

## Department of Biomedical Engineering

### Seminar Series

# Magnetic Particle Imaging: A Primer and Review of Early Applications

## Jeff W.M. Bulte, Ph.D.

Professor of Radiology and Radiological Science  
Director of Cellular Imaging, Institute for Cell Engineering  
Director of Scientific Communications, Dept. of Radiology  
The Johns Hopkins University School of Medicine, Baltimore, MD, USA

Date:	August 12, 2019 (Monday)
Time:	10:00am
Venue:	LT4 - Mr & Mrs David T F Chow Lecture Theatre, 4/F, Yeung Kin Man Academic Building

### Abstract

Magnetic particle imaging (MPI) has recently emerged as a non-invasive, whole body imaging technique that detects superparamagnetic iron oxide (SPIO) nanoparticles similar as those used in magnetic resonance imaging (MRI). Based on tracer “hot spot” detection instead of providing contrast on MRI scans, MPI has already proven to be truly quantitative. Without the presence of endogenous background signal, MPI can also be used in certain tissues where the endogenous MRI signal is too low to provide contrast. After an introduction to the history and simplified

principles of MPI, this talk focuses on early MPI applications including MPI cell tracking, multiplexed MPI, perfusion and tumor MPI, lung MPI, functional MPI, and MPI-guided hyperthermia. While it is too early to tell if MPI will become a mainstay imaging technique with the (theoretical) sensitivity that it promises, and if it can successfully compete with SPIO-based  $^1\text{H}$  MRI and perfluorocarbon-based  $^{19}\text{F}$  MRI, it provides unprecedented opportunities for exploring new nanoparticle-based imaging applications.

## **Biography**

Dr. Bulte is a Professor of Radiology, Oncology, Biomedical Engineering, and Chemical & Biomolecular Engineering at the Johns Hopkins University School of Medicine. He serves as the Director of Cellular Imaging in the JHU Institute for Cell Engineering. He is a Fellow and Gold Medal awardee of the ISMRM and a Distinguished Investigator of the Academy of Radiology Research. He has published over 250 peer-reviewed publications and 40 book chapters, which have been cited over 25,000 times, with an h-index of 84. He specializes in new contrast agent development and molecular & cellular imaging, with particular emphasis on in vivo cell tracking. In 2018, he became the inaugural Radiology Director of Scientific Communications, overseeing nearly 300 Faculty Members for their scientific outreach.

---

Enquiry: 3442 8420

***All are Welcome!***