



THE UNIVERSITY OF
MELBOURNE

Biomedical & Mechanical Engineering

SEMINAR SERIES 2008

A/Prof James Friend

Micro/Nanophysics Research Laboratory
Department of Mechanical Engineering
Monash University, Clayton, Victoria

Tuesday 11th March, 4pm

Theatre 4, Level 1

Alan Gilbert Building
161 Barry St, Carlton

Applications of high- frequency ultrasonics in microfluidics and microactuation.

MORE INFORMATION

For more Biomedical Engineering
seminar information contact:

Professor Marcus Pandey
Department of Mechanical Engineering
E: pandym@unimelb.edu.au

The transmission of acoustic waves through materials and across interfacial discontinuities is a centuries-old area of research. A rather curious application of ultrasonic acoustic radiation—actuation of fluids, particles and solids—has renewed interest in this area and exposed phenomena that are not explained by previous theories that were once viewed as canon. During the talk, examples will be provided of powerful microactuators that fulfill Feynman's original criteria on size (1/64th of an inch on a side, or 400 microns) in his talk "There's plenty of room at the bottom", rotary actuators to enable in- vivo swimming microrobots small enough to navigate arteries of the human brain, fingernail-sized devices to atomize sessile droplets for drug encapsulation and nanoparticle formulation, infusion of stem cells into implantable bioscaffolds, and a device to enable micro and bionanoparticle concentration in a sessile droplet in a matter of seconds. Along the way, a discussion of the phenomena that enable these devices to work and a few reasons why past work appears to fail to adequately describe what is going on will be provided.

James Friend is an associate professor at Monash University, Melbourne Australia, and has interests in the physics and applications of small technologies. He is a member of the IEEE Nanotechnology for Biology Committee, is on the advisory board of the Lifeboat Foundation, and is on the steering committee for the Melbourne Centre for Nanotechnology.

From 2001 to 2004, Dr. Friend was an assistant professor at the Precision and Intelligence Laboratory, Tokyo Institute of Technology.

He joined Monash University in late 2004, and co-founded and co-directs the \$6 million MicroNanophysics Research Laboratory with Dr Leslie Yeo; the lab currently has a staff of three academics, four post-doctorates and nine PhD students. He has over seventy peer-reviewed publications, with eight book chapters, thirty-five peer-reviewed journal papers, and fifteen patent applications in progress.