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**Plant Phenotyping and
Imaging Research Centre**

P2IRC.USASK.CA

Post-doctoral Fellow, Bioinformatics and/or Computational Biology

March 2017

The Plant Phenotyping and Imaging Research Centre (P²IRC) is an agricultural research centre managed by the Global Institute for Food Security (GIFS) and located at the University of Saskatchewan. P²IRC was established thanks to funding awarded to the University of Saskatchewan by the Canada First Research Excellence Fund award, *Designing Crops for Global Food Security*.

GIFS (www.gifs.ca) was founded in 2012 to perform research that will help deliver transformative innovation to agriculture in both the developed and the developing world. Research at GIFS can be divided into three pillars: seed and developmental biology, root-soil-microbial interactions, and digital and computational agriculture. The latter pillar is occupied by P²IRC.

P²IRC's seven-year transdisciplinary program will transform crop breeding through research in phenometrics, image acquisition technologies, computational informatics of crop phenotype data, and societal and developing world impact. P²IRC is a major research centre with partners located on campus, across Canada, and internationally. More information about P²IRC is available at <http://p2irc.usask.ca>.

Primary Purpose:

The "Genotype & Environment to Phenotype (GE2P)" theme in P²IRC is seeking a post-doctoral fellow to work as part of an interdisciplinary and collaborative team consisting of seven faculty and their graduate students. The team is led by Drs. Anthony Kusalik and Michael Horsch. More information is available at <https://www.cs.usask.ca/research/phenotyping-centre/>.

Nature of Work:

The successful candidate will work as part of the GE2P team to identify and predict connections between phenotypic features and genotype and environmental factors in crop species. Activities will be directly supervised by Drs. Horsch and Kusalik. The research will take advantage of the local computer and software resources provided by other P²IRC computer science teams, as well as HPC facilities at the U. of Saskatchewan and at Compute Canada.

Accountabilities:

- Developing ontologies for (plant) phenotypic and environmental information.
- Creating an assessment framework for evaluating computational inference methods explored and devised as part of GE2P.
- Conditioning data for a deep-learning approach to predicting phenotype from genotype.
- Developing, or assisting with development of, improved software for GWAS (genome-wide association study) analysis applied to the crop species context.
- Assisting with development of enhanced feature selection methods and ontologies for plant phenotype information.
- Extending GWAS techniques to incorporate research results from other research projects in GE2P; e.g. enhanced feature selection.

This research is being undertaken thanks in part to funding from the
Canada First Research Excellence Fund



- Improving the computational performance of GWAS techniques.
- Assisting graduate students with research projects also involving GWAS.
- Collaborating between GE2P and other projects in P²IRC.

Qualifications:

Education: Relevant post-graduate training (Ph.D. or previous PDF) in computer science, computational biology, bioinformatics, statistics or a related discipline. PhD must have been awarded within five years immediately preceding the appointment.

Experience: Previous experience with one or more of the following is required: GWAS (genome-wide association studies), phenotypic ontologies, machine-learning methods in a bioinformatics context, analysis of data in a plant biology or crop-breeding setting.

Required Skills:

- Research motivation, good command of English, and excellent communication
- Good programming skills and the ability to rapidly understand different algorithms and knowledge representations
- Familiarity with data repositories of genomic and phenotypic information
- Knowledge of Linux/Unix, R, and Python

Duration:

This term position will be for two years, commencing as soon as possible. A re-appointment after this date is dependent upon satisfactory performance, immigration status (if applicable) and the availability of funding.

Salary:

The salary offered will be in the range of \$45,000-55,000 CAD, and will be based on training, education, and experience.

Application Procedure:

Applicants are asked to e-mail a CV, transcripts from university degrees, and a cover letter to GE2P_position@cs.usask.ca. Inquiries regarding the position can be directed to Dr. Michael Horsch (horsch@cs.usask.ca), Dr. Matt Links (matthew.links@usask.ca), or Dr. Anthony Kusalik (kusalik@cs.usask.ca).

Applications will be accepted until March 27, 2017, or until a suitable candidate is found. We appreciate all expressions of interest; however, only those candidates whose backgrounds best suit our requirements will be contacted. All application materials will be treated confidentially.

All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents of Canada will be given priority.