

# Industrial and Systems Engineering Seminar

## *Biomarker-Based Screening Strategies for Early Detection of Prostate Cancer*

**Wednesday, April 8**

3:15 PM – Refreshments before the Seminar

**3:30 PM – Graduate Seminar**

**Mechanical Engineering Room 4125 A & B**



### **Professor Brian Denton**

Associate Professor

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Prostate cancer is the most common solid tumor that affects American men. Screening typically involves the use of prostate specific antigen (PSA) tests. However, the imperfect nature of PSA tests and the fact that many cancers are likely indolent, means there is the potential for screening to cause harm due to unnecessary biopsies and treatment. Newly discovered biomarkers offer the opportunity to improve screening protocols, but their high cost and imperfect predictive value have raised many questions about whether and when to use them. In this talk I will provide some background on the clinical process for prostate cancer screening and treatment. Next, I will discuss some models for the optimal design of screening strategies, including a partially observable Markov decision process (POMDP) model. Some theoretical properties of the optimal policy will be discussed, and an approximation method suited to solving finite horizon non-stationary POMDPs will be presented. The results of computational experiments will be used to illustrate the use of the model for making screening protocol design decisions, such as if and when to recommend a patient for biomarker testing, and when to refer patients for biopsy and subsequent treatment. The talk will conclude with a discussion of future research directions.

**BIO:** <http://btdenton.engin.umich.edu/>