# University of Arkansas
# Department of Biological Sciences
## Graduate Program Assessment (BIOL MS, BIOL PhD)
## Report: Academic Year 2023-2024

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## A. General Background:

The graduate programs in Biological Sciences (M.S. and Ph.D.) offer the opportunity for advanced study and research for students that desire a comprehensive view of biological sciences. Accomplishment is judged by competence and a developing sense of responsibility for the advancement of knowledge rather than the fulfillment of routine requirements. It is expected that all candidates for advanced degrees will have a period of study in residence, complete the required courses in advanced biology appropriate for the chosen discipline, demonstration of advanced competence in the chosen area of expertise, satisfactory introduction to allied subjects, the ability to communicate at a scholarly level, and the satisfactory performance in examinations. During 2023, 14 and 42 students were enrolled in the Biology master's and doctoral program, respectively. In 2023, the BISC faculty currently mentor 104 graduate students comprised of multiple degree programs: 42 BIOLPH, 14 BIOLMS, 25 CEMBPH, 3 CEMBMS, 2 ENDYPH, 5 STANMS and 1 SPACPH student. For assessment purposes, we only include those obtaining an M.S. or Ph.D. in Biology (BIOLMS or BIOLPH).

For the AY2023-2024 academic year, we are providing data on our single most important metric, namely the scientific careers of our graduates upon completion of their advanced degree. A longitudinal summary (2006 to 2023) of those data is provided for both the M.S. and Ph.D. graduates.

## B. Outcome Reporting:

**Learning Outcomes: PhD in Biology**

- Mastery of the chosen discipline of biology at the graduate level
- Capacity for original research as evidenced by the preparation and defense of a Ph.D. dissertation
- Ability to communicate effectively both as a participant and presenter in graduate seminars
- Demonstrated excellence in the classroom for teaching assistants
- Professional development in science via the presentation of research at national conferences, applying for and receiving nationally competitive grants, publishing research

articles and books in the chosen discipline, participation in departmental professional development seminars
- Participation in the academic life of the Department (attending seminars and public lectures)

**Learning Outcomes: M.S. in Biology**
- Mastery of the chosen discipline of biology at the graduate level
- Capacity for original research as evidenced by the preparation and defense of a M.S. thesis
- Ability to communicate effectively both as a participant and presenter in graduate seminars
- Demonstrated excellence in the classroom for teaching assistants
- Professional development in science via the presentation of research at national conferences, applying for and receiving nationally competitive grants, publishing research articles and books in the chosen discipline, participation in departmental professional development seminars
- Participation in the academic life of the Department (attending seminars and public lectures)

## C. Results of Assessment:

For Ph.D. seeking graduate students, we have assessed their continuation in science careers after completion of their doctoral degree in the Department of Biological Sciences. We have classified students into six broad categories:

1. Employed as a faculty member (Instructors, Assistant Professors, Associate Professors, Professors at academic institutions nationally and internationally.
2. Employed in postdoctoral training positions.
3. Employed in nonacademic science (i.e. industry, state or federal agencies).
4. Continued education toward a professional degree (i.e. MD, DO, JD, DDS, etc.)
5. Left the Ph.D. program without completion.
6. Unknown

The results of our longitudinal data from 2006 to 2024 are shown below in Table 1. The total numbers data from 2006-2023 are from the Office of Strategic Analytics and Insights. The total 2024 data are based on departmental surveys.

**Table 1: Longitudinal data on Ph.D. graduates in Biological Sciences.**

| Ph.D. graduates | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | Total | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Faculty | 1 | 3 | 3 | 4 | 5 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 2 | 28 | 0.28 |
| Postdoctoral | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 3 | 0 | 4 | 4 | 1 | 1 | 2 | 4 | 2 | 2 | 5 | 8 | 41 | 0.41 |
| Nonacademic sci. | 0 | 0 | 1 | 1 | 3 | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 13 | 0.13 |
| Professional | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 2 | 0 | 7 | 0.07 |
| Left Ph.D. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 8 | 0.08 |
| Unknown | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0.02 |
| **TOTAL** | **2** | **3** | **4** | **5** | **9** | **4** | **4** | **6** | **2** | **8** | **6** | **2** | **2** | **6** | **5** | **5** | **4** | **9** | **10** | **99** | |

For M.S. seeking graduate students, we have assessed their continuation in science careers after completion of their M.S. degree in Biological Sciences. We have classified students into six broad categories:

1. Employed in science-related technical positions.
2. Continued education toward a Ph.D. at the U of A or other doctoral granting institutions.
3. Employed as science instructors (i.e. K-12, college, etc.)
4. Continued education toward a professional degree (i.e. MD, DO, JD, DDS, etc.)
5. Employment outside of science
6. Unknown or left the program.

The results of our longitudinal data from 2006 to 2024 are shown below in Table 2. The total numbers data from 2006-2023 are from the Office of Strategic Analytics and Insights. The total 2024 data are based on departmental surveys.

**Table 2: Longitudinal data on M.S. graduates in Biological Sciences.**

| M.S. graduates | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | Total | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Employed in science | 2 | 3 | 2 | 0 | 1 | 1 | 3 | 1 | 5 | 4 | 1 | 5 | 3 | 2 | 3 | 0 | 3 | 3 | 5 | 47 | 0.46 |
| Education to Ph.D. | 3 | 1 | 2 | 1 | 0 | 2 | 0 | 2 | 0 | 3 | 1 | 0 | 1 | 1 | 1 | 3 | 0 | 0 | 1 | 22 | 0.22 |
| Science Instructor | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 10 | 0.10 |
| Professional | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.02 |
| Outside science | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.01 |
| Unknown | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 1 | 0 | 2 | 1 | 3 | 0 | 0 | 3 | 21 | 0.21 |
| **TOTAL** | **9** | **5** | **7** | **3** | **2** | **3** | **3** | **3** | **7** | **12** | **4** | **6** | **5** | **5** | **5** | **7** | **3** | **3** | **10** | 102 | |

**Summary of Assessment (2006 to 2021):**

The Department of Biological Sciences has successfully graduated 201 students (2006-May 2024) that were awarded advanced degrees (M.S. or Ph.D.) in Biology. The students receiving M.S. degrees maintained a GPA as required to be awarded the degree. Additionally, they have successfully written M.S. theses and defended their theses before a committee of experts in the respective fields of biology. The students receiving Ph.D. degrees have maintained a GPA as required by the University to be awarded the degree. In addition, they have successfully passed both written and oral qualifying examinations to enter doctoral candidacy. Finally, the doctoral students have successfully written doctoral dissertations and defended the dissertation before a committee of experts in their field of biology. Most importantly, the vast majority of M.S. and Ph.D. students completing advanced degrees in biology have remained successfully employed in science-related disciplines after completion of their advanced degrees in Biology.

Since 2006 the Department of Biological Sciences has graduated 99 doctoral students with only 8 students leaving the program without degree completion (92% completion). Of those that completed their degree, ~28% are employed as faculty members, ~41% are in postdoctoral training positions and ~13% employed in nonacademic science jobs. Most important, students

completing their doctoral degrees in Biological Sciences at the UA are successfully gaining employment (Table 1).

Since 2006 the Department of Biological Sciences has graduated 102 Master's degree students (Table 2). Of those that completed their degree, ~46% are employed in science-related technical positions, ~22% continued their education toward a doctoral degree, ~10% were employed as a science instructor and 2% pursued other professional degrees. Thus, if one excludes the students with unknown career outcomes, the students completing their M.S. degrees in Biological Sciences are successfully gaining employment with the majority (99%) remaining in a science-related career.