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香港中文大學
The Chinese University of Hong Kong

Institute of Theoretical Computer Science and Communications

Colloquium

Data Reduction and FPT Kernelization: Practical Algorithms and Lower Bounds

By

Professor Michael Fellows

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April 29, 2009 (Thursday)

2:30pm - 3:30 pm

Rm. 121, Ho Sin Hang Engineering Building, CUHK

Abstract: Parameterized complexity allows us to ask new questions. One of the great successes of the multivariate point of view of algorithms and complexity has turned out to be the systematic investigation of pre-processing, a humble but almost universally important strategy in practical computing. A parameterized problem is fixed-parameter tractable (FPT) if and only if there is a polynomial time algorithm that reduces any instance of the problem, to an equivalent instance of size bounded by a function of (only) the parameter. This equivalence provides a systematic framework for studying the power of polynomial time pre-processing. Recent research in this paradigm has revealed unexpected mathematical depth to pre-processing algorithmics, and has led to truly new and useful algorithms for hard problems. In turn, this has raised questions about the ultimate limits to polynomial time pre-processing, and recently, mathematical methods for proving lower bounds to kernelization have been discovered. The talk will survey this enormously practical and rapidly developing area of multivariate algorithmics.

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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