GRADUATE PROGRAM

BIOLOGY
Welcome to the Boston College Biology Ph.D. Program. We strive to provide our graduates with the technical and intellectual training needed for future success in whatever career path awaits them.

Research lies at the heart of the Biology experience at Boston College. Our department is well-equipped for modern molecular, genomics and proteomic research, biochemistry, imaging and bioinformatics. We have core facilities with state-of-the-art instrumentation for fluorescence microscopy and flow cytometry, excellent animal facilities and substantial computational resources. We continue to grow our faculty with new hires who further strengthen our core areas of studies that examine fundamental problems in cell and developmental biology, microbiology and infection, and bioinformatics.

The department is comprised of a close-knit group of graduate students, faculty, post-docs and researchers who collaborate to produce an atmosphere of congenial learning and discovery. We have a robust department life that facilitates our graduate students’ entry into this community of scholars. From our annual Graduate Research Day, which kicks off each academic year, to our weekly graduate student Journal Club, students enjoy a plethora of activities that help to bring a sense of community to their time here at Boston College.

Our graduate program provides enhanced training by having our Ph.D. students begin their research by conducting three seven-week rotations in laboratories of their choosing. Each rotation period ends with an afternoon of short presentations by the students to the entire department. Upon completion of these rotations, students enter the laboratories where they will work side-by-side with other graduate students, postdoctoral scientists and other researchers.

Along with learning to design and conduct experiments, our Ph.D. students get additional opportunities to grow and develop as scientists through the mentoring of undergraduate research students and by giving presentations at our Departmental Data Club. The department provides the funding for our students to attend local, national and international scientific meetings that provide them with the opportunity to present their work and to interact with other members of their scientific community. Our Departmental Seminar Series brings in leaders in various research fields, and our students have a chance to meet with these speakers over lunch to learn more about their work.

For more information on the Boston College Biology Department, please visit us at: www.bc.edu/biology.
The department offers a program of study leading to a Ph.D. degree in biology. Basic areas of study include biochemistry, cellular and developmental biology, genetics, cell cycle, vector biology and neurobiology.

Our Ph.D. program provides an in-depth training experience. Core course work is provided in cell biology, biochemistry, molecular biology, genetics and bioinformatics. Advanced electives are available in all areas of faculty expertise. Seminar courses provide students with ongoing training in critical thinking and oral presentation of scientific data. Research experience is provided by working in close cooperation with faculty members, postdoctoral fellows and senior students in a collaborative, supportive environment.

Focus on Research

Research lies at the heart of the biology experience at Boston College. The department offers a wide array of opportunities for scientific investigation within the areas of:

- Molecular cell biology and genetics
- Cell cycle
- Neurobiology
- Developmental biology
- Structural and cellular biochemistry
- Vector biology
- Infectious disease
- Bioinformatics

For specific areas of research in the department, please refer to our faculty profiles.

### FACULTY PROFILES

#### Anthony T. Annunziato

*Professor*

*Ph.D., University of Massachusetts, Amherst*

**RESEARCH INTERESTS**

Molecular biology, chromatin assembly and histone modifications in human cells and fission yeast

**SELECTED PUBLICATIONS**


#### David R. Burgess

*Professor*

*Ph.D., University of California, Davis*

**RESEARCH INTERESTS**

Cytokinesis and the polarization of the cytoskeleton

**SELECTED PUBLICATIONS**


#### Hugh P. Cam

*Assistant Professor*

*Ph.D., Harvard University*

**RESEARCH INTERESTS**

Epigenetic control of higher-order genome organization and chromatin structures, CENP-B cooperates with Set1 in bidirectional transcriptional silencing and genome organization of retrotransposons.

**SELECTED PUBLICATIONS**

THOMAS C. CHILES
Assistant Professor and Department Chairperson, The DeLuca Chair in Biology, Vice Provost for Research
Ph.D., University of Florida

RESEARCH INTERESTS
B lymphocyte growth and survival, metabolomics, nanodiagnostics

SELECTED PUBLICATIONS

PETER CLOTE
Assistant Professor
Ph.D., Duke University

RESEARCH INTERESTS
RNA thermodynamics-based algorithms, protein and RNA structure, function and molecular evolution machine learning in bioinformatics

SELECTED PUBLICATIONS

ERIC S. FOLKER
Assistant Professor
Ph.D., University of Notre Dame

RESEARCH INTERESTS
Cellular organization—mechanisms of nuclear movement and the role of nuclear movement in muscle development and disease pathogenesis

SELECTED PUBLICATIONS

MARC-JAN GUBBELS
Associate Professor
Ph.D., Utrecht University, The Netherlands

RESEARCH INTEREST
Genetic approaches towards the cell biology of Toxoplasma gondii

SELECTED PUBLICATIONS

CHARLES HOFFMAN
Assistant Professor and Graduate Program Director
Ph.D., Tufts University, The Sackler School

RESEARCH INTERESTS
Glucose sensing, signal transduction, transcriptional regulation in the fission yeast Schizosaccharomyces pombe

SELECTED PUBLICATIONS

Welkin Johnson
Associate Professor
Ph.D., Tufts University School of Medicine

Research Interests
Retroviruses, Primate lentiviruses (HIV and SIV), co-evolution of viruses and their hosts

Selected Publications

Daniel Kirschner
Professor
Ph.D., Harvard University

Research Interests
Structural analysis of amyloids and myelin sheaths, neurodegenerative diseases, peripheral demyelinating neuropathies

Selected Publications

Laura Anne Lowery
Assistant Professor
Ph.D., Massachusetts Institute of Technology

Research Interests
Cytoskeletal dynamics during cell migration, axon outgrowth, development of the nervous system

Selected Publications

Michelle M. Meyer
Assistant Professor
Ph.D., California Institute of Technology

Research Interests
Computational biology, non-coding RNA discovery and validation, molecular evolution, RNA and protein structure

Selected Publications
**JUNONA MOROIANU**

Associate Professor  
Ph.D., Rockefeller University  

RESEARCH INTERESTS  
Nuclear import pathways for human papillomavirus (HPV) proteins and genomic DNA  

SELECTED PUBLICATIONS  

**MARC A. T. MUSKAVITCH**

Professor  
Ph.D., Stanford University  

RESEARCH INTERESTS  
Malaria and vector biology, vector mosquito genomics and genetics, malaria parasite proteasome function  

SELECTED PUBLICATIONS  

**THOMAS N. SEYFRIED**

Professor  
Ph.D., University of Illinois  

RESEARCH INTEREST  
Gene-environmental interactions in epilepsy and brain cancer  

SELECTED PUBLICATIONS  

**TIM VAN OPIJNEN**

Assistant Professor  
Ph.D., University of Amsterdam, The Netherlands  

RESEARCH INTERESTS  
Microbial systems biology; drug/gene interaction networks and the development of new antimicrobials, the development of genome-wide next generation sequencing strategies to link genotypes to phenotypes, the engineering of bacteria with new traits and novel applicability  

SELECTED PUBLICATIONS  

**KENNETH C. WILLIAMS**

Professor  
Ph.D., McGill University  

RESEARCH INTERESTS  
Central nervous system macrophages, neuroAIDS, AIDS pathogenesis, monocyte/macrophage biology  

SELECTED PUBLICATIONS  
**COURSES**

**FALL 2013**
- Environmental Disruptors of Development: Hake
- Human Parásitology: Gubbels
- Virus Infections & Cell Transport: Moroianu
- Cancer/Metabolic Disease: Seyfried
- Advanced Lab in Cell Imaging: Judson
- Topics in Microbial Pathogenesis: Gubbels
- Biology of the Nucleus: Anunziato
- Advanced Genetics: Cam
- Graduate Biochemistry: Kirschner

**SPRING 2014**
- Recombinant DNA Technology: Hoffman
- Immunity and Infectious Disease: Williams
- Viruses, Genes, & Evolution: Johnson
- Literature for Neurological Diseases: Kirschner
- Genomics & Personalized Medicine: Connolly
- DNA Viruses & Cancer: Moroianu
- Graduate Molecular Biology: Anunziato
- Advanced Cell Biology: Burgess
- Scientific Proposal Writing: Meyer
- Cytoskeleton and Disease: Folker

**OUTCOMES**

**Recent Dissertations**

- **Jennifer Campbell**, "Monocyte/Macrophage Traffic Plays an Essential Role in HIV and SIV Pathogenesis"
- **Zeynep Onder**, "Characterization of the Nucleocytoplasmic Transport of the Cutaneous HPV8 E7 Protein"
- **Amit Indap**, "Discovering Rare Variants from Populations to Families"
- **Jiantao Wu**, "Structural Variation Detection in the Human Genome"
- **Chenjia Xu**, "A Novel In vitro PDE7 Inhibitor Inhibits IL-2 Gene Expression in Activated T Cells and Induces Apoptosis in a B-cell Line and Monocytic Cell Line"
- **Jeremy Eberhard**, "Studies on the Nucleocytoplasmic Transport of the E7 Onoprotein of High-Risk HPV Type 16"
Founded in the early 1920s, the Graduate School of Arts and Sciences is the oldest of Boston College’s seven graduate and professionals schools. The Graduate School offers programs of study in the humanities, social sciences and natural sciences, leading to the degrees of Doctor of Philosophy, Master of Arts and Master of Science. In addition, numerous dual-degree options are offered in cooperation with the Carroll School of Management, the Boston College Law School, the Lynch School of Education and the Graduate School of Social Work.

With approximately 1,000 students and 400 full-time faculty, the Graduate School of Arts and Sciences is small enough to know you as a person, but large enough to serve you and prepare you for a rewarding life and satisfying career.

Research Facilities

Our department, in Higgins Hall, is well-equipped for modern molecular, genomic and proteomic research; biochemistry, imaging and bioinformatics.

Departmental genomics and proteomics infrastructure includes capacities for Beckman and LiCor DNA sequencing and DNA fragment polymorphism analysis and Alpha-Innotech two-dimensional gel proteomic analysis. We possess state-of-the-art cell culture and protein purification systems, including the BioCad SPRINT perfusion chromatography system, HPLC, FPLC and preparative isoelectric focusing.

Our imaging facilities include a Leica confocal microscope, a Phillips transmission electron microscope, departmental and individual laboratory Zeiss and Nikon fluorescence and Nomarski compound microscopes, Molecular Dynamics phosphoinmager and densitometer workstations and x-ray diffraction capability. Our digital graphics and image processing facility includes numerous Macintosh workstations with multiprocessor CPU configurations, coupled with high-resolution scanners. A large-format poster printer and dye sublimation printers support preparation of high-quality posters and print communications.

The departmental bioinformatics computing platform consists of a 132 CPU-core cluster and 7 terabytes of local data storage. It is available free of charge to faculty, graduate students and other researchers. Additionally, faculty, students and staff have access to the University central computing cluster, and individual laboratories may have their own dedicated computing systems.

Academic Resources

BOSTON AREA CONSORTIUM
The Boston Area Consortium allows graduate students to cross-register for courses at Boston University, Brandeis University and Tufts University.

BOSTON COLLEGE LIBRARIES
The University is home to eight libraries, containing 2.87 million volumes; more than 700 manuscript collections, including music, photos, art and artifacts; 440,000 e-books and more than 600 electronic databases. O’Neill library, Boston College’s main library, offers subject-specialist librarians to help with research, to set up alerts to new publications in areas of interest and to answer any research- and library-related questions.

THE BOSTON LIBRARY CONSORTIUM
The Boston Library Consortium allows Boston College students access to millions of volumes and other services at 19 area institutions in addition to the world-class resources available through the Boston College Library System.
Boston College is located on the edge of one of the world’s most vibrant cities. Just six miles from downtown Boston—an exciting and dynamic place to live and learn—Boston College is an easy car or “T” ride away from a booming center for trade, finance, research and education.

Home to some of the most prestigious cultural landmarks, including the Museum of Fine Arts, the Isabella Stewart Gardner Museum, Boston Symphony Hall and the Freedom Trail, Boston provides a rich environment for those passionate about art, music and history. For sports fans, Boston hosts a number of the country’s greatest sports teams: the Celtics, Patriots, Bruins and of course, Fenway Park’s beloved Red Sox. Found within a short drive from Boston are some of New England’s best recreational sites, from the excellent skiing in New Hampshire to the pristine beaches of Cape Cod. Boston also offers a wide range of family-friendly attractions, including the Children’s Museum, New England Aquarium, Franklin Park Zoo and the Museum of Science.

There are roughly 50 universities located in the Boston area, and the large student population adds to the city’s intellectually rich and diverse community. Events, lectures and reading groups hosted by world-renowned scholars abound on area campuses, providing abundant opportunities to meet and network with other graduate students and faculty throughout the Boston area.

From its beginnings as a small Jesuit college intended to provide higher education for Boston’s largely immigrant Catholic population, Boston College has grown into a national institution of higher learning that is consistently ranked among the top 35 universities in the nation: U.S. News & World Report ranks Boston College 31st among national universities, and Forbes ranks it 26th in its 2012 America’s Best Colleges listing.

Boston College attracts scholars from all across the United States and 100 countries. Today, Boston College confers more than 4,000 degrees annually in more than 50 fields through its eight schools and colleges. Its faculty members are committed to both teaching and research and have set new marks for research grants in each of the last 10 years; last year alone, faculty member secured more than $60 million in grant funding. The University has made a major commitment to academic excellence. As part of its most recent strategic plan, Boston College is in the process of adding 100 new faculty positions, expanding faculty and graduate research, increasing student financial aid, and widening opportunities in key undergraduate and graduate programs.

The University is comprised of the following colleges and schools: College of Arts & Sciences, Carroll School of Management, Connell School of Nursing, Lynch School of Education, Woods College of Advancing Studies, Boston College Law School, Graduate School of Social Work, School of Theology and Ministry.

General Resources

HOUSING

While on-campus housing is not available for graduate students, most students live off-campus in nearby apartments. The Office of Residential Life maintains an extensive database with available rental listings, roommates and helpful local real estate agents. The best time to look for fall semester housing is June through the end of August. For spring semester housing, the best time to look is late November through the beginning of second semester. Additionally, some graduate students may live on campus as resident assistants. Interested students should contact the Office of Residential Life.
JOHN COURTNEY MURRAY, S.J., GRADUATE STUDENT CENTER
One of only a handful of graduate student centers around the country, the Murray Graduate Student Center is dedicated to the support and enrichment of graduate student life at Boston College. Its primary purpose is to build a sense of community among the entire graduate student population and cultivate a sense of belonging to the University as a whole. Its amenities include study rooms, a computer lab, two smart televisions, kitchen, deck and patio space, complementary coffee and tea, and more! Throughout the year, the Center hosts programs organized by the Office of Graduate Student Life and graduate student groups. The Murray Graduate Student Center also maintains an active job board (available electronically), listing academic and non-academic opportunities for employment both on and off campus.

MCMULLEN MUSEUM OF ART
Serving as a dynamic educational resource for the national and international community, the McMullen Museum of Art showcases interdisciplinary exhibitions that ask innovative questions and break new ground in the display and scholarship of the works on view. The McMullen regularly offers exhibition-related programs, including musical and theatrical performances, films, gallery talks, symposia, lectures, readings and receptions that draw students, faculty, alumni and friends together for stimulating dialogue. Located on the main campus, the McMullen Museum is free to all visitors.

CONNORS FAMILY LEARNING CENTER
Working closely with the Graduate School of Arts and Sciences, the Center sponsors seminars, workshops and discussions for graduate teaching assistant and teaching fellows on strategies for improving teaching effectiveness and student learning. Each fall, the Learning Center and the Graduate School of Arts and Sciences holds a one-and-a-half day “Fall Teaching Orientation” workshop, designed to help students prepare for teaching. The Center also hosts ongoing seminars on college teaching, higher learning and academic life; assists graduate students in developing teaching portfolios; and provides class visits and teaching consultations, upon request. Through these and other activities, the Connors Family Learning Center plays an increasingly important role in enhancing the quality of academic life at Boston College.

FLYNN RECREATION COMPLEX
The 144,000-square-foot Flynn Recreation Complex houses a running track; tennis, basketball, volleyball, squash and racquetball courts; an aquatics center with pool and dive well; saunas and more. Its 10,000-square-foot Fitness Center offers over 100 pieces of cardio equipment, a full complement of strength training equipment and free weights, an air-conditioned spin studio, and three air-conditioned group fitness studios. During the academic year, BC Rec holds more than 80 group fitness classes per week in a variety of disciplines, including Zumba, spin, yoga, strength training, Pilates and more.

BOSTON COLLEGE CAREER CENTER
The Boston College Career Center works with graduate students at each step of their career development. Services include self-assessment, career counseling, various career development workshops, resume and cover letter critiques, and practice interviews. In addition to extensive workshop offerings, Career Center staff members are available throughout the year for one-on-one advising about any aspect of the career path. The Career Resource Library offers a wealth of resources, including books, periodicals and online databases.
Admission Requirements

The application deadline for fall admission is January 2. Please visit bc.edu/gsas for detailed information on how to apply.

Application requirements include:

- **Application Form:** Submitted online, via the GSAS website.
- **Application Fee:** $75, non-refundable.
- **Abstract of Courses Form:** A concise overview of background and related courses completed in an intended field or proposed area of study.
- **Official Transcripts:** Demonstrating coursework completed/degree conferral from all post-secondary institutions attended.
- **GRE General Test:** Official score report required for all applicants.
- **GRE Subject Test:** Official score report recommended for all applicants.
- **Three Letters of Recommendation:** From professors or supervisors. It is highly advisable that at least one letter be from an academic source.
- **Statement of Purpose:** A brief (1-2 page) discussion of an applicant’s preparation, motivation and goals for their proposed courses of study.
- **Proof of English Proficiency:** Official TOEFL/IELTS score reports accepted. (International only)

Financial Assistance

**DEPARTMENT FUNDING**

Full funding is available for qualified Ph.D. students. Students function as either Teaching Assistants or Research Assistants and receive a stipend in exchange for their services. In addition, they receive a full-tuition scholarship for all coursework relative to their program of study.

**FEDERAL FINANCIAL AID**

Graduate students can apply for Federal Financial aid using the FAFSA. The loans that may be available to graduate students are the Federal Direct Unsubsidized Stafford Loan and Perkins Loan, based on eligibility. If additional funds are needed, student may apply for a Grad Plus Loan. For more information, see the Graduate Financial Aid website www.bc.edu/gradaid or contact the Graduate Financial Aid Office at 617-552-3300 or 800-294-0294.

**OFFICE OF SPONSORED PROGRAMS**

The Office of Sponsored Programs (OSP) assists both faculty and graduate students in finding sources of external funding for their projects and provides advice in the development of proposals. OSP maintains a reference library of publications from both public and private sectors listing funding sources for sponsored projects. In the recent past, graduate students have received research support from prominent agencies, corporations and organizations such as the Fulbright Commission, the Guggenheim Foundation, the National Science Foundation, the American Political Science Association, the American Chemical Society and the American Association of University Women.