

Student Learning Outcomes Assessment Summary

Biological Sciences, PhD

College of Natural Science and Mathematics

AY 2014-15 and 2015-16

Submitted by: Diane Wagner

Contact Information: diane.wagner@alaska.edu

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The goal of the Biological Sciences PhD program is to provide students with the knowledge and skills necessary to succeed in the job market or advanced study.

1. Assessment information collected

1.1. Knowledge

There is no standard curriculum for PhD students in biological sciences program; rather, each student works with the graduate advisory committee to design a course of study that is appropriate for the student's background, research interests, and career goals. Most students enter the PhD program having already earned a MS degree. Those that enter the PhD without first earning a MS directly from a bachelor's PhD students are expected to demonstrate broad knowledge of biological concepts and more detailed knowledge of the biology related to their area of study. Their knowledge and ability to communicate are assessed using a written and oral PhD Comprehensive Exam, which ideally takes place during the second year. The Comprehensive Exam is administered by the graduate advisory committee, joined by an outside examiner appointed by the Graduate School.

Nine PhD students took the Comprehensive Exam during the period of record. Of these students, seven (78%) passed both the oral and written portions. Two students were scored as "conditional" for the written portion of the exam. One of these students has re-taken the exam and passed; the other plans to re-take it in fall.

1.2. Communication of Science

PhD students should make substantial and original contributions to scientific knowledge in their field of study, communicated in oral and written form. To assess this objective, we evaluate two criteria.

1.2.1. Dissertation

Students must write a dissertation, publically present their research results, and defend their work in an oral exam setting. The quality of the dissertation and the defense is assessed by the Graduate Advisory Committee, joined by an outside examiner. Fifteen students defended their dissertations during the two-year period of record and all were successful. No reports were provided to the department from outside examiners.

1.2.2. Publications, presentations, and grant proposals

Students must publish papers and make presentations at professional meetings. Additionally, students should write grant proposals, in order to gain feedback on their ideas, help to support their research, and to develop this important professional skill.

We expect PhD students to produce 2 - 3 publishable manuscripts from a thesis. Students in the Biological Sciences PhD program generally begin to publish their research before they graduate, but it takes several years for all publishable chapters of their thesis to appear in the literature. For this assessment, we searched the peer-reviewed literature indexed by Web of Science in late April 2016 and tabulated the number of papers on which the student was first author and the total number of papers on which the student appeared anywhere in the list of authors. Students graduating between 2014 and 2016 had published on average 2.4 peer-reviewed papers as first author and 3.6 papers total. Students graduating between 2012 and 2014 had published slightly more: 2.5 papers as first author and 4.4 papers overall. These numbers are almost certainly conservative, because only a subset of all journals are indexed by Web of Science.

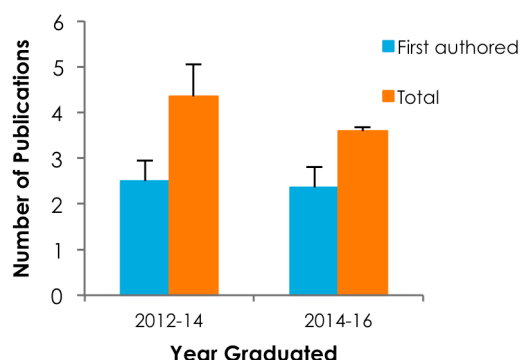


Fig. 1. The average number of publications by graduates of the biological sciences PhD program. Error bars are standard errors.

The frequency with which students presented their work was assessed using annual surveys of student activities. 64% of PhD students ($n = 28$) completed the survey in May 2015; 2016 data were not available when this report was due. Of those completing surveys, 69% (20 students) delivered at least one presentation during 2014-15. Presentation types reported were almost exclusively oral presentations and poster presentations at meetings and conferences, of which 35% were local, 28% were regional, and 37% were national or international. On average, students responding to the survey delivered 2.1 presentations each during that academic year. The proportion of students presenting their work and average number of presentations per year were similar to previous years.

Proposal writing and success were also assessed using the 2014-15 survey. 50% of the 28 respondents reported applying for at least one research grant, fellowship, scholarship, and travel grant during the year. On average, PhD students respondents submitted 1.2 applications each. This is lower than the average 3.7 applications per student reported in 2012-14, but similar to the 1.1 applications per student reported 2010-2012. Of 2014-15 applications, 35% (n = 12) were submitted to external agencies and institutions, including National Science Foundation (NSF), National Institutes of Health (NIH), US Geological Survey, Bureau of Land Management, and Alaska Native Health Consortium; 67% of these external applications were successful. The remaining 65% of applications (n = 22) were submitted to programs administered within UA or UAF, including the NIH-funded programs INBRE and BLaST, the Center for Global Change, and UAF Foundation-administered scholarships and grants; 73% of these internal applications were successful.

1.3. Post-graduate employment

The department's goal is for students to obtain high-quality jobs in the biological sciences, where they will influence the state of the discipline and relevant policy through research, teaching, and management. We track student employment by communicating directly with former students, surveying former major advisors, and by using online resources.

The vast majority of students graduating over the past 6 years are employed as faculty, biological researchers, or professional biologists (Fig. 2). Of the 14 students who graduated during the past two years, 12 are employed as biologists and two are job-hunting.

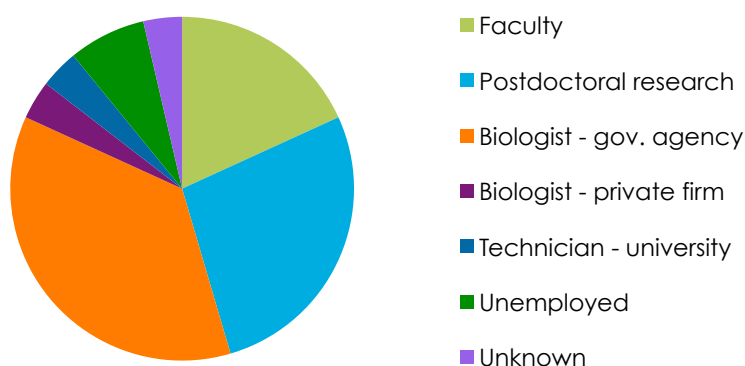


Fig. 2. The occupations of PhD students graduating between 2010 and 2016 (n = 55), on a percentage basis.

2. Conclusions drawn from the information summarized above

The UAF biological sciences PhD program is highly successful by all assessment measures. Most students pass their comprehensive exams the first time. Students are publishing their work relatively quickly, resulting in an average 2 - 3 thesis-related publications within two years of

graduation. The majority of students are presenting their work and applying for funding annually, both of which contribute to a strong professional record. Graduates of the program have an excellent record of obtaining high-quality employment in their discipline. Notably, the duration of the biological sciences PhD program is an impressive 5.3 years, down from the 5.9 years reported for the last 2-year review. By comparison, the national median time to graduation for PhD students in the life sciences between 2011 and 2013 was 6.9 years (Doctoral Recipients from U.S. Universities 2013, NSF 15-304).

3. Curricular changes resulting from conclusions drawn above

Given the success of the program, we do not plan significant changes to the curriculum. However, students will be encouraged to increase their conference and grant proposal-writing activity.

4. Identify the faculty members involved in reaching the conclusions drawn above and agreeing upon the curricular changes resulting

Patricia Doak

Kris Hundertmark

Jeremy Jones

Denise Kind

Christa Mulder

Andrej Podlutzky

Diane Wagner