HiPEDS Imagination Technologies PhD Scholarship
Hardware/Software Co-Optimisation of Concurrent Numerical Software
Supervision: Prof George Constantinides and Dr Alastair Donaldson

Applications are invited for a PhD studentship jointly supervised by the department of Electrical and Electronic Engineering and the Department of Computing at Imperial College London, and sponsored by Imagination Technologies.

The aim of the research is to investigate and propose novel solutions to improve the performance of concurrent numerical software on GPU architectures, by working across the hardware / software boundary. Particular focus will be given to the interaction between the balance of workloads, inter-thread synchronisation and the use and nature of the instructions and resources available on the hardware platform. The aim is to develop automated methods that maintain functional intent (but are not necessarily bit-level accuracy, due to errors introduced by finite precision effects or floating point error.)

This research project includes the development of techniques and tools to optimise performance in multi-threaded numerical computation via source-to-source transformation, compiler optimisation and custom hardware instruction design. This project draws upon various disciplines including static verification techniques, compilers, numerical error analysis and hardware/software co-design. A good candidate will be expected to demonstrate a deep understanding in at least one of these areas, with the drive and ability to draw upon the other areas as required.

This position is fully funded PhD position for a home (UK) student or an EU student resident in the UK for the last three years. Other students will also be considered, and entered into a separate scholarship process.

The student will join the October 2015 cohort of the Imperial College Centre for Doctoral Training in High Performance Distributed and Embedded Systems (HiPEDS).

In addition to academic supervision, the student will have an industrial point of contact within Imagination Technologies (www.imgtec.com). This will allow the student to gain access to real industrial benchmarks, connections throughout the company, industrial tools & support, heterogeneous hardware platforms, research steering and opportunities to discuss, explore and deploy their research ideas through regular company visits.

Please see the HiPEDS web page (http://hipeds.doc.ic.ac.uk) for details on how to apply and contact Alastair Donaldson (alastair.donaldson@imperial.ac.uk) or George Constantinides (g.constantinides@imperial.ac.uk) for informal enquires.