

GEOMAP 2025

A 5-yr Strategic Plan for the Department of Earth and Planetary Sciences

Prepared by the Tenure-Track Faculty and Adopted on 11-19-19

1. INTRODUCTION

1.1. Overview of the Department

The Department of Earth and Planetary Sciences (EPS) has been a vital part of the University of Tennessee – Knoxville (UTK) for over 110 years. EPS has introduced over 65,000 undergraduate students to the Earth Sciences through its 100- and 200-level course offerings. It has produced over 1,200 Bachelor's degrees (since 1907), as well as granting 547 Masters degrees (since 1929) and 153 Doctoral degrees (since 1959). Our graduates have gone on to success in academia, federal research laboratories, government agencies, K-12 schools, and a variety of industries including oil and gas, environmental consulting, mining, and engineering.

As of August 2019, EPS has 12 active tenured or tenure-track faculty members with majority appointments in the department, 2 with majority appointments in other departments, 2 non-tenure track research faculty members, 1 Oak Ridge National Laboratory (ORNL)-based joint faculty member, 4 lecturers, 2 post-doctoral researchers, 3 laboratory technicians, and 4 office staff, serving approximately 130 undergraduate (UG) majors and 44 graduate students. EPS faculty members strive for excellence in research, teaching and service. Currently, over 90% of active tenured or tenure-track (TT) faculty members have external funding to support their research. Several current or recent EPS faculty members have received national honors. EPS faculty and students have a strong history of service to the University (including two Associate Deans, an Interim Dean, and a Vice-Chancellor for Research), as well as to the broader scientific community (including several past-Presidents of the Geological Society of America, chairs and board members of disciplinary associations, journal editors, and associate editors), and to the public. EPS has a very active and engaged Alumni Board. Endowments, gift agreements and/or bequests to the Department totaled over \$7 million as of May 31, 2019.

As a department, we take pride in the breadth of our research exploring the physical, chemical, and biological domains of the Earth and other planetary bodies. This breadth, as well as the strongly interdisciplinary nature of much of our research has led the department to be nationally ranked above many of UTK's peer institutions. In the most recent (2010) National Research Council (NRC) survey of PhD programs in the geosciences, EPS was ranked 30th out of 140 public and private institutions

(<http://sites.nationalacademies.org/PGA/Resdoc/>), ranking above all of the University's peer institutions, and on par with many of the University's aspirational institutions, including the University of Florida (37th), Purdue (31st), the University of Wisconsin (28th), and Michigan State (27th). US News and World Report rankings from 2018 also recognized the success of our program, with a ranking of 54 out of 124 US Earth Science departments (<https://www.usnews.com/best-graduate-schools/top-science-schools/earth-sciences-rankings>). This ranking is higher than all but one of the University's peer institutions, and is squarely in the middle of similar departments within the University's aspirational institutions, ranking with the University of Florida (54th) between Michigan State (64th) and Purdue (41st) (see Appendix 8.1 for details).

With a cadre of highly productive faculty and an exceptional home in Strong Hall, EPS is perfectly positioned to help UTK achieve its VolVision 2020 goal of establishing itself as a top-tier public research university. We are proud of our past successes and we are ready to address current and future challenges in order to bring the Department an even brighter future.

1.2. Our Mission

- a. To prepare students for enriching and successful careers, as well as life-long learning.
- b. To expand the frontiers of knowledge in the Earth and Planetary Sciences and related fields.
- c. To serve the university, government, industry, and people of the State of Tennessee.

1.3. Our Values

- a. Excellence in research, teaching, and service.
- b. A commitment to support all of our students, both undergraduate and graduate.
- c. Professionalism, cooperation, respect for individuals, and a commitment to diversity.
- d. Alignment of departmental objectives with those of the College, Campus and University System, especially as they pertain to the goals of VolVision 2020.
- e. Responsible stewardship of UTK resources and continued self-reliance through the pursuit of external research funding and alumni development support.

2. UNDERGRADUATE PROGRAM

2.1. Background

Degree Requirements

EPS offers a Bachelor's of Science (BS) degree in Geology and Environmental Studies (GES), with concentrations in Geology (GEOL) and Environmental Studies (ES), both with associated honors concentrations and minors. The ES program began as an Interdisciplinary Degree Program (IDP) in 1995. In 2012, it was merged with the existing GEOL BS program to form the new GES degree.

All course offerings in the department fall under the GEOL heading, and can be taken by students in either concentration, as well as by students in other departments. Students in the GEOL concentration take a series of 6 required GEOL courses at the 300-level, 3 elective courses at the 400-level in GEOL, or other disciplines, and a Geology Field Camp. The field camp (minimum 5 credit hours) is not offered by UTK, but students can take it through other institutions, with credit transferred to UTK. Students in the ES concentration are required to take several environmental core courses, 5 GEOL courses at the 300- or 400-level, as well as an internship (GEOL 493), and a set of focus courses (minimum 9 credit hours) in another discipline. The focus requirement can also be fulfilled by taking a minor. ES students are not required to take a field camp.

Retention, Enrollment, and Degrees

One- and two-year full-time, first-time freshman retention rates for GES majors for the period Fall 2013 through Fall 2016 are shown in Fig. 1. In general, these rates are higher than the corresponding UTK-wide averages of 86.0% and 79.3%, for one-year and two-year retention, respectively, over the same time period.

Currently (i.e., Fall, 2019) there are 130 students in the in the GES program, and numbers have varied between 121 and 140 students since 2012 (Table 1). Numbers in the GEOL and ES concentrations have fluctuated substantially since 2012, with the Fall 2019 breakdown being 55 in GEOL and 75 in ES (Table 1). The number of students with no declared concentration has decreased dramatically over time. Currently, there is only one student in honors GEOL and none in honors ES, although several ES students are planning to earn an Honors concentration, but have not formally registered for that concentration. There are currently 10 minors in GEOL and 5 in ES. The number of BS degrees in GES awarded by EPS averages 35 per year (Table 1).

EPS - GES

UTK – All degree programs

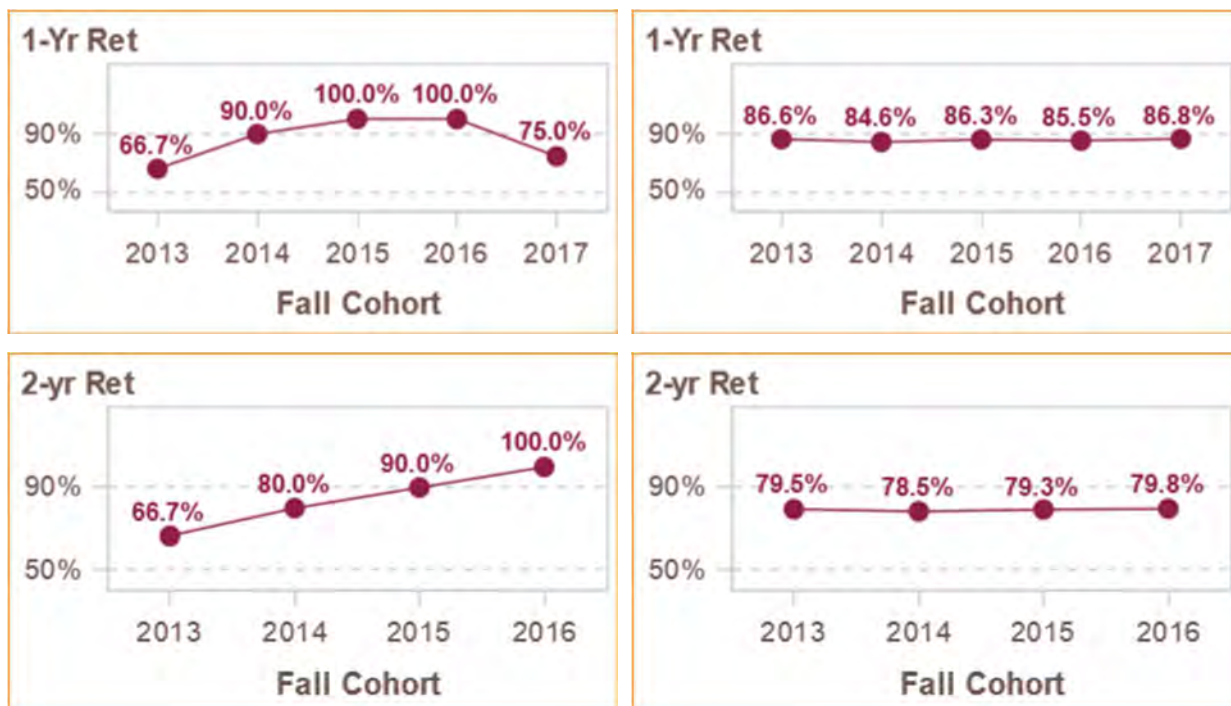


Fig. 1: One- and two-year retention rates for full-time, first-time freshman GES students as compared to those for all degree programs at UTK

Table 1: Undergraduate concentration enrollment and degree production (n/a: data not yet available)

Academic Year	Students in GEOL concentration	Students in ES concentration	Students in GES/ES major but no declared concentration	Total students in EPS UG major	BS degrees in GES awarded
2012/13	65	64	10	139	29
2013/14	64	38	19	121	38
2014/15	58	59	23	140	36
2015/16	51	58	30	139	41
2016/17	63	62	3	128	35
2017/18	51	71	3	125	29
2018/19	n/a	n/a	n/a	129	n/a
2019/20	55	75	0	130	n/a

Time to Completion

Time-to-completion is currently an untracked statistic at the departmental level, and information is not available from the university. It is suggested that EPS begin tracking time-to-completion as part of a proposed exit survey (see section 2.4).

Credit Hours

In Fall 2017, classes at the 100- and 200-level (“lower level”) accounted for 4,471 credit hours, while 300- and 400-level courses (“upper level”) accounted for 570 credit hours. Based on the average of Fall and Spring enrollments (since there is a pronounced oscillation between semesters), upper-level credit hours have increased ~30% since AY 2009-10, while lower level course credit hours have decreased ~20% (Fig. 2).

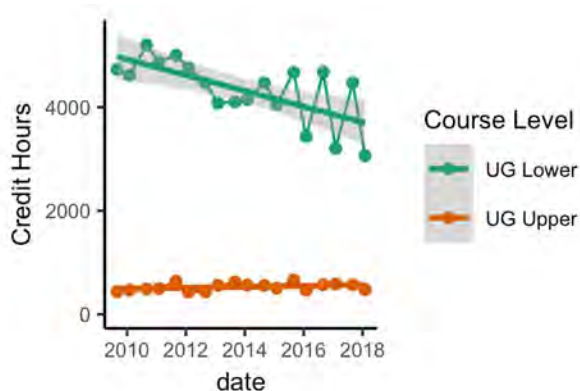


Fig. 2: Undergraduate-level credit hours taught by EPS faculty. “UG Lower” refers to 100- and 200-level courses, “UG Upper” refers to 300- and 400-level courses.

Experiential Learning

At present, 35% of current GEOL students and 8% of ES students have participated in some form of undergraduate research. Undergraduate research is encouraged, but not required by either concentration. Students typically receive course credit (GEOL 493) for research, but rarely produce a senior thesis. Instead, students often make a presentation such as a poster at meeting at UTK or at a professional conference. Occasionally, undergraduate students appear as junior author on a peer-reviewed publication. We have just added GEOL 493R to our undergraduate offerings, to provide a more formal and standardized arrangement for undergraduate participation in research. Undergraduate internships are required for students in the ES concentration, but not for students in the GEOL concentration. These internships offer a practical experiential learning opportunity that we feel will improve student career opportunities upon graduation. They are highly variable and often tuned to the

student's interests and skill set. Some are paid whereas others are volunteer, but all have work hour requirements for the semester. We have just added GEOL 493N to our undergraduate offerings, to provide a more formal and standardized arrangement for undergraduate participation in internships.

Student Placement

Students graduating from GEOL and ES pursue a wide variety of jobs and careers. In a recent survey of GES BS graduates (from the past 6 years) job placement data were collected for 49 students. This represents nearly one quarter of the total GES graduates from 2013 to 2018. Of the 49 BS graduates, 43% pursued graduate or professional degrees, 37% found employment in geological or environmental fields, and 20% found employment in other fields. The department has no information on the other 161 students who received BS degrees during the survey period. It is possible that their employment demographics are very different from the students we were able to track.

2.2. Challenges and Opportunities

Challenges Related to Campus and College Priorities

VolVision 2020 lists 5 main areas for improvement in undergraduate education. These include: 1) growth in student enrollment, 2) improved quality of incoming students, 3) increased retention and improved 5- and 6-year graduation rates, 4) increased engagement of students in enrichment activities like "experiential learning", study abroad, research, etc., and 5) improved success of students in the job market or in pursuing graduate studies. The strategic plan for the College of Arts and Sciences follows the general trend of VolVision 2020. Several of these issues have proven to be particularly challenging, as indicated below:

- a. Increased emphasis on number of undergraduate majors and student credit hours (SCH). UTK has made growth of the undergraduate student body a top priority for the past ~5 years. This was driven by the need for tuition revenue and to meet the demands of the public and employers. UTK invested substantial sums in recruiting staff and freshman scholarships, leading to growth of the incoming freshman class by 2-4% each year over the past three years. Growth of 2% is expected for Fall 2019 and colleges are struggling to provide space in classrooms and majors for the incoming students. These were the highest priorities for the Dean in budget meetings with CAS departments this year.

- b. Increased emphasis on retention and time to completion of UG majors. This is exacerbated by the increase in UG population, especially for programs with extensive pre-requisite requirements and highly specified curriculum.
- c. Increased emphasis on experiential learning, study abroad, student research, internships, number of minors or double-majors, etc.

Challenges Related to UG trends in EPS

- a. Stagnant numbers of majors in the GEOL concentration. This was indicated as a major concern by the Dean during the Spring 2019 budget meeting.
- b. Decrease in SCH's generated in 100- and 200- level GEOL courses, which are primarily populated by non-GES majors. This is due mainly to changes in college and campus level science requirements, but has a negative impact on the department.
- c. Increases in number of community college transfer students entering the GES major in EPS. These students make up about half of the incoming GES majors each year (the highest percentage in the college) and many lack important pre-requisites when they arrive at UT, leading to extended time to completion, as well as lower numbers of credit hours taught and students enrolled relative to the number of students graduating.
- d. Increased competition from other Science, Technology, Engineering, and Mathematics (STEM) majors on campus. There is a limited pool of UG with the skills and desire to be STEM majors. Recently, the Geography major and the Sustainability IDP have seen strong student growth, likely from the pool of students who might otherwise be GES majors.

Challenges Related to Departmental Culture and Demographics

- a. The majority of our faculty focus their UG teaching efforts on the Geology concentration, rather than the ES concentration, even though the majority of our majors are in ES (about 58%). While up to one-half of the credit hours required for the ES concentration are taught outside of the department (18 out of 36 credit hours), the concentration would benefit from a broader base of classes that are attractive to potential ES concentrators. The College sees this as a serious imbalance.
- b. Recent departures of four faculty members (Burr, Emery, Steen (partial) and McKay), with only one hire (ICPMS) in 2019. This will leave EPS with 12 Full Time TT faculty in Fall 2019, which is down from a high of 18 five years ago. It leaves EPS particularly short of TT faculty serving the ES students.

Opportunities for UG Programs in EPS

- a. Interest on campus and in the community for interdisciplinary/liberal arts and sciences programs remains strong. This is evidenced by growth in the ES concentration and there may be potential for further growth through better marketing and development of other tracks or concentrations that focus on interdisciplinary topics and/or the liberal arts and sciences.
- b. There may be potential for some growth in the Geology concentration, given better marketing and development of new options or tracks. However, GES will be competing for a limited pool of candidates with the interest, abilities and background to be successful in rigorous science courses.
- c. The market for jobs and opportunities for graduate studies remains strong for students in both Geology and Environmental Studies.
- d. EPS has a strong record of offering experiential learning for UG students. Students in the Geology concentration mainly pursue this through research, lab work and field trips, whereas ES students pursue it mainly through internships.

2.3. Goals

There was general agreement by the Undergraduate Program Committee (UPC) Strategic Planning Sub-Committee on the following goals, which are listed in order of priority:

- a. Increase the number of GES majors and the number of GES graduates per year.
- b. Increase the quality of the major, especially in key areas related to campus and college priorities.

These include:

- i. Increased participation in UG research and internships,
 - ii. Increased number of GES majors taking minors in other disciplines,
 - iii. Increased number of students pursuing study abroad opportunities,
 - iv. Greater diversity and flexibility in major course requirements.
- c. Reduce the time to completion for GES majors, especially for students who transfer from community colleges or other institutions.
 - d. Improve tracking of career/employment pursued by BS grads and provide more effective career mentoring.
 - e. Increase SCH production per faculty member. This is especially important for upper level courses, because factors leading to decreasing SCH production in lower level courses are largely outside of the control of the department.

2.4. Plans

- a. The department will seek to increase student enrollment via two major approaches:
 - i. Increase awareness of our majors to incoming UTK students by coordinating with counselors at Tennessee high schools and with Admissions to identify students interested in STEM fields. This plan will be implemented by a new committee.
 - ii. Increase the attractiveness of our majors by redesigning our major with new concentration tracks. The redesign will include new concentrations or tracks, potentially including themes such as energy, water resources, and planetary science. These tracks will be crafted to appeal to students who otherwise would not identify their interests as within geology or Earth and Planetary Sciences. It will also allow students interested in pursuing a more traditional geoscience degree to attain the scientific rigor for them to succeed in graduate school or professional career.
- b. Provide incentives and pathways to increased participation in research, internships, and study abroad for students in all concentrations or tracks. This may involve curriculum change.
- c. Improve advising and mentoring for students to help with timely completion. Will also consider curriculum change to reduce roadblock courses. May include removing some prerequisites and/or changing some majors courses from required to elective.
- d. Introduce annual exit survey for GES majors, to improve tracking of career plans and success.
- e. Submit proposals to have more GEOL courses included in connections packages and other college or UTK requirements for non-GES majors. May involve increasing summer and online course offerings.

2.5. Metrics

We will assess the success of the plans outlined in section 2.4 using the following metrics:

- a. Increase the number of GES students to 200 per year, representing a ~40% increase over current numbers. The number of GES students receiving BS degrees will increase proportionally.
- b. Establish quantitative tracking of students who participate in research, internships and study abroad. The number of students participating in these activities will likely increase over time.
- c. Establish quantitative tracking of time-to-completion. Average time-to-completion should decrease, accounting for possible changes in the fraction of transfer students.
- d. Receive completed exit surveys for 50% of graduating students.
- e. Increase the number of SCH to an average of ~290 per full time equivalent (FTE) per semester, which would be equivalent to our productivity in 2012-13 (i.e., ~5,000 SCH from 17.2 FTE's).

3. GRADUATE PROGRAM

3.1. Self-Assessment

Because Ph.D. students are viewed positively by the College, and can increase publication productivity and grant funding within the department, a goal of previous strategic plans was to increase the number of Ph.D. students in our graduate program. In 2000, approximately 35% of our graduate students were in the Ph.D. program, but by 2011, recruitment efforts attracted more Ph.D. students to our program, and nearly 60% of the graduate students were in the Ph.D. program. There were between 56% and 62% Ph.D. students in the program from 2012 through 2019, with an average of 58%. The increase in the number of Ph.D. students was achieved with no major change to the overall number of graduate students in the program, at approximately 50-55 students each year (Fig. 3).

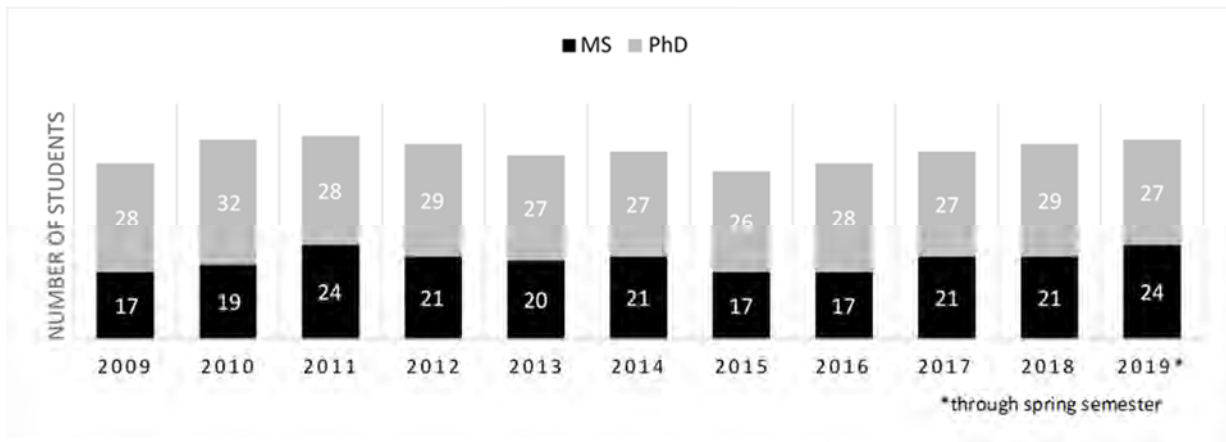


Fig. 3: Number of M.S. and Ph.D. students active in the fall semesters of our graduate programs.

Review of Past Metrics (*previous metrics are listed in italics*)

Based on the Metrics for Success in our 2012 Strategic Plan, over the past 5 years we needed to:

Maintain average Grade Point Average (GPA) for incoming students above 3.7.

This metric was not met when considering only the undergraduate GPA of our incoming students. About 25% of all incoming graduate students in the past 5 years, including those who received a M.S. degree, had an undergraduate GPA at or above 3.7. However, most of the incoming Ph.D. students had higher GPA's for their M.S. coursework, with an average GPA of 3.75, which met the metric.

Increase the number of graduate students from peer-or-above institutions to 60%. This metric is defined to include Top 100 National Universities (UTK ranks 101 by this measure – according to the 2012

Strategic Plan), Top 25 Regional Universities, Top 100 Liberal Arts Colleges and Top 400 World Universities according to US News & World Reports.

During the past 5 years, 19.7% of our incoming graduate students had prior degrees (mostly undergraduate) from UTK. Although we have been able to recruit students into our program from a variety of top-tier institutions, from small liberal arts colleges to large state universities, it became clear that basing a metric like this on an external ranking system is a moving target. Nevertheless, over the past 5 years, only about 25% of our incoming graduate students came from peer-or-above ranked institutions. We need to continue to work on meeting this metric.

Have incoming or existing graduate students receive at least 2 major external fellowships (NSF, NASA, etc.) over the next 5 years.

This metric was exceeded by our existing students but was not met for incoming students. This is because, for the NASA fellowships, as an example, a student needs to already be admitted to the program prior to fellowship submission.

Increase graduate student support to help attract and retain high quality students

a. Increase the number of Graduate Research Assistants (GRA's) to 13 per year within 5 years (the average number of GRA's in the previous 3 years is 9 per year).

This metric was met. The average number of GRA's over the past 5 years has been 14 per year, with a range from 13 to 18.

b. Increase the average M.S. stipend (GRA or Graduate Teaching Assistant, GTA, plus summer salary) to \$18K/year (i.e., 60% of the NSF Grad Fellowship stipend).

This metric was not met, and the base salary for our students is somewhat out of our control. We advocate for raises when we can. The base M.S. stipend remained unchanged until Fall 2018, when all students received a \$300 raise, bringing them to \$13,800/year. With toppings, the average M.S. stipend currently stands at \$16,600. To offset the low base stipends, M.S. students receive "toppings" from various fellowships (e.g., Department, College, and Graduate School) or summer support from their advisors using external grant funds.

Increase the average Ph.D. stipend (GRA or GTA plus summer salary) to \$24K/year (i.e. 80% of the NSF Grad Fellowship stipend).

This metric was not met, and the base salary for our students is somewhat out of our control. We advocate for raises when we can. The base Ph.D. stipend remained unchanged until Fall 2018, when all students received a \$300 raise, bringing them to \$15,300/year. With toppings, the average Ph.D. stipend currently stands at \$21,000. To offset the low base stipends, most Ph.D. students receive “toppings” from various fellowships (e.g., Department, College, and Graduate School) or summer support from their advisors using external grant funds.

Increased placement of Ph.D. graduates in prestigious tenure-track faculty positions

- a. *Place 3 PhD graduates in tenure-track positions at peer-or-better institutions, defined as Top 100 National Universities, Top 25 Regional Universities, Top 100 Liberal Arts Colleges or Top 400 World Universities.*

This metric was met. We placed four students at nationally ranked peer- or better institutions.

- b. *Place a total of 10 Ph.D. graduates in tenure-track positions in 4-year universities or colleges (including the above).*

This metric was met. Overall, 13 of our Ph.D. graduates took tenure-track positions nationally or regionally ranked institutions, and another 3 took faculty positions at non-ranked schools. These graduates represent 57% of all Ph.D. students from our program since 2012.

Decrease the time necessary for M.S. graduates to complete their degrees : ~ 50% of M.S. students should finish within 2 years.

Although we guarantee 2 years of support for our M.S. students, this metric was not met. However, there was a noticeable decrease in the time to M.S. degree completion from 2009 through 2012. But, by 2018, on average, only 10% of the M.S. students finished their degrees within 2 years. The average time for M.S. degree completion is 3.06 years (Fig. 4).

Similarly, there has also been a general decrease in the average time to Ph.D. degree completion since 2009 (Fig. 4), although this was not one of the previous metrics. Overall, we guarantee 4 years of support for Ph.D. students, but only 25% of our Ph.D. students finish in 4 years. Approximately 54% finish within 5 years. Timely graduate degree completion needs to continue to be a focus area for our department.

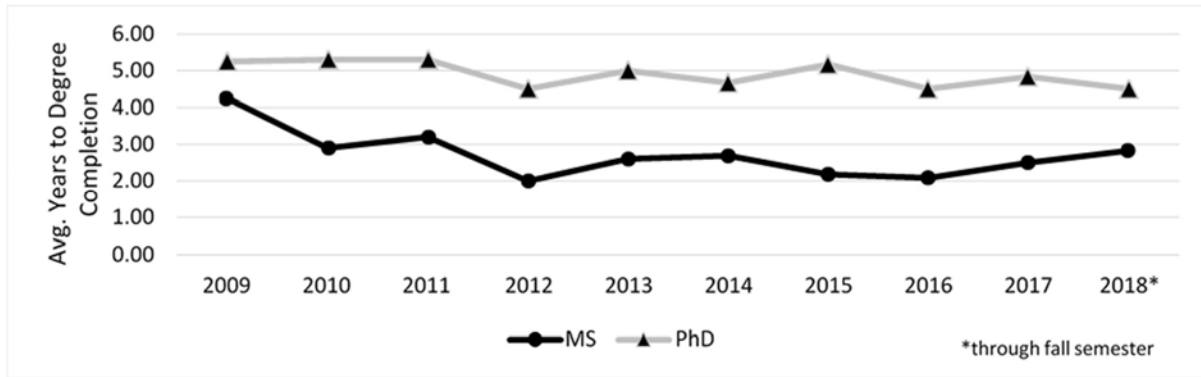


Fig. 4: Average years to M.S. and Ph.D. degree completion since 2009

Increased placement of M.S. graduates in career positions or top Ph.D. programs

a. *Place one-third of M.S. graduates into Ph.D. programs.*

This metric was not met. Only 10% of the M.S. students went into Ph.D. programs.

b. *Place remaining M.S. graduates into career positions in the petroleum industry, government, teaching, etc.*

This metric was met. Roughly <5% of M.S. students did not gain employment within their discipline.

3.2. Gap Analysis

The quality and throughput of our graduate programs needs to increase. At present, we have a few outstanding graduate students and many good ones. There is still room for improvement through better recruiting, more effective mentoring, higher stipends, better achievement recognition, and support for diverse career options and placement. We need to encourage timely degree completion, especially among the M.S. students, and make efforts to improve the requirements for Ph.D. students who enter the program with a B.S. degree so that they can complete their degrees within the current guaranteed funding window. We need to increase the number of students who go on to academic positions and high-salary professional positions (e.g., with major energy and environmental consulting companies).

3.3. Action Plan

We plan to improve the quality and output of the Graduate program through:

- a. Greater efforts to recruit and retain top quality graduate students. This will include better advertising, especially at conferences, offering higher stipends or “toppings” using external grant funds and alumni donations, and better organization/support (using EPS development money) of campus visits by recruits.
- b. The Graduate Program and Admissions Committee (GAPC) will review and likely revise policies to streamline degree completion for M.S. students and to raise the standards for Ph.D. students. Strategies already implemented include more active enforcement of existing rules on the timely completion of thesis proposals (especially for M.S. students and their advisors), encouraging timely completion of preliminary exams for Ph.D. students, and previously setting a more rigorous pre-graduation publication requirement for Ph.D. students. Moving forward, expectations should continue to be explained and enforced to assist students and advisors.
- c. Increased mentoring support for graduate students applying for prestigious research grants, post-doctoral opportunities, faculty positions, and other competitive career opportunities.

3.4. Metrics for Success

- a. Increase the quality of incoming graduate students by recruiting top students, as characterized by their undergraduate GPA, undergraduate research experiences, and the quality of their undergraduate programs, as well as potential graduate-level research and experiences.
- b. Continue to support existing students applying for major external fellowships (e.g., NSF, NASA, Fulbright, etc.), with the goal of receiving at least 2 successful fellowships over the next 5 years.
- c. Increase graduate student stipend support that will help to attract and retain high quality students. GAPC will continue to work with the College and Graduate School to increase student stipends across the board, but will also utilize departmental funds (i.e., from endowments) and from faculty mentors to “top up” salaries, including summer salary. With toppings, the goal is to make graduate student stipends comparable to peer institutions.
- d. Decrease the time necessary for degree completion for M.S. and Ph.D. students with or without prior M.S. degrees.
- e. Increase placement of M.S. and Ph.D. students into prestigious graduate programs, tenure-track faculty positions, as well as competitive industry, government, and teaching positions.
- f. Increase mentoring capacity and effectiveness among faculty advisors by revising documentation and timelines.

4. FACULTY AND RESEARCH

4.1. Self-Assessment

At the time of our last strategic plan in 2012 there were 17 full-time TT faculty. This number was unchanged from the number in 2000. Since then, the number of TT positions has declined to 12 (Fig. 5). The recent losses of Burr, Emery, McKay (to the College), and Steen (60% to Microbiology), in particular, have left the department in a perilous situation. Without a critical mass of TT faculty, our ability to teach and mentor undergraduate and graduate students is coming under strain. Moreover, low faculty numbers decrease our ability to conduct high impact cutting-edge research through external grants from national funding agencies, and serve on committees as needed for the operation of EPS and the College while contributing to the service of professional societies and funding agencies. Without corrective action, the added workload associated with our current state of understaffing will impact the performance of our faculty in terms of annual reviews and promotions as well as the ability of the department to retain faculty.

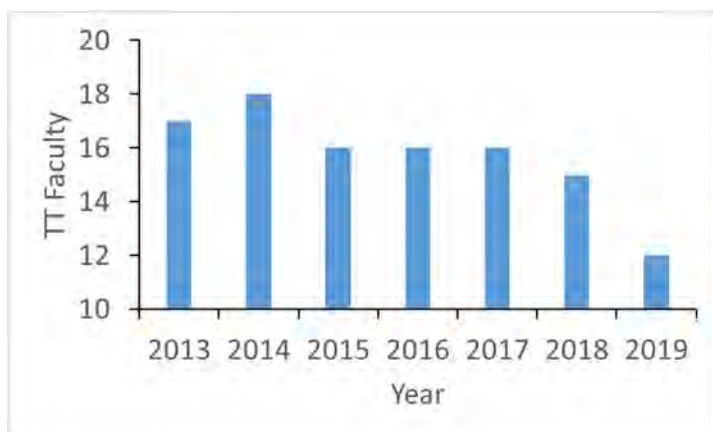


Fig. 5: Full-time tenure track (TT) faculty in EPS in the Fall of each year

The department continues to maintain three basic areas of disciplinary scholarship: Geology, Environmental Science/Studies, and Planetary Science. At the time of our last strategic plan in 2012 there were with ~5-6 faculty members in each area. Now, although the number of TT positions has declined, there is significantly more overlap between areas, with at least 5 faculty working in more than one area. As a result, the current distribution of TT faculty members within each area is ~7 in Geology, ~4 in Environmental Science/Studies, and ~6 in Planetary Science.

External research funding has grown since our last strategic plan. In 2009/10 (when we had 14 TT faculty members), total external grant expenditures were approximately \$2.55M (\$182K per TT faculty member). In 2017/2018 (when we had 15 TT faculty members, and after two of our most

successful grant-winners, Professors McSween and Taylor, had retired), total external grant expenditures were \$2.91M (\$194K per TT faculty member). This corresponds to an overall increase in external funding of 14% and a per-faculty member increase of 6.6% over a period of 8 years. This shows that EPS faculty members continue to compete successfully—on a per TT faculty member basis—with larger departments such as Physics, Chemistry, and the combined departments of the Division of Biology. In fact, a recent (Oct, 2018) report presented by the CAS Associate Dean for Research and Facilities showed that EPS was the only department in the College in which every TT faculty member was receiving external funding in the past two years (FY 2017 and FY 2018), with the average across the Natural Sciences departments being just under 70% of TT faculty receiving external funding.

4.2. Gap Analysis for Improvement

EPS fully supports the institutional and departmental improvements identified in VolVision 2020, and will act to implement them. Additionally, we have identified several critical gaps between EPS and Top Tier 1 Geoscience departments in other public institutions. These are discussed in the following paragraphs. The focus is on gaps where we see the need and potential for substantial improvements. Some of these gaps can be addressed using departmental resources, while others will require input from the College of Arts and Sciences and/or UTK upper administration.

The number of TT faculty in EPS (12 as of August 2019) is substantially below that of nearly *all* Tier 1 research geoscience programs in the country. Productive Tier 1 programs typically have 20 to 40 TT faculty members (Appendix 8.1), and these levels are necessary to provide the scientific depth and scholarly output required to gain recognition as a highly successful program. Our small number of faculty limits our net scholarly output, our service footprint, our visibility in the larger geoscience community, and (because of how the metrics are structured) our departmental ranking in publications like US News and World Report. The small number of faculty means that our service burden per faculty member is higher than larger departments, which takes time away from research and teaching. It also means that on average our faculty must teach more introductory and core curriculum courses instead of seminars and upper-level electives that enrich undergraduate and graduate curricula and our research programs.

These issues affect our ability to raise external funding, compounding the challenges we already face as a small department with limited internal research support. Overworked faculty are less likely to engage in department social events or contribute to extracurricular and outreach events. From existing productivity trends on a per-faculty basis it is clear that additional TT positions in critical areas within EPS would be a “good investment” for the College and University. Hiring more tenured and tenure-track

faculty would improve undergraduate and graduate-level teaching, help us raise external funds, improve the quality and stature of our research, and the overall climate and culture in the department.

Many Tier 1 medium-sized (~20 TT faculty) research departments (e.g., University of Wisconsin, University of California Davis, University of Minnesota) have supporting technical staff including, technicians, lab managers, and technology specialists (Appendix 8.1). Consequently, faculty at these institutions show higher research productivity than EPS faculty because of the professional technical support. EPS has relatively few professional technical positions relative to typical Tier 1 geoscience programs (Appendix 8.1). EPS currently has 1.44 technician positions supported by the college and 1.00 technician positions supported by external funding. College support includes a 100% funded position for the electron microprobe facility and a 44% funded position for the stable isotope facility, with additional 16% support by EPS. External grants support 40% of a technician position for the stable isotope facility and 100% for the analytical geochemistry and geomicrobiology facility. An additional technician position is anticipated for the new ICP-MS facility, but the level of support from the College is currently unknown.

Currently, the following facilities do not have any technical support: experimental petrology laboratory (which contains machining equipment and high and atmospheric pressure experimental apparatuses), saw/polishing laboratory, and the newly-created geochemistry research undergraduate laboratory in Strong Hall (which contains high-maintenance technical instrumentation including gas and liquid chromatography systems, multiple mass spectrometers, and field equipment for environmental monitoring). Overall, this low level of technical support requires TT faculty members, graduate students, and post-docs (the latter funded on external grants) to carry out time-consuming routine technical tasks in support of laboratory facilities, taking valuable time from conducting cutting-edge research. It also limits our ability to use research-quality laboratories in our graduate and upper level course teaching, and is a significant impediment in our efforts to recruit and retain faculty.

EPS has relatively few postdoctoral researchers and Research Faculty members, compared to Top Tier 1 programs. In the geosciences, especially in planetary geosciences, Research Faculty members and sometimes even postdocs can often support themselves on external grants and add value to the research and graduate mentoring missions of a department.

4.3. Action Plan

4.3.1. New Hires

The department is committed to an aggressive hiring plan in order to return to a critical mass of between 16 and 18 TT faculty by 2025. Between 2016 and 2019, EPS made three outstanding TT faculty

hires and one outstanding lecturer hire and we intend to continue this trend. We plan to request one new TT faculty line per year for the next five years. This is in addition to replacing any TT positions vacated by retirement or other departures. If successful this strategy will raise total TT positions in EPS to approximately 17 by 2025. We intend to submit faculty hiring proposals to the College that will highlight the Department's potential to quickly reach Top Tier 1 status, the high productivity of recent EPS faculty hires (including the rapid return on investment from the use of startup funds as seed money for new research initiatives), the international recognition of our research programs, and the high degree of collaboration that EPS faculty have with other departments, colleges, and ORNL.

Tenure-track faculty hiring will focus on the following teaching and research needs and will be guided by cognizance of VolVision 2020 goals to produce an objective recruitment process.

Teaching Needs

With the current small number of TT faculty, the Department's ability to meet its teaching commitments is inadequate. At the present time, the following teaching needs are particularly acute:

- a. *Environmental Studies*. The ES program accounts for over half of our majors and yet we only have 4 TT faculty who regularly teach ES courses.
- b. *Geophysics / geodynamics*. These subjects are fundamental to the undergraduate and graduate curricula in geology and teaching postdocs have been covering geophysics courses for the past ~5 years.
- c. *Introductory-level courses*. The large enrollments in these courses mean that we must rely on lecturers, teaching post-docs, graduate students, and adjunct lecturers, in addition to TT faculty, to teach them.
- d. *Core curriculum geology courses*. Most core curriculum courses are taught by a single faculty member every year. These include Structure, Petrology, Mineralogy, and Paleontology. This impacts the quality of the graduate program by limiting the ability of these faculty to offer upper-level electives. Sedimentology and Planetary Science are co-taught or taught by multiple faculty in alternating years; departure of current faculty in these areas could put a similar burden on the remaining instructors of those courses.
- e. *Planetary geoscience*. EPS has one of the world's pre-eminent programs for graduate education in planetary geoscience, and approximately 40% of our current graduate student population is working in this area. However, because of recent retirements and departures of key planetary faculty to competing programs (which in itself is a mark of our success), our ability to sustain current levels of teaching and graduate advising, while maintaining quality of the program, is in serious jeopardy.

The teaching needs outlined above can be related to priorities one (Undergraduate Education) and two (Graduate Education) of VolVision 2020. First, a critical number of faculty members in EPS is required to implement the Undergraduate Education goal of improving “academic quality through Experience Learning and innovative new approaches to general education.” Second, by having a critical mass of faculty members we can better position ourselves to meet Graduate Education goals such as “Improve recruitment and financial support to attract excellent students” and “Improve graduate student outcomes through focus on career placement and timely completion of degrees.”

Research Needs

The quality of our current research programs is internationally recognized; however, our small number of faculty affects department rank and profile. We propose to improve our research impact by:

- a. Hiring TT faculty in fields complementary to our existing research strengths. These include Planetary Science, Structure / Tectonics, Deep Time, and Environmental Geoscience. This practice helps departments develop outsized reputations in specific specializations, and it has already served us well in developing our current reputation. It also ensures the critical mass necessary to support the graduate program, and promotes intradepartmental collaborations as well as group synergy.
- b. Hiring faculty in fields with long-term potential to generate significant external research funding. We view research that takes advantage of novel analytical, experimental or quantitative methods, planetary missions, and/or research that crosses traditional disciplinary boundaries as having the highest potential for long-term fundability. We note that current and former faculty have been exceptionally successful raising money through NASA and NSF programs. These faculty members could also pursue collaborative transdisciplinary research.

These research needs can be related to priorities three (Research, Scholarship, Creative Activity, and Engagement) and four (Faculty and Staff) of VolVision 2020. For example, one of the major Paradigm Shifts, “Support Transdisciplinary Research”, aligns with our goal of obtaining new faculty to engage in transdisciplinary collaborative research within the Earth and Planetary sciences, as funded by national funding agencies such as NSF and NASA. In terms of Excellence in Sponsored Research, “Improve Proposal Competitiveness,” the new faculty positions would be in a more competitive place to pursue external funding for collaborative research because of the Department’s emphasis on creating a more supportive environment. Also, a critical number of faculty lines will be needed in order to “Increase Student Research Experiences” through engaging undergraduate students in Experiential Learning as well as graduate student research. As related to Effectiveness and Cost Management, the new Strong Hall facility is a successful example of the goal to “Improve Research Infrastructure” that is

an existing foundation for EPS. It is now possible to pursue a hiring plan that can take full advantage of our new cutting-edge facilities for labs, collaborative areas, and teaching. Through the Strategic Direction 2020 for faculty and Staff, EPS is in an excellent position to attract and retain additional competitive faculty lines. Our need to attract excellent faculty members is supported by the Strategic Direction to "actively recruit for top faculty talent on a national level, which will require competitive salary and start-up packages." Also, due to Action Priorities related to Faculty, our department is well placed to recruit and retain excellent new faculty members. In agreement with VolVision 2020, the new hires will be in fields where long-term access to external research funding can be reasonably anticipated. In general, such fields for EPS might include Earth and planetary materials or processes, environment and sustainability, renewable energy, and climate change.

4.3.2. Technical Support

Hiring additional laboratory managers is supported by VolVision 2020 under the Strategic Direction for Faculty and Staff, i.e. "build the staff capabilities required to meet the growing challenges and complexities of a research intensive university." New laboratory manager positions also fall under Action Priorities for staff. Therefore, we plan to request the following increases in technical support positions over the next 5 years:

1. Request an additional technician position line from the College to support the new ICP-MS laboratory. This position would also support existing rock preparation and saw/polishing facilities.
2. Request equal support of 70% for four technician positions, one in each of our main research facilities: the electron microprobe laboratory, the stable isotope laboratory, the analytical geochemistry and microbiology laboratory (including a newly-created undergraduate geochemistry research laboratory), and the ICP-MS laboratory. This would require a doubling of the College's support, from its current level 1.44 FTE employees to 2.88 FTE employees.

4.3.3. Faculty Mentoring

We plan to improve our faculty mentoring system to better facilitate faculty retention and promotion. Currently, Assistant Professors are assigned a team of three mentors from the tenured faculty, and undergo a thorough mid-term review as prescribed by the University. Associate Professors also have a team of three mentors from the full faculty members. Faculty members requesting promotion to Professor undergo a preliminary review, one to two years in advance of their expected application for promotion, and meet with senior faculty members to discuss strategies for compiling a successful dossier.

It is not clear how successful this team-based approach to mentoring has been, or how frequently the teams meet with their mentees. Therefore, other types of one-on-one mentoring will be explored, including feedback from our recently-implemented enhanced annual evaluation procedure (which involves a committee of three full professors in addition to the Head), that will more clearly define and communicate performance expectations. Any proposed changes to the mentoring process will likely require revisions to our Department Bylaws.

4.3.4. Faculty Development Leaves

Where possible, we plan to make changes in departmental service and teaching assignments so as to encourage applications for Faculty Development Leaves (FDL), which have been relatively rare in EPS. Increased FDL's would allow research-productive faculty to spend more time seeking external funding, carrying out research, and mentoring graduate/undergraduate research. This would also help to achieve the VolVision 2020 objective of pursuing "Transdisciplinary Research." Increasing the number of TT faculty (as outlined in section 4.3.1) is critical to facilitating more FDL's, as it would reduce service and teaching loads.

4.3.5. Post-doctoral Researchers and Research Faculty

We plan to seek additional funding opportunities in NASA, NSF, and other agencies to support Post-doctoral researchers and Research Faculty. The goal is to grow the number of Post-doctoral and Research Faculty appointments in EPS. These positions increase research productivity, the generation of external funding, and collaborations within and external to the department.

4.4. Metrics for Success

- a. Increase the number of TT faculty in EPS from 12 to 17 in 2025.
- b. Maintain 100% of TT Faculty with at least one externally-funded grant per year.
- c. Increase external research expenditures to over \$200K per year per TT faculty member in 2025.
- d. Have every TT faculty member in EPS publish a 5-year average of at least 2 peer-reviewed journal articles, book chapters, or books per year.
- e. Have 100% of TT faculty mentoring at least one M.Sc. or Ph.D. student each year, with at least one graduated student every second year.
- f. Increase the number of FDL's taken by TT Faculty from 0.5 per year to 0.75 per year in 2025.
- g. Obtain support from the College for 70% of salary for four technical staff positions.
- h. Double the number of Post-doctoral Researchers and Research Faculty in EPS from 4 to 8 in 2025.

- i. Have EPS receive at least 1 major professional award for its faculty every other year. This includes AAAS, GSA, or ASA Fellows, as well as Penrose, Miner, Meinzer, Gilbert Awards, etc.

5. DIVERSITY AND INCLUSION

This section of the strategic plan was developed by a departmental subcommittee comprised of both faculty members and graduate students.

5.1. Where We Are Coming From

Although always committed to diversity and inclusion, the Department of Earth and Planetary Sciences (EPS) has not paid much explicit attention to these issues in the past. The only mention of diversity in the last EPS Strategic Plan, dated March 2012, was its appearance as one of the Department's guiding values, i.e., "Professionalism, cooperation, and respect for individuals and for gender/racial/ethnic diversity." There was no specific mention of diversity or inclusion in the EPS mid-cycle self-study document, dated September 2016.

During the 2016 mid-cycle review process, and more recently, some concerns were raised with the Head that the treatment of men and women in the department has not always been equal. The Department is working very hard to create a culture where everyone is treated equally and respectfully, regardless of gender or race or any other distinctions. Some of the recent concrete actions that have been taken to help facilitate this goal are listed below:

- a. Since Fall 2016 all Faculty have been required to complete online Mandatory Reporter training,
- b. In Fall, 2016, Jennifer Richter from the Office of Equity and Diversity (OED) gave a talk entitled "UTK's sexual misconduct policy and mandatory reporter responsibilities" as part of our Klepser seminar series,
- c. In Spring 2018, the Head and members of the department's executive committee met with Jennifer Richter and Ashley Blamey from the OED and Title IV offices, respectively, to discuss gender discrimination concerns among grads in EPS,
- d. In Fall 2018, the department implemented the requirement that all graduate students must successfully complete the University's online Mandatory Reporter training,

- e. In Fall 2018, all faculty, staff and graduate students were required to attend (as separate groups) a 50-minute Title IX presentation (with Q & A) on gender equity and sexual harassment issues by the Office of Equity and Diversity,
- f. In Fall 2018, Suzie Allard, Associate Dean for Academic Programs in the College of Communication & Information, gave a talk on “Mentor-Mentee Relationships” as part of the Klepser seminar series.
- g. In Spring 2019, all faculty, staff and graduate students were required to complete online Code of Conduct training.
- h. In Spring 2019, the department’s chapter of the Association for Women Geoscientists hosted a Diversity Education workshop by UTK’s Office of Multicultural Student Life focused on “similarities and differences, inclusion and exclusion, and bias.”

5.2. Where We Are Now

At the undergraduate level, the gender distribution of our majors (Fall 2018) is currently 59% male, and 41% female. Excellent progress has been made over the past 5 years in increasing the number of females in the undergraduate program, with the percentage change in female majors increasing by 28%, as compared to a decrease of 9% in male majors over the same time interval (Fig. 6).

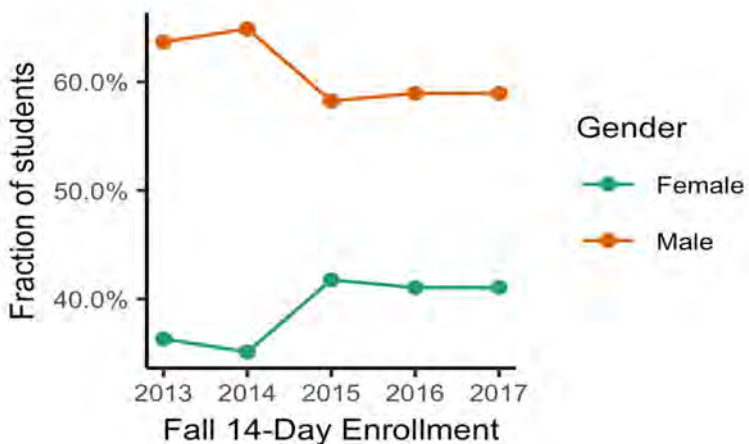


Fig. 6: Students majoring in GES by gender.

In terms of race, 77% of our majors are white, non-Hispanic. African American, Hispanic, and international students currently (Fall 2018) make up 5%, 4%, and 4%, respectively of our undergraduate majors. The fraction of self-identified White students has decreased slightly from 87% in 2013, while other race/ethnicity classes have held roughly steady. Approximately half of our undergraduates are transfer students from junior college – a number that has been growing since the advent of the

Tennessee Promise Program. Since 2013, 79-82% of students had in-state status, with the remainder mainly from a few adjacent states.

At the graduate level, the Department has a relatively equal mix in terms of gender (Fig. 7). We also have Lesbian, Gay, Bisexual, Transgender and Queer (LGBTQ) graduate students within the Department who are open regarding their sexual orientation. The graduate student population is dominated by white, non-Hispanics. In Fall 2018 only, 4% of graduate students were international students, and only 1% identified as either African American or Asian. A total of 77% of all graduate applications to the Department over the past 4 years were received from white, non-Hispanic students. Over the same time period, only 11%, 1%, and 8% of graduate applications to the Department came from African Americans, Asians, and Hispanics, respectively.

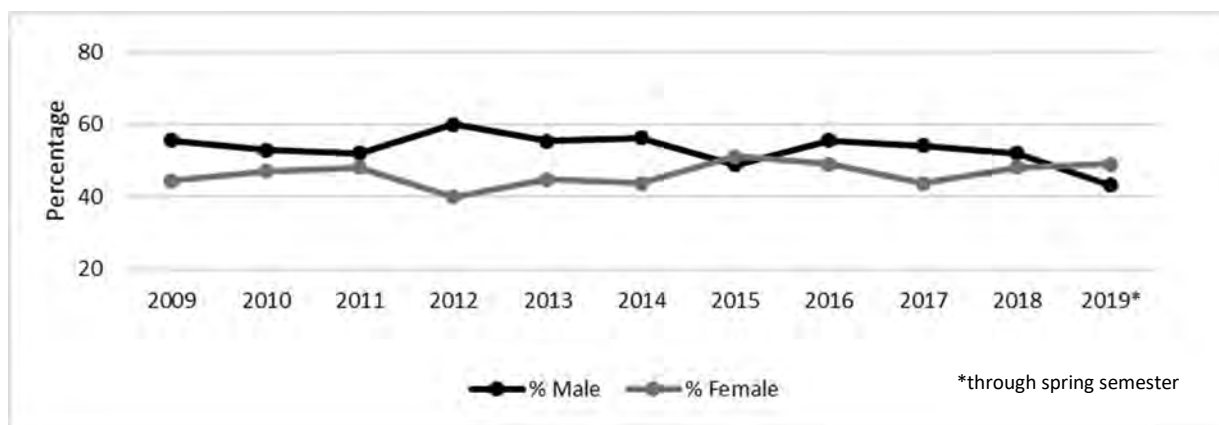


Fig. 7: Percentages of male and female graduate students over time.

Faculty and staff are relatively non-diverse White, other than 8% Hispanic and 8% International. There are currently no African Americans, Asian Americans, or Native Americans represented. Since the last strategic plan, the Department has made some progress, through strategic and target of opportunity hires, in improving the gender balance among faculty, with females now making up approximately one third of active faculty.

5.3. Where We Are Going

In Fall 2019 we created a new Diversity Council led by one faculty member, one graduate student and one undergraduate student. This Council will meet regularly with any interested faculty, staff and students to have conversations with, and generate input on, what we can do to better to accommodate and increase our departmental diversity. The Council is also tasked with developing a diversity component to our website, including creating an anonymous comment mechanism to report

perceived diversity-related issues, and coordinating annual Safe Zone training (see below). We recommend that the Department adds these new Diversity Council positions to its Bylaws and formal service assignments.

We plan to continue efforts to eradicate concerns that men and women in the department are not treated equally. To help facilitate this we have developed a departmental position statement on diversity and inclusion, as well as a departmental code of conduct (see Appendices 8.2 and 8.3). We recommend these guidelines be incorporated into the Department's Bylaws, which are currently under revision. Once approved they will be linked to the departmental website with the expectation that all members of EPS will adhere to them.

We will strive to increase diversity among the graduate student population, including gender and underrepresented minorities. We will try to maintain an even gender ratio. Few of our graduate students belong to an underrepresented ethnic minority, which generally matches the national trend for M.S. and Ph.D. geoscience programs. Although we recognize that the geosciences tend to have the least diversity among STEM disciplines nationally, we would like to increase their representation in EPS. We will work to recruit and retain well-qualified undergraduate and graduate students from diverse, non-traditional, and international backgrounds. Specific goals in this regard include: at least 5% of graduate students with African American, Hispanic, and/or Asian backgrounds, and at least 10% international students. We will continue to make full use of specific College recruiting funds to bring in underrepresented minorities for onsite interviews during graduate student recruiting.

To better recognize implicit biases, and to learn how to be inclusive of all genders and sexualities, we plan to offer annual Safe Zone training (<https://thesafezoneproject.com/>) to all of our graduate students. Graduate students often interact with undergraduate students on a one-on-one basis as teaching assistants. Thus, Safe Zone training of graduate students should also benefit the recruiting and retention of undergraduate students. The Diversity Council will be responsible for coordinating the annual Safe Zone training.

We view the Klepser seminar series as an integral part of graduate education in the department and the speakers as scientific and societal role models. Therefore, efforts will be made each semester to bring in a diverse and inclusive line up of top quality speakers from different disciplines and, when possible, under-represented groups.

We believe that the inclusion of a faculty member from an under-represented group can be a stimulus to recruiting students from minorities, just as the enrollment of females in our undergraduate and graduate programs has increased as the percentage of female faculty has increased. Therefore, we will make explicit efforts to recruit and retain more diverse faculty and staff. Specifically, we will strive to recruit a qualified faculty member from a minority racial group (African American, Asian, Hispanic, or Native American), or one with an openly LGBTQ sexual orientation. To help facilitate this recruiting effort, we will employ targeted advertising on sites such as the Association for Women Geoscientists (<https://www.awg.org/>) and the National Association of Black Geoscientists (<http://www.nabg-us.org/>). We will require all faculty members to participate in STRIDE (Strategies and Tactics for Recruiting to Improve Diversity and Excellence) training (<https://stride.utk.edu/>) to better understand how systemic biases can affect judgement. Additionally, we recommend that all faculty members avail themselves of the Safe Zone training offered to graduate students, to learn how to be inclusive of all genders and sexualities, as well as how to support students with marginalized identities.

5.4. Metrics

We will use departmental data collected by the UPC and GAPC, and well as Academic Unit Statistics available on the University's Office of Institutional Research and Assessment website (<https://oiradev2.oira.utk.edu/onlineReporting>) to evaluate the success of our specific goals for increasing departmental diversity.

6. ALUMNI RELATIONS AND DEVELOPMENT

6.1. Background (where we are)

The 2012 EPS strategic plan set goals of doubling the total departmental endowment, from \$2M to \$4M, establishing two new endowed professorships or faculty achievement awards, establishing 10 new term gift agreements (usually 5 year terms) and 5 bequests. The department has achieved all of these goals and more. The market value of EPS endowments at the end of 2018/19 academic year was over \$7.0M. Seven new endowed professorships/faculty achievement funds have been created, along with four new graduate fellowships, one new undergraduate scholarship endowment, several special use endowments, and a new discretionary endowment – the Strong Hall fund. Engagement with alumni increased substantially since 2012, resulting in a reinvigorated EPS Advisory Board, which now meets twice a year and sets its own agenda. The Advisory Board is now playing a greater role in student career mentoring and recently established a set of Advisory Board scholarships funded by Board dues. The

success in alumni engagement and development since 2012 appears to be the result of the combined efforts of former department head, Larry McKay, college-level development staff, and leaders of the Alumni Board.

6.2. Opportunities and Challenges

It may be difficult to sustain the current high level of alumni engagement and development, especially as key people leave the department or college. The department is experimenting with making greater use of emeritus faculty (McSween) to lead the development effort. This is helpful, but must be supplemented by senior faculty members and/or the departmental head. The department must maintain good engagement with the Advisory Board and be responsive to their suggestions and needs. It is also important that the department become more effective in making annual expenditures from endowments more transparent and showing that these are beneficial to our students and programs.

6.3. Goals for next Ten Years

- a. Grow the EPS Advisory Board to at least 30 members. Such a large group will provide a wide variety of insights and assistance for fund-raising.
- b. Increase opportunities for the Advisory Board to provide career mentoring for students. This can include more interactions with students at alumni board meetings.
- c. Improved plans and oversight for efficient allocation and spending from endowments. This will be the responsibility of the department head, with advice from the college development office.
- d. Greater transparency in reporting spending from endowments so that donors can see that their gifts are benefiting our programs, faculty and students. This will be the responsibility of the department head, with advice from the college development office.
- e. More frequent nomination of alumni for departmental and college awards. This will be the responsibility of the department head, with advice from the college development office.
- f. Continue to encourage giving by alumni, friends, and faculty to increase overall endowment to \$10M by 2029.

7. RESOURCES USED

The data presented in this plan were obtained from a variety of sources, including:

- a. UTK's Office of Institutional Research and Assessment (OIRA) website:

<https://oiradev2.oir.ute.edu/onlineReporting>

- b. UTK Data Central <https://data.utk.edu>
- c. Internal departmental committee, faculty and staff records.
- d. The previous EPS Strategic Plan dated March 1, 2012.

The departmental position statement (Appendix 8.2) closely follows that of the Geological Society of America's Commitment to Diversity statement, on which it was modeled. Portions of the Code of Conduct and some of the definitions (Appendix 8.3) and were drawn from the following sources:

- a. The Association of American Colleges and Universities
- b. The American Association of Public and Land-grant Universities Commission for Access Diversity and Excellence
- c. The American Geophysical Union's 2017 Scientific Integrity and Professional Ethics Handbook
- d. Guidelines for Faculty, Jackson School of Geosciences
- e. Middle Tennessee State University Department Code of Conduct
- f. Sumrall Lab Group Code of Conduct, as modified from the Paleontological Society Code of Conduct
- g. The Toolik Field Station Code of Conduct
- h. The University of Alaska Fairbanks Code of Conduct template
- i. Vol Vision 2020
- j. Wikipedia

8. APPENDICES

8.1. Departmental Ranking Relative to Peer and Aspirational Institutions

Peer Universities	Univ. Rank	Department	Dept. Rank	TT Faculty	Res. Fac.	Post-docs	Lecturers	Admin. Staff	Lab. Tech.
Virginia Tech	76	Geosciences	28	23	5	–	–	3	5
University of Tennessee	115	Earth and Planetary	54	15	2	2	4	4	2
University of Missouri	129	Geological Sciences	78	12	–	4	–	3	–
University of Nebaska	129	Earth and Atmospheric Sciences	78	22	1	–	1	1	–
University of South Carolina	106	Earth, Ocean and the Environment	90	49	6	4	3	4	–
Louisiana State University	140	Geology and Geophysics	90	22	–	–	1	4	2
University of Kentucky	147	Earth and Environemtnal Sciences	107	12	1	3	2	1	1
University of Alabama	157	Geological Sciences	114	22	1	0	1	3	3
North Carolina State	80	Marine, Earth, and Atmosphere Sci	>124	32	8	14	3	5	5
Auburn University	115	Geosciences	>124	18	1	2	7	2	2
Iowa State University	119	Geological and Atmospheric Sci	>124	22	–	4	–	5	–
Clemson University	66	Env Engineering and Earth Sci	>124	24	6	7	4	7	–
Aspirational Universities	Univ. Rank	Department	Dept. Rank	TT Faculty	Res. Fac.	Post-docs	Lecturers	Admin. Staff	Lab. Tech.
University of Wisconsin	49	Geosciences	15	18	9	13	–	4	8
University of Minnesota	76	Earth Sciences	25	28	31	13	–	7	20
Purdue University	56	Earth, Atmospheric, Planetary	41	35	–	1	–	9	1
University of Tennessee	115	Earth and Planetary	54	15	2	2	4	4	2
University of Florida	35	Geological Science	54	18	1	9	6	2	1
Michigan State University	85	Earth and Environmental Sciences	64	21	5	–	1	4	4
University of Georgia	46	Dept of Geology	90	15	0	1	–	5	1
University	Univ. Rank	Peer Departments	Dept. Rank	TT Faculty	Res. Fac.	Post-docs	Lecturers	Admin. Staff	Lab. Tech.
University of Tennessee	115	Earth and Planetary	54	15	2	2	4	4	2
University of Florida	35	Geological Science	54	18	1	9	6	2	1
University of Houston	171	Earth and Atmospheric Sciences	54	32	22	3	4	9	–
University of New Mexico	187	Earth and Planetary	46	19	10	–	2	4	3
University of Hawaii	157	Earth Sciences	41	23	3	–	–	4	2
Purdue University	56	Earth, Atmospheric, Planetary	41	35	–	1	–	9	1
University	Univ. Rank	Aspirational Departments	Dept. Rank	TT Faculty	Res. Fac.	Post-docs	Lecturers	Admin. Staff	Lab. Tech.
Stony Brook University	80	Geosciences	38	19	4	3	1	4	4
Texas A&M	66	Geology and Geophysics	31	38	1	5	2	8	1
Virginia Tech	76	Geosciences	28	23	5	–	–	3	5
UC Davis	38	Earth and Planetary Sciences	24	23	3	9	9	5	5
Rice	16	Earth, Env, and Planetary	24	22	6	12	–	5	2
University of Tennessee	115	Earth and Planetary	54	15	2	2	4	4	2

Rankings from 2018 US News and World Report Rankings (<https://www.usnews.com/best-graduate-schools/top-science-schools/>). Faculty and staff numbers compiled from institutional websites by Linda Kah in Spring 2019 (note: EPS TT Faculty has since dropped to 12). Peer and aspirational Universities from <https://budget.utk.edu/peer-institutions/>. Peer and Aspirational Departments selected from 2018 US News and World Report Rankings for US Earth Science departments.

8.2. Draft Position Statement for Inclusion in Departmental Bylaws

The Department of Earth and Planetary Sciences (EPS) affirms its belief in and commitment to diversity, and will continue to develop and promote a diverse community. EPS is dedicated to maintaining an inclusive working environment where differing ideas, abilities, backgrounds, and needs are fostered with opportunities for students, faculty, staff, and visitors from divergent experiences to participate in and contribute to the Department. EPS recognizes that diverse perspectives are important and necessary in teaching, research, and service. Therefore, EPS will strive to ensure that every departmental activity is open to all students, faculty, staff, and visitors regardless of race, sex, creed, age, sexual orientation, national origin, religion, or disability.

8.3. Draft Code of Conduct for Inclusion in Departmental Bylaws

Members of EPS are required to follow the University's general Code of Conduct (<https://conduct.tennessee.edu/>). Additionally, EPS has established, and seeks to apply, specific code of conduct expectations intended to address ongoing issues within our scientific community that can have profound impacts on our research workplace and on individual lives and careers. The EPS Code of Conduct is a set of principles and practices for professional behavior that governs all EPS students, faculty, staff, and visitors.

Principles

- a. Excellence, integrity, and honesty in all aspects of professional work.
- b. Professional courtesy, equity, and fairness in working with others.
- c. Freedom to responsibly pursue science without interference or coercion.
- d. Unselfish cooperation in all department activities.
- e. Legal compliance in all aspects of the department's professional activities.

Expectations

EPS is committed to equality, in both opportunity and in treatment, for all of our members and visitors. We will not discriminate on the basis of race, color, national or ethnic origin, immigration status, religion or religious belief, age, marital or parental status, sex, sexual orientation, gender identity or expression, socioeconomic background, disability, veteran status, or any other reason. We will conduct ourselves in a professional manner, in which everyone is treated with dignity and respect.

Faculty and students in EPS are expected to conduct themselves in a lawful manner and uphold University rules and policies. In addition, members of EPS are expected to abide by the departmental Code of Conduct to foster a learning and research environment in which all members are valued, respected, and celebrated.

EPS follows Ask Once as a behavioral guideline. This guideline is intended to inform behavior among peers, and to provide a simple way to judge harassment for reporting purposes. The Ask Once guideline means you can ask someone out once from your peer group, and if they do not say yes, you cannot ask them out again. Asking out includes hitting on, expressing interest, or making advances. If someone brushes off the advance, does not reciprocate in a positive way, or turns down the advance in any way, it is considered a “no.”

Responsibilities

Effective instruction, learning, advising, research, and professional career growth require open communication, ethical professional conduct between all individuals, collegial interactions, and a responsive administration to ensure a positive and successful environment across all levels of the educational endeavor. To ensure a productive environment, all members of EPS are expected to treat one another respectfully and fairly, and serve as role models, upholding the highest ethical and professional standards.

The responsibilities below embody best practices to be used by all members of EPS, including faculty, research scientists, staff, and students. They are intended to provide a heightened awareness of the need to consciously establish effective and productive professional relationships that start with trust, courtesy, two-way communications, and shared expectations.

- a. *Conduct:* Members of EPS will act with honesty in the best interests of the department, take full responsibility for the trustworthiness of their research, teaching, and service activities, and treat others with courtesy, equity, fairness, and respect.
- b. *Integrity:* Members of EPS will be responsible for the integrity of their contributions to all professional activities related to the department and university.
- c. *Public Communication:* Members of EPS, when representing the department, will limit professional comments to their areas of scholarly expertise when engaged in public discussions about the application and importance of scientific knowledge and will clearly distinguish professional comments from their opinions based on personal views.

- d. *Environment:* Members of EPS are proactive departmental citizens, responsible for creating and maintaining a safe, open, and professional environment for learning, conducting, and communicating science with integrity, respect, fairness, trustworthiness, and transparency in all endeavors.
- e. *Cooperation:* Members of EPS will cooperate unselfishly in shared responsibilities including departmental service assignments, and teaching loads
- f. *Power Imbalances:* Members of EPS should be aware of, and sensitive to, the natural power imbalances in working relationships among undergraduate and graduate students, faculty of different ranks, research and departmental staff etc.
- g. *Misconduct:* Members of EPS will not engage in discrimination, harassment, bullying, dishonesty, fraud, misrepresentation, coercive manipulation, censorship, or other misconduct. This applies to all professional, research, and teaching environments. See below for further discussion of what constitutes misconduct.
- h. *Reporting:* Members of EPS will take responsibility to act or intercede, where possible, to prevent misconduct. Any suspected misconduct, including fabrication, falsification, plagiarism of materials, as well as discrimination, harassment, bullying, or other unacceptable behaviors will be promptly reported following university policy and procedures (see below).

Student-Advisor Relationship

The relationship between a student and the student's advisor(s) is critical to the progression of science and therefore carries extra demands for ethical behavior. Key areas of sensitivity and concern for the advisor include, but are not limited to:

- a. Provide an environment that is intellectually stimulating and free of harassment.
- b. Be supportive, equitable, accessible, encouraging, and respectful.
- c. Recognize and respect the cultural, socioeconomic, religious, marital or parental, sexual orientation, gender identity or expression, and ability of students.
- d. Be sensitive to the power imbalance in the student-advisor relationship.

All students (both undergraduate and graduate) and advisors need to be aware of the responsibilities of the advisor, the student, and the institution in regards to their relationships. All of the guidelines regarding the mentor-mentee relationship described above are also applicable to the graduate-undergraduate student mentor-mentee relationship.

Unacceptable Behaviors

EPS works to maintain an environment that allows science and scientific careers to flourish through the respectful, inclusive, and equitable treatment of others. As outlined above, members of EPS will not discriminate based on the basis of race, color, national or ethnic origin, immigration status, religion or religious belief, age, marital or parental status, sex, sexual orientation, gender identity or expression, socioeconomic background, disability, veteran status, or any other reason. Additionally, the department opposes all forms of bullying including threatening, humiliating, coercive, or intimidating conduct that causes harm to, interferes with, or sabotages academic activity and careers.

The following behaviors are considered violations of the EPS Code of Conduct and should be reported and addressed, with consequences for the offender. Unacceptable behavior includes, but is not limited to:

- a. *Sexual Harassment* such as unwelcome sexual advances, requests for sexual favors, other verbal or physical conduct of a sexual nature, and offensive comments related to gender, gender identity and expression, sexual orientation, physical appearance, race/ethnicity and body size,
- b. *Sexual Misconduct* including rape, sexual assault, inappropriate touching, sexual battery, sexual exploitation, coercion, and other forms of non-consensual sexual activity.
- c. *Stalking* such as repeatedly following, harassing, threatening, or intimidating including by telephone, mail, electronic communication, or social media,
- d. *Patterns of inappropriate social contact* such as requesting / assuming inappropriate levels of intimacy with others,
- e. *Dating and Domestic Violence* including emotional, verbal, and economic abuse with or without the presence of physical abuse,
- f. *Retaliation* such as withholding employment or academic opportunities or other actions against anyone reporting a violation of this policy (including reporting to any EPS faculty / staff, police, or the Title IX office),
- g. *Power-based personal violence* as when an individual asserts power, control, or intimidation in order to harm another. This includes relationship / partner violence, sexual assault, and stalking,
- h. Deliberately mischaracterizing a person's gender identity,
- i. Gratuitous or off-topic sexual images, comments or behavior,
- j. *Microaggression* or unwelcomed behavior against underrepresented groups,

- k. *Violating the Ask Once Policy.* It may be appropriate to ask someone out once, but no more than once.

Reporting Options

Individuals at the University have multiple reporting avenues. You can report an incident that you experienced, observed, or were told about, in the following ways:

- a. Disclosure to a faculty member (all faculty are mandatory reporters and are lawfully required to share sensitive information with the appropriate offices)
- b. Disclosure to the UTK Title IX Office (<https://titleix.utk.edu>, Phone: 865-974-9600)
- c. Disclosure to law enforcement (911)
- d. Confidential reporting and support services are offered through the Student Counseling Center (865-974-2196), the Student Health Center (865-974-3135) and the Center for Health and Wellness (865-974-HELP).

Definitions

Diversity can be broadly defined to include all aspects of human difference, including, but not limited to race, gender, age, sexual orientation, religion, disability, social-economic status, and status as a veteran.

Inclusion is the active, intentional, and ongoing engagement with diversity — in the curriculum, in the co-curriculum, and in communities (intellectual, social, cultural, geographical) with which individuals might connect — in ways that increase awareness, content knowledge, cognitive sophistication, and empathic understanding of the complex ways individuals interact within systems and institutions.

Discrimination means unequal or unfair treatment in professional opportunities, education, benefits, evaluation, and employment (such as hiring, termination, promotion, compensation) as well as retaliation and various types of harassment. Discriminatory practices can be explicit or implicit, intentional, or unconscious.

Harassment is a type of discrimination that consists of a single intense and severe act, or of multiple persistent or pervasive acts, which are unwanted, unwelcome, demeaning, abusive, or offensive. Offensive conduct constitutes harassment when: 1) it becomes a condition of opportunity, education, benefit, evaluation, or employment or 2) the conduct is severe or pervasive enough to create a work or educational environment that most people would consider intimidating, hostile, or abusive.

These acts may include epithets, slurs, or negative stereotyping based on gender, race, sexual identity, or other categories, as protected by U.S. federal law. Also included are threatening, intimidating, or hostile acts; denigrating jokes and displays; or circulation of written or graphic material that denigrates or shows hostility or aversion toward an individual or a group.

Sexual harassment includes any unwanted and/or unwelcome sexual advances, requests for sexual favors, and other verbal or physical harassment of a sexual nature.

Bullying is the use of force, threat, or coercion to abuse, intimidate, or aggressively dominate others in the professional environment that involves a real or perceived power imbalance. These actions can include abusive criticism, humiliation, the spreading of rumors, physical and verbal attacks, isolation, undermining, and professional exclusion of individuals through any means.

Microaggression refers to verbal, behavioral, or environmental indignities that intentionally communicate hostile, derogatory, or negative prejudicial slights or insults toward any group.

Title IX Violation is the collective term used for incidents involving discrimination, harassment, sexual harassment, sexual misconduct, stalking, dating violence, domestic violence, and/or retaliation.