Department of Mathematics and Statistics
Ingram Lecture Series, Special MICAMS seminar
Monday, March 4, 4:00 – 5:15 pm
Humanities & Social Sciences Building G5
Coffee and refreshments at 4:00 followed by the lecture at 4:15

Imagining and Calculating in Many Dimensions

This presentation is for a GENERAL AUDIENCE

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Abstract: The fourth dimension always fascinates: given that we live in a three-dimensional world, how can we imagine a fourth dimension? Many attempts to imagine a fourth dimension have been made in popular culture, not always successfully. Yet computational scientists nowadays routinely perform calculations not just in four dimensions, but even in hundreds or thousands of dimensions, thereby illustrating the power of mathematics to take us where imagination cannot go. When the dimensionality is large we meet a very real challenge, which Richard Bellman called the "curse of dimensionality". In this talk I will explain in non-technical terms the ideas that allow us, when the conditions are right, to transcend the curse of dimensionality, and so to calculate effectively and painlessly in very high dimensions.

Biographical Sketch: Dr. Sloan's research interests include boundary integral methods, finite element methods, high dimensional numerical integration and related issues of information-based complexity, multivariate approximation theory, and the time discretisation of evolution problems. He was employed by Australia's CSR Company from 1961 to 1965, before joining the University of New South Wales as a Lecturer. After several promotions, he was appointed to a Personal Chair in Mathematics in 1983. He was Head of the School of Mathematics from 1986 to 1990 and from 1992 to 1993. He completed a term as Chair of the Chemistry, Mathematics and Physics Panel of the Australian Research Council and member of the ARC's Research Grants Committee, and is a former President of the Australian Mathematical Society. He was elected a Fellow of the Australian Academy of Science in 1993. In 1997 he was awarded the ANZIAM Medal by Australian and New Zealand Industrial and Applied Mathematics (ANZIAM), and in 2001 was awarded the Thomas Ranken Lyle Medal of the Australian Academy of Science. In 2002 he was awarded the Szekeres Medal of the Australian Mathematical Society, and in 2005 was awarded the Information Based Complexity Prize. In 2008 he was appointed an Officer of the Order of Australia (AO). From 2003 to 2007 he was President of the International Council for Industrial and Applied Mathematics. Before that he was the Chair of the International Program Committee for ICIAM 2003, the fifth International Congress on Industrial and Applied Mathematics, held in Sydney in 2003. He is currently Deputy Director of MASCOS, the ARC Centre of Excellence for Mathematics and Statistics of Complex Systems.