

Seminar: Friday 27 September 2013: Monash Undergraduate Research Projects Abroad (MURPA) and Queensland Undergraduate Research Projects Abroad (QURPA).

The annual MURPA/QURPA program exposes final year undergraduate students to an international research experience within a leading research laboratory.

On Friday 27 September Prof William Gropp will present his seminar "Algorithms and Software in the Post-Petascale Era" live to audiences in Melbourne and Brisbane.

Melbourne Date: Friday 27 September Time: 9.00 - 10.00am Location - Monash University: Seminar Room G12A, Building 26, Clayton Campus Enquiries: Caitlin Slattery (Faculty of IT)

Brisbane Date: Friday 27 September Time: 9.00 - 10.00am Location - University of Queensland: Seminar Room 505A, Building 47 (Axon), St Lucia Campus Enquiries: Sharon Cook (Research Computing Centre)

Abstract: Algorithms and Software in the Post-Petascale Era

Prof William Gropp, Director, Parallel Computing Institute, Deputy Director for Research, Institute for Advanced Computing Applications and Technologies, Thomas M. Siebel Chair in Computer Science, University of Illinois Urbana-Champaign.

The next generations of extreme scale systems face many challenges. The end of frequency scaling forces the use of extreme amounts of concurrency. Power constraints are forcing a reconsideration of the processor architecture, eliminating features that provide small performance benefit relative to the power consumed. So-called heterogeneous architectures that use combinations of simpler, less general processing elements such as graphics processing units (GPUs) or processors in memory (PIM) offer better performance per unit energy. Future systems will need to combine these and other approaches to approach Exascale performance.

Achieving good performance on any system requires balancing many competing factors. More than just minimizing communication (or floating point or memory motion), for high end systems the goal is to achieve the lowest cost solution. And while cost is typically considered in terms of time to solution, other metrics, including total energy consumed, are likely to be important in the future. Making effective use of the next generations of extreme scale systems requires rethinking the algorithms, the programming models, and the development process.

This talk will discuss these challenges and argue that performance modelling, combined with a more dynamic and adaptive style of programming, will be necessary for extreme scale systems.