

## Scholarships

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### **Trust Evaluation in Open Distributed Systems**

Trust is a crucial aspect for the success of many open distributed systems. Due to lacking of global facilitator and evaluation standards, how to objectively estimate the trustworthiness of loosely coupled entities in an open distributed system is a challenge faced by many researchers. Furthermore, entities in a distributed system may have dynamic behaviours and competitive goals. These features make trust evaluation even harder. This research will investigate the use of reputation-based mechanisms and self-learning techniques in trust evaluation. A trust evaluation mechanism will be developed to assist entities in an open distributed system to objectively and accurately evaluate trustworthiness of their potential interaction partners.

For more information, please contact [Dr. Quan Bai](#)

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### **1. Real-Time Data Streaming of Radio Astronomical Data**

The objective of this project is to research and design a software architecture and implement a real-time data-streaming pipeline for correlation and image-synthesis of radio telescope data. A key feature of the pipeline will be its capability to run on hybrid hardware. It will investigate whether a real-time data-streaming pipeline can be effectively implemented in software and is be capable of handling the processing requirements of the Square Kilometre Array, as well as compare different architectures for executing stages of the pipeline, particularly homogeneous (x86, T2, PPC) versus heterogeneous (e.g. Cell BE) versus GPU (e.g. NVIDEA, Tesla) versus exotic architectures (e.g. FPGA).

### **2. Mobile Computer Vision**

This research project is part of the larger Mobile Augmented Reality project currently underway within the School of Computing and Mathematical Sciences. The student will investigate the processing, segmentation, and recognition of images and video captured by mobile devices with the goal of realtime marker-free object recognition and pose estimation. The research will involve the development of new recognition algorithms suited for smart phone devices in outdoor environments. The candidate should have a thorough knowledge of current mobile technologies, data mining and computer vision/image processing techniques.

### **3. Computer Graphics Light and Shading Models**

Light and shading models for realtime and photorealistic rendering of 3D computer graphics will be researched in this project. Particularly, new BRDF models and improved techniques for ambient occlusion will be investigated and implemented using programmable GPU pipelines. The aim will be to further evolve rendering effects that can be applied in the game and film industries using high performance architectures.

### **4. Topology Control and Routing in Heterogeneous Mobile Ad-Hoc Networks**

Mobile ad-hoc networks (MANETs) provide many open and challenging research questions, particularly with regard to network topology control and the routing problem. This PhD research project will review existing solutions to the topology control problem and proactive/reactive routing algorithms for homogeneous MANETs, and then will attempt to extend those techniques to heterogeneous networks which have multiple modes of communication.

For more information, please contact [Dr. Andrew Ensor](#)

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### **Other Research**

There are many other research topics available. If you are interested in a research topic that is not listed above, please do not hesitate to contact our PhD Programme Leader, [Dr. Russel Pears](#) for discussion.