INDUSTRIAL & SYSTEMS ENGINEERING SEMINAR

Wednesday, October 19
3:15 PM – Refreshments before the seminar
3:30 PM – Graduate Seminar
Mechanical Engineering Room 4125 A & B

Analytical Approaches for the Design and Operation of Stroke Units

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The number of hospital beds in many jurisdictions is a matter of considerable public and political concern and has been the subject of widespread debate, in light of the increasing numbers of admissions. Many different services are needed to treat different types of patients during the care given in the hospital, and the coordination of these multi-level services among different patient types is often a formidable challenge. Failure in matching the hospital's service capacity (e.g., the number of properly staffed beds) and the patients' demand for certain levels of care can be problematic. Moreover, the day to day fluctuations in patient demand complicates the efficient allocation of the available hospital capacity. As a result; the patients may not receive care from the appropriate professional at the appropriate time and place. The key issue for matching the demand and service capacity and improving the performance of the hospitals is intelligently designed operational policies. In the context of providing acute in-hospital care for stroke patients, I will discuss the impact of inadequate capacity on patient outcomes, and the opportunities for improving these outcomes through identifying appropriate capacity levels as well as patient admission and bed allocation policies. To this end, I will first present an empirical study conducted at Montreal Neurological Hospital in order to establish the potential impact of emergency department (ED) delays on stroke unit operations and health outcomes. Then, I will present our findings through the use of a comprehensive simulation model of the in-hospital care process for stroke patients. The model is used not only to validate our empirical findings in a more comprehensive environment but also to evaluate the current admissions and bed allocation policies and to explore alternative policies that might decrease ED delays and improve clinical outcomes. Since our simulation model shows significant improvements are possible by switching from the current static bed allocation procedure to a dynamic policy, I will also present an overview of our current work for the development of a stochastic dynamic programming model for optimizing dynamic patient admission policies. Our early computational results with the use of approximate dynamic programming to solve this problem are encouraging.

BIO: Vedat Verter is a Professor of Operations Management at Desautels Faculty of Management, McGill University as well as an Associate Member of McGill's School of Environment. He is also Adjunct Professor at Telfer School of Management, University of Ottawa. Professor Verter's research focuses on supply chain design, hazardous materials logistics, sustainable supply chains as well as healthcare operations management. His work in these four areas is well recognized through top tier journal publications as well as invited presentations around the globe. In the area of healthcare, Professor Verter focuses on emergency department processes, preventive care programs and chronic care systems. He is co-director of McGill's MD-MBA Program and Director of a seven-University PhD program across Canada, the NSERC CREATE Program in Healthcare Operations and Information Management. Professor Verter is also Editor-in-Chief of *Socio-Economic Planning Sciences*, an international journal focusing on public sector decision making.

FOR MORE INFORMATION ON PROFESSOR VERTER'S RESEARCH, please visit:
http://people.mcgill.ca/nafiz.verter/