



## *Microengineering for Genome Sequencing*

by DR. Sanket Goel

**Date: 18<sup>th</sup> March 2009 (Wednesday)**

**Time: 12:00pm to 1:00pm**

**Venue: EA-02-11 (Executive Seminar Room)**

### Abstract

The grand challenge in genomics is to be able to sequence a human genome under \$1000 within one a day. Pyrosequencing, a sequencing-by-synthesis method for DNA sequencing, is emerging as an effective and popular platform for DNA analysis. It relies on the bioluminescent real-time detection of inorganic pyrophosphate (PPi) released on successful incorporation of nucleotides during DNA synthesis. We describe the development of a low-cost pyrosequencer, which will enable any lab to perform de novo genome sequencing. The pyrosequencer contains a microchip with millions of pico-litre sized wells carrying DNA fragments, and a custom-designed detector; both of them can be easily fabricated by standard semiconductor process technology. Even 100 mm<sup>2</sup> region of the device is capable to sequence more than one million bases. DNA sample preparation for short and long read sequencing strategies have grown importance, in particular paired-end ditagging (PET) approach. We are leveraging both silicon and polymer based approaches to automate and integrate different PET steps. The comprehensive genetic information of many species or of many individuals that will arise from the successful development of this technology will reshape our understanding of biology and medicine.

**Dr. Sanket Goel** **Speaker**

Dr. Sanket Goel is an A\*STAR cross-council office (CCO) principal investigator with joint appointment at Genome Institute of Singapore (GIS) and Institute of Microelectronics (IME). He completed his BSc (Honors) in Physics from Delhi University in 1998 and MSc in Physics from Indian Institute of Technology, Delhi in 2000, where he worked on optical fiber gratings for sensor development. Subsequently, he joined Institute for Plasma Research, Gandhinagar as a trainee to work on plasma microwave diagnostics. Thereafter, he joined University of Alberta, Canada for PhD work on Microfluidics and Integrated optics. After completing his PhD in early 2006 he has worked at Defense Development and Research Organization (DRDO, Bangalore, India) for a short period before joining Stanford University in July 2006. He worked as a postdoctoral research fellow at Stanford Genome Technology Center with Dr. Ron Davis and Dr. Mostafa Ronaghi. He moved to Singapore in July 2006 and is leading A\*STAR cross-council projects providing engineering answers to important biology problems.

**Dr Xue Jun Min** **Host**

*All are Welcome!*