3:30 - 4:00 p.m.
**Role of Fatty Acid Metabolism and the Development of Parkinson’s Disease**
Zara Latif
Faculty Advisor: Nick Ragsdale, Ph.D.

Parkinson’s disease is a neurodegenerative disorder caused by the degeneration of dopaminergic neurons. Obesity is a possible risk factor for Parkinson’s disease. It is established that obesity causes inflammation. The inflammation caused due to obesity could lead to an increase in neurodegeneration levels. Past research indicated that it is possible that high fat diet and insulin resistance work together in a multiple hit hypothesis to cause an increase in sensitivity to neurodegeneration. It is hypothesized that high fat content could lead to a higher sensitivity to the neurotoxin 6-hydroxy dopamine (6-OHDA), which can lead to Parkinson’s disease. The nematode *Caenorhabditis elegans* (*C. elegans*) is used as a model organism for this project. Chemotaxis index and Image-J are used to compare neurodegeneration between groups.

4:00 - 4:30 p.m.
**Water Quality and Macroinvertebrate Diversity in Closed-Canopied and Open-Canopied Sections of an Urban Stream in Nashville, TN**
Alexandria Jeffers
Faculty Advisor: A. Darlene Panvini, Ph.D.

Riparian corridors act as barriers along fragile stream ecosystems and help regulate the input and internal processes of streams. Widely susceptible to disturbance, especially in urban settings, changes in the riparian corridor can result in reduced water quality and biodiversity. A water quality assessment examining nine variables and a macroinvertebrate survey were conducted along two stretches of urban Richland Creek, in Nashville, TN. One stretch consisted of open canopy and riparian disturbance while the other was fully covered with a natural riparian canopy. The hypothesis was that water quality and macroinvertebrate diversity would be lower in the disturbed, open-canopied area. The water quality assessment (WQI) was in the “good” range for both sections, though slightly higher in the closed-canopied section. 1896 macroinvertebrates were identified to order. 64.5% of the macroinvertebrates were found in the closed section with the orders Gastropoda and Coleoptera dominating the closed section and the orders Gastropoda and Trichoptera most prevalent in the open-canopied section. Diversity, as measured by the Simpson’s and Shannon Indices indicated no differences, however, among the closed and open sections. This study establishes base-line data that can be used to determine the future success of small tree replanting along the banks of the degraded areas of the stream and will support the monitoring efforts of Richland Creek Watershed Alliance and future citizen science projects.
4:30 - 5:00 p.m.  
**Implications of Parkinson’s Disease in Nematodes Treated with the Insecticide Permethrin**  
Dora Geving  
Faculty Advisor: Nick Ragsdale, Ph.D.

Parkinson’s disease (PD), a neurodegenerative disorder, is caused by the degeneration of dopaminergic (DA) neurons in a certain region of the brain (the substantia nigra) of human patients. In the United States, 50,000-60,000 cases of PD are diagnosed annually. The neurotoxin 6-hydroxydopamine is believed to cause this degeneration; in addition, the insecticide permethrin is known to inhibit mitochondrial function, which might play a role in PD. Permethrin is an active ingredient in children’s lice shampoo, which presents a concern. In this experiment, the model organism *Caenorhabditis elegans* (nematode) was treated with either 6-OHDA or permethrin and observed through chemotaxis to discover the effects on the worm’s motor function. What resulted was a decreased ability in the nematode’s ability to move towards an attractant when treated with either toxin. Thus, permethrin may cause the death of DA neurons and could be a contributing environmental factor to the development of PD.