



## Operations Research and Engineering Management Seminar Series

### Research Seminar

### Power and Scheduling in a Parallel Processing Network



**Dr. Mark E. Lewis**  
**Maxwell M. Upson Professor of Engineering**  
**Cornell University**  
**Friday, April 8, 2022**  
**11:00 a.m. – 12:15 p.m.**  
<https://smu.zoom.us/j/97906267193>

#### **Abstract**

We consider a parallel processing network with removable servers. Beginning with the single server model with power and service rate control, we study the importance of a delayed restart when the server is off. In particular, we show that an optimal policy exists (under the average cost criterion) that delays restarting until a “safety stock” of work is in the system. It then behaves similarly to that of the classic service rate control models. With that as the backdrop, we consider scheduling with the ability to remove servers. We introduce “delay-JSQ” (join the shortest queue) policies, show their stability and asymptotic optimality in the two-server case, and conclude with a detailed numerical study that shows they outperform JSQ by up to 80%.

This is joint work with Professor Douglas Down from McMaster University and Dr. Pamela Badian-Pessot (now at Proctor and Gamble).

### **Biography**

Professor Lewis received his Ph.D. from Georgia Tech in 1998, and then spent a year as postdoctoral fellow at the University of British Columbia. He joined the School of Operations Research and Information Engineering (ORIE) at Cornell University in 2005 as an associate professor after spending six years in Industrial and Operations Engineering at the University of Michigan. Professor Lewis is the recipient of numerous awards including an honorable mention for the Dantzig Dissertation Award (1999), the Presidential Early Career Award for Scientists and Engineers (2002) and the Sloan Mentor of the Year award in 2005. He is also a Fellow of INFORMS and the INFORMS Minority Issues Forum (a group he helped found). Mark was named the Maxwell M. Upson Professor of Engineering in 2021 at Cornell. He is a past Senior Associate Dean for Diversity and Faculty Development and is the current Director of the School of ORIE.