



# GMSE SEMINAR

**Tuesday, November 1<sup>th</sup>, 2011, 4:00 P.M.**

**Room No. 109, DASAN bldg. 1<sup>st</sup> Floor**

*(Host: Prof. Euiheon Chung / Language: English)*

## **Nanoparticles for Biomedical Imaging: Potential for Clinical Translation**

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Nanoparticles hold promise as biomedical imaging, diagnostic, and theragnostic agents. However, the key to their success hinges on a detailed understanding of their behavior after administration to the body. Biodistribution, target binding, and clearance are a complex function of their physicochemical properties in serum, which include hydrodynamic diameter, solubility, stability, shape and flexibility, surface charge, composition, and formulation. Moreover, many materials used to construct nanoparticles have real or potential toxicity, or may interfere with other medical tests. In this talk, we discuss the design considerations that mediate nanoparticle behavior in the body and the fundamental principles that govern clinical translation. By analyzing nanomaterials that have already received regulatory approval, most of which are actually therapeutic agents, we attempt to predict which types of nanoparticles hold potential as diagnostic agents for biomedical imaging.

**KEY WORDS:** Nanotechnology; Quantum dots; Nanoparticles; Diagnostic imaging; Image-guided surgery; Biodistribution; Clearance; Fluorescence imaging; Tumor targeting



Dr. Hak Soo Choi is a faculty member of the Beth Israel Deaconess Medical Center and Harvard Medical School. Dr. Choi is a graduate of the Polymer-Nano Science Program at Chonbuk National University, South Korea and earned his Ph.D. degree in biomaterials and drug delivery systems from Japan Advanced Institute of Science and Technology in Japan. In 2005, he extended his research into molecular imaging and tumor targeting and joined the Center for Molecular Imaging at Beth Israel Deaconess Medical Center in Boston, Massachusetts. Dr. Choi was promoted to Instructor in Medicine in 2008 and Assistant Professor of Medicine in 2011 at Harvard Medical School. His laboratory focuses on the development of new diagnostic agents to solve important problems in oncology and clinical medicine, with an emphasis on in vivo imaging and tumor-specific contrast agent development. A theme of study over the last five years has been

the interaction of nanoparticles with the body, and the establishment of design parameters to achieve adequate biodistribution and clearance for tumor imaging.

Graduate-program of Medical System Engineering (GMSE)