

# Graduate Learning Goals

## Department of Integrative Biology

### Doctoral Level

1) **Introduction** The Department of Integrative Biology provides Ph.D. training in the following broad subject areas: Cellular and Molecular Biology; Developmental Biology; Neuroscience; Physiology; Ecology; Evolution; and Animal Behavior. Each student's course of study in the Department of Integrative Biology is tailored to his or her individual interests, career goals, needs, and background. Regardless of a student's specific interests, a Ph.D. in Zoology requires attainment of a core set of goals to ensure that all students are well-prepared for careers in their specific areas of concentration.

2) **Knowledge** Demonstrate academic mastery in at least one of the broad subject areas represented in the Department of Integrative Biology.

- Students will demonstrate a broad understanding of major current and past theories, research findings, and methodologies and techniques in their area of concentration both orally and in writing
- Students will develop critical thinking skills. They will retrieve and examine scientific literature, evaluate evidence for and against hypotheses, identify knowledge gaps, strengths and weaknesses in existing literature, synthesize knowledge, and develop conclusions

3) **Research** Students will develop and complete original research that advances a specific field of study within one of the broad subject areas represented in the Department of Integrative Biology.

- Students will retrieve, evaluate, and interpret professional scientific literature and use this information to develop theoretical frameworks, testable hypotheses, and predictions for their own research projects
- Students will design realistic and feasible research projects and prepare necessary protocols
- Students will conduct independent research and analyze and interpret resulting data
- Students will prepare and submit manuscripts resulting from their independent research for publication in professional, peer-reviewed journals

4) **Communication** Effectively communicate to diverse audiences in writing, through oral presentations, and discussions.

- Students will write clear and concise research articles for publication in professional, peer-reviewed journals
- Students will present at scientific conferences and/or in formal and informal seminars
- Students will learn methods of communication needed to interact with professional colleagues and to request grant support
- Students will present research articulately and informatively to diverse audiences
- Students will give and receive feedback orally and in writing
- Students will have opportunities to engage in public outreach and education

5) **Teaching** Effectively teach topics or research methods in Cellular and Molecular Biology; Developmental Biology; Neuroscience; Physiology; Ecology; Evolution; or Animal Behavior.

- Students will receive training and serve as teaching assistants for at least one semester
- Students will have opportunities to mentor others in a laboratory or research setting

6) **Ethical Conduct** Students will have an understanding of professional and ethical responsibility.

- Students will be trained to use scientific rigor when designing experiments, collecting and analyzing data, interpreting, and reporting results
- Students will be trained in the ethics of publishing
- Students will know and adhere to laws, regulations, needed permits and licenses, occupational health and safety standards

7) **Career Preparation** Students will be provided with diverse training that will prepare them for a range of flexible and sustainable careers (e.g., academia, industry, government, science policy and administration, science commerce, science writing, law, and science education and outreach at all levels).

- Students will develop broadly applicable skills in critical thinking and problem solving
- Students will have opportunities to develop skills in leadership, project management, teamwork, and communication and to develop collaborations with nonacademic partners

## **Master's Level**

1) **Introduction** The Department of Integrative Biology provides M.S. training in the following broad subject areas: Cellular and Molecular Biology; Developmental Biology; Neuroscience; Physiology; Ecology; Evolution; and Animal Behavior. Each student's course of study in the Department of Integrative Biology is tailored to his or her individual interests, career goals, needs, and background. Regardless of a student's specific interests, the M.S. in Zoology requires attainment of a core set of goals to ensure that all students are well-prepared for careers in their specific areas of concentration.

2) **Knowledge** Master fundamental skills in at least one of the broad subject areas represented in the Department of Integrative Biology.

- Students will demonstrate understanding of major current and past theories, research findings, and methodologies and techniques in their area of concentration
- Students will develop critical thinking skills. They will retrieve and examine scientific literature, evaluate evidence for and against hypotheses, identify knowledge gaps, strengths and weaknesses in existing literature, synthesize knowledge, and develop conclusions

3) **Research** Students will complete an original research project in one of the broad subject areas represented in the Department of Integrative Biology.

- Students will retrieve, evaluate, and interpret professional scientific literature and use this information to select and/or use the most appropriate methods for their own research project
- Students will conduct research, analyze, and interpret resulting data
- Students will prepare a thesis or research report describing their research project

4) **Communication** Effectively communicate in writing and orally.

- Students will write a clear and concise research report
- Students will present research articulately and informatively
- Students will have opportunities to engage in public outreach and education

5) **Ethical Conduct** Students will have an understanding of professional and ethical responsibility.

- Students will be trained to use scientific rigor when designing experiments, collecting and analyzing data, interpreting, and reporting results
- Students will be trained in the ethics of publishing
- Students will know and adhere to laws, regulations, needed permits and licenses, occupational health and safety standards

6) **Career Preparation** Students will be provided with diverse training that will prepare them for a range of flexible and sustainable careers (e.g., academia, industry, government, science policy and administration, science commerce, science writing, law, and science education and outreach at all levels).

- Students will develop broadly applicable skills in critical thinking and problem solving
- Students will have opportunities for teamwork, communication skills, and collaborations