

# Institute Lecture



## Prof. Kannan M. Krishnan

University of Washington, Seattle, USA

## Magnetic Particle Imaging: Translating Science and Engineering to Medicine



**@ 6.15pm | Thursday, February 13, 2020**  
**Venue: L 17 (LHC)**

### About the Talk

Recent developments in synthesis and applications of magnetite nanoparticles, with negligible toxicity and favorable biodistribution, allows for reproducible control of their complex magnetic relaxation behavior, even in “extreme” biological environments. In his talk the speaker will introduce the underlying physics of MPI, the alternative approaches to image reconstruction, and describe recent results in the development of highly optimized and functionalized nanoparticle tracers for MPI. Next, the present state-of-the-art imaging results of preclinical *in vivo* MPI experiments of cardiovascular imaging, stroke, GI bleeding

and cancer using rodent models will be presented. He will also discuss a related diagnostic method using magnetic relaxation and illustrate its use for detecting specific protease cancer markers in solution. Overall, a multidisciplinary approach will be demonstrated which is essential to move biomedical nanomagnetism into the next phase of innovative translational research and commercialization, emphasizing the development of quantitative *in vivo* imaging, and image guided therapy including validation of delivery and therapy response.

### About the Speaker

Prof. Kannan M. Krishnan (Ph.D. 1984, UC, Berkeley) is Professor of Materials Sciences & Physics at the University of Washington, Seattle. Prof. Krishnan’s work has uniquely impacted information and biomedical imaging technologies. He pioneered the colloidal synthesis & use of optimized magnetic nanoparticles for medical imaging (MPI), diagnostics, and therapy, promoted the field of biomedical nanomagnetism, and developed the world’s best magnetic tracers for MPI, transforming it into a viable *in vivo* imaging platform, with demonstrated preclinical applications in oncology, stroke, and cardiovascular diseases. He cofounded a company, LodeSpin Labs LLC, to overcome challenges in scaling up the quantities of tracer synthesis and enabling clinical translation of MPI worldwide. Prof. Krishnan received the Alexander von Humboldt Career Research Award, TMS/FMD Distinguished Scientist/Engineer Award, IEEE Donald G. Fink Prize, Fulbright Specialist Award, IEEE Magnetics Society Distinguished Lecturer Award, Guggenheim Fellowship, the Rockefeller Bellagio Fellowship, the Burton Medal (Microscopy Society of America, JSPS Senior Scientist Fellowship, and the College of Engineering Outstanding Educator Award. He has published a single author text-book of record, entitled, *Fundamentals and Applications of Magnetic Materials*. He is an elected Member of the Washington State Academy of Science, and Fellow of the American Association for the Advancement of Science, the American Physical Society, the Institute of Physics (London) and the Institute of Electrical and Electronics Engineers (IEEE). He is also an alumnus ((BT/ME/1978)) of IIT Kanpur.

**All are invited to attend**  
**Dean of Research and Development**