CHEMICAL BIOLOGY, PHD

Admission Requirements

Students interested in pursuing multidisciplinary research to gain a broad perspective in chemistry and biology are encouraged to apply to the Chemistry-Biology Interface (CBI) PhD program. The CBI Program spans departments in Johns Hopkins University's schools of Arts and Sciences, Engineering, Medicine, and Public Health.

Selected applicants will be asked to visit Johns Hopkins University for an interview. The CBI Program will arrange for meetings with faculty and students, and conduct tours of the facilities and community. Additional admissions information can be found here. (https://cbi.jhu.edu/admissions/)

Application Instructions

To apply to the CBI Program, applicants will need to submit:

- An online application (https://applygrad.jhu.edu/apply/?sr=b330bf34-0cb6-4cec-9fe5-852b518dffb4) for the Chemistry-Biology Interface (CBI) PhD
- An unofficial undergraduate transcript
- Statement of purpose
- Three (3) letters of recommendation

In addition, the general GRE along with one of the following subject tests are **optional** but may be submitted:

- Biochemistry
- Cell and Molecular Biology
- Biology
- Chemistry

International Applicants

A training grant from the National Institutes of Health provides support for our students during their first year in the graduate program at the Chemistry-Biology Interface. However, the NIH limits this to U.S. citizens and permanent residents. International students who are interested in applying to this program must secure an outside grant or fellowship.

Vivien Thomas PhD Scholars

The Vivien Thomas Scholars Initiative (VTSI) is an endowed fellowship program at Johns Hopkins for STEM PhD students. It provides full tuition, stipend, benefits, targeted mentoring, and professional development. Students who have attended a historically black college and university or other minority serving institution for undergraduate study are eligible. Click here to view more information about VTSI. (https://provost.jhu.edu/about/vivien-thomas-scholars-initiative/admissions/)

There is no additional application. To be considered for the VTSI, all components of the PhD application - including supplemental components, special VTSI questions, and letters of recommendation - must be completed according to the VTSI guidelines (https://provost.jhu.edu/about/vivien-thomas-scholars-initiative/admissions/) even if the CBI program's application deadline is later.

Relocation Funds for Incoming Graduate Students

We recognize that it can be financially burdensome to relocate to a new city to attend a PhD program. Students who are accepted to PhD programs at JHU can apply to receive a $1,500 need-based grant to offset the costs of relocating to JHU.

These grants provide funding to a portion of incoming students who, without this money, may otherwise not be able to afford to relocate to JHU for their PhD program.

This is not a merit-based grant. Applications will be evaluated solely based on financial need.

Click here (https://provost.jhu.edu/need-based-relocation-grants-for-incoming-phd-students/) for more information.

Program Requirements

In addition to completing an original research thesis, all Johns Hopkins University PhD candidates are required to pass the Graduate Board oral exam. CBI students are required to meet the following additional requirements:

- Present and defend an original research proposal (http://cbi.jhu.edu/curriculum/thesis-research/) in the CBI Forum during the fall semester of the second year in residence
- Complete 3 research rotations (http://cbi.jhu.edu/curriculum/advising/) in the first year in residence
- Complete 8 graduate-level courses (http://cbi.jhu.edu/curriculum/courses/)

CBI Forum (AS.030.613/AS.030.614)

CBI students and faculty meet monthly in a forum. The forum hosts:

- CBI preceptor presentations (fall semester)
- First-year student rotation presentations (throughout the year)
- Third-year research proposal Seminars (fall semester)
- Advanced-year student research updates (spring semester)
- Seminars presented by distinguished visitors (throughout the year)

Third-Year Research Proposal Seminar

Third-year CBI students will prepare and present a research proposal in an area that is unrelated to their dissertation research. The research proposal will help students develop the critical reading, grant proposal writing, and presentation skills that will enhance their success as a research scientist.

Courses

CBI graduate students are required to complete eight graduate-level courses. Typically, these are completed during the first year at Johns Hopkins.

Required Courses

CBI students are required to take AS.030.619 Chemical Biology I and AS.030.620 Chemical Biology II during their first year at Johns Hopkins.

All CBI students are required to register for CBI Forum - AS.030.613 Chemistry-Biology Interface Program Forum I and AS.030.614 Chemical-Biology Program Interface Forum II - every semester during their graduate career. Students are also required to complete AS.360.625 Responsible Conduct of Research. CBI Forum and RCR do not count toward the eight required courses.

Selecting Your Courses

With the help of a faculty advisory committee, students select the remaining six courses based on their personal academic interests. At least two of these courses must be offered by departments other than the Department of Chemistry, and two must be chosen from the list of Foundation Courses.

Foundation Courses

AS.030.449 Chemistry of Inorganic Compounds
AS.030.453 Intermediate Quantum Chemistry
AS.030.601 Statistical Mechanics
AS.030.625 Advanced Mechanistic Organic Chemistry I
AS.030.626 Advanced Mechanistic Organic Chemistry II
AS.030.677 Advanced Organic Synthesis I
AS.030.678 Advanced Organic Synthesis II
AS.250.685 Proteins & Nucleic Acids
AS.250.689 Physical Chemistry of Biological Macromolecules

Representative Courses

AS.020.312 Introduction to the Human Brain/AS.020.612 Introduction to the Human Brain

AS.020.630 Human Genetics

AS.020.662 Single Molecule Approaches to Biology
AS.020.686 Advanced Cell Biology
AS.250.622 Statistics and Data Analysis

AS.250.649 Introduction to Computing in Biology
AS.030.405 Introduction to Computational Chemistry
AS.030.441 Spectroscopic Methods of Organic Structure Determination
AS.030.442 Organometallic Chemistry
AS.030.623 Molecular Synthetic Biology
AS.030.648 Biocatalysis: Fundamentals, Recent Advances, and Industrial Applications
AS.030.681 Nucleic Acids: Fundamental Chemistry and Applications

EN.510.436 Biomaterials for Cell Engineering/EN.510.636 Biomaterials for Cell Engineering
EN.510.621 Misfolding diseases and the thermodynamics of protein folding
EN.510.636 Biomaterials for Cell Engineering
EN.540.405 Modern Data Analysis and Machine Learning for ChemBEs/EN.540.605 Modern Data Analysis and Machine Learning for ChemBEs
EN.540.614 Computational Protein Structure Prediction and Design
EN.540.622 Introduction to Polymeric Materials
EN.540.628 Supramolecular Materials and Nanomedicine
EN.540.635 Software Carpentry
EN.540.637 Application of Molecular Evolution to Biotechnology
ME.100.716 Analysis of Macromolecules
ME.110.728 Cell Structure and Dynamics
ME.200.707 Drug Discovery Case Studies
ME.260.709 Molecular Biology and Genomics
ME.260.812 Great Experiments in Biology
ME.330.707 Graduate Pharmacology I
ME.330.709 Organic Mechanisms in Biology
ME.330.712 Introduction to Glycobiology
ME.330.715 Graduate Pharmacology II
ME.330.804 Role of Chromatography and Mass Spectrometry in Biomedical Research
ME.340.711 Bacterial Cell Biology and Development
ME.340.712 Bacterial Signaling and Communities
ME.360.728 Pathways and Regulation
PH.120.600 Biochemistry I: Protein Structure and Enzyme Catalysis
PH.120.601 Biochemistry II: Major Metabolic Pathways
PH.120.602 Concepts of Molecular Biology
PH.120.603 Molecular Biology of Pandemic Influenza
PH.120.608 Gene Editing, Therapy and Manipulation
PH.120.613 Nucleic Acid Chemistry
PH.120.620 Fundamentals of Reproductive Biology
PH.120.622 Molecular and Cellular Mechanisms of Reproduction
PH.120.624 Cancer Biology
PH.120.626 Principles of Cell Biology
PH.120.627 Stem Cells and the Biology of Aging and Disease
PH.140.615 Statistics for Laboratory Scientists I
PH.140.636 Scalable Computational Bioinformatics
PH.140.651 Methods in Biostatistics I
PH.187.610 Public Health Toxicology
PH.187.632 Molecular Toxicology
PH.222.651 Nutrients in Biological Systems
PH.260.611 Principles of Immunology I
PH.260.612 Principles of Immunology II
PH.260.623 Fundamental Virology
PH.260.627 Pathogenesis of Bacterial Infections
PH.260.633 Autoimmune Diseases of the Endocrine Glands