



香港浸會大學

HONG KONG BAPTIST UNIVERSITY

## Institute for Computational Mathematics Colloquium

### *Planning for Disaster - Designing Robust Coverage Networks to Hedge against Worst-Case Facility Losses*

Speaker : Dr. Jesse Rush O'Hanley  
Kent Business School  
University of Kent  
UK

Date : 7 November 2008 (Friday)

Time : 10:45 a.m. - 11:45 a.m.

Venue : FSC 1111, Fong Shu Chuen Library,  
HSH Campus, Hong Kong Baptist  
University

#### Abstract:

The potential for long-term facility loss has important implications for the reliability of service/supply networks. In order to design a coverage-type service network that is robust to the worst instances of facility loss, we develop a location-interdiction covering model that maximizes a combination of 1) initial coverage given  $p$  facilities and 2) the minimum coverage level following the loss of any subset of facilities  $r < p$ . The problem is formulated both as a mixed integer program and as a bilevel mixed integer program. To solve the bilevel program optimally, a decomposition algorithm is presented, whereby the original bilevel program is decoupled into an upper level master problem and a lower level subproblem. After sequentially solving these problems, information is fed back to the upper level master by appending supervalid inequalities, which attempt to force the upper level master away from clearly dominated solutions. Supervalid inequalities, unlike standard valid inequalities used in cutting plane algorithms, cut away parts of the feasible region but are guaranteed not to remove all optimal solutions unless an optimal solution has already been found. Computational results show that when solved to optimality, bilevel decomposition is up to several orders of magnitude faster than performing branch and bound on the mixed integer program.

- *All interested are welcome* -