
RMIT Optimisation Group

Meetings

From quadratic equations to neural networks—the story of Hilbert's 13th Problem.
A beautiful theorem but totally useless!



Speaker: Prof. Bill Moran
RMIT University

Date: Friday 19 May 2017

Time: 3:00–4:00pm (Talk & Q/A)

Venue: Building 8 Level 9 Room 66 (AGR),
RMIT City campus

All students and staff are welcome

The talk will be followed by snacks and drinks

ABSTRACT: I will chart the history of Hilbert's 13th Problem and connect it to recent theoretical research in neural networks and statistical regression. The focus will be a remarkable theorem of Kolmogorov and Arnold to the effect that continuous functions of many dimensions do not really exist. Specifically, any continuous function defined on the unit cube in N dimensions can be written as a continuous function of one variable acting on the sum N continuous functions of each of the coordinate variables separately. I will discuss where the problem came from, deep in the history of mathematics, and going back to the solution of polynomial equations, and how its solution might (or might not) be relevant to neural networks.

BIO: Professor Bill Moran currently serves as the Director of Signal Processing and Sensor Control Group in the School of Engineering, RMIT University, Australia. He has been a Professor in the department of Electrical Engineering, University of Melbourne since 2001.

Previously he was the Research Director of Defence Science Institute (2011–2014) in the University of Melbourne, Professor of Mathematics ('76–'91), Head of the Department of Pure Mathematics ('77–'79, '84–'86), Dean of Mathematical and Computer Sciences ('81, '82, '89) at the University of Adelaide, and Head of the Mathematics Discipline at the Flinders University of South Australia ('91–'95). He was a Chief Investigator ('92–'95), and Head of the Medical Signal Processing Program ('95–'99) in the Cooperative Research Centre for Sensor Signal and information Processing. He was elected to the Fellowship of the Australian Academy of Science in 1984. He holds a Ph.D. in Pure Mathematics from the University of Sheffield, UK ('68), and a First Class Honours B.Sc. in Mathematics from the University of Birmingham ('65). He has been a Principal Investigator on numerous research grants and contracts, in areas spanning pure mathematics to radar development, from both Australian and US Research Funding Agencies, including DARPA, AFOSR, AFRL, Australian Research Council (ARC), Australian Department of Education, Science and Training, DSTO. He is a member of the Australian Research Council College of Experts. His main areas of research interest are in signal processing both theoretically and in applications to radar, waveform design and radar theory, sensor networks, and sensor management. He also works in various areas of mathematics including harmonic analysis, representation theory, and number theory.

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