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Bioinformatics of Mammalian Gene Expression

Status	Past
Competition	Competition II
Sector	Health
Genome Centre	Genome British Columbia
Project Leaders	Steven Jones & Marco Marra

Project Description

Genes, the functional units of DNA, are involved in all aspects of normal human development and human disease. While in most cells a core set of genes is active, in specialized cells like muscle, nerve and skin cells, other cell- or tissue-specific genes are selectively activated. Controlling or 'regulating' these genes is central to the mechanisms that underlie cancers and degenerative diseases.

Our program addressed a key goal in biological research: understanding the cellular mechanisms by which mammalian genes are turned on and off. The project has resulted in British Columbia and the BC Cancer Agency (BCCA) hosting one of the world's leading systems and teams for predicting mammalian regulatory elements on a genome scale. The knowledge generated by our project is providing insights from which new therapeutics and diagnostics for diseases are being developed.

Specifically, we developed a bioinformatic pipeline and database that provide information on genomic elements with the potential to control gene regulation. This provides a powerful resource for scientists in British Columbia, Canada and worldwide to accelerate their own research and derive further value from their own research funding.

Through the project activities, the BCCA's Genome Sciences Centre (GSC) developed expertise in innovative, enabling software and in large scale calculations. We have licensed some of the innovative software developed by this project to a new Canadian Bioinformatics start-up company, Upstream Biosciences which also utilized incubator space within the GSC.

Our work is contributing to understanding the mechanisms underlying conditions like cancer, diabetes, liver disease, congenital heart disease and adverse drug reactions. Ultimately all Canadians will benefit from the health benefits arising from this research.

Fast Facts

<i>Highlighted outcome:</i>	Canada now hosts one of the world's leading teams for predicting mammalian regulatory elements on a genome scale, which is central to understanding the mechanisms underlying cancers and degenerative diseases
<i>Number of research personnel employed by the project:</i>	31
<i>Number of peer reviewed publications published:</i>	6 papers, 32 abstracts, 31 invited presentations and 12 awards
<i>Resources generated:</i>	key resources include the development of an automated, high-throughput analysis protocol showing strong performance on a genome-wide scale for mammals
<i>Commercialization:</i>	one commercial license for Sockeye software, a visualization tool, with Upstream Biosciences