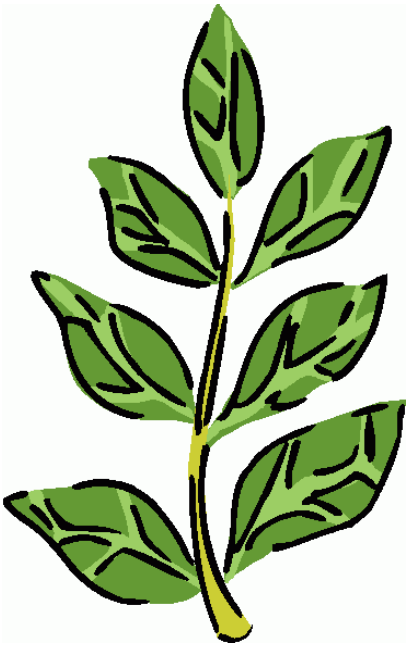
Department of Biological Sciences



Graduate Student Handbook

The Biology Graduate Program

Chicago State University's M.S. program in biological sciences has been designed to fill a unique niche on the landscape of graduate programs in the life sciences. Our program provides both a much-needed bridge from undergraduate to doctoral and professional programs and specialized training for students seeking employment in a biological research setting. We also offer advanced training for science educators wishing to broaden or deepen their knowledge in the life sciences.

Our program centers on a solid foundation of core courses emphasizing genomics, critical analysis of scientific literature, statistical analysis of scientific data, and hypothesis-driven thesis writing. In addition to the core courses, each student chooses an area of concentration from one of the following tracks: Applied Physiology, Molecular/Cell Biology, or Environmental Biology. Because we in the department feel that a meaningful research experience is critical to a good graduate education, each student must complete a thesis project under the guidance of an advisor and committee members. The defense of the thesis in a public forum is the culmination of a student's coursework, research, and scholarship at CSU.

Our choice of the three tracks of study reflects both our faculty strengths and those areas driving biological research interest today. Employment and career trends have shown that employment opportunities for M.S. graduates with the right research experience and laboratory skills are at an all-time high. Our recent graduates have been extremely successful in job placement.

For students wishing to pursue a PhD, our program provides a "proving ground" for those from smaller undergraduate institutions who may feel overwhelmed going directly to a doctoral program. In addition, pursuit of an M.S. degree helps to build the skills and the confidence of students who may not yet be prepared to enter a doctoral program.

We feel that our M.S. program in biological sciences serves a unique mission among area graduate programs, for all the reasons mentioned above. Our goal is to provide a rigorous education filled with research opportunities and exposure to state-of –the-art techniques, facilitated by a faculty with a collective interest in quality teaching and mentoring.

M.S. in Biological Sciences Program

Overview:
Minimum 30 hours of 5000 level coursework required
Maximum 10 hours of transfer credit applied toward degree
Three tracks available
Thesis Project required (3 or 6 hours)
Maintenance of a cumulative GPA greater than / equal to 3.00

Coursework:
15-18 hours of required courses
12-15 hours of electives
Required courses offered once per year during evenings

Check list for M.S. in Biological Sciences (BIOA, BIOE, BIOM)

Requirements for admission to the Graduate College:
_____Bachelor's degree
_____3.00 GPA (minimum) in last sixty hours of undergraduate study

Requirements for admission to the M.S. program in Biological Sciences
_____ minimum of 15 hours of credit in the biological sciences (including at least two upper-level courses)
_____ 3.00 GPA in biological science courses

Requirements for M.S. degree:
Required Courses (15-18 hrs):
_____ BIOL 5090 (Critical Analysis of Research Literature) 3 hr – Fall
_____ BIOL 5015 (Biometrics) 3 hrs – Fall
_____ BIOL 5040 (Evolution and Genomics) 3 hrs– Spring
_____ BIOL 5100 (Methods in Research) 3 hrs-Spring
_____BIOL 5700 (Graduate Research) 3-6 hrs* (Fall/Spring)
3 Credit hours are awarded for a library- based thesis
3-6 hours are awarded for a laboratory/field-based thesis
Electives Courses (12-15 hrs): Selected from one of the three tracks outlined below

Track Requirements:
1. Applied Physiology Track
_____ PSLY 5330 (Physiological Control Mechanisms) 4hrs- Fall
_____ PSLY 5200 (Comparative Cellular Neurophysiology) 4hrs-Alternate Spring
_____ PSLY 5035 (Homeostatic Mechanisms) 4hrs-Spring

2. Microbial/Molecular Biology Track
_____ BIOL 5510 (Molecular Biology) 3 hrs- Fall
At least nine (9) additional credit hours chosen from the following courses:
_____ BIOL 5170 (Immunology) 4hrs-Fall
_____ BIOL 5450 (Techniques in Electron Microscopy) 4 hrs- Alternate years
_____ BIOL 5550 (Advanced Evolution) 3 hrs- Alternate years
_____ CHEM 5303 (Biochemistry I) 3 hrs - Fall
3. Environmental Biology Track
_____ BIOL 5730 (Environmental Biology) 4hrs-Spring
_____ BIOL 5550 (Advanced Evolution) 3 hrs–Alternate years
At least five additional credit hours of biology coursework, chosen in consultation with the graduate advisor

Laboratory/Field Thesis timeline

1. Student successfully completes BIOL 5090 and BIOL 5015
2. Student chooses thesis advisor
3. Student successfully completes BIOL 5100 and BIOL 5040
4. Student presents thesis proposal to thesis committee and committee approves proposal
5. Student registers for BIOL 5700
6. Faculty concerns are communicated through thesis committee
7. Thesis committee meets formally with student at least once per semester
8. Student presents "progress report" seminar between times of proposal defense and thesis defense (followed by committee critique)
9. Written thesis submitted to thesis committee
10. Committee-approved thesis submitted for department review for 14 calendar days prior to thesis defense date. The 14-day period must occur while school is in session.
11. Successful thesis presentation and oral defense
12. Revision of written thesis, if warranted, based on department faculty input
13. Uploading of department-approved thesis to ProQuest

Format for Biology MS Thesis Proposals

Every M.S. laboratory/field thesis proposal must contain the following sections in the order listed:

1. Title and Author
2. Abstract
3. Background and Significance
4. Specific Aims
5. Preliminary data (if applicable)
6. Project design
    a. Significance
    b. Rationale
    c. Method
7. Literature cited
8. Tables
9. Figures and legends

DEPARTMENT OF BIOLOGICAL SCIENCES
TENURED AND TENURE-TRACK FACULTY
RESEARCH INTERESTS

Walid Al-Ghoul, Ph.D. (walghoul@csu.edu)– Pathophysiology, Neurobiology, and Chronobiology. Investigation of the pathophysiological dynamics of major trauma/burn injury using advanced histological, cellular and molecular approaches, such as fluorescent microscopic imaging, flow cytometry, tissue culture, Western blotting, and rtPCR with emphasis on markers of inflammation, extra-pineal/peripheral circadian clock parameters, gut leakiness, gut associated immune factors, and emerging anti-inflammatory remedies.

Anser Azim, Ph.D. (aazim@csu.edu)- Our lab is interested in how different Toll like receptors and actin cytoskeleton regulate different transcription factors in macrophage gene expression. We also address molecular causes of Lou Gehrig's disease (also known as ALS). We use primary cell culture and animal models.

Christopher Botanga, Ph.D. (cbotanga@csu.edu)- Functional Genomics and Reverse Genetics; we use a variety of platforms, including molecular biology, bioinformatics and epigenetics to understand the mechanism of host-pathogen interactions involved in a battery of defense responses mounted by plants to ward off pathogens.

Melvin Daniels, Ph.D. (mdanie25@csu.edu)- Pathology, Transplantation, and Immunology. Investigation of the limitations, or barriers, to the induction of transplantation tolerance through the analysis of the adaptive immune responses of T and B cells using advanced in vivo and in vitro serologic and cellular techniques.

Mark Erhart, Ph.D. (merhart@csu.edu)– Transmission, Molecular, and Evolutionary Mammalian Genetics; molecular biology and bioinformatics approaches to studying mammalian genome evolution and mutations affecting recombination, development, reproduction, and behavior in mice; mouse models of human genetic diseases; genetic modifiers.

Joyce Ache Gana, Ph.D. (Chair; jgana@csu.edu)-Plant Molecular Genetics; investigating biochemical, morphological, genetics, and epigenetics mechanisms of *Medicago sativa* exposed to defoliation stress. In addition, my lab investigates factors that contribute to optimal growth of ornamental plants and economic herbs in GH settings.

Karel Jacobs, Ph.D. (kjacobs@csu.edu)– Tree pathology, Urban forestry, Mycology; Secondary Biology Education and Science Education

Andrew Maselli, Ph.D. **(amaselli@csu.edu)**- My research interests are in cell biology, molecular biology, cell structure, connectomics, electron tomography and correlative light/electron microscopy. In this area our work centers around two related questions: (1) What role does the actin cytoskeleton pay in neurodegenerative disease? (2) How can we create three dimensional maps of complex tissues at high resolution?

Molly McDonough, Ph.D. (mmcdonou@csu.edu) – Genomics, bioinformatics, phylogenetics, and molecular ecology. Application of next-generation sequencing technology and computational methods to understand the ecology and evolution of vertebrates.

Devi Prasad Potluri, Ph.D. (vpotluri@csu.edu)) – Plant Tissue Culture and Biotechnology; environmental plant physiology and biochemistry; horticulture, aquatic and wetland biology; aquatic pollution monitoring and control measures.

Kevin Swier, Ph.D. (kswier@csu.edu)- Cell Biology and Molecular Biology. We use the model organism, *Dictyostelium discoideum*, to investigate intracellular signaling pathways that regulate metabolism and development.