

## Decision Systems Engineering Spring '14 Seminar Series

“Development of a Large Software System for Medical Physics Research in an Academic Department: Challenges and Solutions”

### FEATURING



**Mirek Fatyga**, Associate Professor  
Mayo School of Medicine & Senior Associate Consultant  
Department of Radiation Oncology, Mayo Clinic, AZ

**Friday, January 17th - 12:00 PM – 1:15 PM**  
**BYENG 210**

### Abstract:

Contemporary clinical practice of radiation oncology is entirely dependent on complex computing applications which are provided by commercial vendors. However, development of new technologies in a research setting sometimes requires elaborate in-house software development efforts as the commercial software is not yet available. Some of these efforts are large enough to be categorized as a development of a large software system. Developing large software systems can be challenging in any academic department because of funding limitations which translate into serious manpower limitations. An added difficulty in a medical physics department is lack of basic software development skills among students and most of the faculty as software is not presently considered to be one of the core competencies of a medical physicist. End users of research software are accustomed to commercially developed applications and expect similar ease of use and completeness in their research software. Principal investigators and other stakeholders often underestimate the difficulty inherent in the development, and thus tend to underestimate the scale of the effort that is required. All these factors contribute to high probability of failure of software development projects in this setting, which can in turn cause a demise of expensive and prestigious research efforts. In this talk I will describe my experiences developing a large software system in support of five years long research grant at the department of radiation oncology at Virginia Commonwealth University. I will begin with a brief introduction to contemporary practice of radiation therapy with an emphasis on the purpose of our research project, and subsequently describe challenges of the project and engineering solutions that we devised to meet these challenges.

### Bio:

Dr. Fatyga received his Masters in Physics from the University of Warsaw, Poland (1981) and PhD in Experimental Nuclear Physics from Indiana University in Bloomington, IN (1986). After his PhD degree he spent eight years working on Relativistic Heavy ion and Particle Physics experiments at Brookhaven National Laboratory and the Tevatron proton-antiproton collider. He received clinical training in Medical Physics at Loyola University in Chicago in 1994, followed by two years of work on the development of treatment planning system for radiation therapy at Computerized Medical Systems in St Louis, MO. In 1997 Dr Fatyga joined Lucent Technologies, Inc. where he worked on software development for circuit switching, intelligent networks and optical networks. In 2001 Dr Fatyga joined Circadiant Systems in Allentown PA where he developed software for testing of line card components for optical networks. He returned to Medical Physics in 2004 through an appointment as an Assistant Professor at Virginia Commonwealth University in Richmond, VA. While there he worked on the development of research software for a study of applications of deformable image registration to the clinical practice of radiation therapy. Dr Fatyga is currently a Senior Associate Consultant at the Department of Radiation Oncology, Mayo Clinic AZ and an Associate Professor at the Mayo School of Medicine. He is board certified in therapeutic medical physics by American Board of Radiology.