



Christine Barnett



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Data Analytics for Optimal Detection of Metastatic Prostate Cancer

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One of the most important aspects of cancer staging is the determination of whether the cancer has metastasized. We used data-analytics approaches to develop, calibrate, and validate predictive models to help urologists in a large state-wide collaborative make prostate cancer staging decisions. These models were used to design guidelines that optimally weigh the benefits and harms of radiological imaging for detection of metastatic cancer. The models were validated using statistical methods based on bootstrapping and evaluation on out-of-sample data. The Michigan Urological Surgery Improvement Collaborative implemented these guidelines, which reduced unnecessary imaging by more than 40% and is predicted to limit the percentage of patients with missed metastatic disease to be less than 1%. The effects of the guidelines were measured post-implementation to confirm their impact on reducing unnecessary imaging across the State of Michigan.

Christine Barnett is a doctoral candidate in the Department of Industrial and Operations Engineering at the University of Michigan. Christine received her Bachelor of Science and Master of Engineering in Operations Research and Information Engineering from Cornell University. She is a recipient of the National Science Foundation Graduate Research Fellowship and the 2016 INFORMS Doing Good with Good OR award. During her time at the University of Michigan, she served as the President of the INFORMS Student Chapter. Her research interests include the application of operations research methods to medical decision making and health services research. Christine's current research focuses on investigating the health and economic implications of new technologies for prostate cancer screening and treatment. She has research experience working on a variety of health services research problems with collaborators from the Centers for Disease Control and Prevention, the Mayo Clinic, as well as the Health Services Research group in the Department of Urology at the University of Michigan.

Selin Merdan is a doctoral candidate in the Department of Industrial and Operations Engineering at the University of Michigan. Selin received her Bachelor of Science from Marmara University, Istanbul, Turkey, and Master of Engineering in Industrial and Operations Engineering from University of Michigan. She is a recipient of Seth Bonder Departmental Fellowship and the 2016 INFORMS Doing Good with Good OR award. Her research is in the area of machine learning and optimization for developing computational methods to help organize, process and transform data into actionable knowledge in clinical settings such as detection and screening of chronic diseases.

The seminar series "Providing Better Healthcare through Systems Engineering" is presented by the U-M Center for Healthcare Engineering and Patient Safety: Our mission is to improve the safety and quality of healthcare delivery through a multi-disciplinary, systems-engineering approach. For additional information and to be added to the weekly e-mail for the series, please contact genehkim@umich.edu. **Please note on location: 1123 LBME** is room 1123 in the Ann & Robert H. Lurie Biomedical Engineering Building (LBME). Street address is 1101 Beal Avenue, link to map and directions: <http://www.bme.umich.edu/about/directions.php>.

