



Biotechnology Science and Technology Research Laboratory

Director: Fred Lampazzi

Educational Background

National Board Certified Teacher (NBCT) Certification, November 22, 2002
Masters in Science Biology, George Mason University, Fairfax, VA, May 1983
Bachelor of Science in Biology, Niagara University, NY, May 1976

Teaching and Research Interests

As the director of the Biotechnology Laboratory, Mr. Lampazzi implements and updates the school's innovative DNA Science I and II curricula. These Post-AP programs are designed to enable students to develop the necessary research skills

to conduct college-level molecular biology research. Mr. Lampazzi also oversees the Senior Biotechnology Mentorship Program. During Mr. Lampazzi's teaching career, he has also taught numerous Biology I and AP Biology classes.

Mr. Lampazzi is also responsible for the Summer Biotechnology Institute. This three-week outreach program is designed for rising eighth and ninth graders and introduces various technologies used to enhance scientific research in the field of molecular biology.



**Senior Research Instructor: Larry A.
Gaudreault**

Educational Background

Bachelor of Science, Biology, University of Virginia, 1969.
Master of Science, Biology, George Mason University, 1975.
Additional coursework in DNA Biotechnology and Protein Analysis, Virginia Polytechnic and State University.

Teaching and Research Interests

After retiring in 1999, in 2000, Mr. Gaudreault returned to Thomas Jefferson and now serves as the Biotechnology Laboratory's Senior Research Instructor. In this current role, he is the teacher of Jefferson's Biotechnology Senior Research program.

Background Information on the Laboratory

The **Biotechnology Science and Technology Research Laboratory** was established in September 1985 when Thomas Jefferson first opened its doors as the Virginia Governor's School in Northern Virginia. During the 1987-1988 academic year, the Biotechnology Laboratory received its first group of junior students. They enrolled in semester courses developed with the intent of preparing students for senior research projects.

Over the last two decades, the Biotechnology Laboratory has grown in proportion to the dramatic surge in new biotechnologies. The Biotechnology Laboratory provides a unique technology experience for *nearly 25 percent* of all Jefferson students who elect its biotechnology training and research program. Designed to transform traditional secondary molecular biology studies into an applications based programs, students experience the power of newly discovered research tools associated with recombinant DNA technologies.

The laboratory's primary mission is to enable student experiences in topics ranging from bacterial transformation to DNA mapping. Additionally, students are afforded experience working with new, leading-edge technologies, including bioinformatics, western blotting, PCR, and DNA sequencing.

Outstanding government, corporate and university partners in the Greater Washington Metropolitan Area currently participate in Jefferson's Mentorship Program, and offer our students invaluable research experiences in their laboratories and workplaces.

Current Mentorship partners for students enrolled in Biotechnology Laboratory include:

- ▶ Armed Forces Institute of Pathology (AFIP)
- ▶ Armed Forces Radiobiology Research Institution (AFRRI)
- ▶ George Mason University (GMU)
- ▶ Georgetown University Hospital
- ▶ Georgetown University Lombardi Cancer Research Center
- ▶ Food and Drug Administration (FDA)
- ▶ National Cancer Institute (NCI)
- ▶ National Institute of Mental Health (NIMH)
- ▶ National Institutes of Health (NIH)
- ▶ National Zoo
- ▶ Naval Medical Research Center (NMRC)
- ▶ Naval Research Laboratory (NRL)
- ▶ The Institute for Genomic Research (TIGR)
- ▶ Uniformed Services University of the Health Sciences (USUHS)
- ▶ Walter Reed Army Institute of Research (WRAIR)

Recent Student Research Initiatives

- The Effects of Polyphenols on Mitochondrial DNA
- The Effect of 2, 4-epibrassinolide on the Drought Resistance of *Brassica napus*
- Expression of hepatitis surface antigen in *Agrobacterium tumefaciens* in preparation for creation of an edible vaccine

- Determining the evolutionary timeline of Asian populations through mitochondrial DNA sequencing
- The effect of thermoperiodism on the Circadian rhythms of *Messor andrei*
- The effects of varying concentrations of hypericin on *Escherichia coli* B and the replication of T4 bacteriophage

A sampling of investigations performed in the DNA Science program includes:

- DNA Restriction and Electrophoresis
- Effects of DNA Methylation on Restriction
- Bacteriophage Infection of *E. coli*
- Rapid Colony Transformation of *E. coli* DH5 with pBLU
- Plasmid Minipreparation and Restriction Analysis of Purified pAMP
- Isolation of *E. coli* chromosomal DNA
- Recombination of Antibiotic-Resistance Genes
- Transformation of *E. coli* with Recombinant DNA
- Restriction Mapping of the Chromosome
- Restriction Mapping of pBR322
- Detection of an *Alu* Insertion Polymorphism by Polymerase Chain Reaction
- Genetics of albino tobacco plants
- Genetics of hybrid corn
- Genetics of *Drosophila* (a study involving three autosomal traits)
- Study of normal human chromosome and *Hela* cells
- Detection of an *Alu* Insertion Polymorphism by Polymerase Chain Reaction