



College of Arts and Sciences

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29 July 2016

MEMO

TO: Kate Miller
Provost/VPAA

FROM: Paula M. Lutz
Dean, Arts and Sciences

A handwritten signature in cursive script that reads "Paula M. Lutz".

RE: Program Review for Geology & Geophysics' M.S. in Geophysics—
Dean's recommendation

The Geophysics M.S. has had ten graduates in the past five years. This is the primary degree for those graduate students training to work in the oil and gas industry. Geologists and geophysicists are hired separately by these companies. Geophysicists with the M.S. are preferred.

Although a small masters degree program, this degree fits well with the campus mission and previous (and present) strategic plans. It complements our STEM initiatives (the Science Initiative and Engineering Initiative) and interfaces with goals of the SER.

There is a dearth of U.S. students with this degree, giving a strategic advantage for UW. Recruiters from the petroleum companies come to UW to interview because we have this degree. Elimination would hurt this relationship.

It is the recommendation of the Dean that the M.S. in Geophysics be maintained. This is a degree that works to benefit the state's interests in energy. We suffer from the misconception at times that UW does not support Wyoming's economy. Maintaining this degree will help us prove that this IS a misconception.

ACADEMIC PROGRAM REVIEW – GEOLOGY & GEOPHYSICS

1. *Program:* MS – Geophysics
2. *Level:* Graduate – Masters of Science
3. Department of Geology & Geophysics, College of Arts & Sciences
4. *Head:* Paul Heller, 766-3386, heller@uwyo.edu

5. Program productivity:

- A. 10 students have graduated over the past 5 years.
- B. Over the past five years the program has maintained about 6 majors (Figure 1).

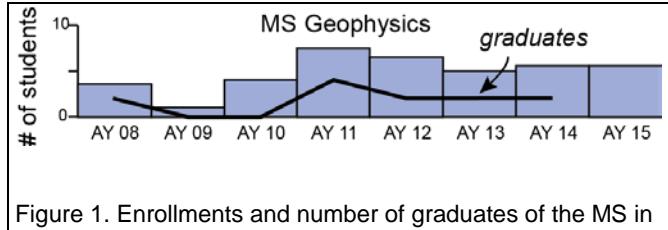


Figure 1. Enrollments and number of graduates of the MS in Geophysics over the past 8 years. Data from OIA and registrar's office.

6. Program quality:

- A. There is no accreditation in this field.

B. Credentials of Geophysics faculty:

Name	Status	Highest Degree	Discipline
Brad Carr	APR	Ph.D.	Geophysics
Michael Cheadle	Faculty	Ph.D.	Geophysics
Po Chen	Faculty (SER)	Ph.D.	Geophysics
Ken Dueker	Faculty	Ph.D.	Geophysics
Dario Grana	Faculty (SER)	Ph.D.	Geophysics
W. Steve Holbrook	Faculty	Ph.D.	Geophysics
Subhashis Mallick	Faculty (SER)	Ph.D.	Geophysics
Andrew Parsekian	Faculty (75%)	Ph.D.	Geophysics

II. Demographics: In terms of ethnicity, I am unsure what you mean. But if you are talking about race, we have two Asians (including Indian) and the rest are white. The geophysics faculty is 100% male. But overall the department is 26% female.

III. Grants:

OIA data, shown in Figure 2, does not break out grants from the geophysics faculty, and only goes up until 2013.

New grants in 2013 came to \$1,334,899.

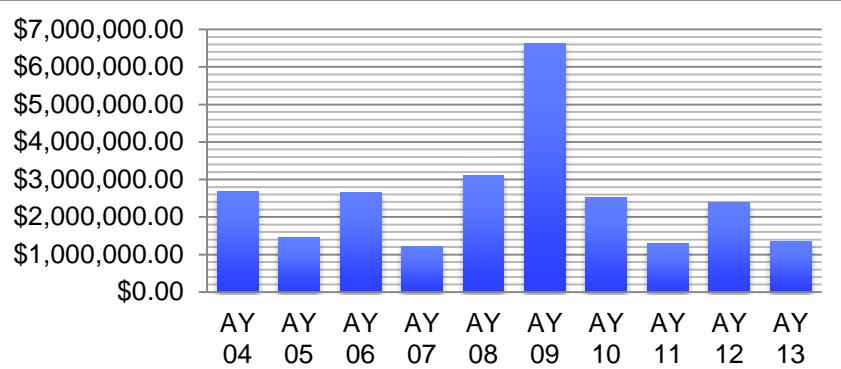


Figure 2. Annual grants awarded to the Dept. of Geology & Geophysics over past 10 years. Data from OIA.

C. Program Reputation:

I. Our department has been ranked 42 (second quartile) in the most recent (2014) U.S. News and World Report ranking of Earth Sciences departments. This is tied with Purdue University, University of Miami and University of Utah.

II. This year we had 301 applicants to our graduate program, a number that has slowly been increasing. Based on past years records, of these we will interview c. 25-30. Of those we will likely make c. 15-20 offers. Our recent history indicates that between 50-75% of students who are made offers will accept.

D. Curriculum: MS in Geophysics

Required: 26 credits of >4000 level UW coursework are required. To fulfill this: take the 5 credits of required department courses; take four required Geophysics classes (12 credits); pick two other geophysics courses (6 credits). In addition, 3 more credits are required in either geology, geophysics, mathematics, and physics. Finally, four credits of dissertation research are required.

E. Only offered on main campus.

F. Quality of Assessment Plan: MS in Geophysics

We do not assess the M.S. in Geophysics separately from the M.S. in Geology degree. For all of our graduate degrees we assess proficiency of scientific communication, knowledge of Earth Sciences and understanding of core disciplines. This is done through different measures taken at three times during student tenure in the department. In the first semester at UW, the students are evaluated in terms of verbal and written communication as part of our required Fundamentals of Research class, and by a written self-assessment. At the end of their first year, students are given a Qualifying Exam. This exam includes both a writing and verbal component. The student's graduate committee assesses the student's depth of knowledge, and ability to communicate. Student communication and depth of knowledge are again evaluated during their thesis defense. Data from these three events are combined and used to evaluate how our graduate students overall improve during their tenure in our department. We have only recently implemented this assessment and so data to show trends are limited to date.

G. Strategic Plan:

Our M.S. in Geophysics has been the primary degree for graduate students in geophysics who plan to go to work in the oil and gas field. The curriculum our geophysics students take differs significantly from those in our geology programs. Petroleum companies hire geophysicists separately from geologists and the Masters degree is the most heavily recruited degree. Also, starting salaries for those with an M.S. in geophysics is higher than those with the M.S. in Geology. So it is to our students' advantage to receive this specific degree. There is a relative dearth of students produced in the U.S. with this degree and so there is strategic advantage in our offering it for those students seeking petroleum employment. This degree offering is one of the reasons petroleum companies recruit in our department. Loss of the degree would impact our

visibility in the industry and hurt both our overall graduate enrollment as well as our efforts to get all of our graduates hired.

This degree works to benefit state interests. The oil and gas industry in the state include many small companies centered in Casper. Hires made by these companies include those with facility of working on geophysical databases. Three of our geophysics faculty were hired, and paid for, by SER. This reflects the importance of the discipline to the petroleum industry in the state and elsewhere. Losing the degree offering would feed the misconception that UW does not address the state's economy. The very best of these students in this degree are cherry picked to move into our PhD degree, so it makes a useful gateway to benefit our PhD.

At this point in time, we have no plan to consciously increase the size of the M.S. in Geophysics. Over the years the geophysics program has placed more of an emphasis in their Ph.D. program, so we have seen an increase in the enrollment in that program. Nonetheless, we see the value of producing well-trained M.S. students which are in high demand by the oil and gas industry.

7. Mission Centrality –

Our MS in Geophysics feeds directly into UW's STEM initiatives, including both the UW Science and Engineering Initiatives. It also compliments the goals of SER and the economic interests of the State by producing a student workforce that feeds into the petroleum industry.

Academic Program Review: **Geology MS Geophysics**

Section 8 – Cost

- a) Ratio of student credit hours per FTE (AY 2014/15): **270.3**
- b) Direct instructional expenditures (FY 2015): **\$3,822,890**
 - i) Per student FTE: **\$16,344**
 - ii) Per total degrees awarded: **\$109,225**
 - iii) Non-personnel expenditures / total academic FTE: **\$8,834**
- c) Course enrollment (AY 2014/15)
 - i) Classes falling under university minimums: **4**
 - ii) Lower-division courses falling under university minimums: **0**
- e) Research expenditure per tenure-track FTE (FY 2015): **\$95,046**