

IIT Bombay is organising an Institute Lecture on Wednesday, April 6, 2011. The details are as follows:



Speaker: **Dr. Robert (Bob) S. Anderssen**  
Senior Principal Mathematician  
CSIRO Mathematics, Informatics and Statistics  
Australia

Title : **Modelling Information Recovery – The Near Infrared Technological Revolution**

Day & Date : Wednesday, April 6, 2011  
Time : 5.15 p.m.  
Venue : P. C. Saxena Auditorium

*All are invited.*

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**Abstract:** Australian farmers are paid for their wheat on the basis of a near infrared (NIR) spectroscopic assessment of its protein content. Pharmaceutical companies use NIR to check the contents of the tablets that they sell. Farmers use simple NIR devices to determine the optimal time to pick the fruit that they grow. The utilization and analysis of the spectra recorded, for example, on NIR instruments is undergoing a continuing technological evolution. At the heart of the matter is computer controlled instrumentation. It allows, through the averaging of multiple sweeps, the recording of highly accurate spectra on a very fine grid. Calibration-and-prediction methodologies and derivative spectroscopy can be utilized to highlight hidden structure in such data. The talk will discuss, from a modelling perspective.

- (i) relevant details about NIR and Raman spectroscopy,
- (ii) the protocol by which spectroscopic data can be utilized to recover information about the molecular composition of biological materials,
- (iii) how derivative spectroscopy can be utilized to highlight molecular differences, and
- (iii) the analysis of the calibration-and-prediction protocol in order to improve its applicability.

**About the Speaker:** Dr Bob Anderssen is a mathematician who specialises in mathematical modelling to solve challenging problems in image recovery and reconstruction, rheology and biology.

His career in mathematics began with undergraduate and postgraduate studies at the University of Queensland and doctoral studies at the University of Adelaide, South Australia.

Dr. Anderssen is one of CSIRO's most respected mathematicians. His recent research at CSIRO has included:

- mathematical modelling of pasta drying to improve the drying process and reduce wastage
- understanding the sound produced by the Stuart & Sons piano manufactured in Newcastle, New South Wales, Australia, by Piano Australia
- working on the equations that describe dough rheology, basically the 'stretchiness' of dough, to improve the efficiency of mixing wheat-flour dough to make bread.

Dr Anderssen has been awarded the:George Szekeres Medal by the Australian Mathematical Society in 2004 ; Joe Moyal Medal by Macquarie University, Sydney, Australia in 2005 ; ANZIAM (Australian and New Zealand Industrial and Applied Mathematics) Medal by the Australian Mathematical Society and Medal of the Order of Australia for services to the mathematical and information sciences in 2010. Dr Anderssen is also a Fellow of the Australian Mathematical Society.