



香港中文大學
The Chinese University of Hong Kong

Institute of Theoretical Computer Science and Communications

Colloquium

The Multivariate Approach to Algorithms and Complexity

By

Professor Michael Fellows

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4:30pm - 5:30 pm

Rm. 121, Ho Sin Hang Engineering Building, CUHK

Abstract: Parameterized complexity and algorithmics has emerged as a two-dimensional sequel to the classical (P versus NP) framework for analyzing computational complexity and for meeting the challenges of designing efficient algorithms. Systematically considering relevant secondary measurements that affect computational complexity allows greater realism, and uncovers fresh opportunities in algorithm design. Arguably, the classical framework has never been hugely successful, mainly because most interesting computational problems turn out to be NP-hard. The parameterized framework asks different questions, and in answer to these questions, has developed different tools for complexity analysis and algorithm design, and it has developed a workflow that has become successful at delivering useful results for applied computer science. The key idea in parameterized algorithmics is to consider the effects of a declared "significant measurement" k (the parameter) that captures structure or information beyond the overall input size n that affects problem complexity on real-world input distributions. The talk will survey the main ideas of parameterized complexity and algorithmics, with an emphasis on those aspects that might be of interest and use to applications-oriented computer scientists, and researchers in other fields.

Biography: Professor Michael Fellows received his Ph.D. in Computer Science at the University of California, San Diego, in 1985. Born in California, he now holds three citizenships: USA, Canada and Australia, having held academic positions in those three countries and also New Zealand.

He has published more than 200 research papers, mostly in the area of theoretical computer science, and coauthored several influential books, prominently including the research monograph *Parameterized Complexity* (1999, with Rod Downey). He is credited as the principal co-founder of the field of parameterized complexity and algorithmics, and for this was honored with a Humboldt Research Award in 2006, leading to several years as a distinguished research visitor at various universities and research institutes in Europe and Asia.

He is an Associate Editor of *ACM Transactions on Algorithms* and the *Journal of Computer and System Sciences*.

***** ALL ARE WELCOME *****

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