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## Seeing Tumors: The Role of Advanced Materials in Oncology

**Wednesday, April 1**
312 Ell
11:45am – 1:00pm

*Refreshments will be served*

**ABSTRACT** Cancer diagnoses, and increasingly treatment, are progressively being aided by the development of new medical and molecular imaging technologies. Central to the utility of these procedures has been the concurrent development of contrast agents that enable clinicians to clearly delineate tumor peripheries, determine pathologies, and develop personalized intervention strategies. Nanotechnology has provided innovative materials that have been proven to provide elevated contrast in a number of different imaging modalities. Specifically, tumor tissue-specific nanoparticles have shown great potential as contrast agents for the direct *in vivo* detection of a number of cancers.

This seminar will focus on two examples of nanoscale contrast agents. The first of these is a composite material consisting of $Fe_3O_4$ nanoparticles embedded in a 200 nm diameter porous Si nanoparticle "superstructure." The composite exploits the dipolar coupling of superparamagnetic nanoparticles trapped within a secondary inorganic matrix, and has been shown to enhance the transverse relaxivity contrast in a 3 T MRI more than 1.6 fold when compared to similar, unencapsulated $Fe_3O_4$ nanoparticles. The second describes the enhanced visualization of breast cancer in X-ray Computed Tomography that was achieved by using $Bi_2S_3$ nanoparticles of 10 nm diameter modified to display a tumor targeting peptide (LyP-1, CGNKRTRGC). In these studies the accumulation of the nanoparticle contrast agent within the tumor was increased by 260% compared to nanoparticles that did not contain the homing peptide.

**BIOGRAPHY** Matt Kinsella is an Assistant Professor of Bioengineering at McGill University in Montreal, QC, Canada. Before joining the faculty at McGill in 2012 he was an American Cancer Society Postdoctoral Fellow at the University of California, San Diego. His postdoctoral research, in the Sailor lab at UCSD and in collaboration with the Ruoslahti lab at SBMRI, focused on developing nanomaterials to aid in medical imaging. In 2007 he received his PhD from the Weldon School of Biomedical Engineering at Purdue University working with Prof Albena Ivanisevic.

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