EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

Improving Patient Safety in the External Beam Radiation Therapy Process

ABSTRACT – Radiation therapy (RT) is used to treat more than half of the over 1.6 million cancer patients diagnosed annually in the US. The risk for errors is high in RT as the planning and delivery processes involve numerous hand-offs, each person interpreting and entering information via multiple complex electronic systems. The accuracy and safety in RT requires the establishment of effective quality assurance programs, which institute manual reviews, so-called safety barriers (SBs), during treatment planning and delivery. Each SB checks one or more treatment elements related to the outcomes of previous steps to ensure that they are accurate and meet safety standards. While it may seem desirable to check each treatment element several times to prevent errors from reaching patients, unnecessary checks distract providers and cause extra cognitive workload that can lead to additional errors. It is imperative to strike a balance between overburdening the treatment process with too many safety barriers and jeopardizing patient safety with insufficient quality checks. We propose a mathematical programming approach to optimize the design of SBs by exploring the trade-offs between patient safety and SB implementation costs.

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SPEAKER BIO – Osman Özaltın is an Assistant Professor in the Edward P. Fitts Department of Industrial and Systems Engineering, and a member of the Personalized Medicine Faculty Cluster at the North Carolina State University. He received his MS and PhD degrees in Industrial Engineering from the University of Pittsburgh. His dissertation received the Pritsker Doctoral Dissertation Award from Institute of Industrial and Systems Engineering in 2013. His research interests span theoretical, computational, and applied aspects of mathematical programming, focusing on optimization problems arising in public health, personalized medicine and healthcare delivery.

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3:30PM – 4:50PM

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