

SummerScience@Jefferson 2025

June 23 – July 22



Biochemistry and Molecular Biology, Forensic Science, and Genetics

Students are introduced to the basics of molecular biology, with an emphasis on the exciting field of Biotechnology, in which they will learn about the human genome and genomics, recombinant DNA technology and cloning, gene expression, and an introduction to gene editing techniques. Laboratory experiences will include techniques such as isolation of genomic DNA, PCR and DNA fingerprinting. Students will also have the opportunity to become immersed into the suspenseful world forensic science. They will carry out mock criminal investigations as junior forensic scientists, analyzing and solving a variety of cases. These cases will incorporate a wide array of forensic science applications, such as forensic biology to analyze blood and DNA evidence, entomology to use insects to estimate time of death and hair and tire track analysis. Students will be introduced to current gene editing tools such as the buzzworthy "CRISPR/Cas9" tool. They will learn about CRISPR technology, current uses, and the many ethical considerations surrounding its use and how ethics and regulations must evolve to keep up with the current and fast-paced advances in science.

Cell Biology and Neuroscience

Students are introduced to the basic facts of cell biology, including cell morphology and physiology. Students also study the morphology of cancer cells in comparison to normal healthy cells and learn about apoptosis (programmed cell death) and how cancer cells evade this phenomenon. Laboratory experiences include basics of cell culture and an introduction to stem cell culture. They are also introduced to the unique story of HeLa cells and how these immortal cells have contributed to many scientific advances all over the world, from the development of the polio vaccine, to testing the effects of zero gravity on humans in space! Students will also be introduced to the field of Neuroscience and its core component, "the brain" and how its study can occur at multiple levels, from molecular synapses and cellular networks to cognition and behavior.

Anatomy and Molecular Mechanisms of Disease, Cancer Biology, Microbiology and Immunology

Students are introduced to the etiology and pathogenesis of various diseases such as cancer and emerging infectious diseases such as the Ebola Hemorrhagic Fever and Zika Virus. Exploration of the mechanisms of diseases will focus on microbes, genetics, environmental factors, and an introduction to epigenetics. Laboratory experiences include an introduction to immunohistochemistry and ELISA (enzyme-linked immunosorbent assay) to diagnose infections such as HIV, ABO blood typing, Gram staining, and evaluating bacteria for antimicrobial sensitivity.

What is it?

Experience cutting-edge science through SummerScience@Jefferson, an immersive online program designed for rising high school sophomores, juniors, and seniors. This virtual platform allows you to learn from Jefferson science faculty and engage in research projects conducted in an interactive online environment. You will also have the opportunity to conduct at-home laboratory experiments, bringing scientific exploration directly to you.

Working alongside Jefferson faculty, staff, postdoctoral scholars, and students, you will develop a deeper understanding of real-world research questions, scientific methods, and practical applications. The program culminates in a Virtual Summer Science Symposium, where you will present a formal project on a topic explored during your experience.

SummerScience@Jefferson brings together faculty from across the Jefferson College of Life Sciences, providing an engaging and collaborative environment for students passionate about science.

When and Where is SummerScience@Jefferson?

The VIRTUAL SummerScience@Jefferson program will be held daily (Monday - Friday), typically from 9 a.m.–1 p.m., from June 23, 2025 through July 22, 2025. **There will be no class Thursday, July 3, 2025 and Friday, July 4, 2025 to allow for the July 4th holiday to be observed.**

All classes are held online and internet access is necessary in order to participate.

Am I eligible to apply to SummerScience@Jefferson?

The program is open to high school students who:

- Will be a high school sophomore, junior, or senior by September 2025
- Are in good academic standing in your high school program and have completed a high school level biology course
- Demonstrate a sincere interest in the biological sciences
- Students who identify as underrepresented minorities including first generation college students, particularly in the area of biological sciences, are strongly encouraged to apply.

When is the application due?

Completed applications and supporting documents must be submitted by Friday, May 30, 2025 for review.

How much does SummerScience@Jefferson cost?

The program fee is **\$650**.

When is payment due?

After acceptance to the Program, the \$650 Program fee is due by Monday, June 9, 2025.

- All payments are accepted online, via credit card: jefferson.catalog.instructure.com/courses/summerscience

How do I apply?

Interested students should submit the following information for consideration:

- Completed Application Packet (Incomplete applications will not be considered.)
- 250–500 word essay explaining your interest in the biomedical sciences/the SummerScience@Jefferson Program
- One letter of recommendation addressing your academic ability and commitment from a current science teacher, coach, club advisor, or school administrator.
- Official high school transcript or **most recent Report Card**

PLEASE NOTE: Incomplete applications will not be considered.

Where do I send my Application?

Complete Application Packets should be emailed to Ms. Waliya Moton-Muhammad at walia.moton@jefferson.edu.

Important Payment Information: Payments can only be made online via credit card by clicking on the link: jefferson.catalog.instructure.com/courses/summerscience

