



## **Controlling and Designing Software Defined Networks** (Research Internship Offer in Computer Science/Engineering)

### **Background**

Software Defined Networks (SDNs) allow network administrators to have programmable central control of network traffic via a *controller* without requiring physical access to the network's switches. A configuration of an SDN can create a logical network control where hardware is physically decoupled from the data forwarded, i.e. network switches follow the rules given by the controller and only forward packets by the given rules.

In cooperation with the University of New South Wales (Sydney, Australia), NICTA explores and develops new techniques for controlling and designing SDNs. Close collaboration with industry partners ensures the use-inspired nature of the project.

### **Research Question and Tasks**

Up to date network configuration often requires the configuration of each and every router separately, which of course yields a huge effort. For SDNs, however, there are prototypic languages which can manage the configuration of routers automatically (e.g. NetCore <http://frenetic-lang.org>).

Aim of the project is to analyse the capabilities of such a language and use the language to formalise contemporary network routing.

The ideal applicant should be interested in applying Formal Methods and logic-based calculi in general. Prior knowledge about SDNs is not needed at all.

### **General Information**

NICTA (National ICT Australia) is Australia's Information and Communications Technology (ICT) Centre of Excellence. It is an independent company in the business of research, commercialisation and research training. With over 700 people, NICTA is the largest organisation in Australia dedicated to ICT research.

The internship is integrated in *Concurrency and Protocol Verification* (<http://ssrg.nicta.com.au/projects/concurrency/home.pml>). The team behind *Concurrency and Protocol Verification* is a highly motivated group with different backgrounds (e.g., formal methods and network engineers), working at different institutes (UNSW, NICTA, UQ, and Macquarie University), and with different levels of experience (from young researchers to professors). The successful applicant will work in the Software Systems Research Group. He/She will work together with Prof. Rob van Glabbeek and Dr. Peter Höfner.

Sydney is the largest and most populous city in Australia. It is located on Australia's south-east coast of the Tasman Sea. With an approximate population of 4.5 million in the Sydney metropolitan area the city is the largest in Oceania. Sydney also ranks among the top 10 most liveable cities in the world according to Mercer Human Resource Consulting and The Economist.

Unfortunately, NICTA, as the host institute, cannot offer further financial scholarships.

## Contact Information

If you have any questions concerning the internship, please do not hesitate to contact us:

Peter Höfner  
Office E409, 223 Anzac Parade,  
Kensington NSW 2052  
T +612 8306 0561  
F +612 8306 0405  
email: peter.hoefner@nicta.com.au

Rob van Glabbeek  
Office E410, 223 Anzac Parade,  
Kensington NSW 2052  
T +612 8306 0492  
F +612 8306 0405  
email: Robert.vanGlabbeek@nicta.com.au