BIOLOGY MEETS ENGINEERING
SUMMER 2025 OPPORTUNITIES
UNIVERSITY OF AKRON

1. **ASTLEY LAB**: *Project Title*: Dead End – How Snakes Reverse Direction in Confined Spaces. *Project Description*: The Astley Lab is looking for interested, motivated and dedicated high school student interested to gain research experience examining the behavior of snakes. Our lab studies living snakes to make bio-inspired robots to navigate cluttered and confined environment such as pipes, like real snakes, however, no previous study has examined what happens when snakes reach a "dead end", particularly given that no terrestrial species has been documented to perform locomotion "in reverse". This research experience will involve some animal handling, behavioral trials, constructing test arenas, using infrared and visible light video, and analysis of video data.
   Website: https://blogs.uakron.edu/astleylab/
   Requirements: work in mornings and early afternoon would be preferred (but not required), must be comfortable handling and interacting with 3-4 foot harmless snakes
2. **BLACKLEDGE LAB**: *Project Title*: Spider webs as sensory antennae. *Project Description*: This project explores the ways in which spiders use their webs as ears or antennae to learn about the world around them. The research combines behavioral observations of spiders with high speed video analysis of prey capture to investigate questions like "Does urban noise make it harder for spiders to locate prey in webs?" and "How do spiders control web shape and silk properties to maximize information transmission in webs". Research techniques include care of spiders, how to measure behaviors, video analysis and statistical design of experiments. The project is mostly laboratory based but will include opportunities to collect and observe spiders in the wild.
   Website: https://www.blackledgelab.com/
   Requirements: willingness to work with harmless spiders and insects, curiosity and drive to learn more about nature
3. **OLSON LAB**: *Project Title*: Paws in Motion - Analyzing the Biomechanics of Performance Dogs. *Project Description*: The Olson Lab is looking for interested,

motivated and dedicated high school student interested to gain research experience examining how dogs move and perform athletic behaviors like running, jumping, and other agility obstacles. The Olson Lab studies how dogs move in space, the resulting forces the dog experiences to determine how we can minimize injury risk in canine athletes. This research experience may involve training in animal handling, collecting data, constructing equipment for data collection, using infrared and visible light video, and analysis of data.
Requirements: Preference for flexibility in workdays, with a 3-day work week preferred (generally Tues-Thur). Must be comfortable handling and interacting with pet dogs.

4. **RENNA LAB:** *Project Title:* Untangling the Neural Circuitry of the Retina. *Project Description:* The Renna Lab is seeking a motivated high school student interested in gaining hands-on research experience in neuroscience. Our lab uses serial block-face electron microscopy (SBEM) and connectomics to study the circuitry of the retina. This thin layer of neural tissue is responsible for processing visual information prior to its transmission to the brain. The goal of this project is to identify synaptic structures, reconstruct neurons, and understand how different types of retinal cells connect and work together to support vision. This student will assist in analysis of high-resolution electron microscopy images, reconstructing neural circuits with 3D models, and identify important synaptic components like synapses. This project will allow you to gain valuable experience working with digital reconstruction software to map and study neural pathways. This is a computer-based research project and is NOT a wet-lab mixing up chemicals, using a microscope, type research experience. We have a computer in the lab dedicated to this project.
Lab Website: https://rennalab.uakron.edu/
Requirements: Students should have an interest in biology or neuroscience. No prior experience is required, but attention to detail and comfort working with computers for image analysis is preferred.