

SummerScience@Jefferson 2023

June 26 – July 25



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?

The opportunity to engage with innovative science is still taking place this summer with the move of SummerScience@Jefferson to an immersive, online virtual platform. Through this program — *designed for rising high school sophomores, juniors, and seniors* — you can still learn from Jefferson science faculty and engage with them in research projects conducted in an online environment. During this Program, you will also have the opportunity to conduct some at-home laboratory activities/experiments.

Working with Jefferson faculty, staff, postdoctoral scholars, and students, you will build your understanding and proficiency about real-life research questions, methods, and applications. To cap off your experience, we will host our virtual Summer Science Symposium Day, during which you'll prepare and make formal presentations on a topic that you have explored during the summer program. SummerScience@Jefferson brings together faculty from across our College of Life Sciences programs. These topics may include:

When and Where is SummerScience@Jefferson?

The VIRTUAL SummerScience@Jefferson program will be held daily, typically from 9 a.m.–1 p.m., from June 26, 2023 through July 25, 2023. **There will be no class Monday, July 3, 2023 and Tuesday, July 4, 2023 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 2023
- 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, June 9, 2023 for review.

How much does SummerScience@Jefferson cost?

The program fee is **\$600**.

When is payment due?

After acceptance to the Program, the \$600 Program fee is due by Friday, June 16, 2023.

- 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 **recent Report Card**

PLEASE NOTE: Please ensure the transcripts are emailed directly from your high school. 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

