



Medical Physics Seminar



Monday, October 2, 2017

1345 HSLC ~ 4:00 - 5:00 P.M.



Benjamin E. Nelms, Ph.D.

President, Canis Lupus LLC

The Most Important Medical Device in Radiation Therapy (And Why Nobody Is Using It)

The workflow of modern radiation therapy is an impressive assembly line, one that ultimately produces 3D (sometimes 4D) radiation dose distributions customized to the unique anatomy of each patient. Though highly complex, there is intuitive workflow to the whole system. First, there is volumetric imaging, where one or more modalities (CT, CT+MR, PET/CT, etc.) builds a detailed map of the human body, a map comprised of pixels with stories to tell. Next, highly-trained humans read those maps and carefully delineate both the target volumes and the critical organs to be spared. Dose levels are prescribed, then treatment planning specialists use sophisticated optimization algorithms to simulate dose delivery, accurately calculate dose, and strive to find the best solution for each patient. The plan solution is reviewed by the team, and often tweaked and fine-tuned, then finally approved. Before treatment fractions commence, rigorous QA is performed – usually on dosimetry phantoms set up as a patient surrogate – to ensure that the calculated dose was accurate and the plan delivery achievable. When treatment fractions begin, pre- and intra-fractional image guidance and real-time image registration allows the patient (who is not, in fact, a perfectly rigid body) to be aligned to an optimal position. Dose is delivered. And over fractions, cancer cells are damaged beyond repair while normal organs are spared. We might fairly say, “Radiation therapy: It works. It’s amazing. And it’s cool!” But, it is far from perfect. And some of the most glaring flaws, regrettably, receive disproportionately low attention, energy, and funding. You see, we have as an industry been somewhat lulled into a sense that technology advancements – the next new gadget, the next hardware breakthrough, the next leap forward in software automation – are what drive us forward. This is part truth, but not the whole truth. In this talk we will walk through several of the key steps of radiation therapy and reveal some recent research results that may both wow you and shock you at the same time. We will analyze and discuss the problems, the impact, and potential solutions. We may even step back and ask ourselves, “Wait, how did we get here?” In the process, we will reveal what the most important medical devices really are. And, more importantly, we will be inspired to make them better. And perhaps we leave with a new mantra: “Radiation therapy: It can work better. It can be more amazing. And I can help...”

1345 HEALTH SCIENCES LEARNING CENTER @ 4:00 TO 5:00 PM