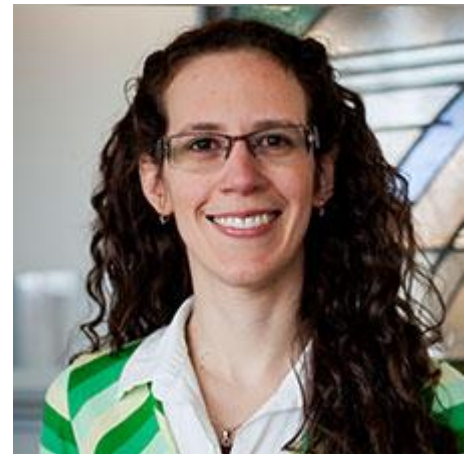


# EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

## Personalizing Management of Glaucoma Patients

**ABSTRACT** – This talk discusses work of a multidisciplinary collaboration between the Department of Industrial and Operations Engineering and the Kellogg Eye Institute at the University of Michigan to develop a forecasting tool that assists eye doctors by (a) helping to identify which patients will experience worsening of existing glaucoma, and at what pace, (b) recommending when the patient should next be assessed for possible disease worsening as well as which test to take, and (c) calculating the patient’s optimal intraocular pressure. Using novel extensions of linear quadratic Gaussian (LQG) control and Kalman filtering, the forecasts and controls are calculated by incorporating detailed longitudinal testing information from two landmark clinical trials and data on the specific patient for whom the forecasts and recommendations are being made. This tool has the potential to greatly inform doctors’ decisions on who, when, and how to treat glaucoma patients in a personalized manner. The objective is to avoid overtreatment and unnecessary treatment, while giving the patients at highest risk for blindness their best possible chance at preserving their sight in the long term.



**Dr. Mariel Lavieri**

Associate Professor, University of Michigan  
Department of Industrial and Operations Engineering  
Recipient of the 2016 National Science Foundation CAREER Award

**SPEAKER BIO** – **Dr. Mariel Lavieri** is an Associate Professor in the Department of Industrial and Operations Engineering at the University of Michigan. She has bachelor's degrees in Industrial and Systems Engineering and Statistics and a minor in String Bass Performance from the University of Florida. She holds a Masters and PhD in Management Science from the University of British Columbia. In her work, she applies operations research to healthcare topics. Among others, Dr. Lavieri has developed dynamic programming, stochastic control, and continuous, partially observable state space models to guide screening, monitoring and treatment decisions of chronic disease patients. She has also created models for health workforce and capacity planning. Dr. Lavieri is the recipient of the 2016 National Science Foundation CAREER Award, the 2013 International Conference on Operations Research Young Participant with Most Practical Impact Award, and the 2006 Bonder Scholarship. She received the 2009 Pierskalla Best Paper Award, and an honorary mention in the 2010 George B. Dantzig Dissertation Award. She participated in the 2016 Frontiers of Engineering Symposium organized by the National Academy of Engineering. Dr. Lavieri has mentored students who won the 2012 Doing Good with Good OR, the 2013 Society for Medical Decision Making Lee Lusted Award, the 2015 IBM Research Service Science Best Student Paper Award, and the 2016 Production and Operations Management Society College of Healthcare Operations Management Best Paper Award.

**USC Viterbi**  
School of Engineering  
*Daniel J. Epstein Department of  
Industrial and Systems Engineering*

**TUESDAY, FEBRUARY 28, 2017**

**3:30PM – 4:50PM**

USC ANDRUS GERONTOLOGY CENTER (GER), Room 206