

# Biosciences Ph.D.

## Functional Genomics and Biotechnology

The Biosciences PhD Program is located on the George Mason University Prince William Campus. The laboratories are located in Discovery Hall along with Advanced Biosystems (ABS), ATCC, as well as the National Center for Biodefense (NCBD), the Center for Biomedical Genomics and Informatics (CBMGI) and the Center for the Genomics Of Liver Disease (CGOLD). The Life Sciences Division of the College of Arts and Sciences and the Department of Molecular and Microbiology are also located in Discovery Hall.

### PROGRAM DESCRIPTION

The Biosciences Doctoral Program in Functional Genomics and Biotechnology is a research-oriented field of study that prepares students for significant contributions in an academic or industry setting. Areas of emphasis include microarray analysis of gene expression at the whole-genome level; the sequencing and analysis of genes and gene families; gene family evolution; molecular studies of the mechanisms of toxicology and mutagenesis; and biotechnological applications such as drug testing and design, protein purification and enzymology, and the construction of recombinant DNA gene fusions and targeted sequence changes.

Coursework is largely completed in the first two years of the program. In addition to the fundamental course requirements, students must take courses in laboratory methods, genomics, biotechnology, sequence analysis, and molecular genetics. Laboratory rotations, completed in the first year,

impart laboratory skills and provide students a basis for selecting a mentor with whom to pursue their dissertation. Students may choose from a diverse group of faculty members for laboratory and dissertation supervision

### CURRICULUM

The first year curriculum is unified for all concentrations in order to provide a common foundation in research methodology. Students are required to take a survey course in biochemical systematics, engage themselves in the elements of research, and attend a series of seminars covering recent scientific advances in related fields. The second year curriculum is designed to provide greater depth in the student's chosen area of concentration. The third and fourth years focus primarily on research.

### FUNDAMENTAL COURSE REQUIREMENTS

BIOS 701	Biochemical Systematics	3
BIOS 702	Research Methods	3
BIOS 703	Lab rotations	3
BIOS 704	Topics in Biosciences	4

**First-year Total Credits** 13

### CONCENTRATION COURSE REQUIREMENTS

BIOS 740	Current Laboratory Methods in FGB	3
BIOS 741	Genomics	3

BIOS 742	Biotechnology	3
BIOS 743	Biological Sequence Analysis (CSI 730)	3
BIOS 744	Molecular Genetics	3

**Second-year Total Credits** 15

<b>Electives/research</b>	20
<b>Dissertation</b>	24
<b>Concentration Total</b>	72

### SEQUENCE OF PROGRESSION:

1. Register for Classes
  - a. If you have a Ms. in hand then you're over all credit requirements if reduced by 30 to 42 which you will require to graduate.
  - b. If you have previously taken a course in you Ms. that equates to a core cores i.e. syllabus matches AND you receive authorization from the core course instructor then your requirement for this core course can be waiver HOWEVER you will still have to take the equivalent number of credits to give you a final number of credits at GMU of 72 without a Ms, and 42 with and Ms.
2. Your choice of courses for each semester must be approved by the Bios Director OR your advisor.

3. Within your first year you **MUST**
  - a. Complete **AT LEAST** once rotation of BIOS 703
  - b. Have introduced your self to each of the faculty (<http://www.gmu.edu/departments/bioscience/faculty.html>) and be familiar with their research.
4. By year two you will need to have chosen an advisor and their lab to carry out your research.
5. Once you have chosen your advisor and your area of research the follow is the sequence of events required for advancement to candidacy:
  - a. Establish a committee of 4 members
    - i. Committee chair (usually your advisor, **MUST** by GMU)
    - ii. 2 MMB Department members
    - iii. One external member, if not GMU then you must affiliate them by submitting their CV to the Faculty.

This committee form must then be submitted to the BIOS director and approved by the CAS Deans office.
  - b. Organize committee meetings to discuss your proposed research.
  - c. Complete **AND PASS** your comprehensive exams
  - d. Complete your program of study
  - e. Submit your research proposal which must be approved by each member of your committee.

- f. At this point you may file for advancement to candidacy.
- g. Once you have advanced to candidacy you will be allowed to file for BIOS 999, and embark/continue on your research.

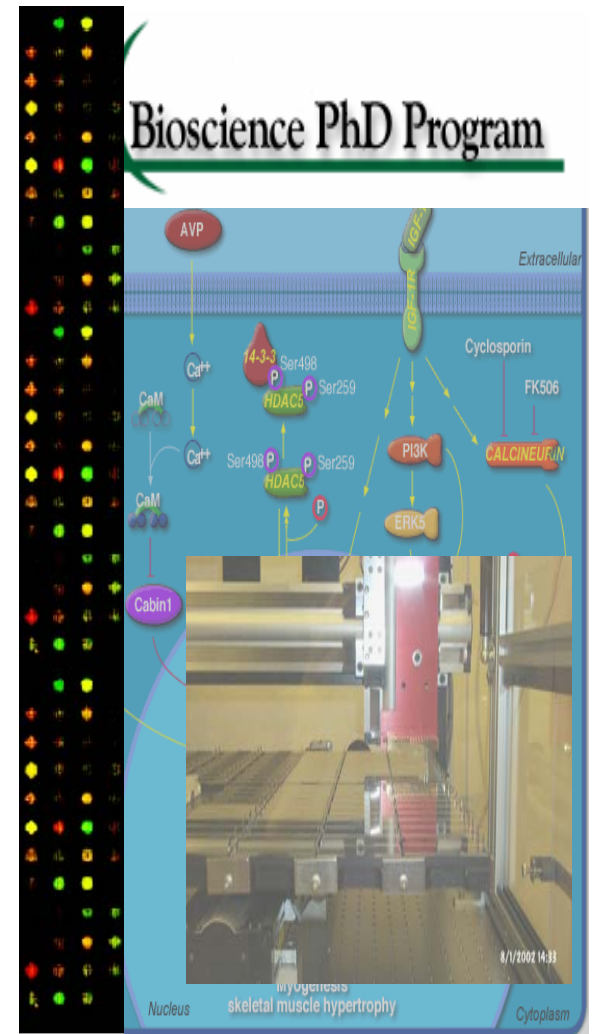
The faculty and staff of MMB and Biosciences program welcome you. We wish you luck in your years with us, and remember this is **YOUR PROGRAM**, what you put in to it will reflect your return.  
If you have any questions, concerns etc please do not hesitate to contact either:

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**I'm In ....now what?????**  
**A guide to new Biosciences Students**



George Mason University