COMBINED PROGRAM IN THE BIOLOGICAL AND BIOMEDICAL SCIENCES (BBS)

55 College Street, 203.785.5663
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 350 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
- Computational Biology and Bioinformatics
- Immunology
- Microbiology
- Molecular Cell Biology, Genetics, and Development
- Molecular Medicine, Pharmacology, and Physiology
- Neuroscience
- Plant Molecular Biology

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** Just 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 eleven 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

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 average time to degree is 5.5 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 grants from foundations and companies.

INTEGRATED GRADUATE PROGRAM IN PHYSICAL AND ENGINEERING BIOLOGY (PEB)

Students applying to the Computational Biology and Bioinformatics track, the Molecular Cell Biology, Genetics, and Development track, the Neuroscience track, or the Biochemistry, Quantitative Biology, Biophysics, and Structural Biology track of the BBS program 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.
MEDICAL RESEARCH SCHOLARS PROGRAM (MRSP)
The Medical Research Scholars Program bridges barriers between traditional predoctoral and medical training by providing both medically oriented course work and a mentored clinical experience to select BBS students. The course work provides a grounding in biomedicine, and the clinical experience enables students to interact with patients to learn firsthand about disease symptoms, treatment options, and the limitations of current therapies. This combination of medical knowledge and face-to-face interaction with patients and their doctors provides a new perspective to Ph.D. students and enhances the training in basic science already provided within the BBS program. Upon completion of their training, MRSP graduates will be capable of working much more closely with physicians and physician-scientists and will be better prepared to conduct clinically relevant basic research.

The MRSP is open only to students who have already been accepted into the BBS program, and a separate application is required. Five or six incoming students are admitted into the program each year. They remain in their BBS tracks but will participate in the additional MRSP curriculum. For more information see https://medicine.yale.edu/bbs/training/nihprograms.

Program materials are available upon request to Bonnie Ellis, Associate Director, BBS Program, Yale University, PO Box 208084, New Haven CT 06520-8084; telephone 203.785.5663; fax 203.785.3734; e-mail, bbs@yale.edu; website, https://medicine.yale.edu/bbs.

COURSES

**B&BS 640a / PATH 640a, Developing and Writing a Scientific Research Proposal**  Jean-Ju Chung and 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 681a / PATH 681a, Advanced Topics in Cancer Biology**  Kurt Schalper
This advanced course focuses on readings and discussion on three or four major topics in cancer biology, such as targeted therapy, tumor immunology, tumor metabolism, and genomic evolution of cancer. For each topic, the class starts with an interactive lecture, followed by critical analysis of primary research literature. Recent research articles are assigned, and a student leads discussions with input from faculty who are experts in the topic area. Prerequisite: PATH 650 or permission of the instructor. Open to all Ph.D., M.D./Ph.D., and M.P.H. students and to advanced undergraduates at the discretion of the instructor.