Transportation Center Seminar Series presents…..

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

Thursday, Oct. 2, 2008
4:00 – 5:00 pm

Location: Transportation Center –Lower level
Northwestern University
Chambers Hall - 600 Foster
Evanston, IL

Refreshments available at 3:30 pm

Abstract: 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 fifteen 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)

Bio: Michel Gendreau is Professor of Operations Research at Université de Montréal (Canada). From 1999 to 2007, he was the Director of the Centre for Research on Transportation, a centre devoted to multi-disciplinary research on transportation and telecommunications networks. In 2007, he also was the Acting Director of a recently created research centre, the Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT). His main research interests deal with the development of exact and approximate optimization methods for transportation and telecommunications network planning problems, some of which have been included in commercially-available software. He has published more than 130 papers on these topics. He is also the co-editor of five books on transportation planning, metaheuristics and scheduling.

Dr. Gendreau will become Editor-in-chief of Transportation Science in January 2009. He is currently Associate Editor of Operations Research, the Journal of Scheduling, Optimization and Engineering, International Transactions in Operational Research and RAIRO-Recherche opérationnelle

He is Vice-President of the International Federation of Operational Research Societies (IFORS) and the Vice-President, International Activities of the Institute for Operations Research and the Management Sciences (INFORMS). Dr. Gendreau received in 2001 the Merit Award of the Canadian Operational Research Society in recognition of his contributions to the development of O.R. in Canada.