

# Cell and Developmental Biology

[www.med.virginia.edu/cdb](http://www.med.virginia.edu/cdb)

## Objectives & Philosophy

The overall goal of the Cell and Developmental Biology (CDB) Program is to equip students with the background and research training needed to contribute to the rapidly evolving and exciting areas of research in cell and developmental biology. We anticipate that this experience will serve as a foundation for a career in academics and/or the biotechnology industry.

The Program includes faculty mentors from both the College of Arts and Sciences and the Medical School. Unlike many institutions, these schools are closely situated and provide an unusually high concentration of expert investigators who are strongly committed to research and training. Significantly, the Program is naturally allied with the newly formed Morphogenesis and Regenerative Medicine Institute at the University of Virginia, which is a unique and visionary integrative center building on today's fundamental knowledge of genetics, genomics, molecular and cell biology to understand how cells, tissues and organs are formed and repaired.

The primary emphasis of the CDB Program is on original research and the development of the student as an independent investigator. We seek to provide a strong background in cell and developmental biology and related fields. This objective is achieved through a combination of formal coursework in the first year, graduate colloquia, various seminar series, and journals clubs. Considerable time and attention are devoted to the primary literature and how to read, write and converse in the language of science. During the first year, the student is also introduced to the research experience through research rotations that are intended to facilitate the selection of a laboratory and mentor for dissertation research. The second year completes the transition from more didactic learning to increased dependence on the scientific literature and immersion in hypothesis-based laboratory research.

Beyond Year-2 and following completion of a comprehensive examination and defense of a thesis proposal, the student's time is devoted mainly to dissertation research. Guidance is provided by the student's mentor and through regular meetings with an advisory committee of Program faculty selected jointly by the student and mentor. This phase of training also includes vigorous participation by the student in the intellectual life of the Program by attending seminars and participating in colloquia, advanced courses (within and outside the university), research in progress meetings, and journal clubs.

The goal is the emergence of the student as an investigator-scholar in cell and developmental biology who is proficient in both quality bench research and effective communication of results and information. Achievement is validated by preparation and publication of research findings in high visibility peer-reviewed journals. The training culminates with the writing, successful defense and public presentation of the dissertation with the Ph.D. degree ultimately being awarded by the mentor's academic department.

## CDB Training Areas

We have identified six major research/training areas in the CDB Program that reflect the strengths and expertise of the program faculty. These areas are:

- Cell Migration, Adhesion and Morphogenesis
- Cell Signaling and Proteomics
- Gene Expression, Cell Growth and Differentiation, Embryonic Patterning
- Intracellular Transport, Trafficking and Polarity
- Neurogenesis and Cellular Neurobiology
- Reproductive Biology

## Financial Support

All Ph.D. graduate students are assured support for all years of study, contingent on satisfactory progress in the program. Such support includes the annual stipend (amount set each year by the BIMS Programs and Associate Dean for Research) and full payment of tuition and fees. Support is provided in the form of a fellowship, traineeship, teaching assistantship, research assistantship or a combination of these.

## Application/Admissions

Applications for graduate study toward the Ph.D. degree are made on-line through the Graduate School of Arts and Sciences at the University of Virginia – Biomedical Sciences (BIMS) Graduate Program at <http://artsandsciences.virginia.edu/grad/admission/>. Cell and Developmental Biology should be identified as the *Area of Interest*. The application deadline for the CDB Program is February 1.

Once received, applications complete with letters of reference and official test score reports are forwarded to the CDB Program where they are reviewed and evaluated by the Program Admissions Committee. Promising applicants are invited to attend one of the CDB program recruiting visits held in January – March where they are interviewed by program faculty including members of the Admissions Committee. They also meet and interact with current graduate students, postdoctoral fellows and faculty associated with the program in both scientific and social settings and get a taste of the enjoyable life in Charlottesville.

## The Location

Great science and good life go together in Charlottesville! The University of Virginia is a vibrant campus with a rich range of cultural activities. It is situated among the foothills of the Blue Ridge Mountains, offering excellent opportunities for outdoor recreation including hiking, fishing, camping, and bicycling. The Nation's capital is a short 2 hour drive, which, with the nearby Richmond (70 miles), extends the range of available cultural opportunities. Charlottesville consistently ranks among the top 10 most livable "small" cities in the United States.



BIOMEDICAL SCIENCES GRADUATE PROGRAMS  
at the University of Virginia

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## Professional Development

The CDB Program views the professional development of its students as one of its most important missions. The successful student will have ample opportunity to develop the skills of scientific writing and presentation in both the talk and poster formats. Beyond the ample local opportunities for public communication, participation in national and appropriate international conferences is strongly encouraged. Attendance at such meetings is supported by funds from the mentors' research grants and from other sources including the institution and competitive travel awards from national societies (e.g., American Society for Cell Biology).

The CDB Program also encourages its experienced students to apply to an advanced specialized course in cell and developmental biology or a related area selected from multiple possibilities available at Woods Hole Oceanographic Institute, Cold Spring Harbor Laboratory and elsewhere. These are short intensive courses and represent exceptional training opportunities; the application process is highly competitive. Support is generally provided from grant or institutional funds, and attendance at one of these courses can be used as a substitute for one of the colloquium requirements.

## Academics

In order to receive a Ph.D. in the GSAS at UVA, students must receive at least 54 topical credits and at least 18 "non-topical" credits for a total of at least 72 credits. Topical credits are defined by GSAS as those credits typically earned in the first two years but may include credits taken at any time during your enrollment in the program. These credits include required classes, colloquia, the department journal club, topical research, and lab rotations.

Non-topical credits are defined as those credits earned for dissertation research. These credits should be used during each summer semester and once a student has begun full-time dissertation research (i.e., end of Year 2). Up to 12 credits of non-topical research may be accumulated in a given semester, depending upon whether other courses/colloquia are also being taken. Students must register for at least 12 credits in the fall and spring semesters and 6 credits in the summer to be considered full time. Offer packages for CDB students are based on full time enrollment each semester.

## Grades

Letter grades are given in interdisciplinary core courses, advanced courses, colloquia, current topics/journal club, and laboratory rotations. The following set of grade symbols is used by the Graduate School: A+ (4.0), A (4.0), A- (3.7); B+ (3.3), B (3.0), B- (2.7), C (0.0). Topical and non-topical research is graded on an S/U basis. A grade of U (Unsatisfactory) is considered a failing grade.

## Coursework

Courses that are considered to be an essential foundation for graduate work in the field will be taken in the first part of the Program. While Cell Biology, Genetics and Developmental Biology courses are required, other selections can be tailored to the particular student's background and interests. Selections are made in consultation with the CDB Academic Committee.

### PRE- YEAR-1: *Optional*

#### SUMMER SESSION – 6credits

Laboratory Rotation

### YEAR-1: Core Curriculum and Required Credits

#### FALL SEMESTER – 12 to 15 credits

Cell Structure and Function

Gene Structure, Expression and Regulation

Current Topics / Journal Club

Laboratory Rotation

#### SPRING SEMESTER – 12 to 15 credits

Developmental Mechanisms

Laboratory Rotations

Current Topics/Journal Club

*One elective from the following:*

General and Molecular Genetics

General Physiology

Molecular Basis for Carcinogenesis

Fundamental Immunology

### YEAR – 2 AND BEYOND

Students in the CDB Program must identify a degree track as the CDB program itself is not degree granting. Specific degree requirements for Biology, Cell Biology, Microbiology, Neuroscience, etc. can be obtained from the CDB Program Administrator. CDB Program requirements do not conflict with degree requirements for any of the degrees offered within the BIMS areas. However, degree requirements vary slightly and students are strongly encouraged to work with their mentor, CDB Academic Committee members, and Program Administrator to determine which elective courses would be appropriate during Year 1 and how to proceed with course registration in Year 2. All students enrolled in biomedical sciences graduate programs are required to take Research Ethics.

## For More Information

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