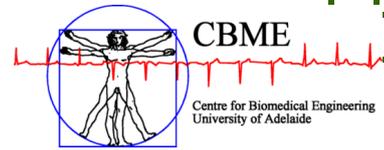


# CBME Seminar



**Seminar Title:** **Modelling & Analysis of Wirelessly Interrogated SAW based Micropumps for Drug Delivery Applications**

**Presenter:** **Dr Don Wenura Dissanayake**

School of Electrical and Electronic Engineering  
The University of Adelaide, Adelaide, SA

**Date and Time:** Thursday, the 29th of April 2010 at 5.30 PM

**Venue:** Medical School Sth, SG16, Stirling Lecture Theatre

**Site Map:** [http://www.adelaide.edu.au/campuses/mapscurrent/north\\_terrace.pdf](http://www.adelaide.edu.au/campuses/mapscurrent/north_terrace.pdf)

## Abstract

Drug delivery devices using Micro Electromechanical Systems (MEMS) technology are increasingly being developed for implantable drug delivery applications. A micropump is a fundamental part of a drug delivery system which provides the actuation source to effectively transfer an accurate amount of fluid/drug from the drug reservoir to the targeted location.

In this presentation, important stages in the modelling and multi-field analysis of a wirelessly operated, securely actuated, fully passive, valveless micropump is presented. The device is developed using a novel method, which is based on Surface Acoustic Waves (SAW) and wireless transcutaneous radio frequency (RF) communication. The device is capable of extracting the required power from the RF signal itself, like RFID tags; hence the need of a battery and active electronics is negated. The design and development of the micropump, and its microfluidic analysis is carried out with extensive use of modelling and simulation tools. A strong emphasis is given on utilising Computational Fluid Dynamics (CFD) to analyse the microfluidic flow behaviour of the device, and Fluid-Solid Interaction (FSI) analysis is also performed.

The new contributions made in this research in modelling, simulation, and analysis of MEMS devices, will be able to effectively utilise in a range of fields such as advanced computational numerical modelling of BioMEMS, secure transcutaneous communication, and implantable drug delivery systems and other biomedical applications.

## Biography

Dr Don Dissanayake graduated from Bachelor of Engineering (Computer Systems) with first class honours at the University of Adelaide in 2004. He then worked as an Electronic Design/Production Engineer for Maptek Pty Ltd in Adelaide for over two years. In 2006, he started his PhD research in the area of Wirelessly controlled Micropumps for biomedical applications. He was awarded PhD in Electronic Engineering in March 2010 for his thesis titled "Modelling & Analysis of Wirelessly Interrogated SAW based Micropumps for Drug Delivery Applications".

Don's research interests include micro-/nano- technology (Bio--MEMS, RF--MEMS, and NEMS), biomedical research, numerical modelling; including finite element modelling (FEM) and computational fluid dynamics (CFD), and low powered RF communication.



**School of Electrical and Electronic Engineering**

For catering purposes, please **RSVP** by 5pm on Tuesday 27th of April [rmdescal@eleceng.adelaide.edu.au](mailto:rmdescal@eleceng.adelaide.edu.au)