Imperial College London

Department of Aeronautics

PhD Studentship – Development of In-situ Visualisation and Analysis Technology for High-Fidelity Computational Fluid Dynamics

Tax-free stipend of approximately £16,300 per annum

Overview:

Computational simulation of fluid flow, often referred to as Computational Fluid Dynamics (CFD), plays a vital role in the design of numerous complex systems, including aircraft, cars, ships, and wind turbines. In our group we are working to develop a new generation of CFD technology that can perform high-fidelity time-dependent simulations of unsteady compressible flows on a range of hardware architectures - up to and including the worlds biggest supercomputers. However, such large-scale time-dependent simulations can potentially generate very large amounts of data (many TB/s). As such, the paradigm of writing this data to magnetic disk for *a posteriori* analysis simply does not scale. Instead, 'in-situ' visualisation, processing, and analysis technology must be developed that can act on data in fast memory, when and where it is generated by the CFD solver. This project aims to develop such technology for the open-source PyFR (www.pyfr.org) solver, and apply it to a range of industrially/scientifically relevant flow problems. It will be undertaken in collaboration with the Department of Computing at Imperial College, and various industrial partners.

Prerequisites:

Candidates should have (or expect to obtain) a very strong undergraduate degree in a quantitative discipline (e.g. a 1st Class degree in Physics, Computer Science, Aeronautics, Mathematics). Previous programming experience is important (ideally Python, C++ and CUDA). The candidate should also have an interest in fluid dynamics and aerospace applications.

Apply:

To apply for the position please send a cover letter, and CV to Dr Peter Vincent (p.vincent@imperial.ac.uk) with the subject line 'PhD Studentship - Development of In-situ Visualisation and Analysis Technology for High-Fidelity Computational Fluid Dynamics'.

The position will remain open until filled.