**PhD Candidate**

**Multi-Omics of Drought Adaptation in Oilseed Crops**

The Global Institute for Food Security is a rapidly expanding Institute based at the University of Saskatchewan. Our **Vision** is **a world where everyone has access to safe and nutritious food.**  This is a bold vision, one that we will strive to achieve through investing in out talent. In line with our **Mission, we will work with our employees, partners and stakeholders to discover, develop and deliver innovative solutions for the production of globally sustainable food.**

We are guided by our Values of: **Innovation. Excellence. Collaboration. Integrity. Equity, Diversity and Inclusion.**

**PRIMARY PURPOSE**

The Global Institute for Food Security (GIFS) is recruiting for a Ph.D. candidate in Plant Sciences in the Root-Soil-Microbial Interactions research group. The incumbent will participate in a collaborative project with the National Research Council of Canada (NRC) and Agriculture and Agri-Food Canada (AAFC) focused on drought adaptations in oilseed crop species. Specifically, the Ph.D. candidate will discover and investigate mechanisms of drought tolerance and avoidance using novel high-throughput root and shoot phenotyping platforms and multi-omics analyses. Using integrated network modeling combining transcriptomics and metabolomics, the goal of the project is to identify key biological pathways and genes for drought and climate resilience. The Ph.D. candidate will perform their studies at AAFC, NRC, and GIFS laboratories in Saskatoon, Saskatchewan, and will be co-supervised by Professor Leon Kochian, Canada Excellence Research Chair in Food Systems and Security, and Dr. Allan Feurtado, Associate Research Officer in Seed and Root Biology at NRC. Project collaborators at AAFC Saskatoon include Drs. Isobel Parkin and Christina Eynck.

**NATURE OF WORK**

The incumbent will be part of the project “Systems approach for adaptation of Prairie oilseed crops: Multi-dimensional simulated and field environment omics for climate resilience and sustainability” and will utilize the lysimeter-based high-throughput phenotyping (HTP) Plant Array system at AAFC to analyze *Brassica napus*, *B. carinata*, and *Camelina sativa* germplasm. Measurements of plant water use efficiency, carbon assimilation and overall plant productivity will indentify oilseed germplasm divergent in drought response. Utilization of novel 3-dimensional imaging systems at GIFS and NRC will characterize root and shoot architecture responses to drought. Gene expression and metabolite analyses will be performed to construct biological networks towards the identification of key genes for drought resilience. The Ph.D position will provide comprehensive training in oilseed genomics, crop physiology, functional trait analyses and gene discovery. The overall project will be supported by a project team including the investigating scientists, technicians, and other graduate and undergraduate students cutting across organizations located within a key Canadian agricultural research hub.

**ACCOUNTABILITIES**

* Physiological analyses of plant water use efficiency, drought tolerance, measurement of parameters such as stomatal conductance and carbon assimilation traits
* Analyses of root system architecture to quantify root traits that describe root growth, topology and architecture under drought conditions; concurrent analyses of shoot architectural drought responses
* Plant tissue collection, RNA isolation and qRT-PCR assays for multi-omics work
* Statistical analyses of phenotype data, gene expression, and metabolite datasets
* Generation of biological networks to identify key drought gene modules, hubs, and nodes

The research will deliver:

* Assessments of the adaptive capacity of oilseed species to water stress events predicted to increase with climate change.
* A prioritized list of drought tolerance and adaptation mechanisms of canola, camelina, and Ethiopian mustard germplasm.
* An integrated knowledge network of transcripts, metabolites, and physiology for oilseed stress-resilience.

**QUALIFICATIONS**

A Master’s degree in plant biology or crop science with experience in plant physiology and molecular biology research. Previous course or thesis work on abiotic stress would be an asset.

**SKILLS**

* Demonstrated ability and desire to work in a fast-paced, team-oriented, multidisciplinary research environment and computer proficiency with Microsoft Word, Excel, and Outlook.
* Excellent written and verbal communication skills in the English language, attention to detail, willingness to learn, and the desire to discover complex biological mechanisms.
* Familiarity with next-generation sequencing data, gene expression analyses and skills in statistics and R are preferred.

Please send cover letter and CV to Megan Paul, HR Officer, megan.paul@gifs.ca.