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Collaborative Graduate Specialization in
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WEEKLY COLLOQUIUM
Tuesday, 15 November 2005
2:30-3:30 in Goodes 409

Speaker: David Sankoff
Professor and Canada Research Chair, Mathematics and Statistics,
University of Ottawa

Title: Genome rearrangement algorithms for comparative maps.

Abstract: The comparison of traditional genetic maps by rearrangement algorithms cannot
be carried out without first solving many practical problems. Three examples, all
of which are hard:
   1) Orientation assignment for unsigned genomes.
   2) Ortholog identification in the presence of multiple copies of genes.
   3) Linearisation of partially ordered genomes.
   4) Reduction of noise due to mapping error.
The objective function of the genome rearrangement problem allows the
integration of other genome-level problems so that they may be solved
simultaneously. We combine heuristics for the first two problems with an exact
algorithm for the third to solve a moderate-sized instance
comparing maps of cereal genomes. Some of these methods also motivate an
effective heuristic for the fourth problem.

About the speaker:
David Sankoff studied mathematics at McGill University with Donald Dawson. He presently holds the Canada Research Chair in Mathematical Genomics at the University of Ottawa and is a member of the Centre de recherches mathématiques at the Université de Montréal. He has worked on the design of algorithms in computational biology, applied probability for phylogenetic analysis of evolution, and statistical methodology for studying grammatical variation and change in speech communities. The focus of his current research is the modelling of processes of long-term genomic evolution, devising algorithms and statistical analyses capable of reconstructing evolutionary history and characterizing it quantitatively making use of comparative genomic data. He is a Fellow of the Royal Society of Canada and of the Canadian Institute for Advanced Research, a medalist of the Association Francophone pour le Savoir, recipient of the first Senior Scientist Accomplishment Award by the International Society for Computational Biology and the Weldon Memorial Prize from Oxford University. In addition to his research activities, Dr. Sankoff is editor of Language Variation and Change and serves on the editorial boards of a number of bioinformatics, computational biology and linguistics journals.