# Developmental, Regenerative & Stem Cell Biology, PhD

## Degree Requirements

# Developmental, Regenerative, & Stem Cell Biology

The Developmental, Regenerative, & Stem Cell Biology (DRSCB) graduate training program at WashU is housed under the Roy and Diana Vagelos Division of Biology and Biomedical Sciences (DBBS).

The various research groups in the DRSCB program study problems in embryonic development and cell and tissue differentiation in a variety of model systems, ranging from vertebrates such as fish and mice to invertebrates such as *Drosophila* and *C. elegans* as well as stem cell and reprogramming models. Genetic (both classical and molecular), genomics, cell biological, immunological, and biochemical approaches are utilized to elucidate the molecular mechanisms that underlie many key processes of development and diseases. Research areas include embryo and tissue organization, cell-cell and cell-matrix interactions, and control of cell fate, differentiation, tissue-specific gene expression, and pattern formation.

To earn a PhD at within the Roy and Diana Vagelos Division of Biology and Biomedical Sciences at Washington University, a student must complete all courses required by their department; maintain satisfactory academic progress; pass the qualifying examination; complete all requirements for doctoral candidacy; create a Research Advisory Committee (RAC); submit a Title, Scope, and Procedure Form; fulfill residence and Mentored Experience Requirements; write, defend, and submit a dissertation; and apply for program completion (graduation) via Workday Student.

# Program Requirements

- **Total Units Required:** 36 units
- **Degree Length:** Seven years
  - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education. Across DBBS programs, the average time to degree is 5.6 years.
  - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their coursework, if enrolled in fewer than 9 graduate units, they must enroll in a specific Biology & Biomedical Sciences research graduate course to maintain full-time status. Prior to completing 36 credit units, student will enroll in BBS 5900 Research for research credit; after completing 36 credit units, students will enroll in BBS 9000 Full-Time Graduate Research/ Study, which will show 0 credit units but fulfills full-time status. Students should follow advising instructions to ensure proper enrollment prior to Add/Drop.
  - Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintains satisfactory progress toward completion of the degree.
- **Grade Requirement:** Required courses generally consist of four to nine courses in areas fundamental to the student's program. Students are expected to maintain a B average in graduate courses.

# Required Courses

## DBBS Required Courses

- BBS 5098 Graduate Research Fundamentals
- BBS 5011 Ethics & Research Science

## Program Required Courses

- BBS 5617 Development Biology PhD Program Seminar
- BBS 5352 Development Biology
- BBS 5491 Advanced Genetics Advanced Genetics
- Two of the following three courses:
  - BBS 5480 Nucleic Acids & Protein Biosynthesis
  - BBS 5068 Fundamentals of Molecular Cell Biology
  - BBS 5075 Introduction to Coding and Statistical Thinking for Genetics and Genomics

## Advanced Elective

Students may select one or more of the following, subject to approval by the DRSCB Steering Committee:

- BBS 5224 Molecular, Cell and Organ Systems
- BBS 5053 Immunobiology I
- BBS 5054 Immunobiology II
- BBS 5488 Genomics
- BBS 5312 Macromolecular Interactions
- BBS 5392 Molecular Microbiology & Pathogenesis

## Journal Clubs

Students are required to complete two credit hours of journal clubs. Second-year students are required to take the BBS 5152 Rad Journal Club (Regeneration, Aging, and Development) in the fall semester. Students may choose an option that is listed below for their second requirement:

- BBS 5138 Journal Club for the Molecular Mechanism of Aging
- BBS 5128 Cell Biology of Extracellular Matrix Journal Club
- BBS 5235 Genetics Journal Club
- BBS 5123 Experimental Hematopoiesis Journal Club
- BBS 5137 Ion Channels Journal Club
- BBS 5192 Cancer Biology Journal Club
- BBS 5255 Experimental Skeletal Biology Journal Club
- BBS 5284 Current Research in Chromatin, Epigenetics and Nuclear Organization
- BBS 5412 Tropical and Molecular Parasitology
- BBS 5445 DNA Metabolism Journal Club
- BBS 5484 Genetics and Development of C. Elegans Journal Club
- BBS 5496 Seminar in Computational Molecular Biology
- BBS 5416 Molecular Microbiology & Pathogenesis Journal Club

# Laboratory Rotations

Selecting a thesis advisor is the most important decision a student makes in graduate school. To help each student make an informed, thoughtful choice, the Division builds in flexibility to explore options. Students usually participate in three lab rotations during their first year. Additional rotations can be arranged, and rotation lengths are flexible. Students usually begin their thesis research by the end of their first year.

# Scientific Scholarship

Keeping abreast of scientific developments is critical for faculty and students alike. The Division offers many ways to stay current. More than 15 weekly biology seminars provide excellent opportunities to meet outstanding scientists from outside Washington University. Several annual symposia bring internationally recognized speakers to campus. Journal clubs meet weekly for students, postdoctoral fellows and faculty to present and discuss current scientific literature. A number of Interdisciplinary Research Pathways allow students to enhance their PhD program. Program retreats allow for informal interaction among students and faculty. The Division also provides funds for each student for professional development.