

Concordia Institute for Information Systems Engineering

**THE CONCORDIA INSTITUTE FOR INFORMATION SYSTEMS  
ENGINEERING  
IS PLEASED TO PRESENT THE FOLLOWING GUEST LECTURE IN  
OUR CIISE DISTINGUISHED SEMINAR SERIES**

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**Dr. Michel Gendreau**

Interuniversity Research Centre on Enterprise Networks,  
Logistics and Transportation (CIRRELT) and  
Département de mathématiques et de génie industriel (MAGI)  
École Polytechnique de Montréal

**Metaheuristic Approaches for Solving the Fixed-Charge Capacitated Multi-commodity  
Network Design Problem**

The Fixed-Charge Capacitated Multi-commodity Network Design (CMND) problem is the core “abstract” problem that one has to deal with when designing telecommunications or transportation networks. It consists in finding the optimal configuration, i.e., the arcs to include in the final design, of a network on which the flows of several products (“commodities”) must be routed to satisfy given demands between origin-destination pairs. Each of the arcs that can possibly be included in the design is characterized by its capacity (the maximum amount of flow of all commodities it can support), a fixed cost to be incurred if the arc is selected, and a variable cost for each unit of flow that uses the arc. The objective of the problem is to minimize the total system cost, i.e., the sum of the fixed costs of selected arcs and variable routing costs, while respecting capacity limits.

In this talk, we will present heuristic approaches that we developed, with different coauthors, over the last twenty years to tackle this problem. These encompass several different types of metaheuristics: Tabu Search, Path Relinking and Scatter Search. As far as we know, the most recent of these approaches are still the most effective approximate methods for the CMND. Computational results on a set of small and medium size benchmark instances will be reported and discussed. (Joint work with Teodor Gabriel Crainic and others)

**Biography:** Michel Gendreau is Professor of Operations Research at the Department of Mathematics and Industrial Engineering of École Polytechnique de Montréal (Canada). He received his Ph.D. from University of Montreal in 1984. From 1999 to 2007, he was the Director of the Centre for Research on Transportation. Since September 2009, he is the Chairholder of the NSERC/Hydro-Québec Industrial Chair on the Stochastic Optimization of Electricity Generation. His main research area is the application of operations research to energy, transportation and telecommunication systems planning and management.

Dr. Gendreau is the Editor in chief of Transportation Science and member of several other editorial boards. Until December 2009, he was also Vice-President of the International Federation of Operational Research Societies (IFORS) and of The Institute for Operations Research and Management Science (INFORMS). Dr. Gendreau has received several research grants and awards including the Merit and the Service Award of the Canadian Operational Research Society.

**Thursday, March 11, 2010**

**16:00 – 17:00**

