Poster Title: A forward genetic screen identifies mutants that suppress the effects of a gene-diet interaction in *C. elegans*

Abstract:
How organisms manage energy resources is fundamental to their growth and survival. Stressors such as low nutrient availability, pathogen invasion, and other adverse environmental conditions influence the metabolic decisions an organism makes to respond to these cues and promote homeostasis. We can investigate the molecular mechanisms underlying these critical cellular decisions using the nematode *C. elegans*, which shares several conserved signaling pathways with mammals. In *C. elegans*, the DRL-1 MAP kinase, which functions in the intestine, is one key regulator of growth and reallocation of lipids from the intestine to key tissues. The crosstalk between DRL-1 and other key signaling pathways is critical to proper management of energy resources and homeostasis. One molecular regulator that attenuates DRL-1 pro-growth signaling, and thereby tunes the packaging and export of lipids from the intestine, is the FLR-2 glycoprotein hormone which is secreted from neurons to activate G-protein signaling in the intestine. When *C. elegans* consume a traditional *E. coli* OP50 bacterial diet, FLR-2 opposes the DRL-1 kinase by regulating a phase transition of the toll-like interleukin receptor TIR-1 to induce p38 signaling which restricts growth. Intriguingly, when *C. elegans* consume a closely related bacterial strain known as E. coli HT115, growth and lipid reallocation are managed through another molecular mechanism independent of FLR-2. The *drl-1; flr-2* double mutants which display a wild-type phenotype when consuming OP50 are otherwise slow-growing and lipid-devoid when consuming HT115. To explore the genetic basis of this mechanism, I conducted a forward genetic screen to identify mutants which can effectively sense nutritional cues to manage energy resources despite disruptions in DRL-1 and FLR-2 signaling. Identifying the causative mutations in the strains isolated from this EMS screen may provide new insights into the signaling events that are necessary for animals to sense dynamic changes in their environment, including nutritional cues, to direct energy homeostasis.