



BIOLOGY MEETS ENGINEERING

SUMMER 2026 OPPORTUNITIES

OHIO UNIVERSITY

1. FAIK AND SHARMA LABS:

Project Title: Improving plant biomass using computational molecular docking and biochemistry.

Introduction: One of the targeted research areas to achieve United States energy needs (and independence from foreign oil) is the improvement of the yield and quality of plant biomass as sustainable raw materials for production of alternative biofuels. Because the dry weight of plant biomass is made up of more than 50% of cell wall polymers, improvement of bioenergy crops relies largely on the cell wall (CW) components and structure. This project seeks to enhance our understanding of plant CW polysaccharides synthesis, a process carried out by glycosyltransferases (GTs) that work in a concerted manner as multi-protein complexes.

Project Description: The Faik Lab is looking for high school student(s) interested in working on a project that combines computational, and biochemical experimental work to first determine the three-dimensional structure of multi-protein complexes that can be validated through inhibition of protein-protein interactions using a novel technology (called NAPPA assay) developed in Faik lab. The computational work will be performed in Dr. Sharma lab and NAPPA assay will be performed in Faik lab. This research experience will involve using molecular docking software on a laptop or a desktop; and molecular biology (cloning) and biochemistry (NAPPA assay) experimental work. There are two positions.

Websites: Sharma website: <https://sharma-research.com/> Faik website: <https://faiklab.weebly.com/>

Total internship duration: 6 weeks

Internship hours per week: 20-30 hours per week

Requirements: Willing to work in a wet lab to perform experiments and learn the use of some computer programs.



2. KRUSE LAB:

Project Title: Buckeye Lake and erosion, an assessment of erosion differences.

Project Description: Comparing vegetative community and erosion differences between a hillside surface mine reclamation project using borrow soil and one (the other side of the valley) using lake dredge from Buckeye Lake.

Website: <https://www.ohio.edu/experts/expert/natalie-kruse-daniels>

Total internship duration: 6 weeks

Internship hours per week: 20-30 hours per week

Requirements: Interest in biology is critical. Interns must also be comfortable with working outdoors in various weather conditions, traveling to an off-campus location with a graduate student, and possess strong organizational and time-management skills.

3. KEVIN NYBERG LAB

Project Title: Testing the effects of MiMIC transposon insertions on gene expression and function in the fruit fly *Drosophila*

Project Description: The Nyberg Lab is interested in exploring the roles of traditionally overlooked genes, especially those that encode long non-protein coding RNAs (lncRNAs), using the fruit fly *Drosophila* as a model. While thousands of lncRNA genes have been identified in complex animal species, including humans, only a few of them have been shown to have important functions in development or disease. A recent large-scale effort by the *Drosophila* community to mutate genes by inserting MiMIC transposons into them has produced ~200 mutations in lncRNA genes, with about 50 of those genes expressed in the testes. The Nyberg Lab seeks two highly motivated high school students who are interested in gaining hands-on research experience in molecular genetics to study the effects of these MiMIC insertions on lncRNA gene expression and function. This research experience will involve testing whether the MiMIC transposon insertions: (1) have effects on lncRNA gene expression using quantitative PCR and (2) have effects on male reproduction using microscopy and fertility assays. The two student interns will participate in our regular lab meetings, keep a detailed lab notebook, and communicate their findings at the end of the summer.

Website: <https://www.ohio.edu/cas/biology/contact/faculty-directory/kgnyberg>

Total internship duration: 6 weeks

Internship hours per week: 20-30 hours per week



Requirements: Interest in biology is critical. Must also be comfortable with dissections of insects and possess strong organizational and time-management skills.

4. NATHAN WEYAND LAB

Project Title: Kaleidoscope of Neisseria Projects

My lab works in the fields of bacteriology and cellular microbiology. For bacteriology projects, my students often work to isolate new species in the genus *Neisseria* or family *Neisseriaceae*. Some of our projects study bacterial factors needed for biofilm formation, certain types of colony morphologies, or antimicrobial resistance. Another area of my research is the development of animal models that can study *Neisseria*-host interactions that have been difficult to study in living mammals including colonization, transmission and the spread of antimicrobial resistance. We also study tricks *N. gonorrhoeae* uses to evade immune defenses of the human body.

Summer interns can expect to learn basic bacteriology techniques and use PCR and sequencing to identify bacterial species cultured from clinical or environmental samples.

I also am looking for two students to help the lab make contributions to science education and outreach by generating content for social media.

Total internship duration: 6 weeks

Internship hours per week: 20-30 hours per week