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## **Discovery Frontiers: Advancing Big Data Science in Genomics Research**

### **Researchers Invited to Apply**

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**Principal Investigator: Lincoln Stein**

**Host Institution: Ontario Institute for Cancer Research**

Cancer is a disease of the genome; understanding how changes in the genome lead to tumors is the key to developing new therapies to treat patients with the disease. The proposed research will establish an integrated cloud of cancer genomic data and compute services that will empower biomedical researchers around the globe to make new discoveries on the causes and effects of cancer genome changes.

**Principal Investigator: David Maslove**

**Host Institution: St. Michael's Hospital**

The modern practice of medicine generates vast quantities of data, from electronic health records, to devices that provide real-time monitoring of vital signs, to new technologies that reveal our genetic makeup in great detail. The CONDUIT database project applies computational methods to the integration and analysis of these diverse sources of biomedical “big data”, in order to better understand acute illness, cultivate personalized treatment plans, and enhance health outcomes.

**Principal Investigator: David Jaffray**

**Host Institution: Princess Margaret Hospital**

Create a Cancer Informatics Platform that can effectively mine the wealth of information in cancer informatics databases in the Toronto Discovery District for novel cancer biomarkers with prognostic value. Immediate testing of biomarker predictive value, facilitated by this platform, will then be performed so that clinically relevant biomarkers are rapidly developed with strong clinical engagement.

**Principal Investigator: Brendan J. Frey**

**Host Institution: University of Toronto**

The human genome has been likened to the book of life, but to understand life and to develop medical advances, we need to figure out how to read that book. Our team of scientists from across Canada and collaborators from around the world aim to decipher the codes embedded



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in the genome, develop widely accessible tools for reading the genome, and provide the foundation for decades of future biomedical research.

**Principal Investigator: Guillaume Bourque**

**Host Institution: McGill University**

The Microbial Meta-omics Resource Centre (MMRC) is a project to house, develop and disseminate microbial meta-omic data, analysis tools and other software. The MMRC will be the first such integrated microbiome resource, and it will position Canadian science for a leadership role in this key emerging research area.

**Principal Investigator: Gary Bader**

**Host Institution: University of Toronto**

Genomics promises to transform medicine by helping precisely select the right treatment for the right patient, but the data is complex and large, thus difficult to use effectively. We will develop new algorithms and computer systems to help researchers use the data they need to make medical breakthroughs.