three compounds isolated from *Piper cenocladum*, Joseph L. Richards, Sylvia M. Myhre, and Julie I. Jay, presented at session on Methodology, Asymmetric Reactions, Synthesis, Process R&D, Division of Organic Chemistry, 221st National Meeting of the American Chemical Society, April 2001.

The Role of "Piper" Amides in the Ecology of a Neotropical Ant-Plant-Mutualism Formed Between *Piper cenocladum* and *Pheidole bicornus*, C.D. Dodson, L.A. Dyer and J.L. Richards, presented at the Joint Meeting of American Society of Pharmacognosy, Association Francaise pour l'Enseignement et la Recharche en Pharmacognoise, Gesellschaft fur Arzneipflanzenfor-schung, and Phytochemical Society of Europe, Amsterdam, The Netherlands (1999).

Distance Dependence of Photoinduced Electron Transfer in Metalloporphyrin Dimers, Carmita F. Portela, Jarmilla Brunckova, Joseph L. Richards, Bernd Schöllhorn, Yassuko Iamamoto, Douglas Magde, Teddy G. Traylor, and Charles L. Perrin, *J. Phys. Chem A*, **103**, 10540-10552 (1999).

Formation of Both 1° and 2° *N*-Alkylhemins During Hemin-Catalyzed Epoxidation of Terminal Alkenes, Z-Q Tian, J.L. Richards, and T.G. Traylor, *J. Amer. Chem. Soc.*, 117, 21 (1995).

Reactions of Iron(III) Porphyrins with Oxidants: Structure-Activity Studies, T.G. Traylor, C. Kim, J.L. Richards, F. Xu, and C.L. Perrin, *J. Amer. Chem. Soc.*, 117, 3468 (1995).

Synthesis, structural characterization and dioxygen reactivity of imidazole-ligated Cu(I) complexes, T.N. Sorrell, M.L. Garrity, and J.L. Richards, *Inorganica Chimica Acta*, 218 (1/2), 103 (1994).

Model Compounds for the Study of Electron transfer in Photosynthesis, J.L. Richards, B. Schöllhorn, Y. Iamamoto, C.F. Portela, and T.G. Traylor, presented at the 6th International Conference on Bioinorganic Chemistry, San Diego, CA (1995).

Imidazole-Ligated Copper complexes: Synthesis, Structure, and Reactivity
T.N. Sorrell, M.L. Garrity, J.L. Richards, F.C. Pigge, and W.E. Allen, in *Bioinorganic Chemistry of Copper*, K.D. Karlin and Z. Tyeklar, eds., Chapman & Hall, New York (1993).

The Curriculum and Experiments in an Organic Honors Laboratory
N.J. Pienta, C. Regitz, J.L. Richards, and T.N. Sorrell, *J. Chem. Ed*, 70(10), 841 (1993).

Selectively Difunctionalized Cavitands
T.N. Sorrell and J.L. Richards, *SYNLETT*, 155 (1992).

Synthetic Models for the Active Site of Type III Copper Proteins
J.L. Richards, Dissertation, The University of North Carolina (1991).

WILLIAM M. TIERNAN **ASSOCIATE PROFESSOR of PHYSICS**
PHYSICS DEPARTMENT
MESA STATE COLLEGE, GRAND JUNCTION, CO 81503
970-248-1587 btiernan@mesastate.edu

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

1986-1992	University of Massachusetts Dissertation: "Studied of the Superconducting Behavior of Polycrystalline YBCO", Robert B. Hallock, advisor	Ph.D. Sept. 1992
1973-1978	Colby College	B.A. June 1978

Refereed Publications

1. "Magnetization and Resistance of Melt-Textured Growth YBCO Near Tc and at Low Magnetic Fields" , W. M. Tiernan, N. S. Bingham, and J. C. Combs, Proceedings of the 24th International Conference on Low Temperature Physics, AIP Conference Proceedings 850, 2006.

2. "A superconducting persistent current measurement for an undergraduate laboratory", (W.M. Tiernan), Am. J. Phys. **65,** 778 (1997).

3. "AC susceptibility near the superconducting transition in polycrystalline YBCO" (W.M. Tiernan and R.B. Hallock), Phys. Rev. B **49**, 9168 (1994).

4. "I-V characteristics and the superconducting transition in polycrystalline YBCO" (W.M. Tiernan, R. Joshi, and R. B. Hallock), Phys. Rev. B **48**, 3423 (1993).

5. "Superconducting properties of polycrystalline YBCO: evidence for a guage glass" (W.M. Tiernan and R.B. Hallock), Phys. Rev. B **46**, 3688 (1992).

6. "Linear T_c suppression in Mg doped YBCO" (W.M. Tiernan, R.B. Hallock, J.C.W. Chien, and B.M. Gong), Phys. Rev. B **44**, 4661 (1991).

7. "Temperature and field dependent I-V characteristics of an Ag/YBCO fiber" (W.M. Tiernan and R.B. Hallock), Phys. Rev. B **43**, 10508 (1991).

8. "Transport properties of Ag-Y123 fibers prepared using the polymer-metal-complex precursor process" (W.M. Tiernan, J. M. Madsen, R. B. Hallock, J.C.W. Chien, B.M. Gong, S.H. Dong, and Y.S. Yang), Physica B **165&166**, 1383 (1990).

9. "YBCO prepared by a polymer-metal-complex precursor process: morphology and superconducting transition properties" (J.C.W. Chien, B.M. Gong, Y.S. Yang, J.M. Madsen, W.M. Tiernan, and R.B. Hallock), Physica C **165**, 279 (1990).

Recent Presentations

1. "Evidence for a Percolative Superconducting Transition in Melt-Textured Growth YBCO", W. M. Tiernan, J. C. Combs, and N. S. Bingham, Oral presentation at the American Physical Society Four Corners meeting, Oct 2005.

2. "Magnetization and Resistance Measurements Near Tc in the Low Magnetic Field Non-Meissner Regime of Melt-Textured YBCO", W. M. Tiernan, N. S. Bingham, and J. C. Combs, Poster presentation, 24th International Conference on Low Temperature Physics, Orlando FL, August 2005.

3. "Teaching Inquiry-Based Physics Labs", Presentation at the Western Colorado Math and Science Institute, August 2005.

4. "High Tech/Low Temp", Invited Talk for Sigma Xi meeting, April 2005.

5. "Fluctuation Conductivity of Superconducting Melt-Textured Growth YBCO", J. C. Combs, N. S. Bingham, and W. M. Tiernan, Colorado-Wyoming Academy of Sciences conference, April 2005.

6. "Magnetic Behavior and Critical Currents Near Tc in Melt-Textured Growth YBCO", N. S. Bingham, J. C. Combs, and W. M. Tiernan, Colorado-Wyoming Academy of Sciences conference, April 2005.

7. "One Hundred Years of Low Temperature Physics" MSC Physics Sminar presentation, March 2005.

8. "Mesa State's New Low Temperature Physics Facility", MSC Physics Seminar, October 2004.

9. "The 2004 Nobel Prize in Physics: Ginzburg, Abrikosov and Understanding Why Superconductors DO the Things They Do", MSC Physics Seminar, March 2004.

Alexander A. Gurshtein

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E-mail: agurshtein@hotmail.com

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)
- Head of Research Group on History of Astronomy & Space. Chair of Astronomical Section of the Russian National Committee for History and Philosophy of Science (1988-2000)
- 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)
- Head of the Methodological Council for Astronomical Education, Russian Ministry of Education (1991-1996)
- 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

Library Program Assessment
John U. Tomlinson Library
Mesa State College

Date of Assessment: __September 2006_____

Purpose of Assessment: __Assess library support for Physical Sciences Programs____

Program under review: _Physical Sciences--Chemistry_____

Program Level/s: __Bachelor of Science_____

Liaison Signature: _____

1. Collection Assessment

   a. Reference Support:
   The Reference collection contains 80 titles covering Chemistry (5 titles covering Analytical Chemistry, 26 on Organic Chemistry, 13 for Inorganic Chemistry, 2 for Biochemistry, and 9 for Physical Chemistry).

   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: Elizabeth A. Brodak Date: 10/2/2006

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

6/06

• E-journal ✓ Print subscription and E-journal

Library Program Assessment
John U. Tomlinson Library
Mesa State College

Date of Assessment: __September 2006_____

Purpose of Assessment: ____Assess Library support for Physical Sciences Programs___

Program under review: ___Physical Sciences--Physics_____

Program Level/s: __Bachelor of Science_____

Liaison Signature: _____

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

of Astronomy, Dictionary of Scientists, and Science, Technology, and Society.

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: Elizabeth N. Brodak 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

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, GEOBASE, 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: Elizabeth M. Brodak 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 Succuess

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 Succuess

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 Succuess

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 be establish a data base 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 data base 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 Succuess

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 Succuess

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 Succuess

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.

Department of Physical and Environmental Sciences
Physical Science Academic Program Review
Mesa State College
Fall, 2006

Conducted by Dr. Robert L. Eves, Chair, Department of Physical Science, Southern Utah University, Cedar City, Utah

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 5,764 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.