

# Status of Recent Geoscience Graduates



**Carolyn Wilson**



# About AGI's Geoscience Student Exit Survey

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The American Geosciences Institute (AGI) launched the Geoscience Student Exit Survey to assist geoscience departments in assessing the educational experiences of graduating students, as well as to examine ongoing evidence of knowledge gaps of new graduates entering the workforce. With this survey we hope to identify student decision points for entering and persisting within the geosciences, identify the geoscience research fields and co-curricular activities of interest to the students, identify the preferred jobs and industries of graduating students including those not considered part of the traditional geoscience workforce, and establish a benchmark for a detailed study of the career pathways of early career geoscientists. Likewise, the Geoscience Student Exit Survey is the gateway for an ongoing longitudinal survey of geoscience professionals that was launched in 2013.

The report examines the responses to AGI's Geoscience Student Exit Survey by graduates from the 2013-2014 academic year.

This survey has four major sections: student demographics, educational background, postsecondary education experiences, and post-graduation plans, with specific questions that cover areas such as community college experiences, quantitative skills, field and research experiences, internships, and details about their immediate plans for graduate

school or in a new job. The survey was piloted twice in spring 2011 and spring 2012. For spring 2013 graduation, we opened the survey up to all geoscience department in the United States, and they were asked to pass along the survey link for their department to their graduating students. As an incentive for participating, each department has the opportunity to add questions to the survey for their particular graduates to answer. At the end of the survey period, all the data from students from a particular department is shared in aggregate with that department as long as they have a sufficient number of participating students to ensure individual response privacy. In 2014, the survey was available for graduates at the end of each semester — fall, spring, and summer.

AGI is working to expand the distribution of the survey starting with geoscience departments in the United Kingdom. As we move forward, we hope to keep recruiting more countries to participate in AGI's Geoscience Student Exit Survey. This survey will provide the global geosciences community with a more detailed description of the make-up and preparation of the early career geoscientist as he/she enters the workforce.

If you would like more information or would like your department to participate in AGI's Geoscience Student Exit Survey, please contact Carolyn Wilson.

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## Status of Recent Geoscience Graduates 2014

Edited by Carolyn Wilson

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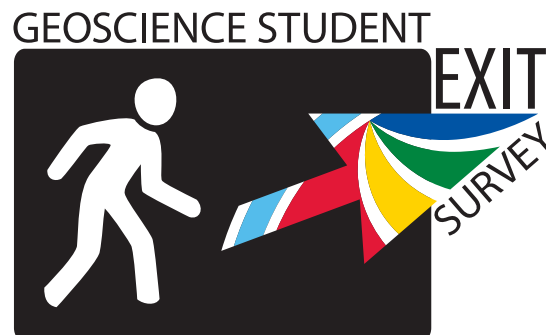
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Front cover photo © Alison Dorsey, back cover photo © Matt Smith. All photos in this report were submitted to the 2014 Life in the Field contest, which requested images representing meaningful geoscience work through internships, research, employment, or field experiences.



# Executive Summary

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The American Geosciences Institute's (AGI) Status of Recent Geoscience Graduates 2014 provides an overview of the demographics, activities, and experiences of geoscience students that received their bachelor's, master's, or doctoral degree during the 2013-2014 academic year. This research draws attention to student preparation in the geosciences and their education and career path decisions, as well as examines many of the questions raised about student transitions into the workforce.

The Status of Recent Geoscience Graduates report was first released in 2013 presenting data from spring 2013 graduates. For the 2014 report, the number of participants in the AGI's Geoscience Student Exit Survey increased by 60% compared to 2013 creating a sample size that better represents the community of geoscience graduates. However, many of the trends seen in 2013 are echoed in the 2014 report.

This report presents the results for the end user's consideration. Two notable trends seen in this report are related to the quantitative skills and knowledge of the graduates and their plans for the immediate future. As in 2013, most geoscience graduates complete Calculus II during their postsecondary education, but the rate of graduates taking higher-level quantitative coursework drops quickly. However, in 2014, there was an overall decrease in the rate of graduates that took Statistics, even though an understanding of statistics is often necessary for graduate research. In addition, the type of school the students

attended may affect their access to some of these higher-level quantitative courses beyond Calculus I.

This year also saw an increase in the rate of bachelor's and master's graduates planning to attend graduate school and/or still seeking employment in the geosciences. While jobs are currently available in the geosciences, many graduates appear to have struggled finding employment, which raises the concern about the preparedness of these graduates for entering the geoscience workforce upon graduation. When asked why they were looking for employment outside of the geosciences, the graduates mentioned trouble finding employers at geoscience industries willing to hire them with their little to no work experience, but the majority of graduates do not participate in an internship during their postsecondary education. Also, based on the graduation rates collected by AGI over the years, most of the graduate programs across the country are near capacity, which could increase the difficulty for these recent graduates to secure a position within these programs.

As participation continues to grow, we expect to provide more details and comparisons regionally and by degree levels. AGI is also conducting an ongoing longitudinal survey that will follow these early-career geoscientists as they continue to progress in the workforce. The combination of these two studies will present a better understanding of the workforce pathway in the geosciences and enable both geoscience departments and employers to improve the educational and career opportunities for future geoscience graduates.

## Acknowledgements

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I would like to recognize a few organization and individuals for their support for this project. Thanks to ConocoPhillips for their support towards the project this year. Thanks also to the American Institute of Professional Geologists and the Geological Society of America for distributing the survey to their student membership. I also want to thank the AGI Workforce 2014 Summer Intern, Sebastian Corrochano, for his hard work quality controlling and organizing the data from this survey, and the AGI Workforce 2014 Fall Intern, Jamie Ricci, for her help coding the qualitative responses. Finally, I would especially like to thank the department contacts from each participating department for distributing the survey to their graduating students.

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# An Overview of the Demographics of the Participants

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This year, AGI's Geoscience Student Exit Survey was made available to geoscience graduates at all traditional graduation periods (winter, spring, and summer) during the 2013-2014 academic year, to be collectively referenced as from 2014. Approximately two months before the end of each semester, an email was sent to all the heads and chairs of geoscience departments asking for their participation in this study. As an incentive to participate, AGI gives the departments the data in aggregate for their graduates for their internal assessment purposes. Distribution instructions and the survey link were sent to the identified representatives for each department that agreed to send the survey to their graduates. Departments continue to have the option to customize the survey appropriately for their graduates.

This year, AGI also asked the American Institute for Professional Geologists (AIPG) and the Geological Society of America (GSA) to distribute the survey link to their student membership, which helped increase participation dramatically. In the future, AGI hopes to recruit more member societies to help with distribution of the survey.

The survey was available to winter and summer graduates for two months, and spring graduates had three months to complete the survey. At the close of the survey, 688 graduating students from 163 geoscience schools

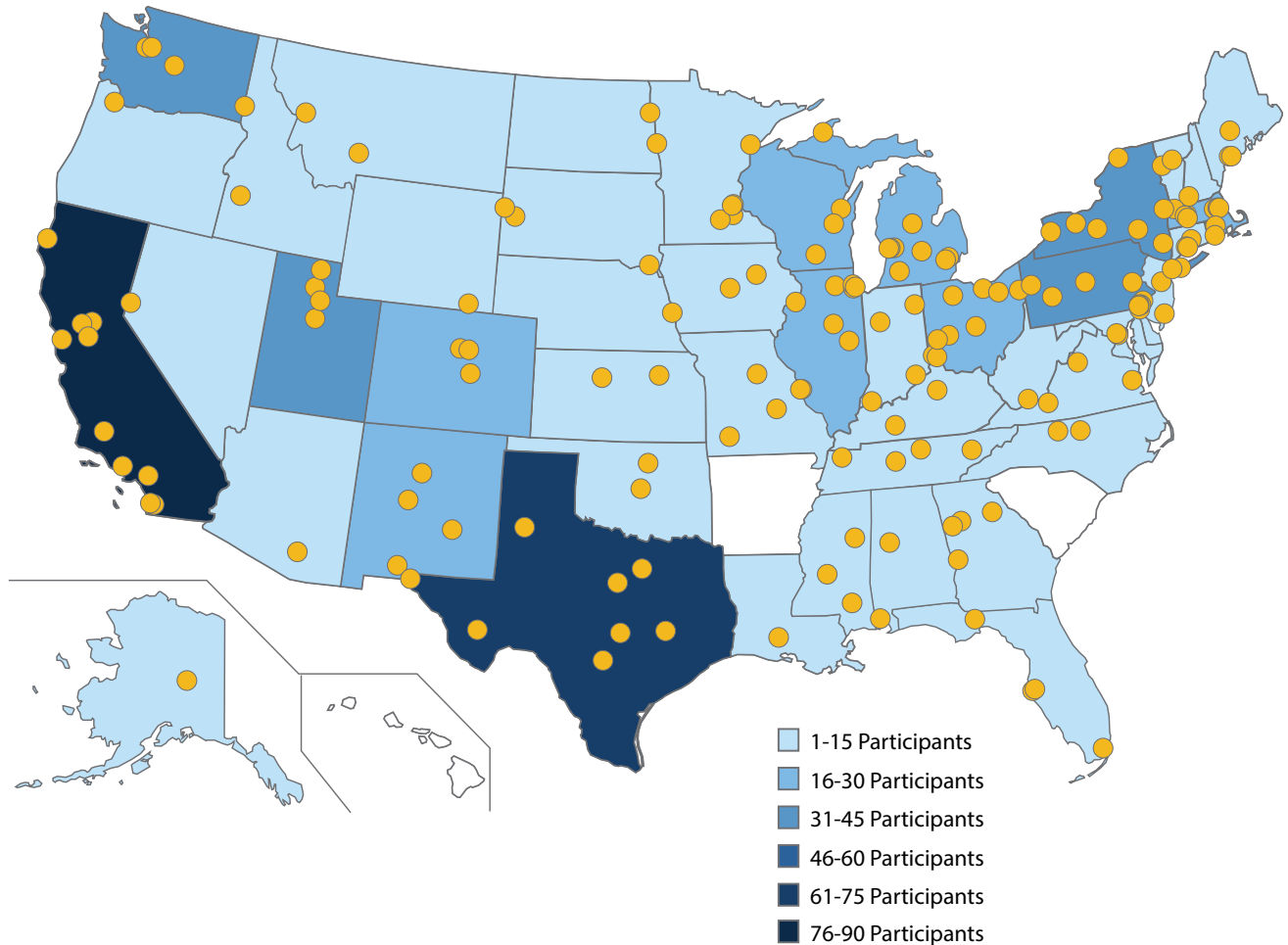
or departments provided responses — 517 bachelor's graduates, 115 master's graduates, and 56 doctoral graduates. This is a 60 percent increase in participation from last year, and using AGI's graduation data from 2013, this sample size was determined to be sufficiently large enough to statistically represent the total population of geoscience graduates.

This first section of the survey covered student demographics to establish an understanding of the students that graduate in the geosciences. Even with the increased participation, the data are similar to the data collected in 2013. However, there is a shift in the gender dynamics. The percentage of female master's graduates increased to nearly equal to male master's graduates, and in 2014, the percentage of female doctoral graduates exceeded the percentage of male doctoral graduates by 11%. As in 2013, students indicating their citizenship as U.S. citizen or permanent resident were asked to indicate their race and ethnicity. The percentage of underrepresented minorities include African Americans, Hispanic/Latinos, Native Americans/Alaskans, and Native Hawaiians/Pacific Islanders. However, it is important to note that the percentage of underrepresented minorities is dominated by the Hispanic/Latino population of geoscience graduates. For the 2014 report, a figure showing the distribution of graduates by their age was added.



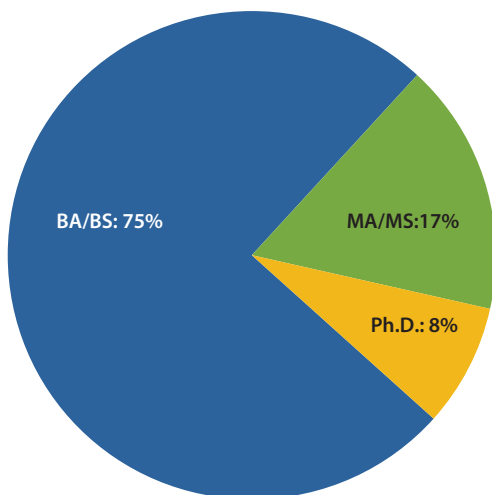
Photo by Arnaud Mansat, Roman Teisserenc, and Allison Myers-Pigg from the AGI 2014 Life in the Field photo contest.

Distribution of participating graduating students and departments\*

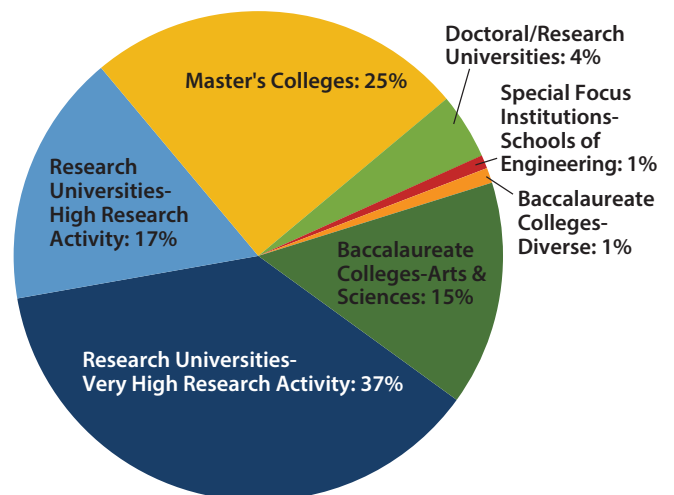


The relative distribution by state of the universities and their graduating geoscience students across the United States that participated in the Exit Survey. \*See Appendix I for list of departments

Degree received by participating graduates

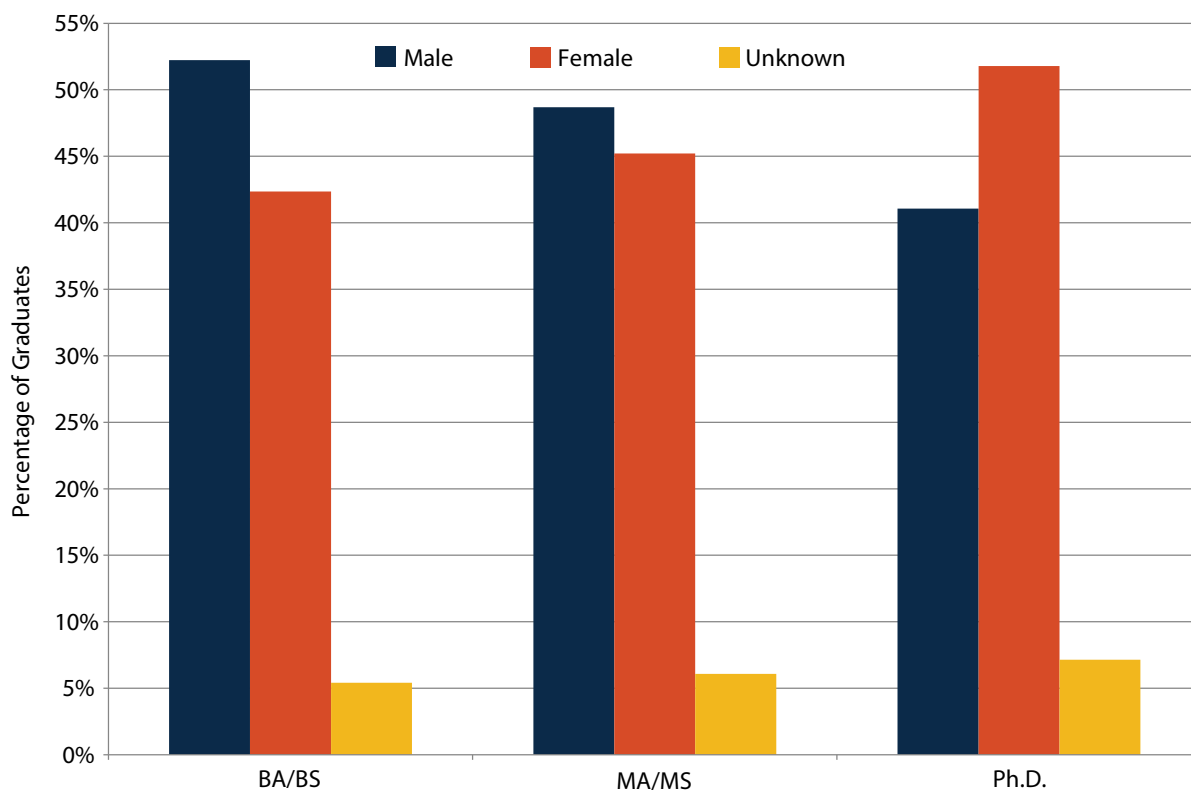


Percentage of respondents within different classified institutions\*\*

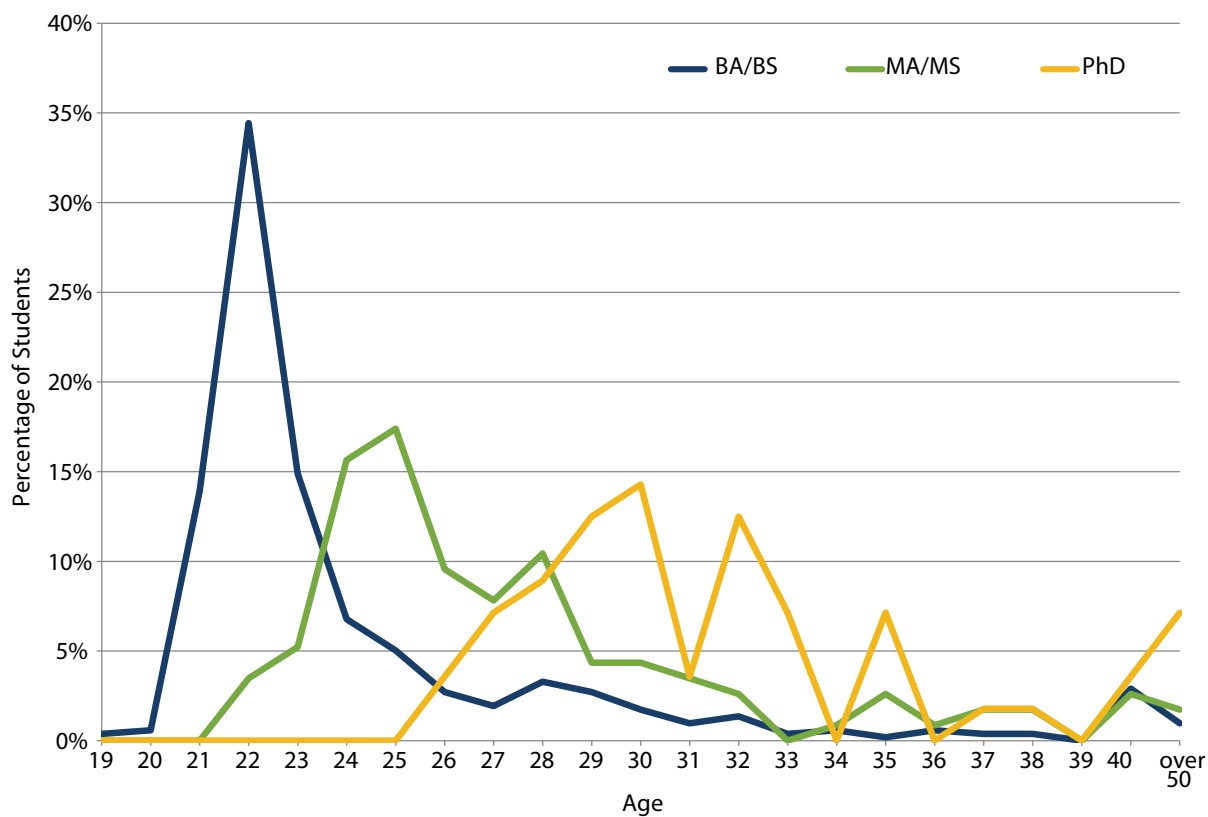


\*\*See Appendix II for definitions of the Carnegie University Classification System

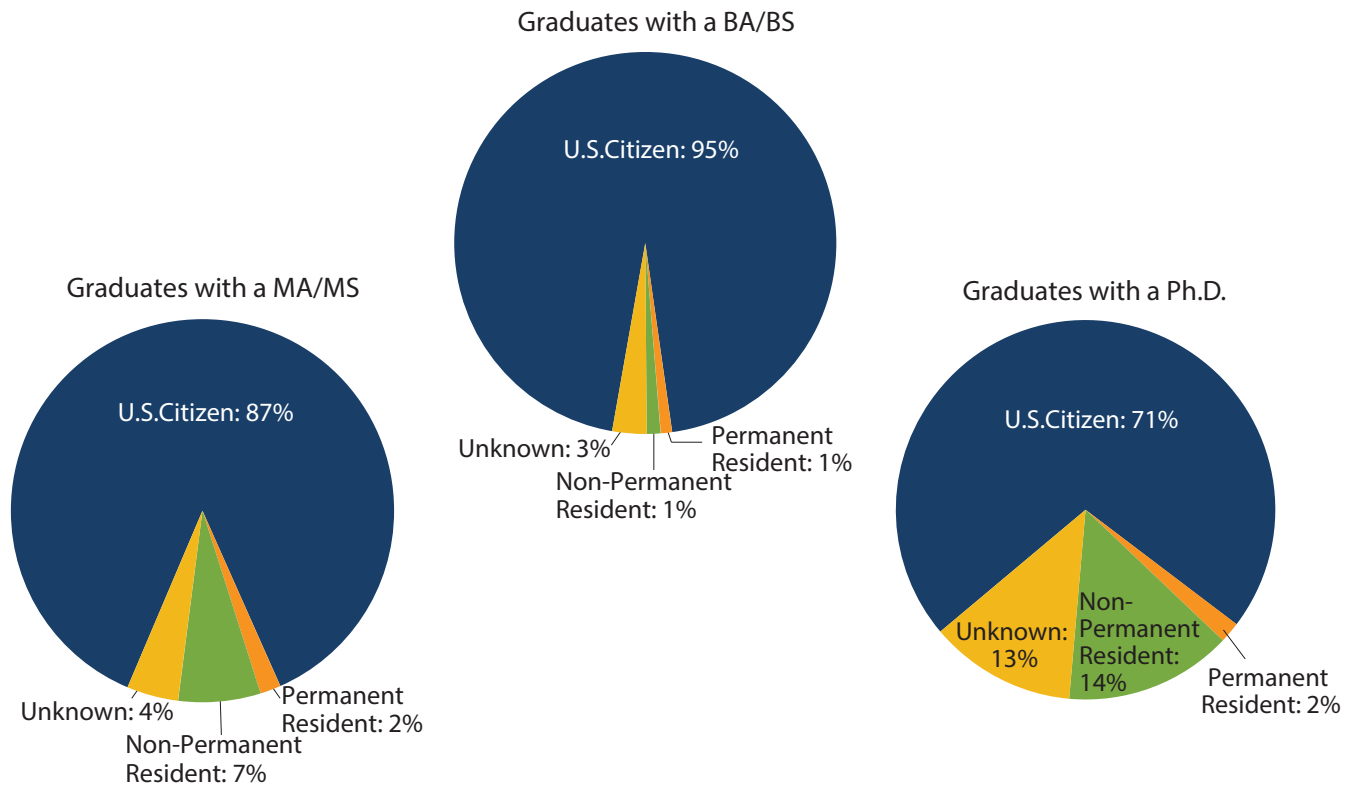
### Gender breakdown of graduates



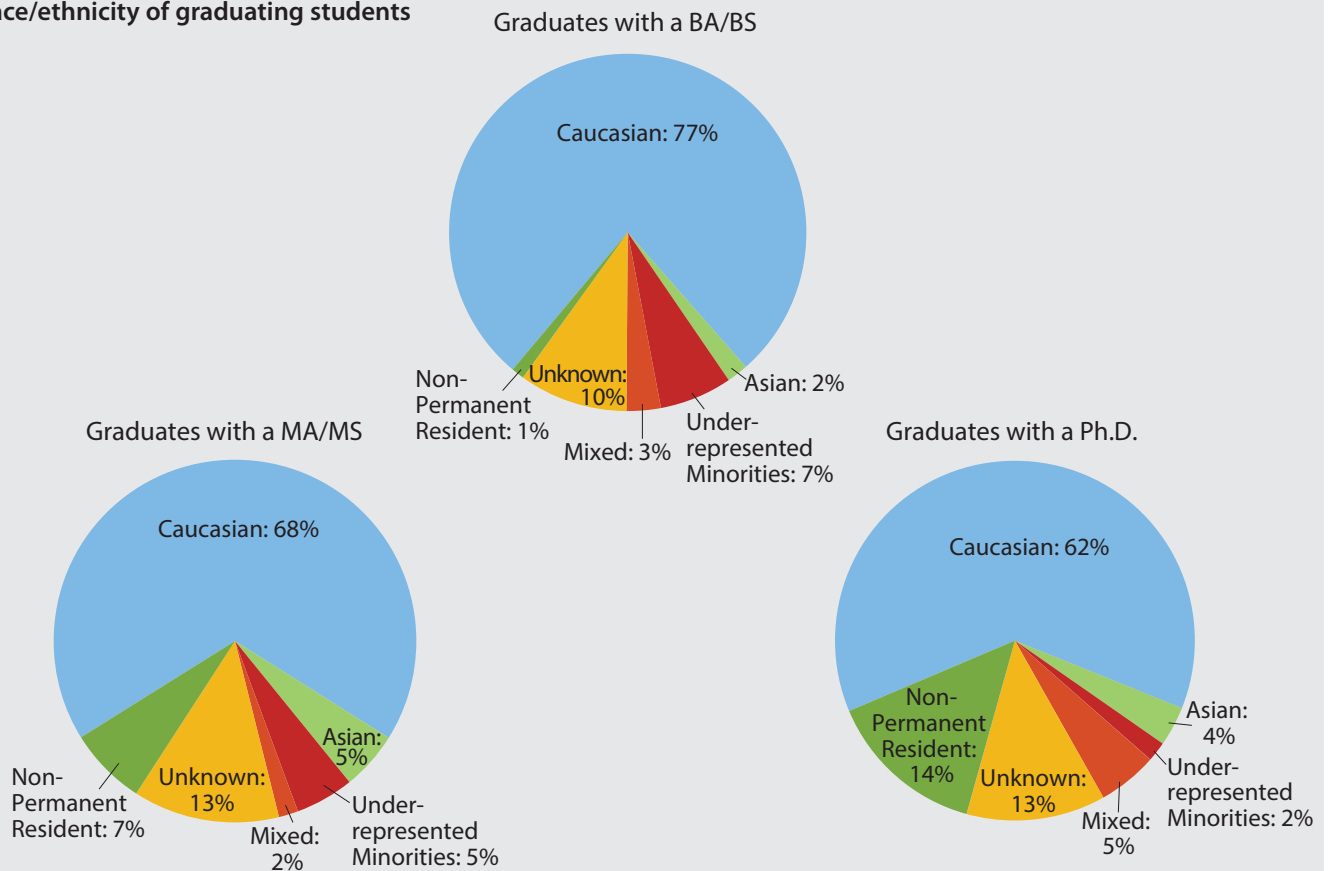
### Age distribution of graduates



Citizenship of graduating students



Race/ethnicity of graduating students



# Quantitative Skills and Geoscience Background of the Graduating Students

This section examines graduates' educational background, such as quantitative rigor, the role of K-12 experiences, and the importance of two-year colleges.

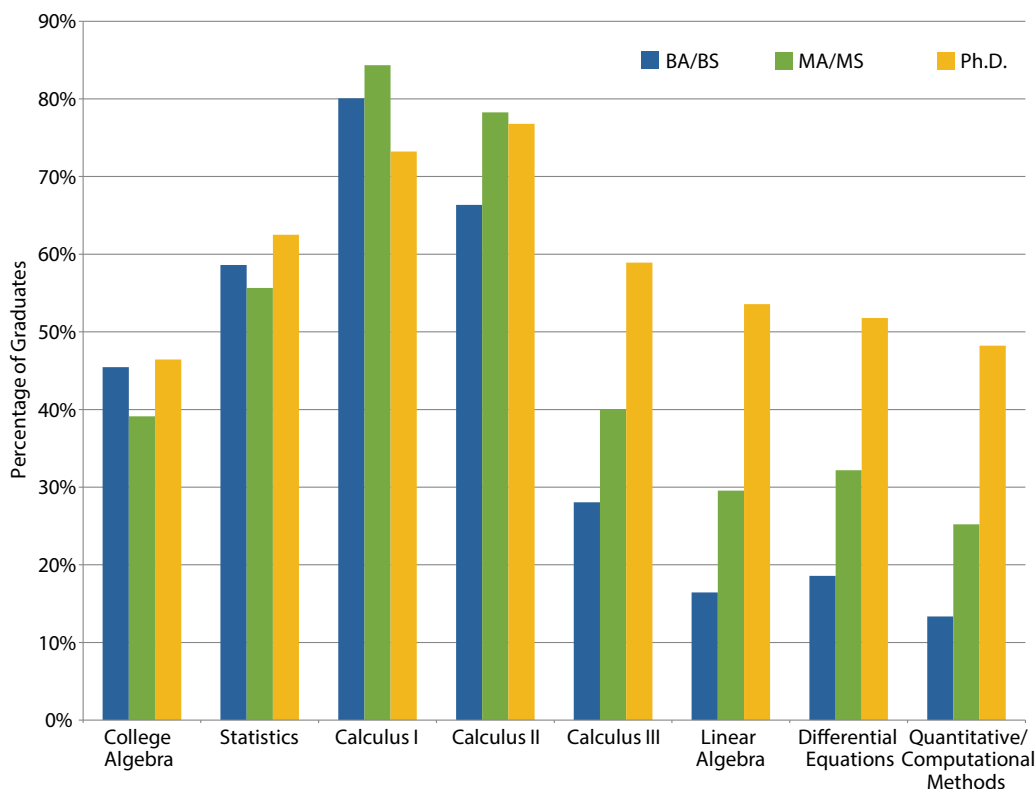
The students were asked to select all the quantitative courses they have taken at a two-year or four-year institution. As in 2013, most bachelor's and master's graduates took Calculus II. A smaller percentage took higher level quantitative courses, and this percentage represents generally the same cohort of students taking those higher level classes. However, there is an overall drop in the percentages of graduates at all degree levels taking Statistics, as well as the other courses beyond Calculus II, in 2014. When looking at the classifications of the institutions these students attended, it is clear that most of the students that took quantitative courses beyond Calculus I attended schools classified as high and very high research institutions.

Along with identifying the quantitative courses taken, students were asked which additional core physical science

courses they took during their postsecondary education. In 2014, the percentage of master's graduates that completed a chemistry course increased compared to 2013, and the doctoral graduates taking either a calculus or algebra-based physics course decreased in 2014 compared to 2013.

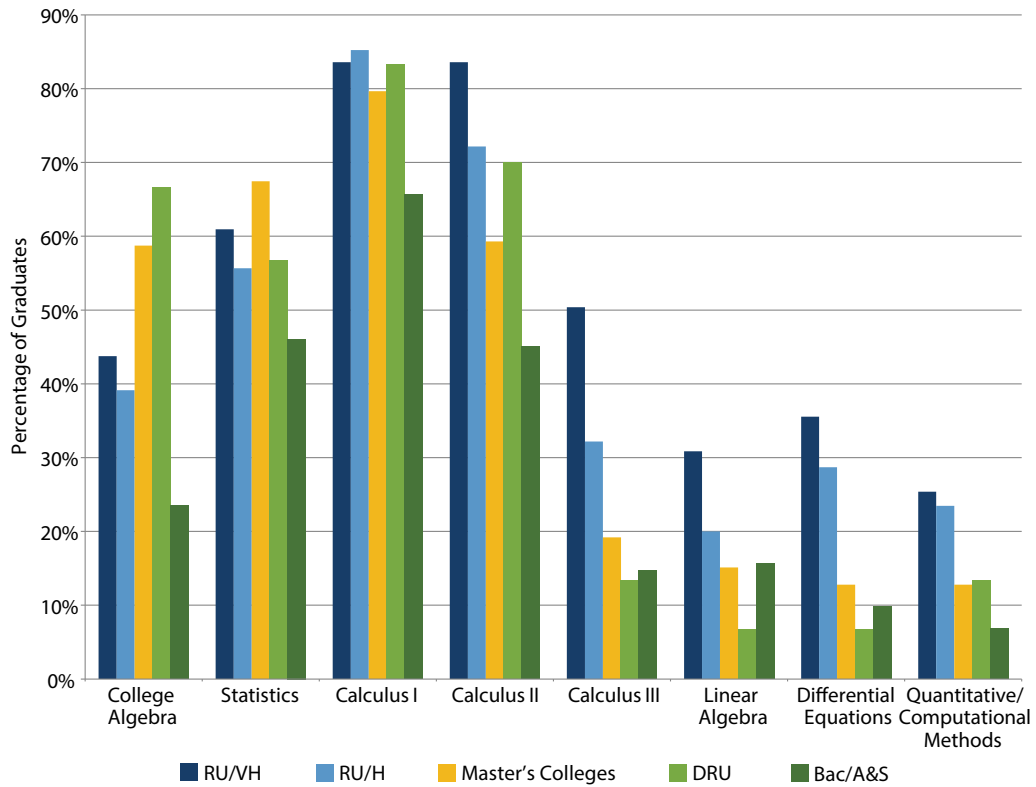
Students were asked if they took an earth science course in high school and if they attended a two-year college for at least a semester before receiving their degree. The percentages of geoscience graduates that took an earth science course in high school was just under 50 percent in 2014. While these percentages are a little lower than in 2013, this trend still seems to go against anecdotal claims of a lack of exposure to earth science in high schools. There was also an increase in the percentages of graduates at all three levels that attended a two-year college for at least a semester, particularly master's graduates. Increases in attendance at two-year colleges among geoscience graduates could continue due to increased efforts of collaboration between two-year and four-year institutions to create pathways for two-year college students to transition into geoscience majors at four-year universities.

## Quantitative skills and knowledge gained while working towards degree



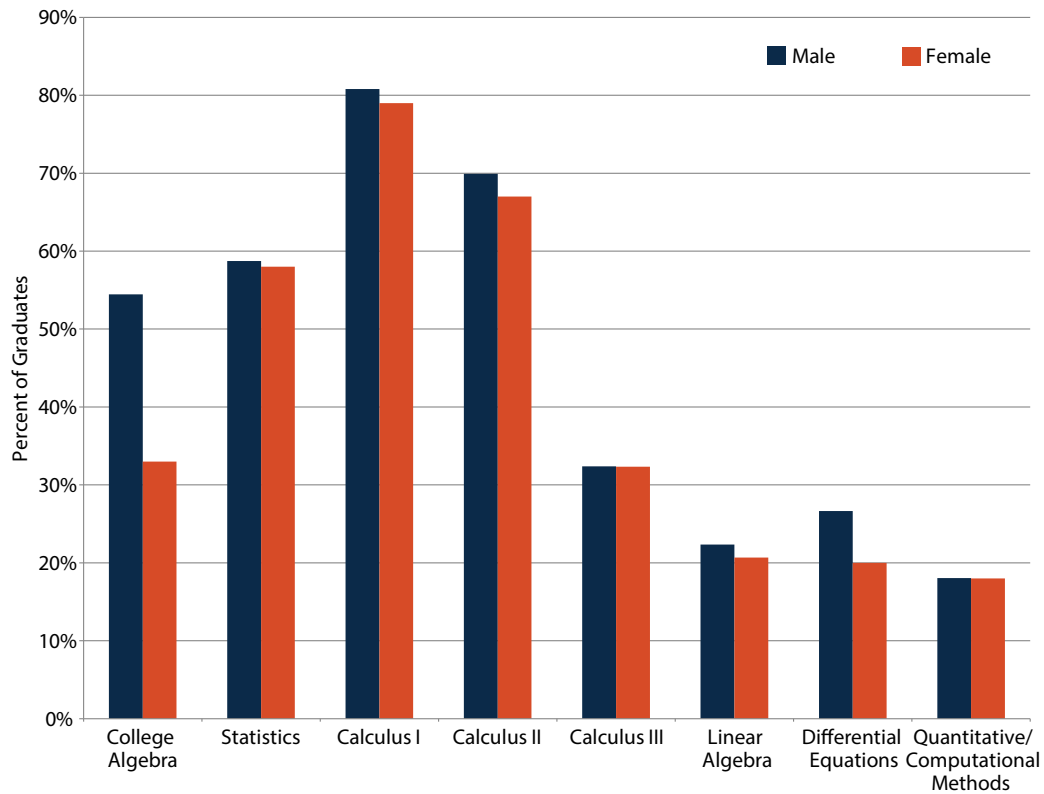


**Quantitative skills and knowledge gained by graduates based on university classification\*\***



\*\*See Appendix II for definitions of the Carnegie University Classification System

**Quantitative skills and knowledge gained while working toward degree by gender**



Percentage of graduates taking other core physical science courses

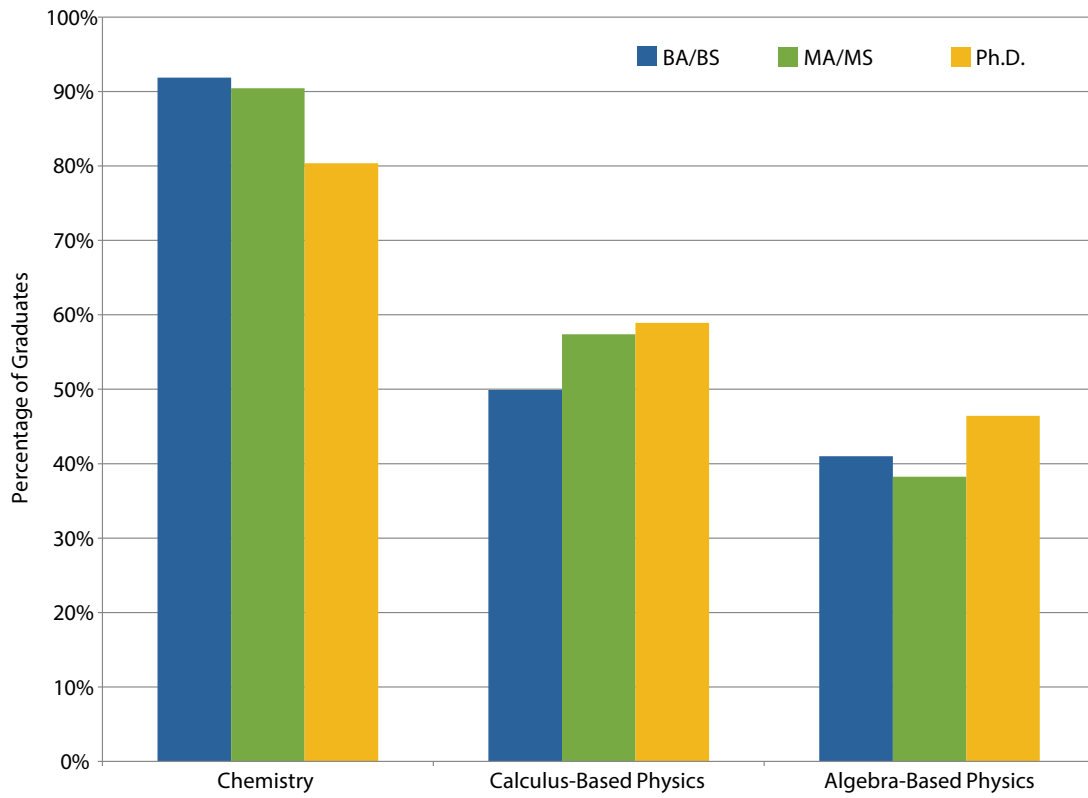
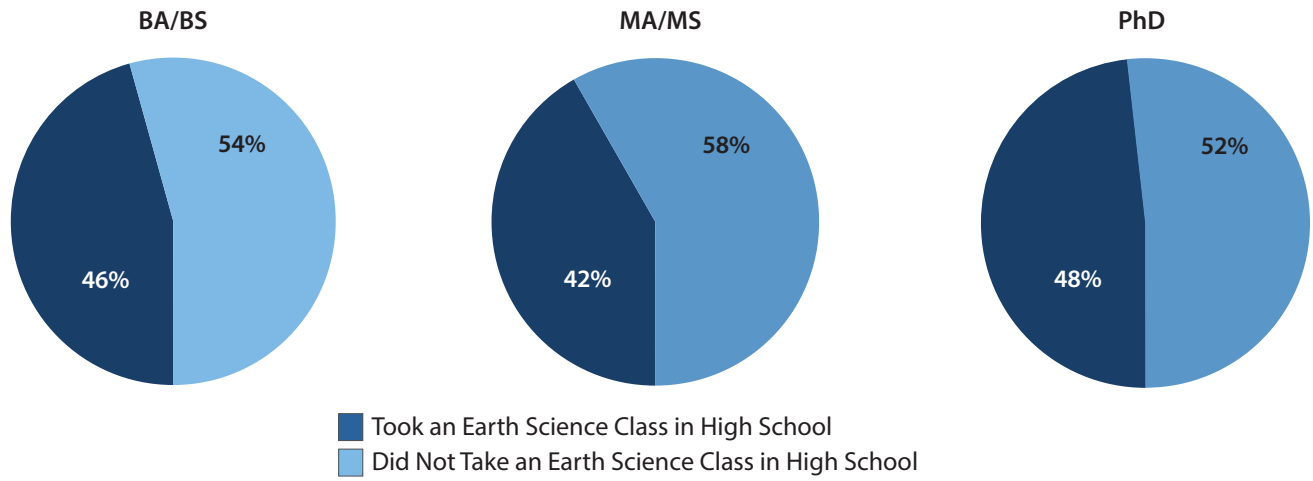
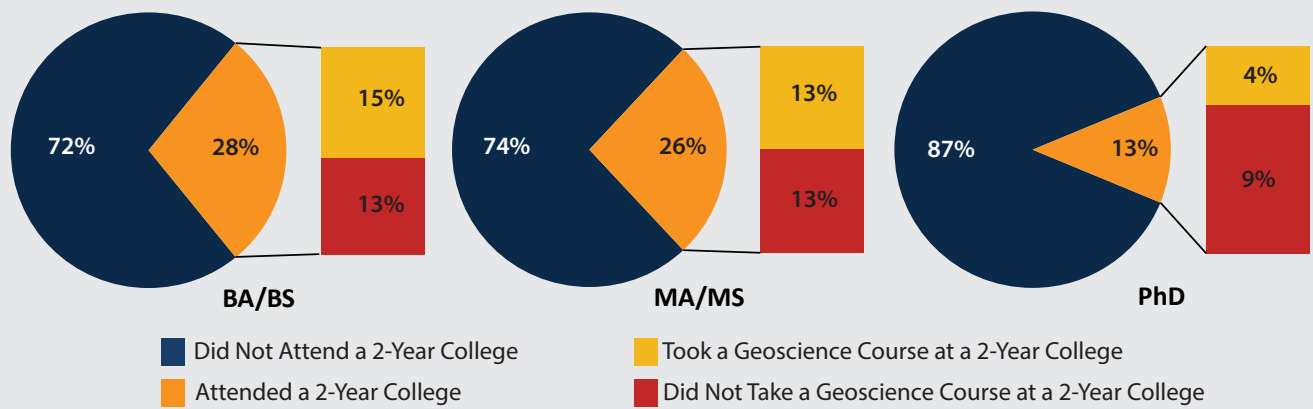


Photo by Rob Thomas from the AGI 2014 Life in the Field photo contest.

**Graduates who took an earth science course in high school**



**Graduates who attended a two-year college for at least 1 semester and took a geoscience course**



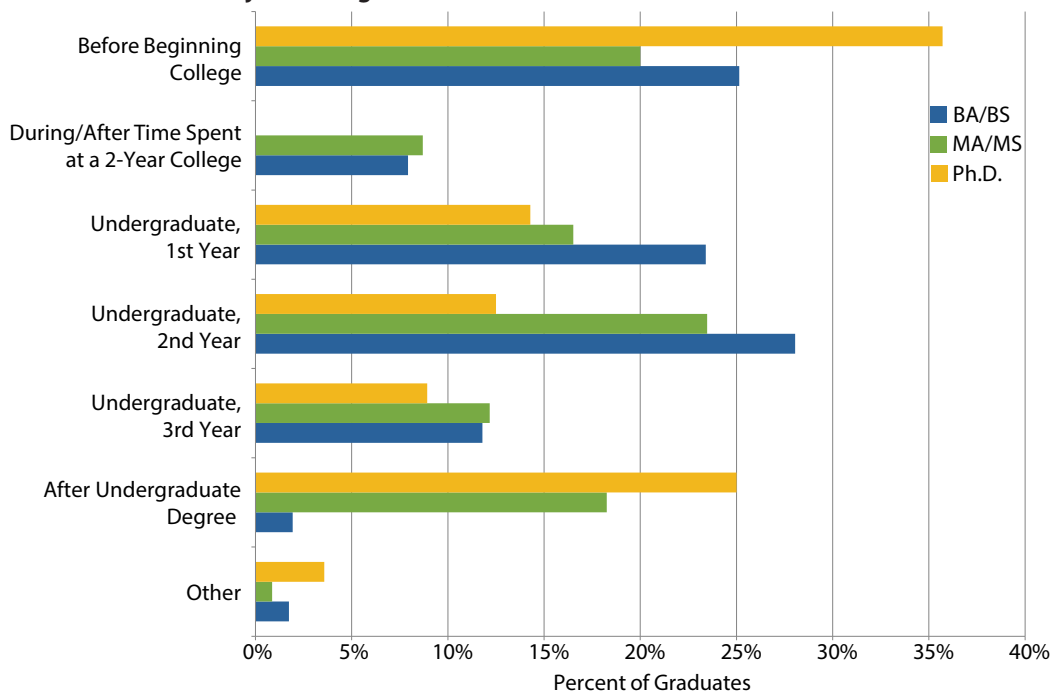
# Choosing Geoscience as a Major

Graduates were asked which geoscience field they were getting a degree in, as well as the fields associated with any other postsecondary degrees. The chosen degree fields demonstrate the variety of disciplines related to the geosciences. Geology continues to be the most popular degree among undergraduates with students specializing in different fields more often in graduate school. The “Other Geosciences” categories represent degree fields such as economic geology, petrology, mineral physics, and paleomagnetism. For bachelor’s graduates, the “Other” category also includes a few interdisciplinary degree fields specifically for a particular department that allows for an emphasis or minor in a geoscience field. For master’s graduates, 63 percent switched their degree field within the geosciences for their graduate work and 19 percent had earned an undergraduate degree in a field outside of the geosciences. For doctoral graduates, 68 percent switched into a different geoscience degree field for their graduate work and 23 percent earned an undergraduate degree in a field outside of the geosciences.

In 2014, the majority of graduates at the bachelor’s and master’s levels chose to major in the geosciences at some point during their undergraduate educations. This trend was also seen in 2013, which highlights the importance of undergraduate geoscience courses to the recruitment of majors. However, in 2014, an equal percentage of doctoral graduates claimed to have chosen a geoscience major before beginning their postsecondary education and

during their undergraduate education. While the majority of graduates at all levels indicated the intellectual engagement of geoscience as the reason for choosing their major, the students spoke of different intellectual draws to the field. Among bachelor’s graduates, 20 percent found the college coursework and experiences engaging and 18 percent indicated an interest in the outdoors within the overall reason of intellectual engagement. Bachelor’s graduates also cited the career opportunities and job security (24%) and the influence of a role model within the department, either a faculty member or fellow student, (21%) as reasons for majoring in the geosciences. Among master’s graduates, 21 percent claimed an overall interest in science, 17 percent indicated an interest in the outdoors, and 16 percent found the college coursework and experiences interesting within the claim of intellectual engagement. Twenty-three percent of master’s graduates also cited the career opportunities and job security as a reason to major in the geosciences. Among doctoral graduates, 18 percent were drawn to the interdisciplinary nature of the geosciences, 16 percent cited an overall interest in science, and 14 percent indicated both liking the outdoors and specifically the field work associated with the geosciences within the claim of intellectual engagement. Doctoral graduates also cited the importance of a role model within the department (14%) as a reason for majoring in the geosciences. Other reasons mentioned by graduates include the societal impact of the geosciences, the applicability of the geosciences to everyday life, and pre-college coursework.

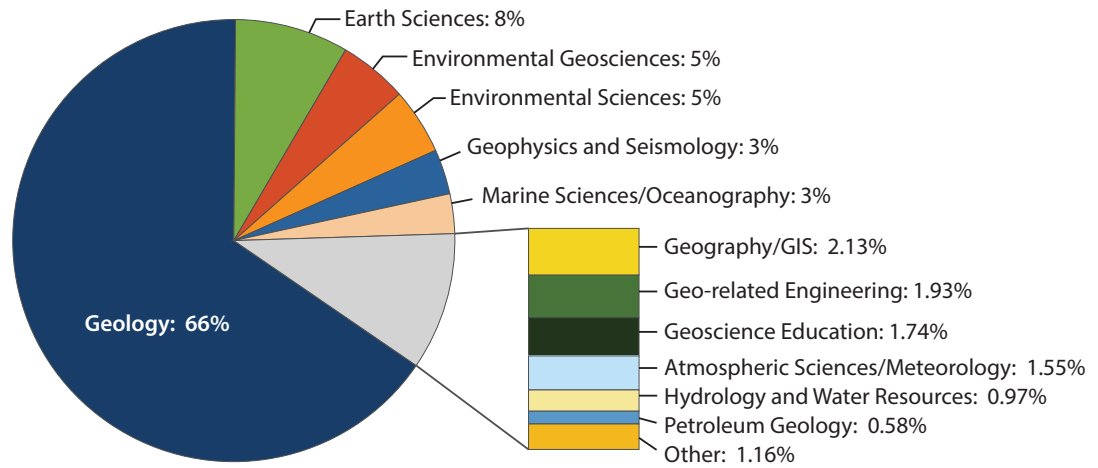
## When students decide to major in the geosciences



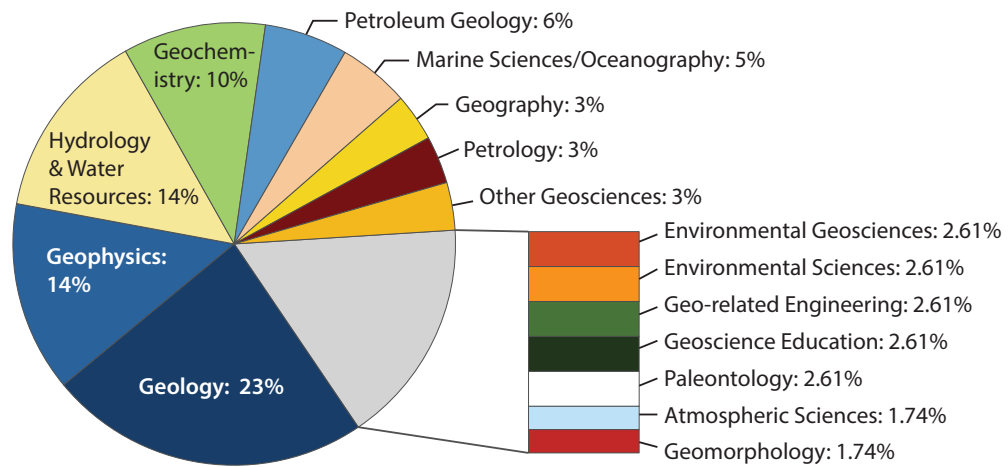


Chosen geoscience degree fields

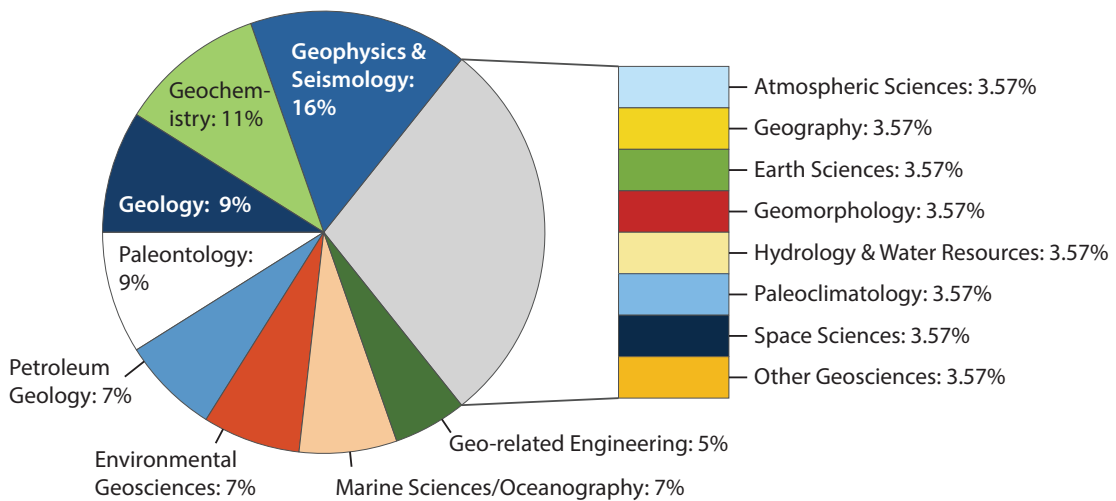
Bachelor's Degree Graduates



Master's Degree Graduates



Doctoral Degree Graduates



## Ancillary Factors Supporting the Degree

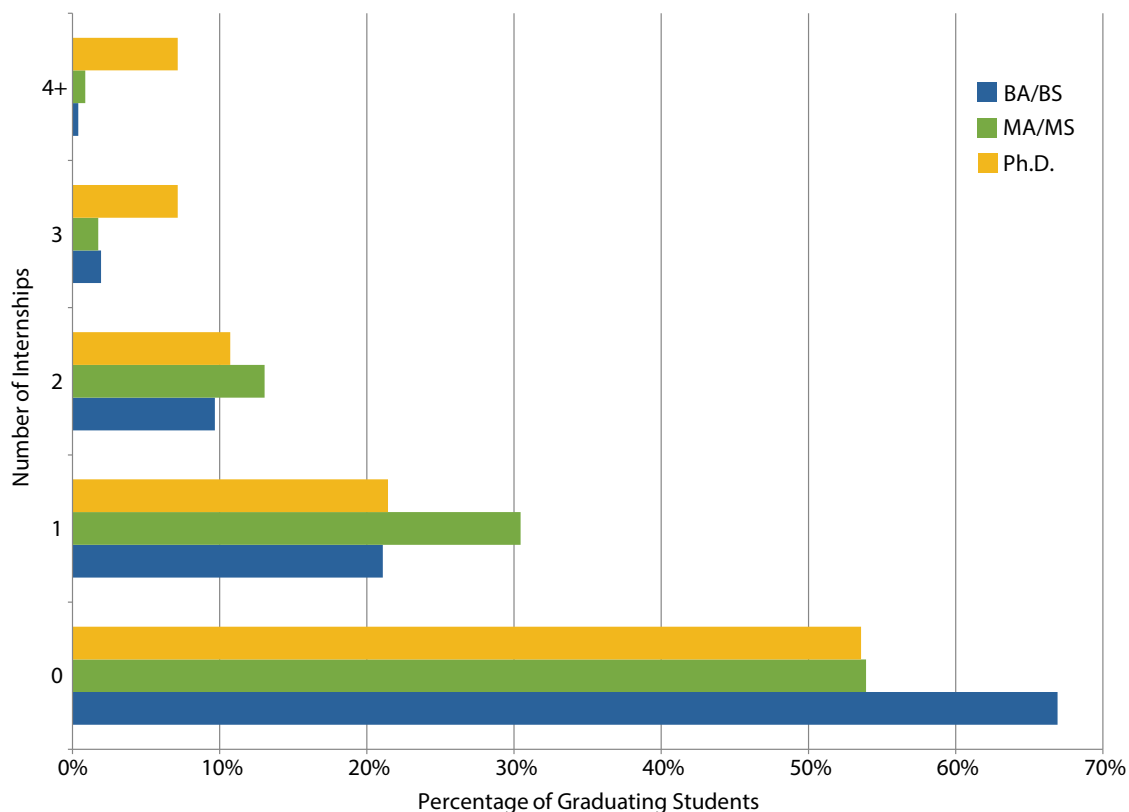
Graduates were asked about their experiences while working towards their degree. As in 2013, the majority of bachelor's graduates and doctoral graduates, 67 percent and 54 percent respectively, did not hold an internship during their postsecondary education. There was also an increase in the percentage of master's graduates that did not participate in an internship during their postsecondary education from 38 percent in 2013 to 54 percent in 2014. This continued trend is worrisome due to invaluable experiences and networking that occur during internship experiences. Also, among the graduates that participated in an internship, 74 percent of bachelor's graduates, 81 percent of master's graduates, and 73 percent of doctoral graduates rated their internships as "very important" for their academic and professional development. This is reinforced by the graduates that found a job within the geosciences at time of graduation. Nineteen percent of bachelor's graduates, 51 percent of master's graduates, and 67 percent of doctoral graduates that completed an internship during their postsecondary education secured a job in the geosciences at the time of graduation.

When asked about the types of financial aid used to fund their education, over 80 percent of graduates at

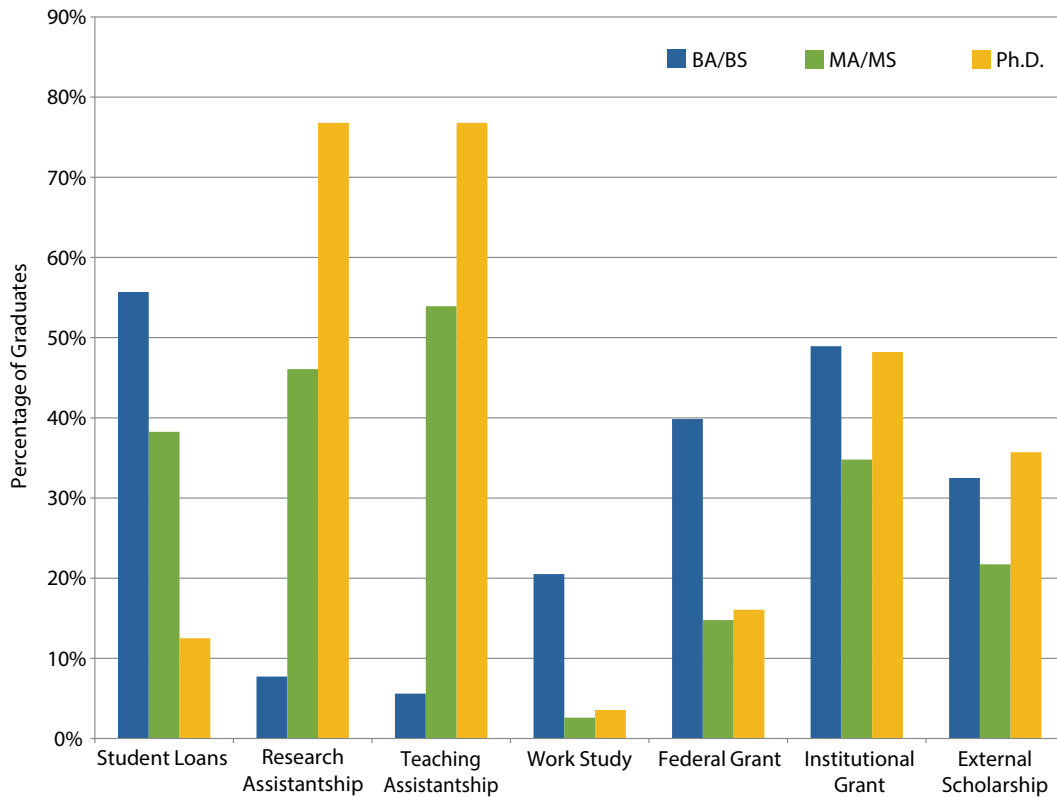
all levels had some sort of financial aid while working towards their degree. In 2014, there was a decrease in the percentage of graduates at the bachelor's and doctoral levels that used student loans to fund their education, but student loans are still utilized by graduates at all levels. Also, there was a decrease in the percentage of master's and doctoral graduates that held a research assistantship compared to 2013, and an increase in the percentage of doctoral graduates that held a teaching assistantship compared to 2013.

Graduates were also asked about their involvement with geoscience membership organizations. AGI is a federation of 49 different geoscience membership societies, including societies such as the American Geophysical Union, the American Institute of Professional Geologists, and the Geological Society of America. Professional societies can be useful tools for success as an early-career geoscientist, but the percentages of participation in these organizations, particularly among students finishing their graduate degrees, were surprisingly low. Only 21 percent of bachelor's graduates, 39 percent of master's graduates, and 39 percent of doctoral graduates mentioned association with one of these organizations.

Number of internships held by graduating students



**Types of financial aid used by graduating students while working towards a degree**



**Participation in geoscience clubs**

	BA/BS	MA/MS	Ph.D.
Associated with a geoscience-related club/organization	65%	76%	70%
Participated in department-level geoscience club	50%	53%	34%
Member of an AGI Member Society	21%	39%	39%
Member of an Honor Society	12%	10%	9%

**Average GPA**

	BA/BS	MA/MS	Ph.D.
Average years to degree completion	3.19	2.45	4.84
Average overall GPA	3.77	3.75	3.89
Average geoscience GPA	4.00	3.78	3.91

# Field Experiences

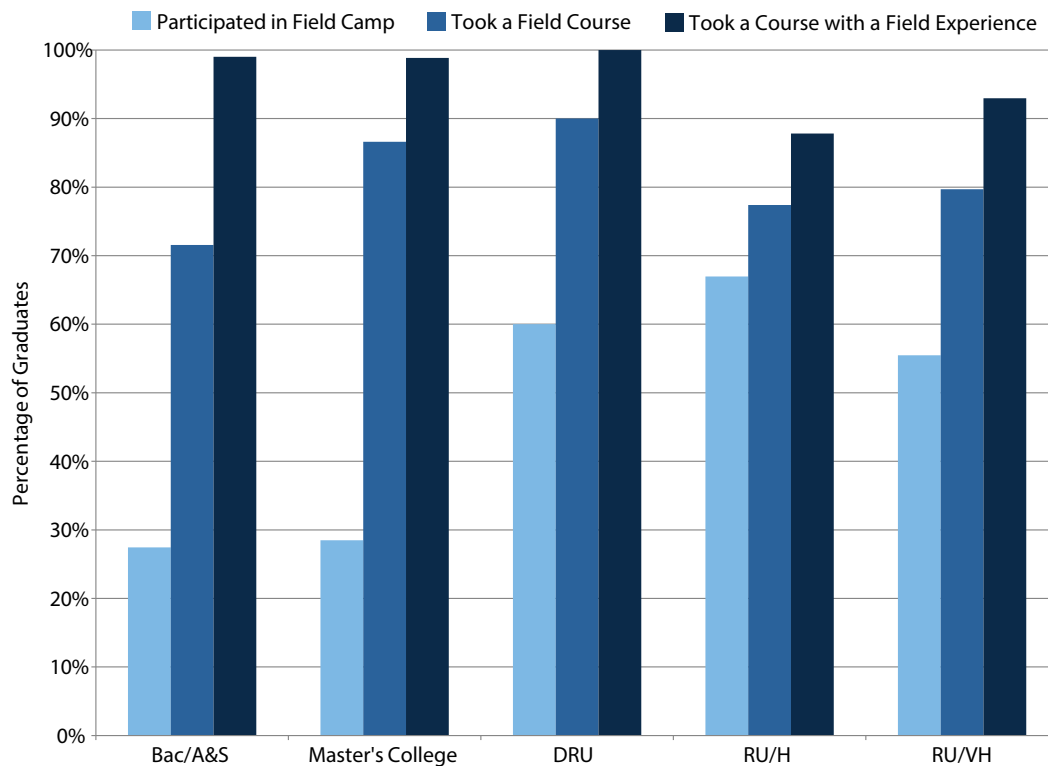
Clear definitions were set to distinguish between field camp, field courses, and field experiences. A field camp was defined as an academic program lasting four or more weeks that is primarily focused on field tools and methods. A field course was defined as a course with a field component primarily covering field methods and experimentation that utilized at least half of the total class time. A field experience was defined as any course that contained a field component, such as a field trip, field work, or other time in the field, that is not included in the definitions for field camp or field course.

Nearly every graduate that took the survey had at least one field experience while working towards their degree. In 2014, there was a slight increase in the percentage of bachelor's graduates that participated in field camp and a slight decrease in the percentage of bachelor's graduates that still have the desire to participate in field camp compared to 2013. However, in 2014, we see the opposite trends among

master's graduates. There is also a gender difference in field camp participation with approximately 10 percent more men attending field camp before graduation than women. When asked about the importance of these field experiences to the graduates' academic and professional development, field camps, field courses, and field experiences were all rated as "very important" by the majority of graduates. However, this rating was the highest for all degree levels for field experiences, with 86 percent of bachelors' graduates, 83 percent of master's graduates, and 80 percent of doctoral graduates finding these experiences "very important" to their academic and professional development.

Graduates' participation in field experiences was also broken down by the Carnegie Classification of the institution (see Appendix II). While field experiences are prevalent at all the participating universities, research universities continue to provide more expansive access to field camp experiences.

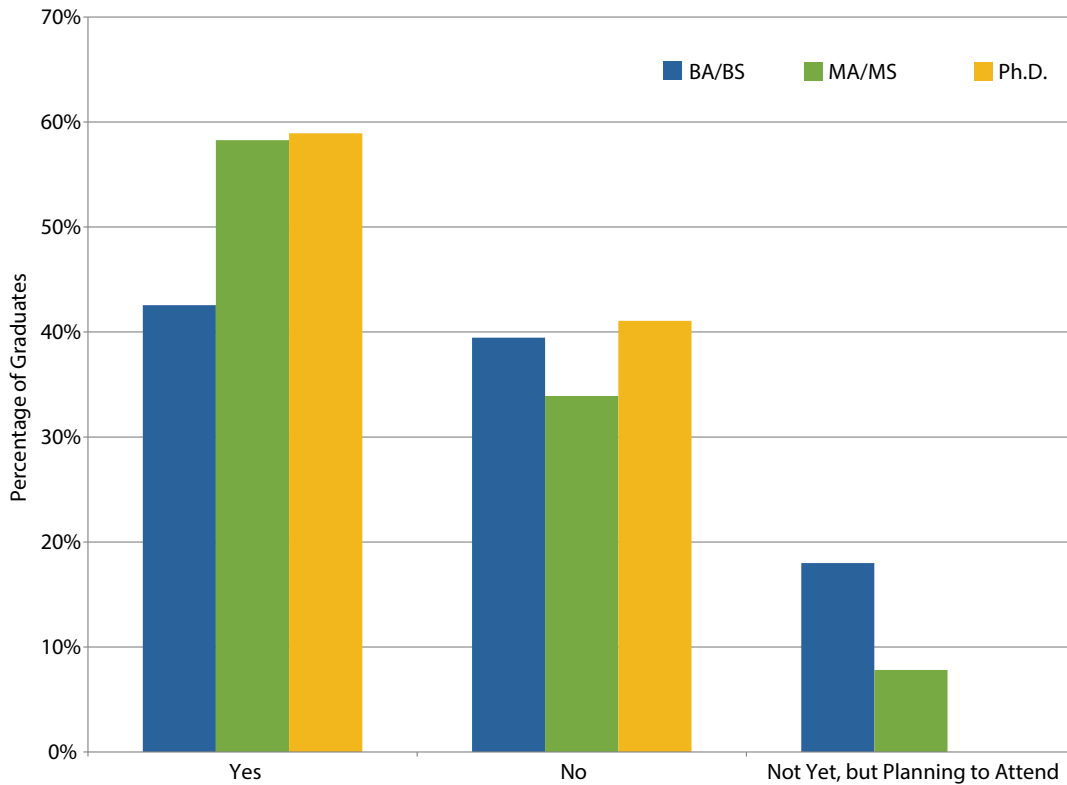
Student participation in field experiences based on university classification\*\*



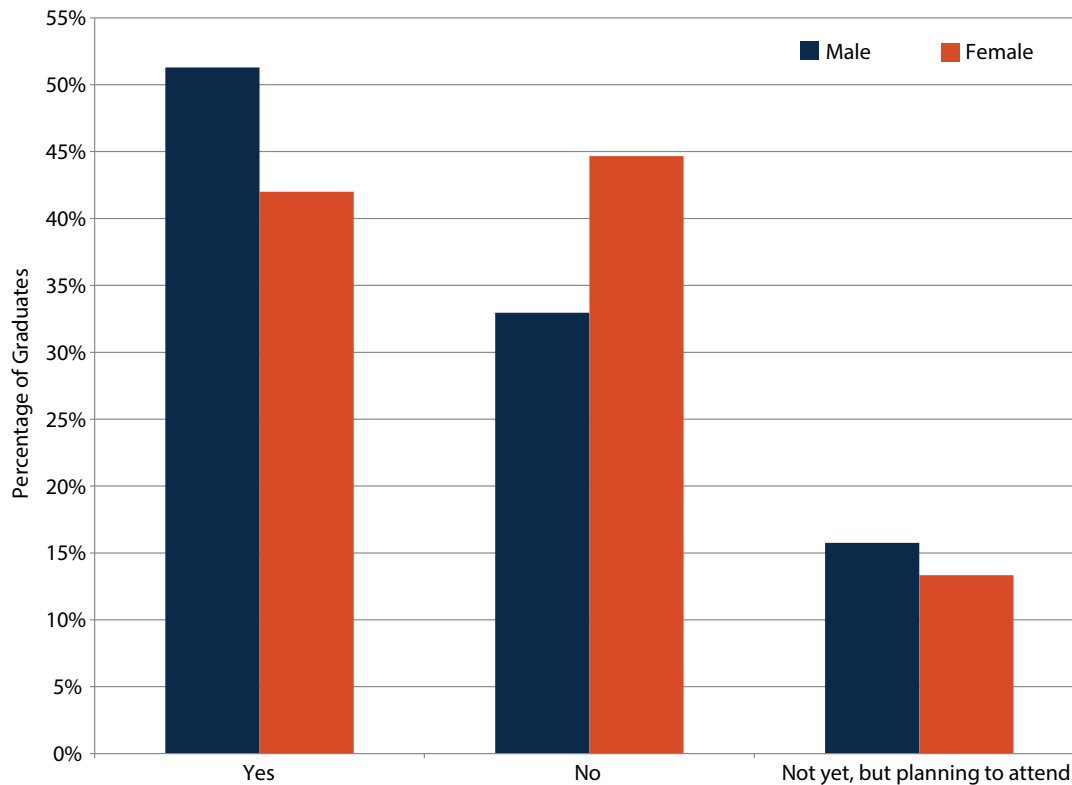
\*\*See Appendix II for definitions of the Carnegie University Classification System



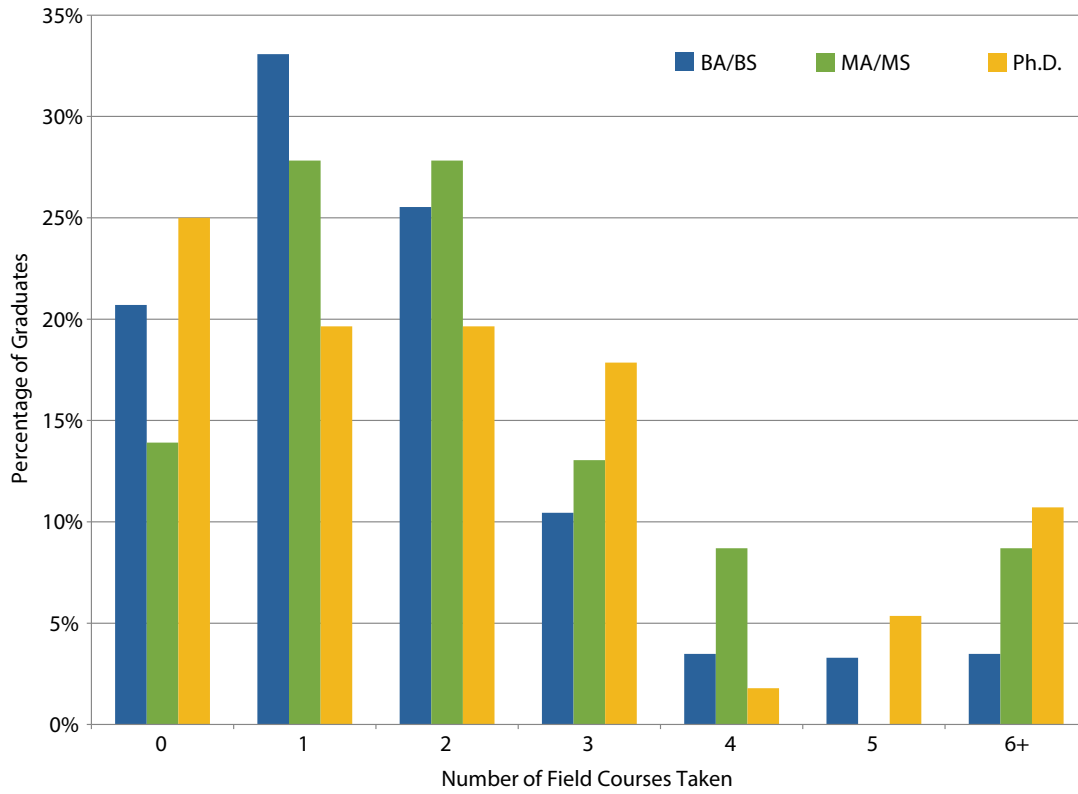
### Graduating students who have participated in field camp



### Graduating students who have participated in field camp by gender



### Graduates who have taken one or more field courses



### Graduates who have taken one or more courses with a field experience

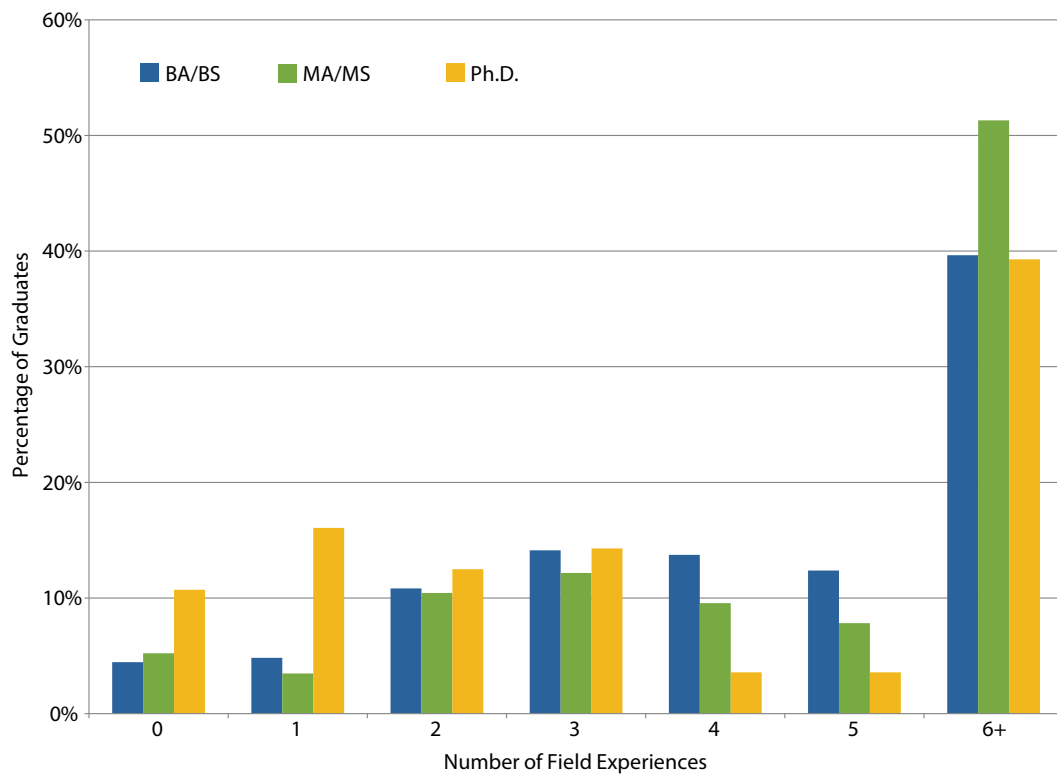




Photo by Samuel Castonguay from the AGI 2014 Life in the Field photo contest.

# Research Experiences

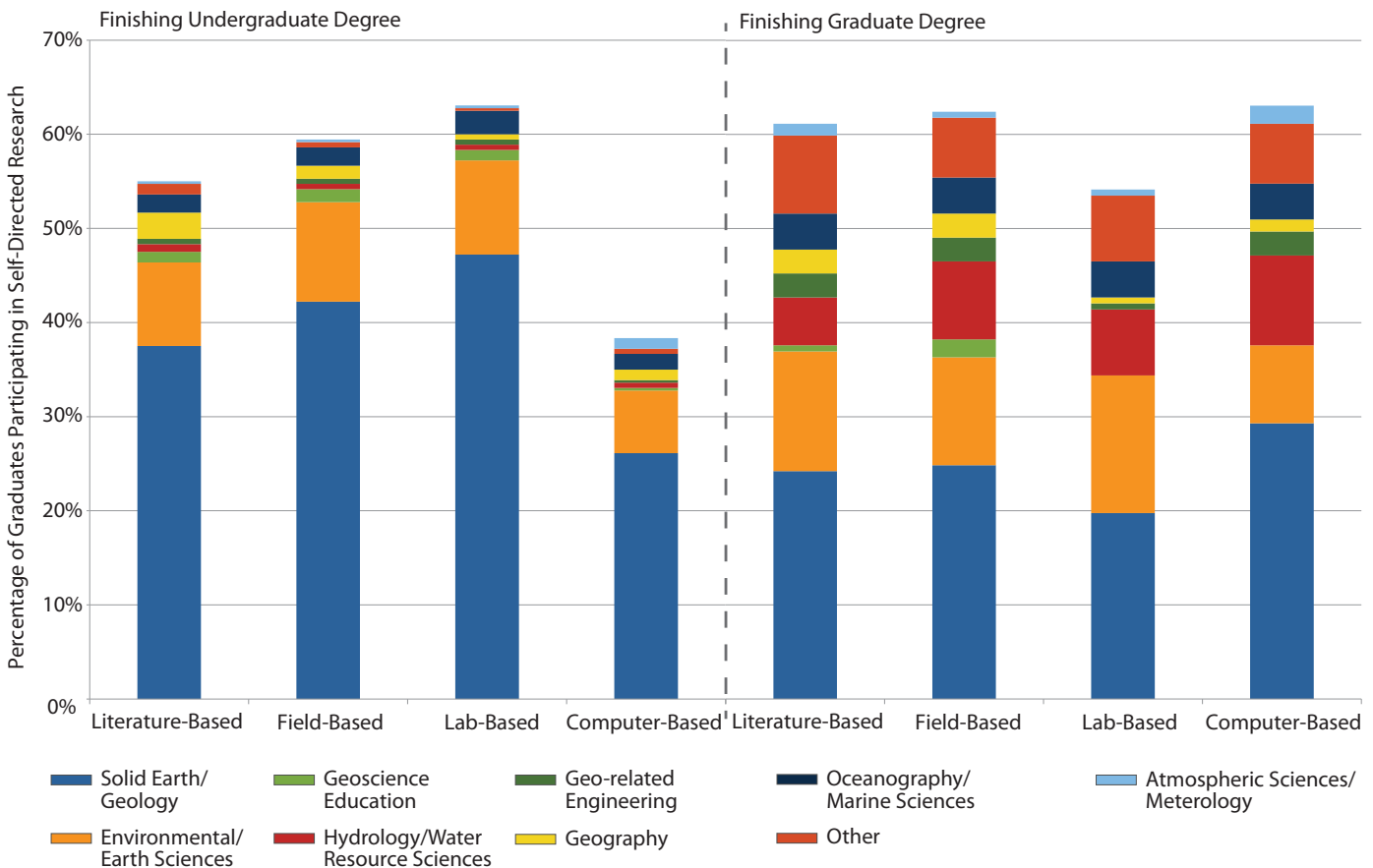
The graduates were asked about their research experiences while working towards their degrees. If they indicated participation in at least one research experience, the graduates were then asked about their participation in faculty-directed research and self-directed research. If they indicated participation in self-directed research, they were then asked to identify the basic research methodology used to conduct their research.

In 2014, there was a slight increase in the percentage of bachelor's graduates participating in at least one research activity while working towards their degree compared to 2013. Additionally, there was an increase at all degree levels in the percentage of graduates participating in self-directed research in 2014 compared to 2013.

In 2014, undergraduate students continued to use field-based and lab-based research methods more often, but 55 percent of bachelor's graduates also used literature-based methods, which is an 11 percent increase from 2013. However, among graduate students finishing their degree in 2014, there was a shift compared to 2013 with an increased percentage of students utilizing field-based methods and a decreased percentage of students using lab-based methods. The specific methods used have dependency on the field of study.

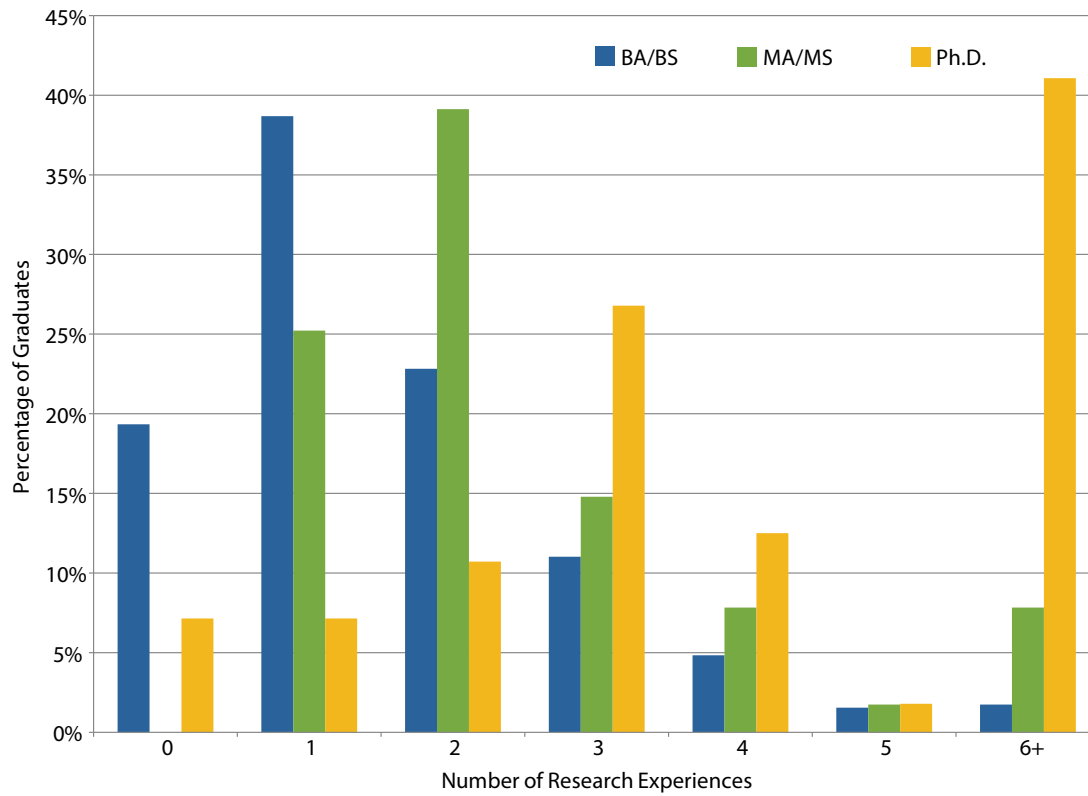
When asked about the importance of research experiences to the graduates' academic and professional development, research experiences were rated "very important" by 83 percent of bachelor's graduates, 88 percent of master's graduates, and 96 percent of doctoral graduates.

Research methods utilized by graduates in their self-directed research





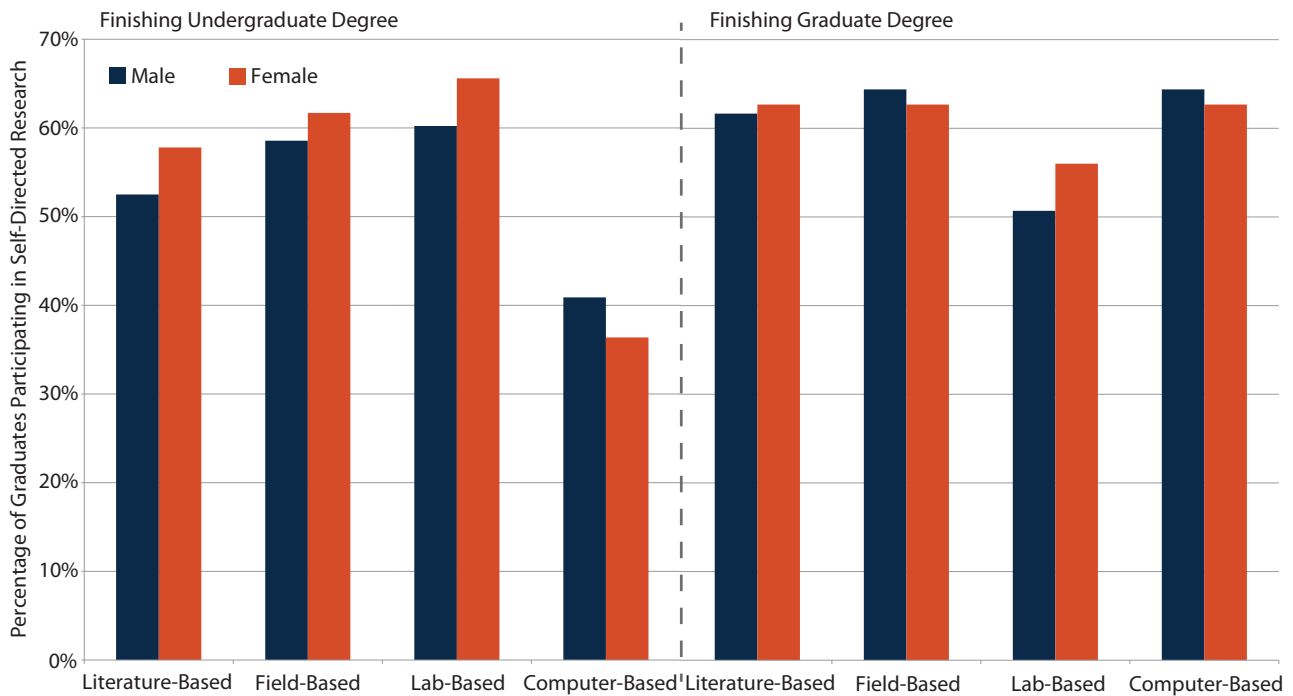
### Graduates with one or more research experiences



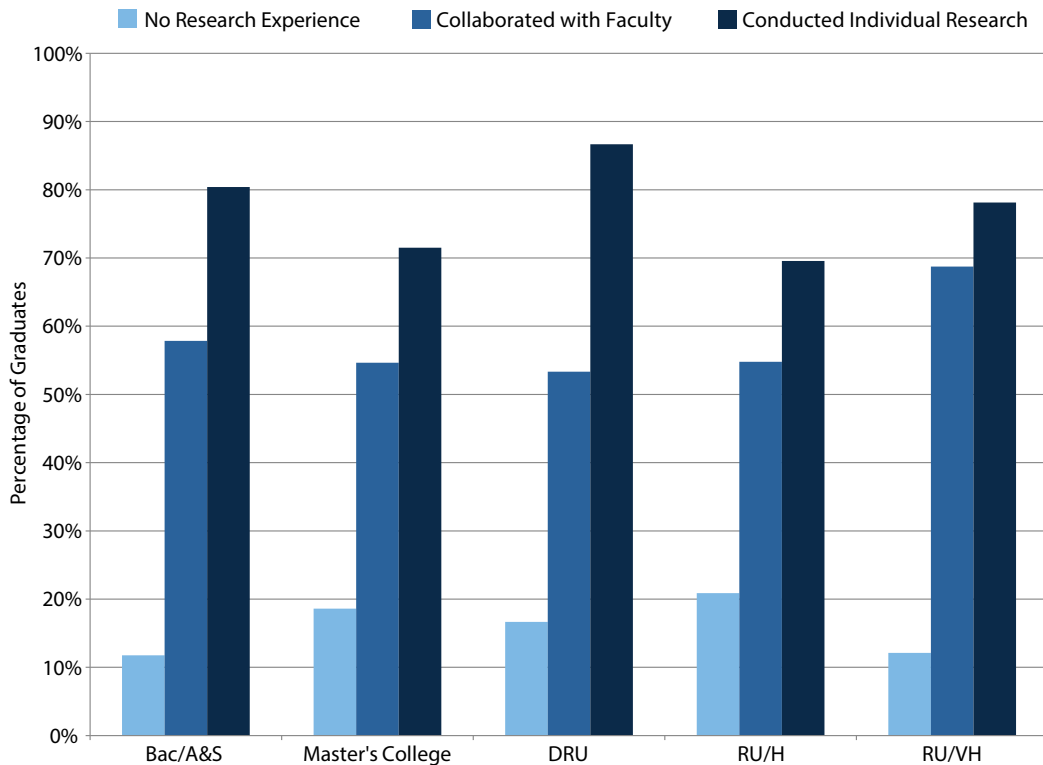
### Student participation in faculty-directed and self-directed research

	BA/BS	MA/MS	Ph.D.
Faculty-Directed Research	56%	70%	91%
Self-Directed Research	70%	90%	96%

Research methods utilized by graduates in their self-directed research by gender



Student participation in research based on university classification\*\*



\*\*See Appendix II for definitions of the Carnegie University Classification System



Photo by Ijeamaka Okechukwu from the AGI 2014 Life in the Field photo contest.

# Future Plans: Working Toward a Graduate Degree

The graduates were asked if they have immediate plans to continue their education. Those indicating plans for a graduate degree after graduation were then asked to share the degree they would pursue and the degree field of interest for the degree.

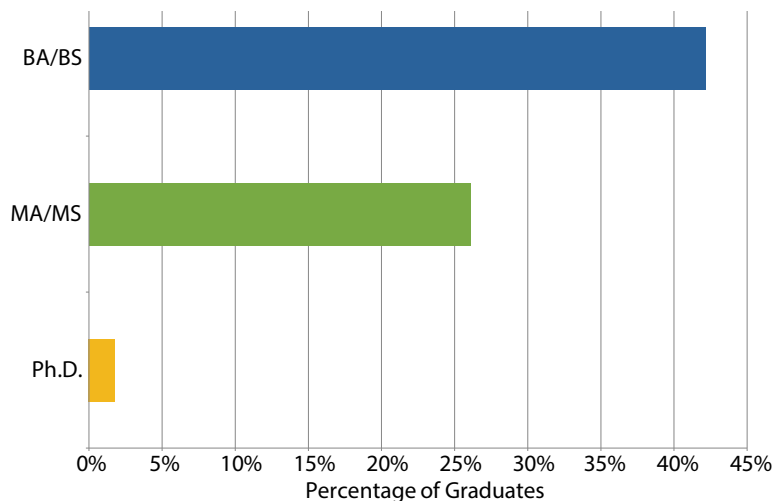
In 2013, 38 percent of bachelor's graduates were planning to attend graduate school, which was higher than prior surveys that showed intent to continue education among new bachelor's graduates between 28 to 35 percent. In 2014, this percentage increased again to 42% of bachelor's graduates planning to attend graduate school in the immediate future. However, there is concern that geoscience graduate departments are reaching capacity, which will make it difficult for this increasing number of bachelor's graduates trying to continue their education. There was

also an increase in the percentage of master's graduates planning to continue their education from 17 percent in 2013 to 26 percent in 2014.

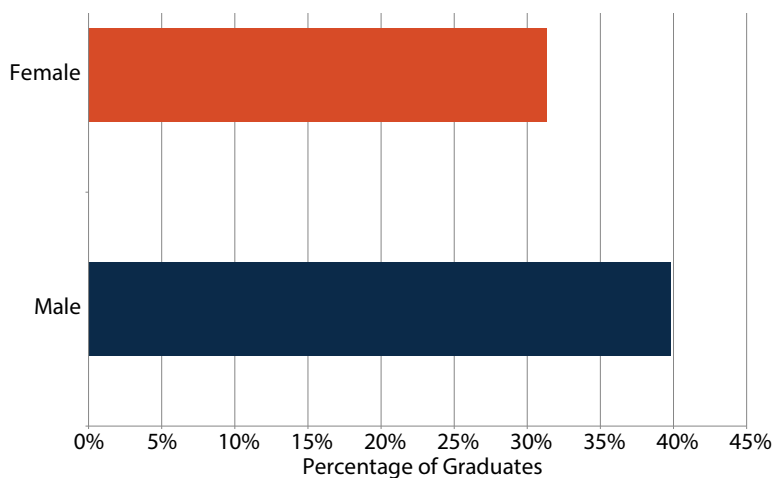
New bachelor's graduates showed a varied array of intended graduate degree fields. The fields that fell into "Other Geosciences" included gemology, soil science, petrology, energy and earth resources, volcanology, mineral and energy economics, and environmental public health. The fields that fell into "Other" included public administration, museum studies, graphic design, disaster medicine and management, exercise and sport science, and zoology.

Unlike in 2013, the majority of graduate students wanting to obtain a second graduate degree intended to work towards another master's degree.

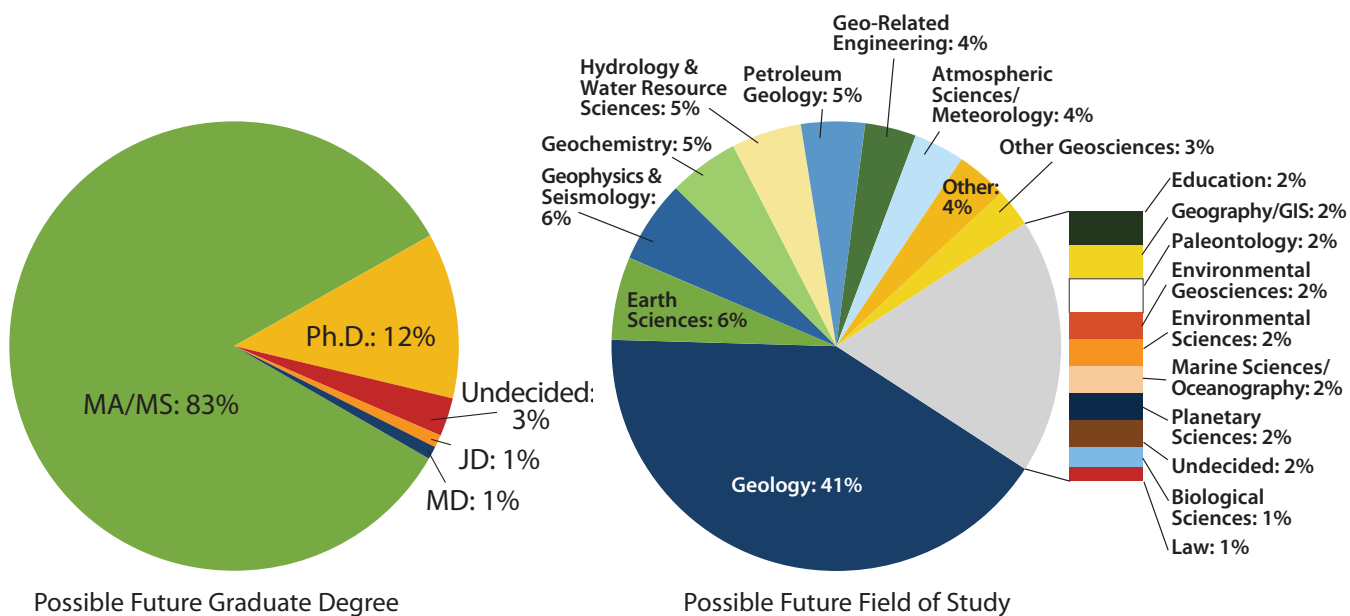
## Students planning to attend graduate school after graduation



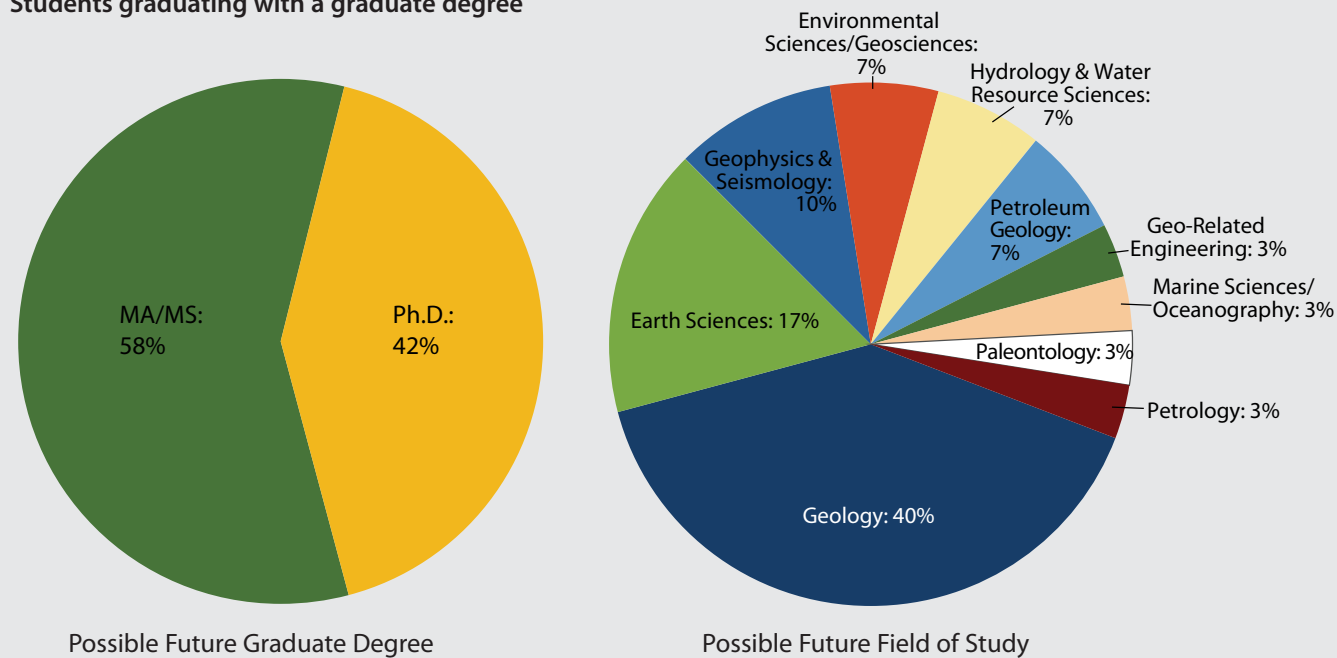
## Students planning to attend graduate school after graduation by gender



Students graduating with an undergraduate degree



Students graduating with a graduate degree





## Future Plans: Working in the Geosciences

The graduates were asked if they had accepted or were seeking a job position within the geoscience workforce. If they had accepted a job, they were asked about these accepted job positions. Because the graduates take this survey right around graduation, it is not surprising that there are still relatively high percentages of graduates at all degree levels still seeking employment. In 2014, there was an increase in the doctoral graduates that had found a job position at time of graduation from 43 percent in 2013 to 70 percent. However, in 2014 there was a decrease in the bachelor's and master's students that found a job position at time of graduation, from 15 percent in 2013 to 12 percent for bachelor's graduates and 43 percent in 2013 to 35 percent for master's graduates.

Overall, the oil and gas industry continues to hire more graduates than any other industry, largely driven by effective on campus recruitment and highly competitive salaries. The top three industries hiring bachelor's graduates are the oil and gas industry, environmental services companies, and four-year universities. The top three industries hiring master's degrees are the oil and gas industries, environmental services companies, and state or local governments. The top three industries hiring doctoral graduates are four-year universities, the oil and gas industry, and research institutions. These jobs also tended to be primarily located in Texas.

As expected, most bachelor's graduates continued to find jobs with an annual salary between \$20,000 and \$60,000. The salary range for master's and doctoral students vary widely depending on the position. However, as in 2013, it appears the master's graduates tend to find jobs with higher annual salaries than doctoral graduates. Also, as in 2013, every graduate making an annual salary of more than \$90,000 found their job in the oil and gas industry. However, not every graduate with a job in the oil and gas

industry has an annual salary above \$90,000. Sixty-three percent of all graduates with a job in the geosciences mentioned receiving additional compensation from their employer as a bonus, moving expenses, etc. In 2014, this compensation was typically less than \$10,000, with some graduates receiving more than \$25,000.

Graduates that found geoscience employment were asked to identify the resources they used to find their job. Bachelor's graduates and doctoral graduates continued to rely largely on their personal contacts and faculty referrals, whereas master's graduates in 2014 relied on campus recruiting events and job fairs, personal contacts, and internet job boards or searches. Overall in 2014, these graduates found increased success using of the internet and less success through faculty referrals and campus recruiting events compared to 2013.

In 2014, the graduates at all degree levels still seeking employment in the geosciences showed interest in the same industries that tended to hire their peers.

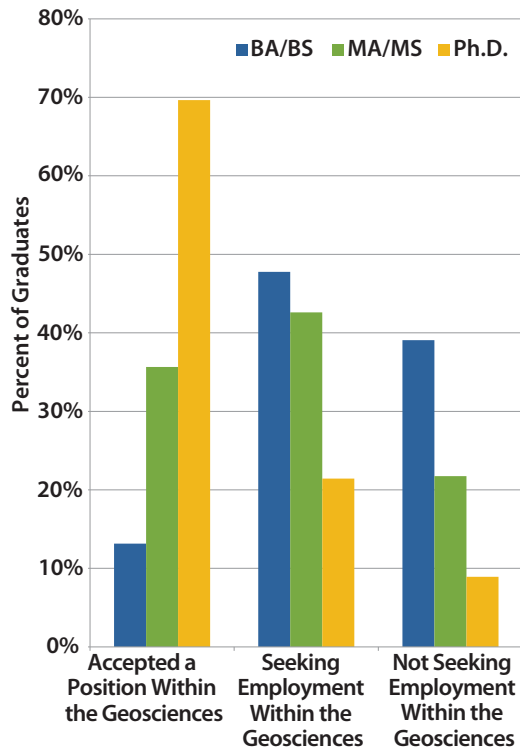
The circular figure displays the connection between the degree fields of recent geoscience graduates in 2013 and 2014 (in color) to the industries where these geoscientists found their first job after graduation (in gray). The size of the bars along the outer edge of the circle represents the number of recent graduates that pursued a particular degree field and entered a particular industry. Each colored, inner ribbon connects a particular degree field with the various industries where graduates found jobs. The thickness of each ribbon is determined by the number of graduates within each degree field with a job in a particular industry. This visualization shows the variety of industries available to graduates with a geoscience degree, as well as the complexity of the workforce and knowledge needed in the distinct industries.

Photo by Judah Epstein from the AGI 2014 Life in the Field photo contest.

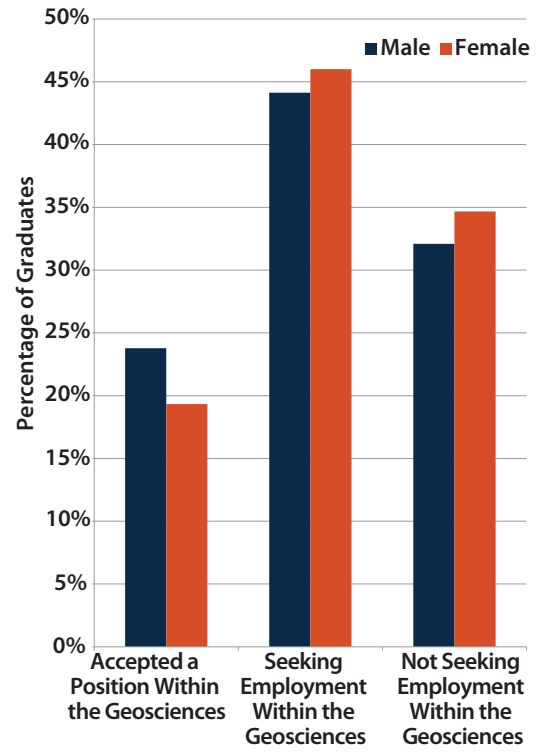




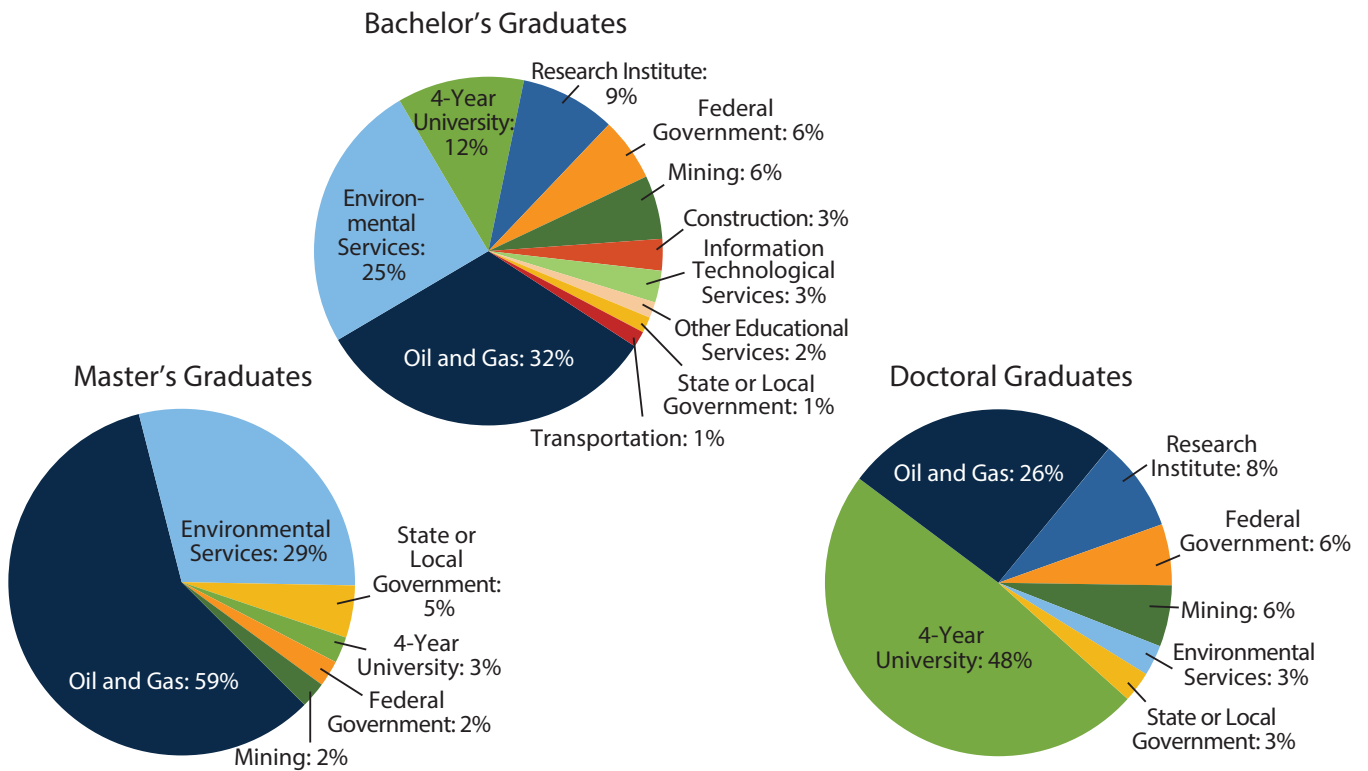
Graduating students seeking or have accepted a position within the geosciences



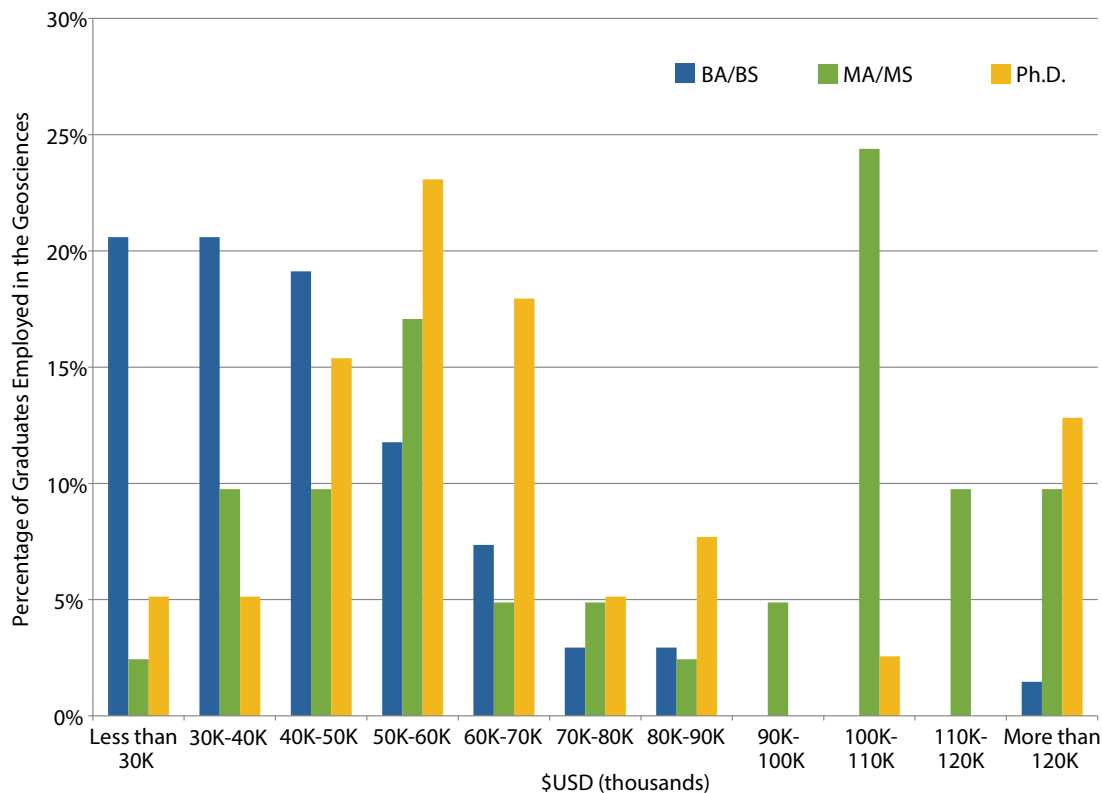
Graduating students seeking or have accepted a job within the geosciences by gender



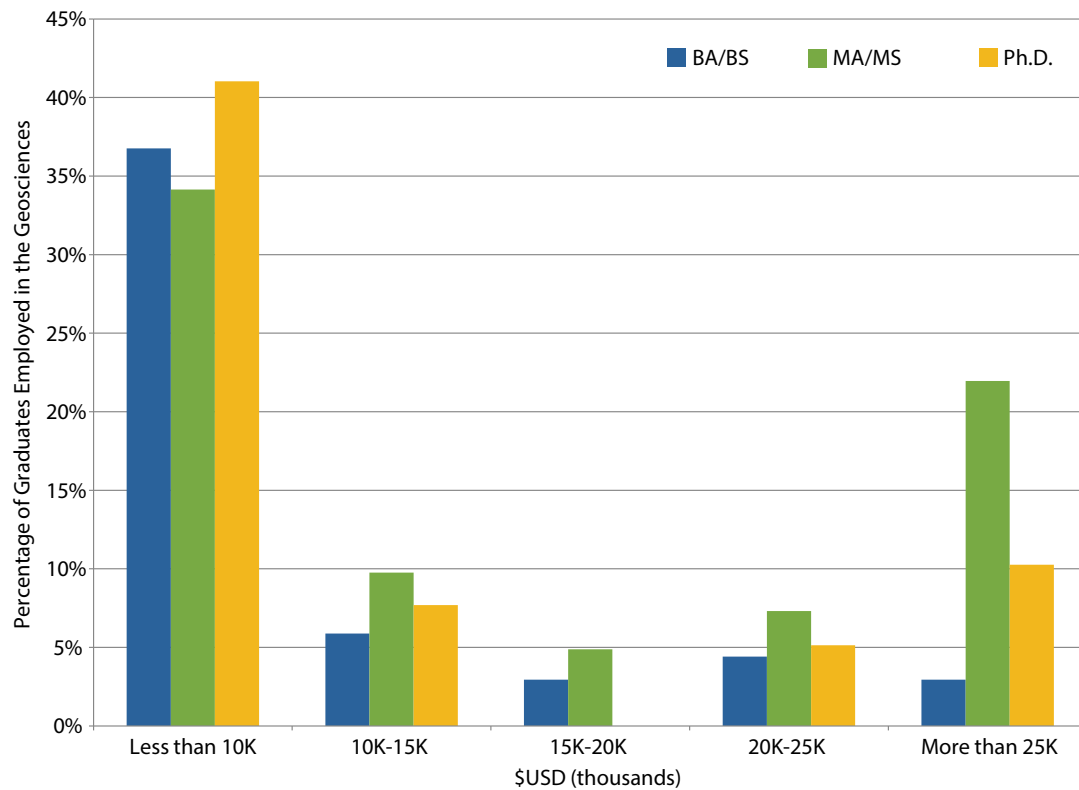
Industries where graduating students have accepted a job within the geosciences



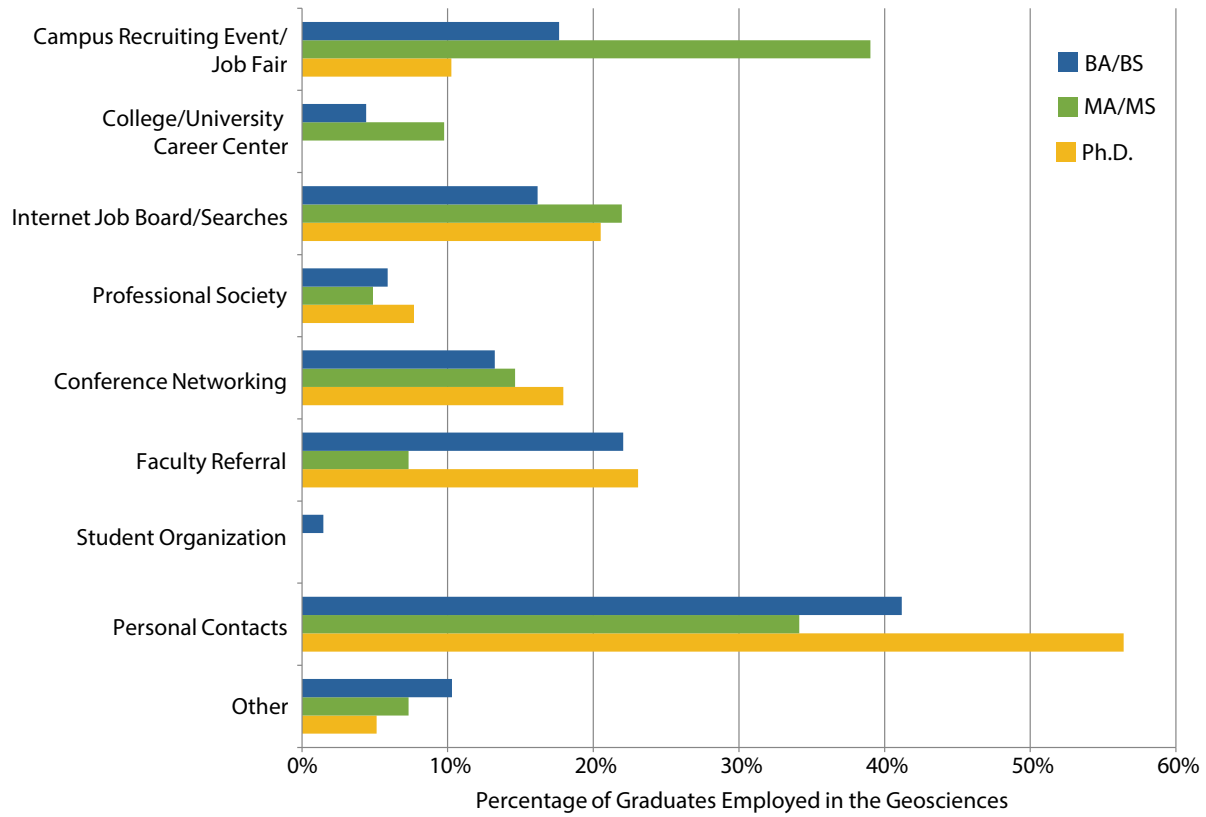
### Starting salaries for graduates who accepted a job in the geosciences



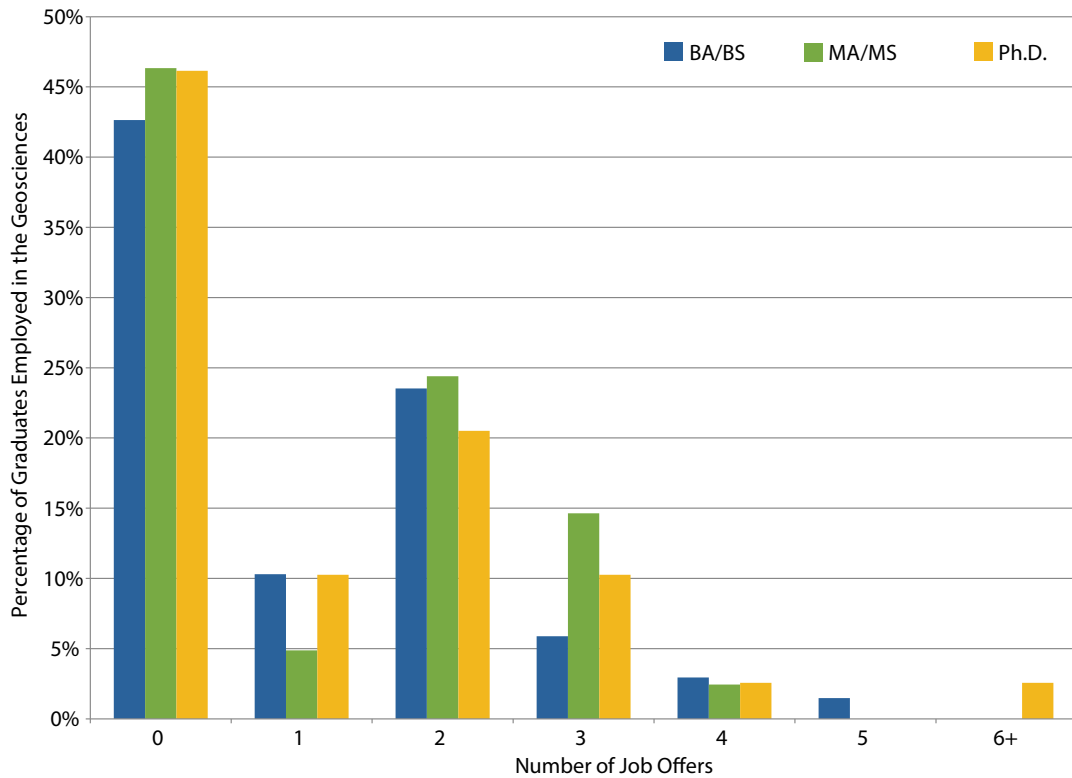
### Additional compensation for graduates who accepted a job in the geosciences



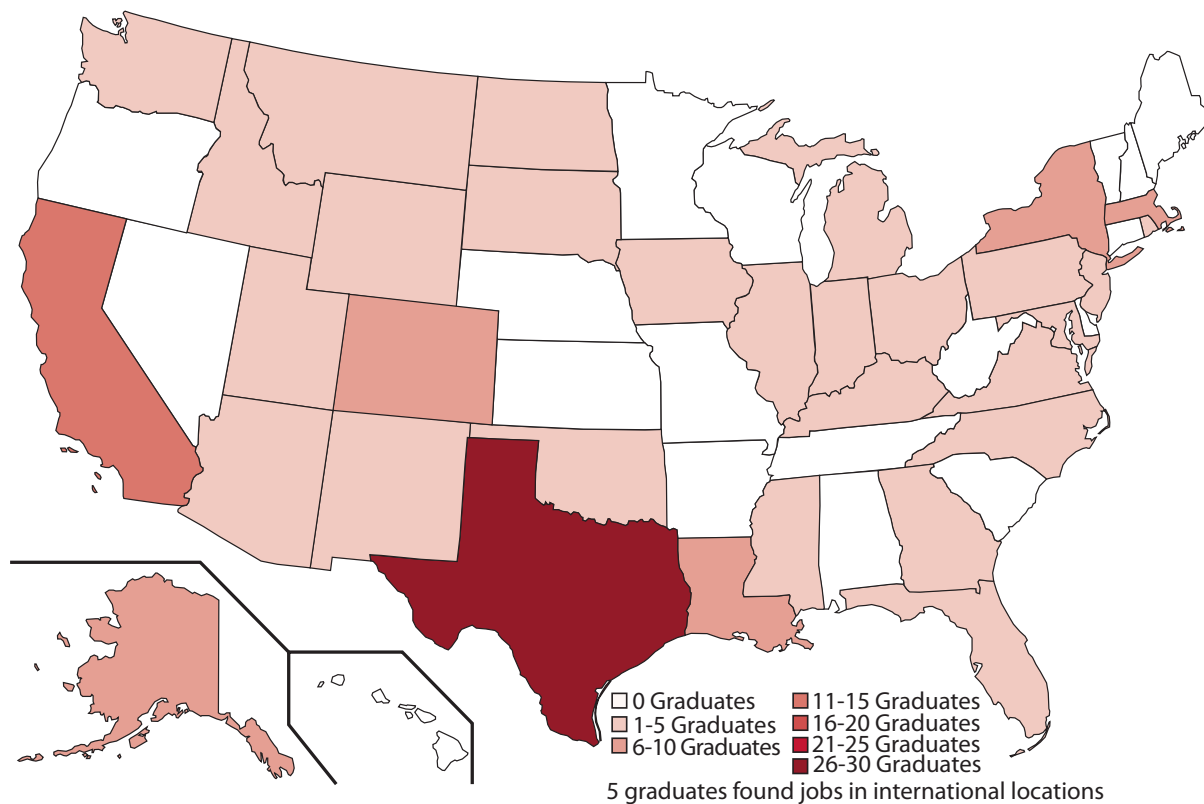
Resources identified as useful for finding geoscience jobs



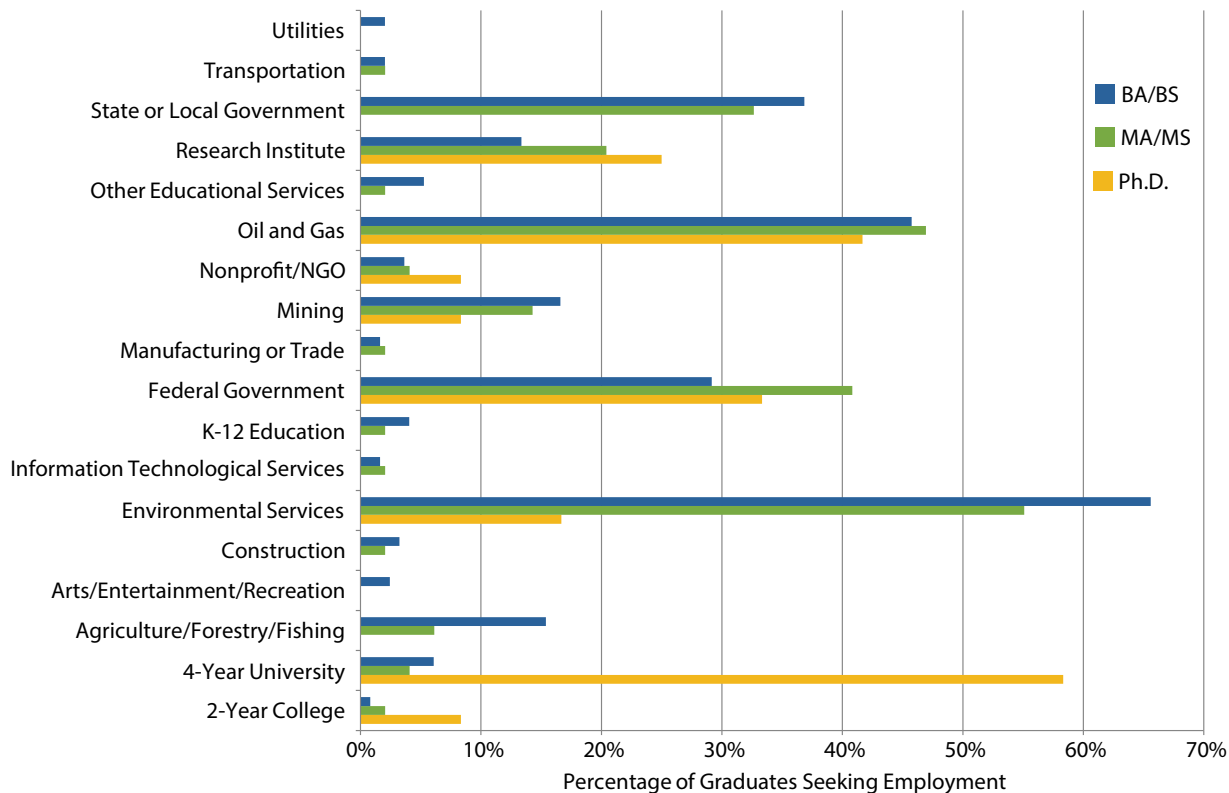
Other job opportunities offered to graduates who accepted a job in the geosciences



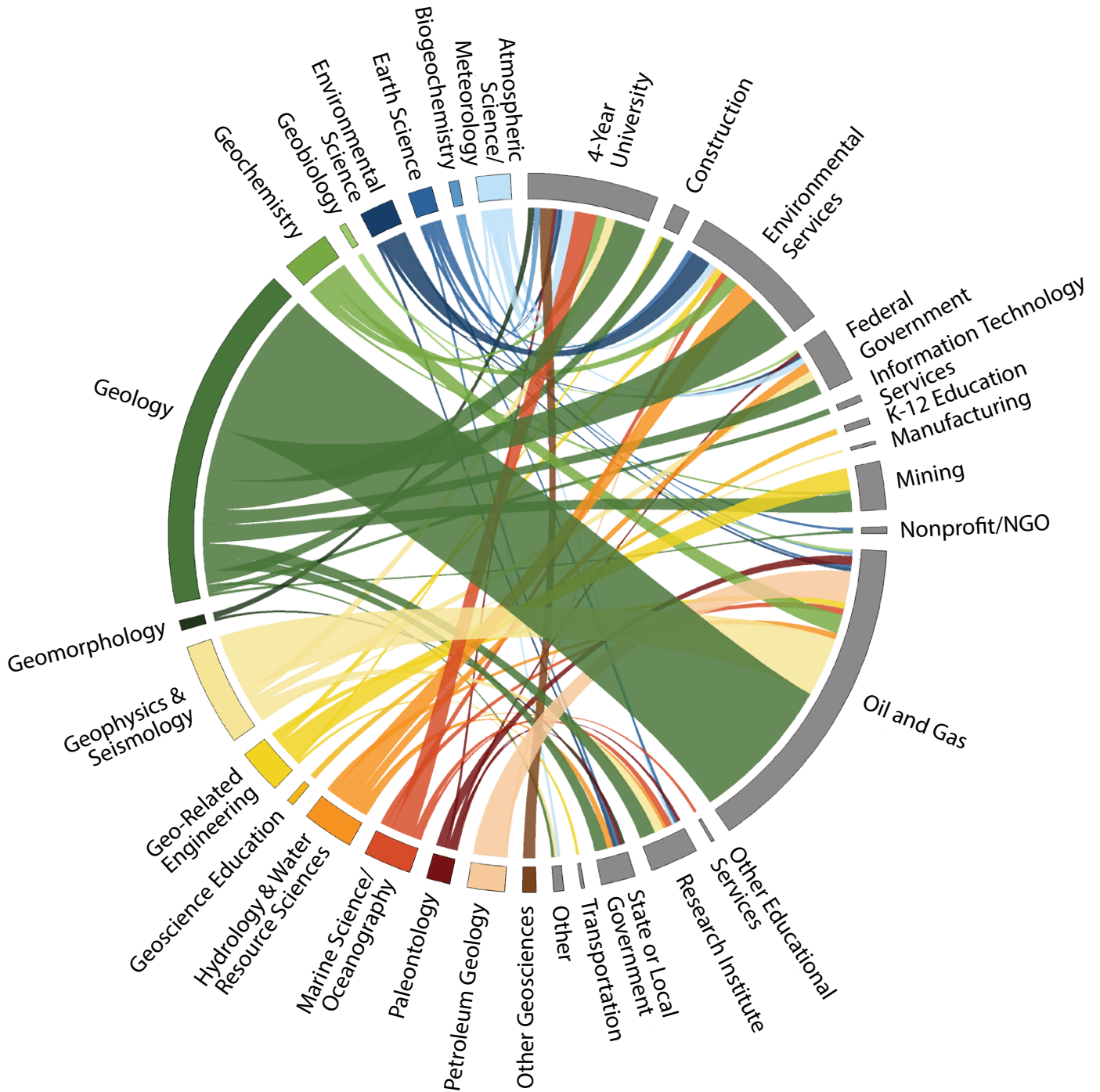
States where graduates found employment in the geosciences



Industries of interest for graduating students seeking a job within the geosciences



Industries of geoscience graduates' first jobs by degree field for the past two years\*\*\*



\*\*\*The code for this visualization was modified from Kzyzwiniski, M. et al. Circos: an Information Aesthetic for Comparative Genomics. *Genome Res* (2009) 19:1693-1645

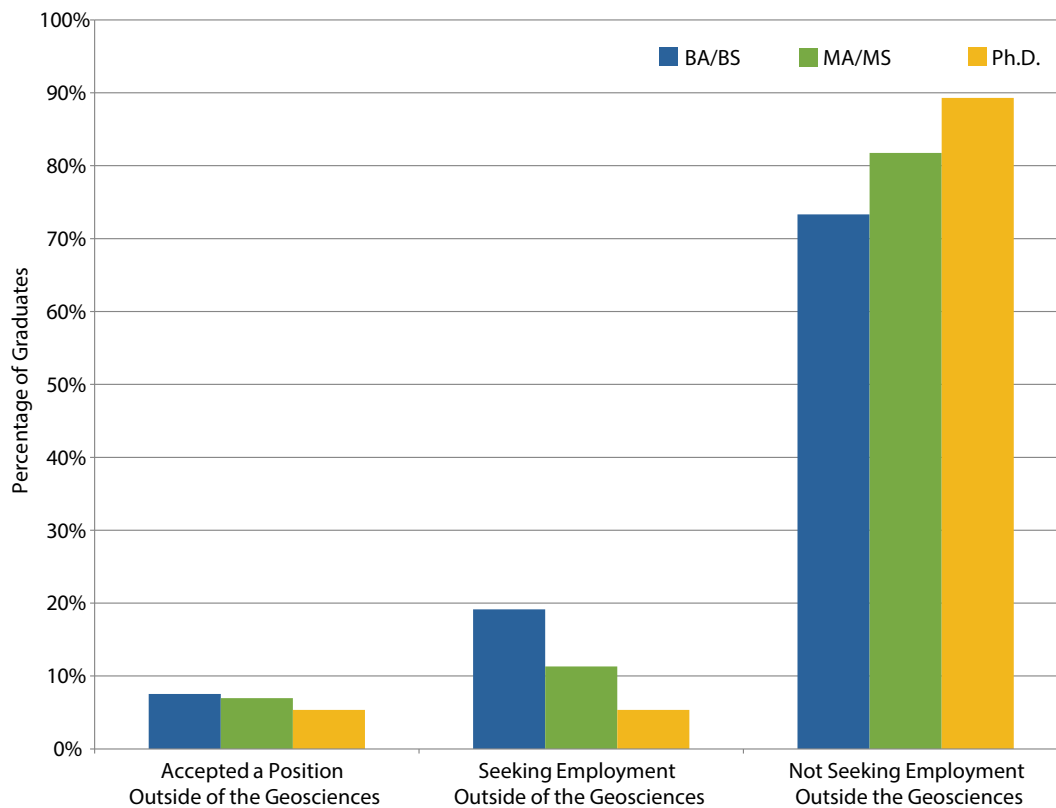
# Future Plans: Working Outside of the Geosciences

Very few students are seeking or have secured jobs outside of the geosciences. Due to this, the figures displaying data about these graduates that either accepted or are seeking a job outside of the geosciences show the number of graduates regardless of degree level. Most of the graduates that have accepted a job position outside of the geosciences chose these positions because they wanted to pursue other interests, wanted a geoscience job but had trouble getting hired, and/or need to earn money to help pay for student loans or other life expenses. A handful of graduates commented on their desire for a science education job teaching the earth sciences or a job in other areas that allow the use of their geoscience knowledge. While these types of positions may not be considered traditional

geoscience careers, AGI considers them still within the geosciences workforce.

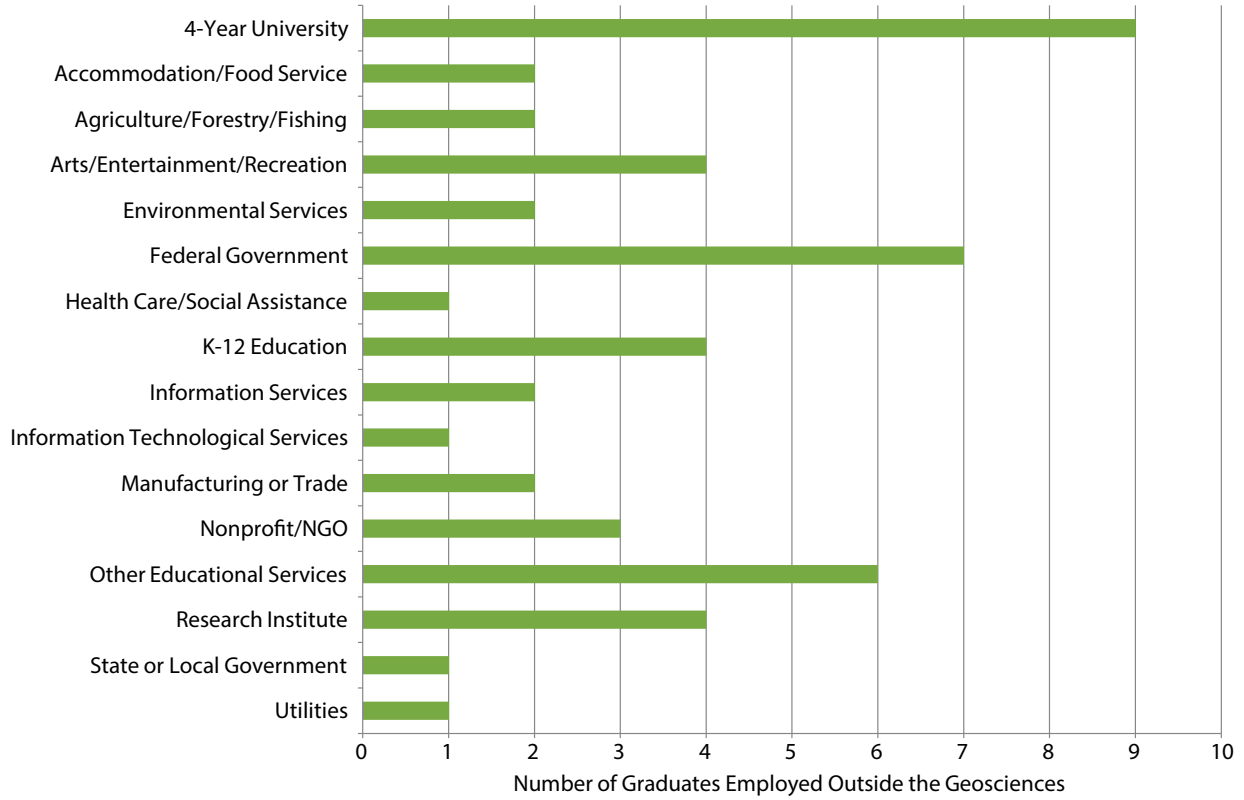
Those graduates that had accepted a job outside of the geosciences were asked to provide more details about their jobs. The industries most often hiring students into jobs they felt were outside of the geosciences include four-year universities, the federal government, and other educational services outside of formal education. These graduates on average make quite a bit less in their starting salary that those graduates with jobs in the geosciences. However, most of these graduates with jobs outside of the geosciences found their job using similar resources as the graduates employed in the geosciences, such as through personal contacts and internet searches.

Graduating students seeking or have accepted a job position outside the geosciences

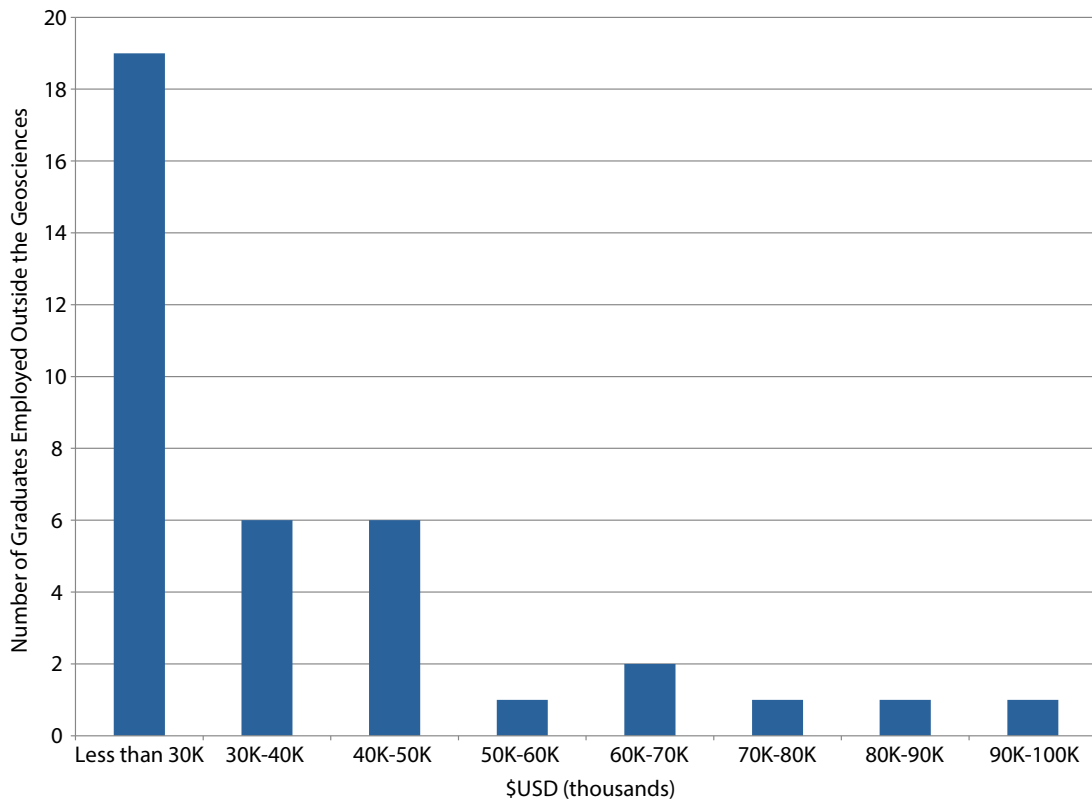




**Industries where graduating students have accepted a job outside the geosciences**



**Starting salaries for graduating students that accepted a job outside the geosciences**



Resources identified by graduating students as useful for finding non-geoscience jobs

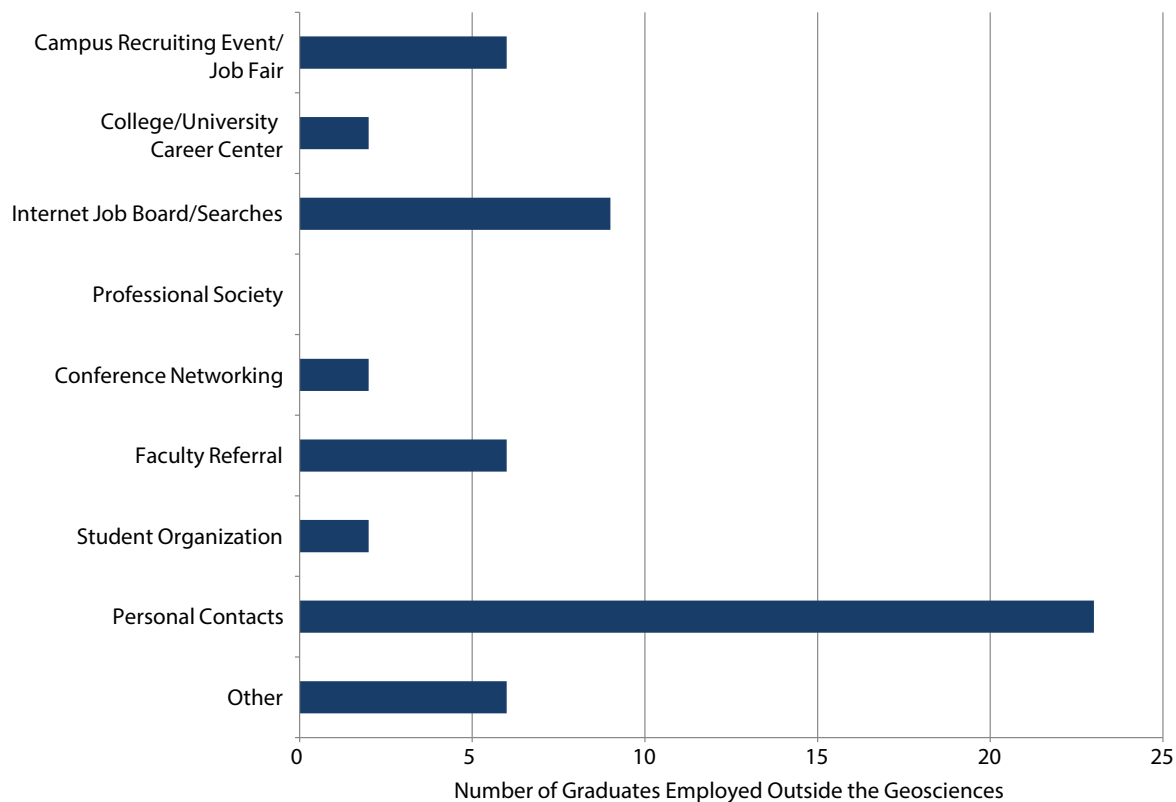
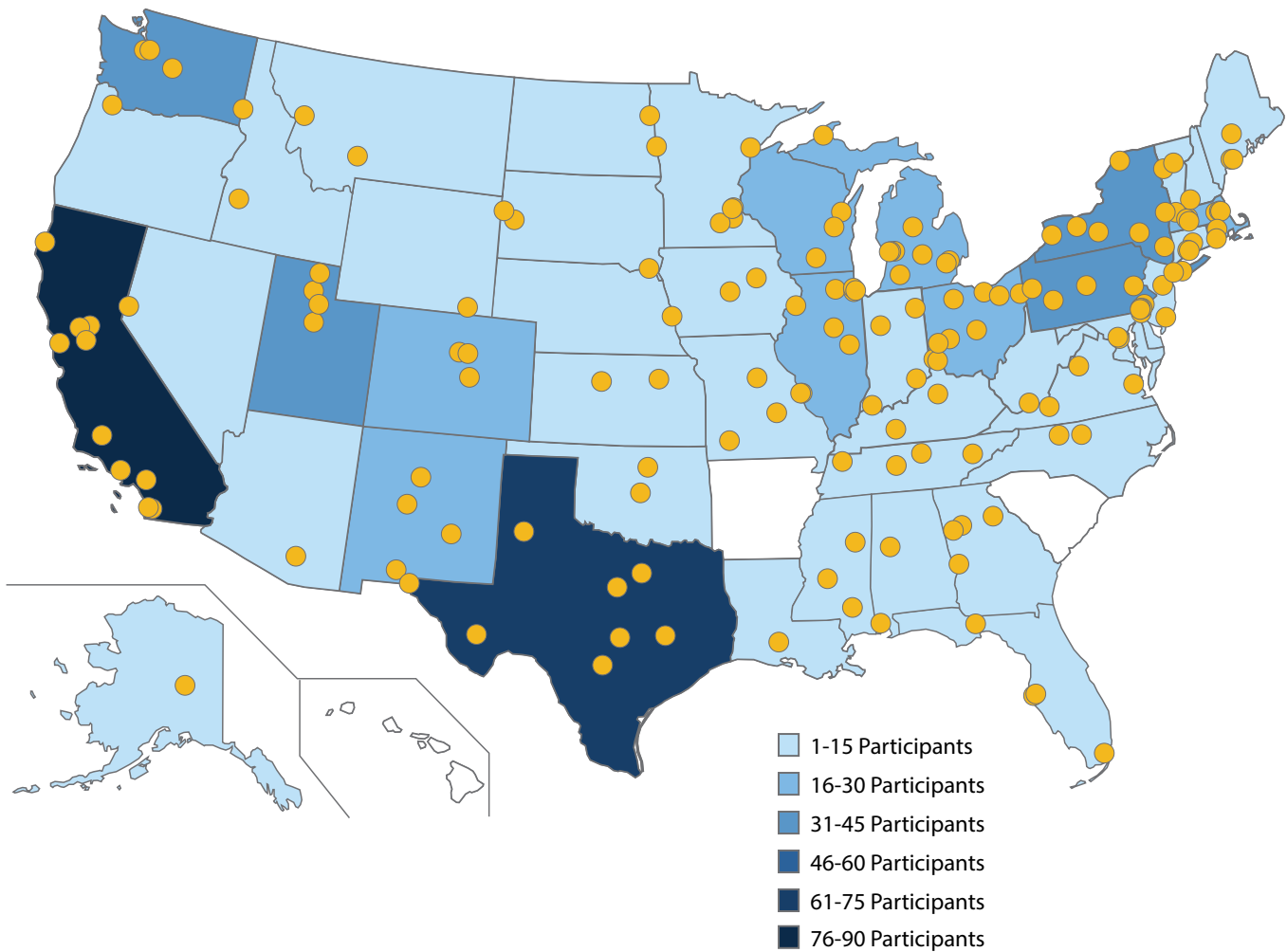




Photo by Artur Pacyga from the AGI 2014 Life in the Field photo contest.

# Appendices



## Appendix I

The following is a list of all the institutions and departments with graduating students that took AGI's Geoscience Exit Survey in the 2013-2014 academic year.

### University, Department

Amherst College, Department of Geology

Augustana College, Department of Geology

Black Hills State University, Department of Environmental Physical Sciences

Boise State University, Department of Geosciences

Boston College, Department of Earth and Environmental Science

Bowdoin College, Department of Earth and Oceanographic Sciences

Bowling Green State University, Department of Geology

Brigham Young University, Department of Geological Sciences

Brown University, Department of Geological Sciences

Bryn Mawr College, Department of Geology

California State University-Bakersfield, Department of Geology

- California State University-Fullerton, Department of Geological Sciences
- California State University-Northridge, Department of Geological Sciences
- California State University-Sacramento, Department of Geology
- Calvin College, Department of Geology, Geography, and Environmental Studies
- Carleton College, Department of Geology
- Central Michigan University, Department of Earth and Atmospheric Sciences
- Central Washington University, Department of Geological Sciences
- Colby College, Department of Geology
- College of William and Mary, Department of Geology
- Colorado College, Department of Geology
- Colorado School of Mines, Department of Geology and Geological Engineering
- Columbus State University, Department of Earth and Space Sciences
- Concord University, Department of Physical Sciences
- Cornell University, Department of Earth and Atmospheric Sciences
- Eastern Michigan University, Department of Geography and Geology
- Eastern New Mexico University, Department of Physical Sciences
- Eckerd College, Department of Geosciences
- Eckerd College, Department of Marine Sciences
- Florida State University, Department of Earth, Ocean, and Atmospheric Sciences
- Fort Hays State University, Department of Geosciences
- Georgia State University, Department of Geosciences
- Grand Valley State University, Department of Geology
- Guilford College, Department of Geology and Earth Sciences
- Gustavus Adolphus College, Department of Geology
- Hanover College, Department of Geology
- Hope College, Department of Geological and Environmental Sciences
- Humboldt State University, Department of Geology
- Illinois State University, Department of Geology
- Indiana University of Pennsylvania, Department of Geoscience
- Indiana University-Purdue University Fort Wayne, Department of Geosciences
- Iowa State University, Department of Geological and Atmospheric Sciences
- James Madison University, Department of Geology and Environmental Sciences
- Kansas State University, Department of Geology
- Keene State College, Department of Geology
- Kutztown University of Pennsylvania, Department of Physical Sciences
- Metropolitan State University of Denver, Department of Earth and Environmental Sciences
- Miami University of Ohio, Department of Geology and Environmental Earth Science
- Michigan State University, Department of Geological Sciences
- Michigan Technological University, Department of Geological/Mining Engineering and Sciences
- Middle Tennessee State University, Department of Geosciences
- Middlebury College, Department of Geology
- Millsaps College, Department of Geology
- Mississippi State University, Department of Geosciences
- Missouri State University, Department of Geography, Geology, and Planning
- Missouri University of Science and Technology, Department of Geosciences and Geological and Petroleum Engineering
- MIT, Department of Earth, Atmospheric, and Planetary Sciences
- Montana State University, Department of Geology
- Mount Holyoke College, Department of Geology
- New Mexico Institute of Mining and Technology, Department of Earth and Environmental Sciences
- New Mexico State University, Department of Geological Sciences
- North Dakota State University, Department of Geosciences

Northern Illinois University, Department of Geology and Environmental Geosciences	Temple University, Department of Earth and Environmental Science
Northwestern University, Department of Earth and Planetary Sciences	Tennessee Tech University, Department of Earth Sciences
Norwich University, Department of Geology	Texas A&M University, School of Geosciences
Oberlin College, Department of Geology	Trinity University, Department of Geosciences
Ohio State University, School of Earth Sciences	Tufts University, Department of Earth and Ocean Sciences
Oklahoma State University, Department of Geology	University at Buffalo, Department of Geology
Pace University, Environmental Sciences Program	University of Akron, Department of Geosciences
Pacific Lutheran University, Department of Geoscience	University of Alabama, Department of Geological Sciences
Pennsylvania State University, Department of Geosciences	University of Alaska-Fairbanks, Department of Geology and Geophysics
Portland State University, Department of Geology	University of Arizona, Department of Geosciences
Purdue University, Department of Earth and Atmospheric Sciences	University of California-Berkeley, Department of Earth and Planetary Science
Queens College-CUNY, School of Earth and Environmental Sciences	University of California-Davis, Department of Earth and Planetary Sciences
Rensselaer Polytechnic Institute, Department of Earth and Environmental Sciences	University of California-San Diego, Scripps Institution of Oceanography
Richard Stockton College of New Jersey, Department of Geology	University of Cincinnati, Department of Geology
Rutgers University, Department of Earth and Planetary Sciences	University of Delaware, Department of Geological Sciences
San Diego State University, Department of Geological Sciences	University of Georgia, Department of Geology
Slippery Rock University, Department of Geography, Geology, and the Environment	University of Idaho, Department of Geological Sciences
Smith College, Department of Geosciences	University of Illinois at Chicago, Department of Earth and Environmental Sciences
South Dakota School of Mines and Technology, Department of Geology and Geological Engineering	University of Illinois, Department of Geology
St. Lawrence University, Department of Geology	University of Kentucky, Department of Earth and Environmental Sciences
St. Louis University, Department of Earth and Atmospheric Sciences	University of Louisiana at Lafayette, Department of Geology
St. Norbert College, Department of Geology	University of Maryland, Department of Geology
Sul Ross State University, Department of Biology, Geology, and Physical Sciences	University of Maryland-Baltimore County, Department of Environmental Engineering
SUNY Geneseo, Department of Geological Sciences	University of Miami, Department of Geological Sciences
SUNY College at Oneonta, Department of Earth and Atmospheric Sciences	University of Michigan, Department of Earth and Environmental Sciences
Tarleton State University, Department of Geoscience	University of Minnesota-Duluth, Department of Geosciences



- University of Minnesota-Twin Cities, Department of Earth Sciences
- University of Missouri, Department of Soil, Environmental, and Atmospheric Science
- University of Montana, Department of Geosciences
- University of Nebraska-Omaha, Department of Geography/Geology
- University of Nevada-Reno, Mackay School of Earth Science and Engineering
- University of New Haven, Department of Environmental Science
- University of New Mexico, Department of Earth and Planetary Sciences
- University of North Carolina at Chapel Hill, Department of Geosciences
- University of North Dakota, School of Geology and Geological Engineering
- University of Northern Iowa, Department of Earth Science
- University of Oklahoma, School of Geology and Geophysics
- University of Pennsylvania, Department of Earth and Environmental Science
- University of Rhode Island, Department of Geosciences
- University of South Alabama, Department of Earth Sciences
- University of South Dakota, Department of Earth Sciences
- University of South Florida, Department of Geology
- University of Southern Indiana, Department of Geology and Physics
- University of Southern Maine, Department of Geosciences
- University of Southern Mississippi, Department of Marine Science
- University of St. Thomas, Department of Geology
- University of Tennessee at Knoxville, Department of Earth and Planetary Sciences
- University of Tennessee at Martin, Department of Agriculture and Applied Sciences
- University of Texas at Arlington, Department of Earth and Environmental Sciences
- University of Texas at Austin, Jackson School of Geosciences
- University of Texas at El Paso, Department of Geological Sciences
- University of the Pacific, Department of Earth and Environmental Sciences
- University of Utah, College of Mines and Earth Sciences
- University of Washington, Department of Earth and Space Sciences
- University of Washington, Department of Oceanography
- University of West Georgia, Department of Geosciences
- University of Wisconsin-Madison, Department of Geology and Geophysics
- University of Wisconsin-Oshkosh, Department of Geology
- University of Wyoming, Department of Geology and Geophysics
- Utah State University, Department of Geology
- Vassar College, Department of Earth Sciences
- Virginia Polytechnic Institute and State University, Department of Geosciences
- Washington University in St. Louis, Department of Earth and Planetary Sciences
- Weber State University, Department of Geosciences
- Wesleyan University, Department of Earth and Environmental Sciences
- West Chester University, Department of Geology and Astronomy
- Western Kentucky University, Department of Geography and Geology
- Western Michigan University, Department of Geosciences
- Wheaton College, Department of Geology and Environmental Science
- Williams College, Department of Geosciences
- Wittenberg University, Department of Geology
- Wright State University, Department of Earth and Environmental Sciences
- Yale University, Department of Geology and Geophysics
- Youngstown State University, Department of Geological and Environmental Sciences

## Appendix II

### Carnegie Classifications of Institutions of Higher Learning (<http://classifications.carnegiefoundation.org/>)

This classification system was used for some of the analysis of the Spring 2013 results of AGI's Geoscience Student Exit Survey. The following are the definitions for the classification system and the participating institutions belonging to each category as defined and categorized by the Carnegie Foundation for the Advancement of Teaching.

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#### Baccalaureate Colleges — Arts & Sciences (Bac/A&S)

#### Baccalaureate Colleges — Diverse Fields (Bac/Diverse)

Includes institutions where baccalaureate degrees represent at least 10 percent of all undergraduate degrees and where fewer than 50 master's degrees or 20 doctoral degrees were awarded during the update year. Excludes Special Focus Institutions and Tribal Colleges.

Among Institutions where bachelor's degrees represented at least half of all undergraduate degrees, those with at least half of bachelor's degree majors in arts and science fields were included in the "Arts & Sciences" group, while the remaining institutions were included in the "Diverse Fields" group.

#### Exit Survey Departments (Bac/A&S):

Amherst College  
 Augustana College  
 Bowdoin College  
 Bryn Mawr College  
 Calvin College  
 Carleton College  
 Colby College  
 Colorado College  
 Eckerd College  
 Guilford College  
 Gustavus Adolphus College  
 Hanover College  
 Hope College  
 Middlebury College  
 Millsaps College  
 Mount Holyoke College  
 Oberlin College  
 Smith College  
 St. Lawrence University

St. Norbert College  
 Vassar College  
 Wesleyan University  
 Wheaton College  
 Williams College  
 Wittenberg University

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#### Exit Survey Departments (Bac/Diverse)\*

Concord University  
 Metropolitan State University of Denver

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#### Master's Colleges and Universities — Larger Programs (Master's/L)

#### Master's Colleges and Universities — Medium Programs (Master's/M)

#### Master's Colleges and Universities — Smaller Programs (Master's/S)

Generally includes institutions that awarded at least 50 master's degrees and fewer than 20 doctoral degrees during the update year (with occasional exceptions). Excludes Special Focus Institutions and Tribal Colleges.

Master's program size was based on the number of master's degrees awarded during the update year. Those awarding at least 200 degrees were included among larger programs; those awarding 100-199 were included among the medium programs; and those awarding 50-99 were included among the smaller programs. The smaller programs group also includes institutions that awarded fewer than 50 master's degrees if (a) their Enrollment Profile classification is Exclusively Graduate/Professional or (b) their Enrollment Profile classification is Majority Graduate/Professional and they awarded more graduate/professional degrees than undergraduate degrees.

#### Exit Survey Departments (Master's/L):

Boise State University  
 California State University-Bakersfield  
 California State University-Fullerton  
 California State University-Northridge  
 California State University-Sacramento  
 Columbus State University  
 Eastern Michigan University  
 Fort Hays State University  
 Grand Valley State University  
 Indiana University-Purdue University  
 James Madison University

Kutztown University of Pennsylvania  
 Missouri State University  
 Norwich University  
 Queens College-CUNY  
 Slippery Rock University  
 Sul Ross State University  
 Tarleton State University  
 Tennessee Tech University  
 University of New Haven  
 University of Northern Iowa  
 University of Southern Indiana  
 University of Southern Maine  
 University of West Georgia  
 University of Wisconsin-Oshkosh  
 West Chester University  
 Western Kentucky University  
 Youngstown State University

**Exit Survey Departments (Master's/M):**

Central Washington University  
 Humboldt State University  
 New Mexico Institute of Mining and Technology  
 Pacific Lutheran University  
 Richard Stockton College of New Jersey  
 Trinity University  
 University of Minnesota-Duluth  
 University of Tennessee at Martin  
 Weber State University

**Exit Survey Departments (Master's/S):**

Black Hills State University  
 Eastern New Mexico State University  
 Keene State College  
 SUNY Geneseo  
 SUNY College at Oneonta

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**Research Universities — Very High Research Activity (RU/VH)**

**Research Universities — High Research Activity (RU/H)**

**Doctoral/Research Universities (DRU)**

Includes institutions that awarded at least 20 research doctoral degrees during the update year (excluding doctoral-level degrees that qualify recipients for entry into professional practice, such as the JD, MD, PharmD, DPT, etc.). Excludes Special Focus Institutions and Tribal Colleges.

Doctorate-granting institutions were assigned to one of three categories based on a measure of research activity. For more information about the analysis of research activity, please visit <http://classifications.carnegiefoundation.org/methodology/basic.php>.

**Exit Survey Departments (RU/VH):**

Brown University  
 Cornell University  
 Florida State University  
 Georgia State University  
 Iowa State University  
 Michigan State University  
 Mississippi State University  
 MIT  
 Montana State University  
 North Dakota State University  
 Northwestern University  
 Ohio State University  
 Pennsylvania State University  
 Purdue University  
 Rensselaer Polytechnic Institute  
 Rutgers University  
 Texas A&M University  
 Tufts University  
 University of Arizona  
 University at Buffalo  
 University of California-Berkeley  
 University of California-Davis  
 University of California-San Diego  
 University of Cincinnati  
 University of Delaware  
 University of Georgia  
 University of Illinois at Chicago  
 University of Illinois  
 University of Kentucky  
 University of Maryland  
 University of Miami  
 University of Michigan  
 University of Minnesota-Twin Cities  
 University of Missouri  
 University of New Mexico  
 University of North Carolina at Chapel Hill  
 University of Oklahoma  
 University of Pennsylvania  
 University of South Florida  
 University of Tennessee at Knoxville  
 University of Texas at Austin  
 University of Utah  
 University of Washington  
 University of Wisconsin-Madison  
 Virginia Polytechnic Institute and State University  
 Washington University in St. Louis  
 Yale University

**Exit Survey Departments (RU/H):**

Boston College  
Bowling Green State University  
Brigham Young University  
College of William and Mary  
Colorado School of Mines  
Kansas State University  
Miami University of Ohio  
Michigan Technological University  
Missouri University of Science and Technology  
New Mexico State University  
Northern Illinois University  
Oklahoma State University  
Portland State University  
San Diego State University  
St. Louis University  
Temple University  
Texas Tech University  
University of Akron  
University of Alabama  
University of Alaska-Fairbanks  
University of Idaho  
University of Louisiana at Lafayette  
University of Maryland-Baltimore County  
University of Montana  
University of Nevada-Reno  
University of North Dakota  
University of Rhode Island  
University of South Alabama  
University of South Dakota  
University of Southern Mississippi  
University of Texas at Arlington  
University of Texas at El Paso  
University of Wyoming  
Utah State University  
Western Michigan University  
Wright State University

**Exit Survey Departments (DRU):**

Central Michigan University  
Illinois State University  
Indiana University of Pennsylvania  
Middle Tennessee State University  
Pace University  
University of Nebraska-Omaha  
University of St. Thomas  
University of the Pacific

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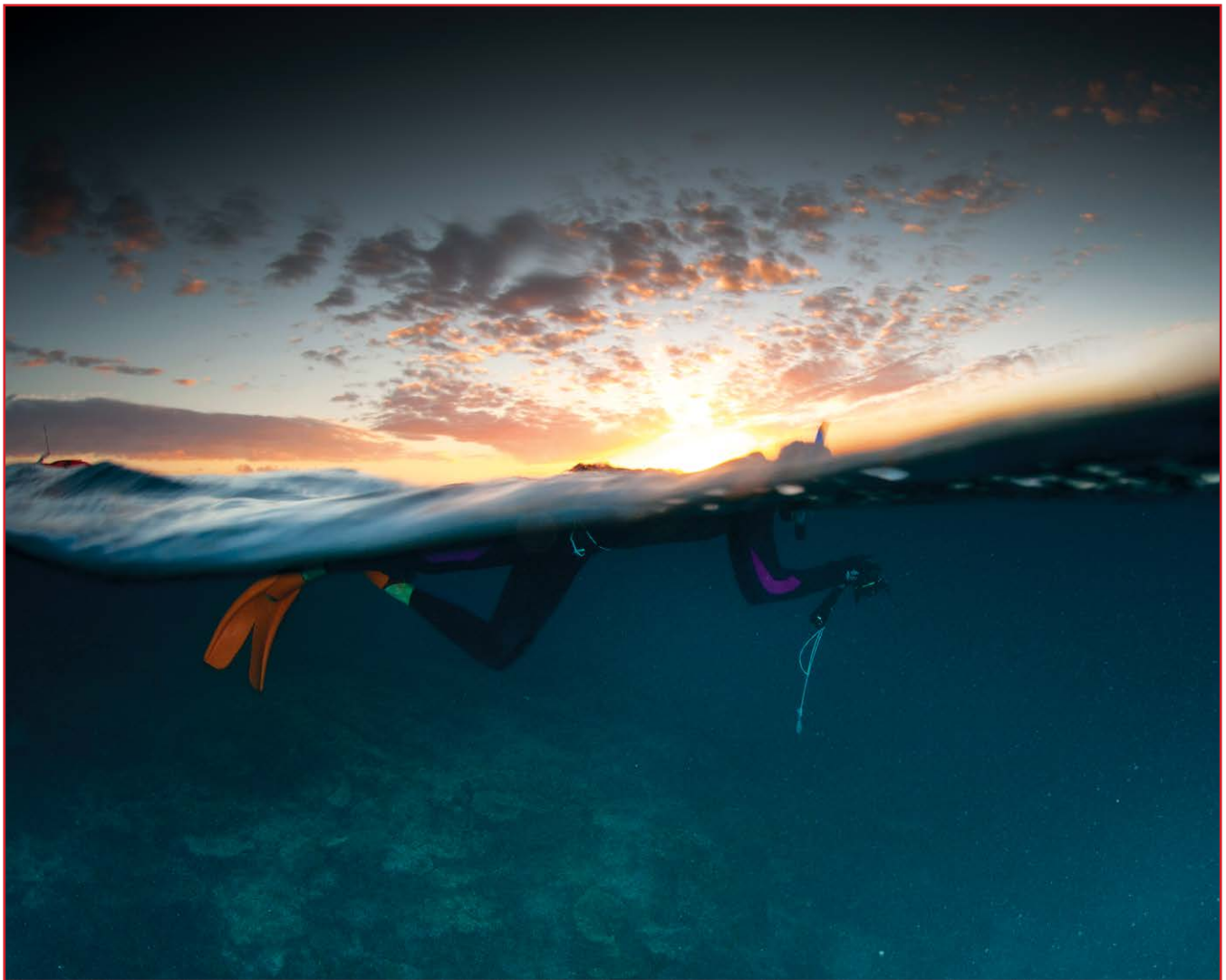
**Special Focus Institutions — Schools of Engineering (Spec/Engg)**

Institutions awarding baccalaureate or higher-level degrees where a high concentration of degrees (above 75%) is in a single field or set of related fields. Excludes Tribal Colleges.

**Exit Survey Departments (Spec/Engg)\*:**  
South Dakota School of Mines and Technology

\*Institutions in this classification were not included in comparisons using the Carnegie Classification system due to the small number of institutions in the Exit Survey belonging to the particular classification.





### **AGI Geoscience Workforce Program**

([www.americangeosciences.org/workforce](http://www.americangeosciences.org/workforce)) tracks the supply and demand of geoscientists by collecting original data and by analyzing existing data from federal, industry, and other sources. The Geoscience Workforce Program informs the geoscience community by reporting on workforce and higher education trends and by making predictions for future workforce needs.



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