A scholarship is available for a PhD position in the School of Engineering and Information Technology (SEIT), University of New South Wales (UNSW) Canberra.

**Project Title:** Development of optimization methods for problems involving multi-fidelity analysis

**Supervisors:** Dr. Hemant Kumar Singh, Associate Professor Tapabrata Ray

**Degree:** PhD in Computer Science / Mechanical Engineering

**Project description:**

Optimization forms an indispensable part of engineering design, from nano-scale systems to massive infrastructures. Engineering optimization involves searching for design parameters that result in best performance of a design subject to given constraints. The evaluation of each design often requires not just a simple analytical calculation, but a computationally expensive analysis such as Finite Element Modelling (FEM), Computational Fluid Dynamics (CFD) and others. To solve such problems, meta-heuristic optimization methods are popular choice because of their ability to handle complex and **black box** functions (where transfer functions are unknown to the user). However, this ability comes at a computational cost, as these methods iterate over a several generations of *intelligently* sampled solutions in order to find the optimum, resulting in high number of function evaluations. If a high fidelity analysis is used for each evaluation, it translates to prohibitive overall optimization time. On the other hand, low fidelity analysis may give faster estimates of performance but with less reliability. Multi-fidelity optimization aims to find the optimum solution(s) to the problem by extracting information from estimates obtained using varying fidelity of analyses.

In this project, novel methods will be developed for multi-fidelity optimization. The research is intended to potentially reduce the optimization runtime significantly by effectively utilizing combinations of varying fidelity data for solving engineering design optimization problems.

**Required Background:**

Good programming (Matlab, C/C++) and analytical skills, preferably with a Masters Degree in Engineering / Computer Science. Prior research experience in optimization is desirable but not necessary. Demonstrated competence in academic writing and oral presentation skills will be beneficial.

Must meet UNSW admission criteria and English Language requirements.

**Expected joining:** No later than **August 31, 2014**.

**Contact:**
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