COMBINED PROGRAM IN THE BIOLOGICAL AND BIOMEDICAL SCIENCES (BBS)

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https://medicine.yale.edu/bbs

Director
Craig Roy

FIELDS OF STUDY

The Yale Combined Program in the Biological and Biomedical Sciences (BBS) offers unprecedented access to Yale's extensive array of bioscience resources, encompassing everything the University has to offer in one comprehensive, interdisciplinary graduate program. BBS has no boundaries, either departmental or geographical. Students therefore have access to courses, seminars, and faculty labs in every department. Moreover, students can participate in research activities anywhere—on the main University campus, West Campus, or the School of Medicine.

Within BBS there are approximately 425 participating faculty, several dozen courses, and a great many seminars from which to choose. BBS is currently divided into eight interest-based "tracks":

Biochemistry, Quantitative Biology, Biophysics, and Structural Biology (BQBS)
Computational Biology and Bioinformatics (CBB)
Immunology
Microbiology
Molecular Cell Biology, Genetics, and Development (MCGD)
Translational Molecular Medicine, Pharmacology, and Physiology (TMMPP)
Neuroscience
Plant Molecular Biology (PMB)

Students apply to and, upon matriculation, affiliate with one of these eight tracks. It is important to note that, regardless of a student's home track, all courses, faculty, and research opportunities at the University remain available.

Year 1 Each track has a faculty director who helps first-year students select courses and find suitable lab rotations. Students typically take two to three courses per term and conduct two to four lab rotations over the course of the year.

Year 2 Prior to the start of the second year, students select a thesis adviser in whose lab they will conduct their doctoral research. They also then leave their BBS track and formally join one of twelve Ph.D.-granting programs:

Cell Biology
Cellular and Molecular Physiology
Computational Biology and Bioinformatics
Experimental Pathology
Genetics

Immunobiology
Interdepartmental Neuroscience Program
Microbiology
Molecular Biophysics and Biochemistry
Molecular, Cellular, and Developmental Biology
Pharmacology
Translational Biomedicine

Students in year 2 complete the course requirements for the graduate program they have joined, take a qualifying exam, act as teaching assistants in lecture or lab courses, and begin thesis research.

Year 3 and beyond Students focus primarily on thesis research, publishing their results, and presenting their work at scientific meetings.

The median time to degree is 5.7 years.

For the duration of their studies all students receive a stipend, full tuition, and health coverage. Financial support comes from Yale University Fellowships, National Institutes of Health (NIH) training grants, and research grants from foundations and companies.

INTEGRATED GRADUATE PROGRAM IN PHYSICAL AND ENGINEERING BIOLOGY (PEB)

Students applying to the BQBS, CBB, MCGD, TMMPP, or Neuroscience tracks may also apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements, and https://peb.yale.edu for more information about the benefits of this program and application instructions.

COURSES

B&BS 640a / PATH 640a, Developing and Writing a Scientific Research Proposal Rui Chang

The course covers the intricacies of scientific writing and guides students in the development of a scientific research proposal on the topic of their research. All elements of an NIH fellowship application are covered, and eligible students submit their applications for funding. Enrollment limited to twelve. Required of second-year graduate students in Experimental Pathology. Registration allowed by prior authorization from course directors only.

B&BS 680b / IMED 680b, Topics in Human Investigation Joseph Craft and Karen Anderson

The course teaches students about the process through which novel therapeutics are designed, clinically tested, and approved for human use. It is divided into two main components, with the first devoted to moving a chemical agent from the bench to the clinic, and the second to outlining the objectives and methods of conducting clinical trials according to the FDA approval process. The first component describes aspects of structure-based drug design and offers insight into how the drug discovery process is conducted in the pharmaceutical industry. The format includes background lectures with discussions, labs, and computer tutorials. The background lectures include a historical perspective on drug discovery, the current paradigm, and important

considerations for future success. The second component of the course provides students with knowledge of the basic tools of clinical investigation and how new drugs are tested in humans. A series of lectures and discussions provides an overview of the objectives, research strategies, and methods of conducting patient-oriented research, with a focus on design of trials to test therapeutics. Each student is required to participate (as an observer) in an HIC review, in addition to active participation in class. Consent of instructor required.