The Institute for NanoBioTechnology (INBT) at Johns Hopkins University is an exceptionally diverse, multidisciplinary team of faculty, researchers, and students uncovering new knowledge and creating innovative technologies at the interface of nanoscience, engineering, and medicine. Launched in 2006, INBT aims to revolutionize research by fostering a collaborative environment among engineers, scientists, and clinicians to pioneer new ways to solve some of the complex challenges in healthcare and the environment. The Institute brings together experts from the Bloomberg School of Public Health, School of Medicine, Whiting School of Engineering, Applied Physics Lab, and Krieger School of Arts and Sciences to fulfill their research, education, outreach, and translation initiatives. INBT collaborates with major industry partners through its Corporate Partnership Program, to help move emerging technologies from laboratory to marketplace, as well as provide a vehicle for open exchange between Hopkins researchers and students with their counterparts in industry. Their headquarters are located in 100 Croft Hall on the Homewood campus, with laboratory facilities and research teams located at several Johns Hopkins locations. Examples of INBT research include the development of new tools and techniques to probe biological systems at the molecular, cellular, and tissue levels, to provide new insight into the mechanisms of disease, and the development of new diagnostic and therapeutic platforms for improved diagnosis, prevention, and treatment of disease. These are achieved through their three research focused platforms: Engineering for Cancer Therapies, Diagnostic Tools Engineered for Early Detection, and Stem Cells and Regenerative Engineering.

INBT education programs foster the next wave of nanobiotechnology innovations. Goals include training scientists and engineers who work between the physical sciences/engineering fields and life sciences/medical fields, as well as creating an entrepreneurial environment. The Nanotechnology for Cancer Research program trains students to study and model cancer motility and the biophysical forces involved in metastasis. Additionally, research opportunities exist through INBT’s summer Research Experience for Undergraduates (REU) and International Research Experience for Students (IRES), both funded by NSF.

**Programs**

- Nano-Biotechnology, Certificate of Advanced Study (http://catalog.jhu.edu/engineering/full-time-residential-programs/degree-programs/nanobiotechnology/nano-bio-certificate-advanced-study/)

For current course information and registration go to https://sis.jhu.edu/classes/

**Courses**

**EN.670.502. INBT Undergraduate Research. 1 - 3 Credits.**

Student participation in ongoing research activities. Research is conducted under the supervision of a faculty member and often in conjunction with other members of the research group.

**Prerequisite(s):** Students must have completed Lab Safety training prior to registering for this class. You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration &gt; Online Forms.

**EN.670.609. Communication for Scientists and Engineers. 1 Credit.**

Developing communications skills is a vital part of the training process to prepare scientists and engineers for successful careers. The course’s goal is to provide participants with fundamental training in science communication, focusing on how to present science to a non-expert audience. Students will reach this objective through reading, writing, and classroom activities. Conciseness and clarity are valued in scientific fields, so an emphasis will be on quality rather than quantity of writing. Topics covered generally include: communicating with your target audience, communicating on the web and social media, the editing process, communication resources, and more.

**Writing Intensive**

**EN.670.615. Introduction to NanoBio Tutorial. 1 Credit.**

Students in the INBT training grant programs study and present topics in nanotechnology applied to biology from the scientific literature.

**EN.670.616. Introduction to NanoBio Tutorials II. 1 Credit.**

Ph.D. students and postdoctoral fellows in the HHMI/IGERT/PSOC/CCNE/CNTC training programs study and present topics in nanotechnology for biology and medicine.

**EN.670.618. Nanobio Tutorials. 1 Credit.**

As a follow-up to Intro to NanoBio Tutorials, INBT training grant students will conduct extensive article reviews on topics related to the research being conducted in their labs (i.e., nanoparticles synthesis, quantum dots, cancer, etc.). Topics will also be related to nanotechnology applied to biology from scientific literature. Students will present literary reviews, discussions, and formal presentations on articles as they relate to research or projects they wish to partake in. Recommended Course Background: EN.670.615/EN.670.616

**EN.670.621. NanoBio Laboratory. 3 Credits.**

This course introduces students to concepts and laboratory techniques in nanobiotechnology. The focus of the laboratory is on nanoparticle carriers for drug delivery and markers for imaging. The laboratory involves the synthesis of nanoparticles using solution phase techniques and characterization by optical techniques such as dynamic light scattering and absorbance spectroscopy. Strategies for functionalization of nanoparticles are covered with focus on methods for attaching biomolecules. The basic aspects of cell culture and optical microscopy techniques will be covered. Nanoparticles functionalized with a drug or gene will be used to perform transfection experiments and compared to standard techniques.

**Prerequisite(s):** Students must have completed Lab Safety training prior to registering for this class. To access the tutorial, login to myLearning and enter 458083 in the Search box to locate the appropriate module.

**EN.670.622. Advanced NanoBio Tutorials. 1 Credit.**

As a follow-up to NanoBio Tutorials, INBT training grant students will present scientific articles and reviews related to their current research project. Topics will also be related to nanotechnology applied to biology from scientific literature. At this time all students should be assigned a project and be able to engage participating students in their field of study. Recommended Course Background: EN.670.615, EN.670.616, EN.670.618, EN.670.619, and Introduction to NanoBio Tutorials and NanoBio Tutorials.

**Area:** Engineering, Natural Sciences

**EN.670.623. Advanced NanoBio Tutorials II. 1 Credit.**

INBT training grant students only. Recommended Course Background: EN.670.615, EN.670.616, EN.670.618, and EN.670.619

**Area:** Engineering, Natural Sciences
EN.670.624. **NanoBio Tutorials: Special Topics I.** 1 Credit.
This course is to allow students pursuing a certificate in nanobiotechnology the opportunity each week to review and present on special research topics. The papers and discussions will cover the latest developments in various researches. Recommended Course Background: EN.670.615, EN.670.616, EN.670.618, EN.670.619, EN.670.622, and EN.670.623. Certificate of Advanced Studies in Nanobiotechnology only. Area: Engineering, Natural Sciences

EN.670.625. **NanoBio Tutorials: Special Topics.** 1 Credit.
This course is to allow INBT training grant fellows the opportunity each week to review and present on special research topics. The papers and discussions will cover the latest developments in various researches. INBT training grant students only. Recommended Course Background: EN.670.615, EN.670.616, EN.670.618, EN.670.619, EN.670.622, and EN.670.623. Area: Engineering, Natural Sciences

EN.670.628. **NanoBio Tutorials II.** 1 Credit.
As a follow-up to Intro to NanoBio Tutorials, INBT training grant students will conduct extensive article reviews on topics related to the research being conducted in their labs (i.e., nanoparticles synthesis, quantum dots, cancer, etc.). Topics will also be related to nanotechnology applied to biology from scientific literature. Students will present literary reviews, discussions, and formal presentations on articles as they relate to research or projects they wish to partake in. Recommended Course Background: EN.670.615/EN.500.615 and EN.670.616/EN.500.616

EN.670.643. **Nanotechnology for Cancer Research Tutorial.** 1 Credit.
Students in the NTCR training grant program study and present topics in nanotechnology applied to biology from the scientific literature. For NTCR Fellows only. Area: Engineering, Natural Sciences