

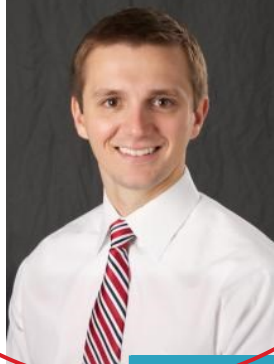
UNIVERSITY OF WISCONSIN-MADISON



MEDICAL PHYSICS SEMINAR  
MONDAY, JANUARY 30, 2017



1325 HSLC — 4:00 PM



**DANIEL HYER, PHD**

CLINICAL ASSISTANT PROFESSOR

DEPARTMENT OF RADIATION ONCOLOGY

UNIVERSITY OF IOWA

## COLLIMATION IN SPOT SCANNING PROTON THERAPY

Pencil beam scanning (PBS) proton therapy offers a key advantage over photon therapy: the proton beam can stop sharply at a pre-defined depth, allowing sparing of normal tissue beyond the tumor. While the ability to spare tissues distal to the tumor with proton therapy is excellent, the lateral tissue sparing lags behind that of photon therapy. This is especially true when targeting brain, pediatric, or head and neck tumors, which require use of a low energy proton beam due to the relatively shallow depth of the target. Low energy proton beams are more susceptible to lateral dose spread due to scatter in the beam delivery system, resulting in unwanted radiation dose being delivered to the healthy tissue surrounding the target.

This seminar will focus on the development of a new collimator technology, called the dynamic collimation system (DCS), which can be combined with existing commercial PBS proton therapy delivery systems to limit the lateral dose spread. The DCS makes use of four independently controlled trimmer blades that are designed to move in synchrony with the scanned proton beam during PBS delivery. By intercepting the beam as it arrives at the lateral boundaries of the tumor, the dose distribution can be effectively sharpened. The dosimetric benefits of the DCS have been demonstrated through in-silico treatment planning studies of patients with brain tumors, with the mean dose to the healthy brain tissue outside of the tumor being reduced on average by 25.1% (A. Moignier, E. Gelover, D. Wang, et al., 2016).

**1325 HEALTH SCIENCE LEARNING CENTER ( HSLC ) 4:00 – 5:00 P.M.**