



## **Operations Research and Engineering Management Seminar Series**

### **Research Seminar**

**Operations with Machine Learning to Improve Patient Experience and Patient Outcomes Through the Lens of (i) Patient Access Delay and (ii) Personalized Bed Placement**



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**11:00 a.m. – 12:15 p.m.**

<https://smu.zoom.us/j/94376887977>

#### **Abstract**

Healthcare delivery and operations, especially post-COVID 19, needs innovation. We have seen increased need for appropriate planning, adaptation to extreme uncertainty, and the reduction of access delays from time of request until the time of service. Fighting a novel

disease revealed the need for joint machine learning and optimization. Operations research, operations management, optimization, and systems modeling and control are some of the areas of strength that we must build upon, integrating areas such as recent advances in machine learning and data science to meet the special needs of healthcare. One highlight is work on personalized bed unit assignment to reduce mortality or readmissions. Another is appointment setting for timely access to a visit and surgery based on patient urgency while ensuring coordination of care. I will emphasize stratified or personalized approaches and how to balance the efficiency of care with its effectiveness. Our area is exceptionally well positioned to address limited resources, budgets, and the need for efficiency. On the one the one hand, effectiveness and patient experience includes waiting times and care delivery choices, which can be explicitly modeled. On the other hand, machine learning integrated with optimization will be very helpful for incorporating predictions of future outcomes such as 30-day unplanned readmissions or mortality events. These data driven healthcare operations methodologies have grown out of practice-based collaborations with several health systems.

### **Biography**

Mark Van Oyen's research spans operations management, operations research, systems engineering, data analytics/machine learning, stochastic control, and industrial engineering. His current research emphasizes stochastic systems, optimization, and prescriptive analytics for healthcare operations and medical decision making. He co-authored papers that won numerous awards including the 2016 Manufacturing and Service Operations Management (MSOM) Best Published Paper, MSOM Service Special Interest Group best published paper, 2010 Pierskalla Award, two 1st and two 2nd place best paper awards from the POMS College of Healthcare Op's. Mgmt., and 2012 INFORMS "Doing Good with Good OR" first prize to his students for joint work. He has served as Associate Editor for Operations Research, Management Science, Naval Research Logistics, and IIE Transactions, and IIE Trans. Healthcare Syst. Engr. and Senior Editor for Flexible Services & Manufacturing. He has received grant funding from the NSF, ONR, NIH, EPRI, ALCOA, General Motors, and the VA. He served as President and VP for the INFORMS Health Applications Society. He received his Ph.D. from Electrical Engr. Systems from the Univ. of Michigan and has also worked for GE Corporate R&D, GE Aerospace, Northwestern University (IEMS) and Loyola University of Chicago (Business – OM