**PhD Project Proposal**

School of Electronics, Electrical Engineering and Computer Science

& ECIT Global Research Institute

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| **Proposed Project Title: Scaling of OpenCL kernels for multiple accelerators** |
| **Principal Supervisor: Ivor Spence Second Supervisor: Peter Kilpatrick** |
| **Project Description:**  Modern large computer systems typically use multiple accelerators such as GPUs to provide the desired high performance. Such systems are called heterogeneous because they contain different kinds of processor and writing programs which exploit the available power is very challenging.  OpenCL provides a mechanism for programmers of heterogeneous computing systems to specify that certain operations should be carried out on an accelerator (e.g. GPU or FPGA) rather than the host computer. To make use of multiple accelerators the programmer has either to run different operations (kernels) on different devices (for example using a pipeline) or explicitly divide the work of a kernel into separate sections which can be executed on different devices. To enable scalability to large heterogeneous systems it is desirable that programmers be supported in running multiple kernels or partitioning large kernels. This project will investigate appropriate programming models, abstractions and implementation techniques to simplify this task of scaling out. |
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