



UNSW

THE UNIVERSITY OF NEW SOUTH WALES
SYDNEY • AUSTRALIA



Expressions of Interest

Associate Professor Positions
in
Service Engineering

Faculty of Engineering

School of Computer Science
and Engineering

October 2007

think ahead } UNSW
THE UNIVERSITY OF NEW SOUTH WALES

EXPRESSIONS OF INTEREST

THE UNIVERSITY OF NEW SOUTH WALES FACULTY OF ENGINEERING

Associate Professor Positions in Services Engineering SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

The University of New South Wales (UNSW) recently awarded the School of Computer Science (CSE) and Engineering a Strategic Initiative Grant in order to recruit two academics at the Associate Professor level with high-level expertise in services engineering for eResearch. The initiative aim at capability enhancing in will build upon the strengths in the areas of Web service engineering, business intelligence, and end-user-centric and real-time analytics. The areas of focus will be investigated in frontier eResearch application areas: e-science, finance, government, digital media, environment, and personal processes management – where expertise to empower a service-based and competitive economy is much needed. CSE has been an active member of the Smart Internet CRC (Cooperative Research Centre), which winds up operations this year, and is also one of six universities and many industrial partners in its successor, the Smart Services CRC, which is expected to be formally launched before the end of the year.

The Strategic Initiative builds on UNSW's expertise in services engineering to maximise the opportunities arising from new CRC and thereby strengthening its eResearch capability more generally. The initiative will not only build on UNSW strengths in services engineering, but leverage this to build eResearch capability within UNSW.

The School is one of the largest computing schools in Australia. It offers undergraduate programs in Software Engineering, Computer Engineering, Computer Science and Bioinformatics, as well as a number of combined degrees with other disciplines. It attracts excellent students who have an outstanding record in international competitions. At the postgraduate level there is a large PhD research program and course work programs at the Master's and Graduate Diploma level in Computing and Information Technology and at Graduate Certificate level in Computing.

The School is a founding partner and significant contributor to the following centres: NICTA (National ICT Australia), ARC Centre of Excellence for Autonomous Systems, iCinema - Centre for Interactive Cinema.

The current salary range for Associate Professor is A\$101K - A\$111K per year depending on qualifications and experience plus up to 17% employer superannuation plus leave loading.

Expressions of interest may be forwarded to: A/Professor Boualem Benatallah (leader Service Oriented Computing Research group, project leader for Service Aggregation Research for the Smart Services CRC), email: boualem@cse.unsw.edu.au, or Professor Paul Compton (Head of School) on (61 2) 9385 5518 or email Compton@cse.unsw.edu.au

Further information about the School can be found in the supplementary information pack found at: http://www.cse.unsw.edu.au/~soc/ServiceEng_ExplInterest.pdf

SUPPLEMENTARY INFORMATION

THE UNIVERSITY OF NEW SOUTH WALES FACULTY OF ENGINEERING

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THE UNIVERSITY OF NEW SOUTH WALES

Since its establishment in 1949, the University of New South Wales (UNSW) has developed as one of the most respected teaching and research institutions in Australia. The UNSW mission to be an international university of outstanding quality is reflected in its consistent success in gaining external competitive research grants. UNSW is a member of Universitas 21, a consortium of prestigious universities in North America, Europe and South East Asia, and a member of the Group of Eight research-intensive universities in Australia. UNSW's current enrolment exceeds 40,000 students, with campuses in Sydney and ACT and soon to be in Singapore.

For further information on UNSW, visit its website at: <http://www.unsw.edu.au/>

THE FACULTY OF ENGINEERING

The Faculty of Engineering is the largest in Australia and comprises ten Schools, viz. the Schools of Biomedical Engineering, Chemical Sciences and Engineering, Civil and Environmental Engineering, Computer Science and Engineering, Electrical Engineering and Telecommunications, Mechanical and Manufacturing Engineering, Mining Engineering, Petroleum Engineering, Photovoltaic Engineering and Surveying and Spatial Information Systems.

For further information on the Faculty, visit our website at <http://www.eng.unsw.edu.au/>

THE SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (CSE)

The School of Computer Science and Engineering was founded in 1991 out of the former Department of Computer Science within the School of Electrical Engineering and Computer Science. It is now one of the largest schools within the University, and one of the largest of its kind in Australia. It currently has 54 full-time academic staff, 26 research staff and 31 support staff. The School also employs a large number of part-time and casual teaching staff to support teaching and teaching administration. The academic staff have research foci in the following areas; Machine Learning and Knowledge Acquisition; Knowledge Representation and Reasoning; Database Systems; Service Oriented Computing; Computer Networks; Operating Systems; Compilers and Distributed Computing; Formal Methods in Software Engineering; Empirical Methods in Software Engineering; Human Computer Interaction; Reconfigurable Architectures and Algorithms and Embedded Systems.

TEACHING ACTIVITIES OF THE SCHOOL

The School has a student body of approximately 3000 undergraduate students, more than 900 of these majoring in a computing degree, over 250 postgraduate coursework students and 185 Higher Degree Research students.

For further information on the School, visit our website at <http://www.cse.unsw.edu.au/>.

Undergraduate Programs

The School offers four undergraduate degrees:

BE (Computer Engineering) – a four-year degree

BE (Software Engineering) – a four-year degree

BSc (Computer Science), a three-year degree with optional Honours year.

BE (Bioinformatics), a four-year degree offered in collaboration with the School of Biotechnology and Biomolecular Sciences.

For information regarding undergraduate courses, visit our website at:
<http://www.cse.unsw.edu.au/undergrad/programs/index.html>

The School also offers a number of combined degrees with Science, Arts, Commerce, Law and COFA and a concurrent five-year degree leading to the award of the Bachelor of Engineering in Computer Engineering and Master of Biomedical Engineering (BE/MBiomedE). During 2000, the School began offering a combined five-year program in Bachelor of Engineering and BSc in Computer Science. This combined program allows students to combine a BE in a traditional Engineering discipline with an undergraduate degree in Computing.

For further information regarding undergraduate courses visit our website at:
<http://www.cse.unsw.edu.au/undergrad/programs/index.html>

The School encourages its students to participate in international competitions. Some of the recent successes can be found at: <http://www.computing.unsw.edu.au/#links>

Postgraduate Programs

The School offers an extensive range of postgraduate coursework programs:

Master of Information Technology
Master of Computing and Information Technology
Graduate Diploma in Computing and Information Technology
Graduate Certificate in Computing
Graduate Certificate in Computing (Advanced).

For information regarding postgraduate courses, visit our website at:
<http://www.cse.unsw.edu.au/postgrad/index.html>

RESEARCH PROFILE OF THE SCHOOL

Research within the School is conducted largely within groups, although collaboration between groups is common. Research groups typically have a number of on-going research projects in specific areas related to the overall area of the groups' interest. The School has identified the following core areas as central to its mission:

- Computer Networks
- Machine Learning and Knowledge Acquisition
- Knowledge Representation and Reasoning
- Database Systems
- Service Oriented Computing
- Programming languages and Compilers
- Operating Systems
- Hardware and Computer Architectures
- Theory of Computing and Algorithms
- Formal and Empirical Methods in Software Engineering
- Human-Computer Interaction
- Reconfigurable Architectures
- Algorithms and Embedded Systems

The School has unique opportunities to leverage its core areas of strengths to engage in multidisciplinary with other schools and centres within the University.

Research Centres:

The School is a founding partner and significant contributor to the following centres:

NICTA (National ICT Australia):

The University of New South Wales and the Australian National University are the two core university partners and Sydney University a supporting partner in the consortium that won the bid to operate National Information and Communication Technology Australia (NICTA), the new Federal Government Centre of Excellence in Information and Communication Technology (ICT). NICTA's steady state Government funding is approximately \$50M per year.

NICTA's objective is to develop a research capability of the highest international standard and scale. Research is guided by NICTA's vision of universal Information and Communication Technology. Inspired by this vision, NICTA's objective is to develop research that will make ICT universal, ubiquitous, usable, reliable, and affordable.

Approximately 25% of NICTA activity is undertaken at the UNSW campus and another 27% at the Australian Technology Park in Sydney. The school has a major involvement in NICTA with three of the research programs directed by School staff. The involvement of these staff in NICTA is part of UNSW's in-kind contribution to NICTA. Many of the research and academic staff in the School are involved in NICTA research programs and similarly many NICTA research staff are involved in supervision and teaching through Visiting appointments in the School.

SIT and Smart Services Cooperative Research Centres (CRC) - SIT (Smart Internet Technology) CRC and Smart Services CRC: CRC is a consortium of leading university, industry, and government organisations. The CRC for Smart Internet Technology conducts research combining Artificial Intelligence, Computer Networking and Social Interaction to create enabling technologies for smart internet applications. Recently, the Smart Services CRC has been awarded a \$30 million grant from the Department of Education, Science and Training. Smart Services CRC's 24 industry, government and research partners will provide a further \$68.5 million co-investment. This will enable the new CRC, an evolution of the Smart Internet Technology CRC, to deliver high value mobile and on line services across key media, finance and government sectors. The Smart Services CRC will be fully operational by end of this year. The school is one of six universities and many industrial partners who formed Smart Services CRC.

Centre for Autonomous Systems: The School is a major partner in the ARC Centre of Excellence in Autonomous Systems, which focuses on robotics research. The Centre is a partnership between UNSW, the Australian Centre for Field Robotics at Sydney University and the Mechatronics Research Group at UTS. The Centre's research includes advances in perception, machine learning, planning, human-robot interaction and the software infrastructure for building large-scale robotic systems. The Centre funds several post-doctoral fellows, PhD scholarships, laboratories and equipment.

iCinema - Centre for Interactive Cinema: The iCinema Centre for Interactive Cinema Research, established in 2002, is a joint venture of the College of Fine Arts and the Faculty of Engineering, School of Computer Science and Engineering at the University of New South Wales. This unique initiative brings together researchers and postgraduate students in digital media, aesthetics, sociology of art, cinematic theory, multimedia design, computer science, cognitive science and software/hardware engineering.

RESEARCH AREAS and GROUPS

Artificial Intelligence

The group conducts research in the following areas:

- Knowledge Representation And Reasoning
- Robotics And Autonomous Systems
- Learning And Knowledge Acquisition

Cognitive Science, Agent Systems
Computer Vision, Medical Imaging, Health Informatics

Embedded Systems and Architectures

The group conducts research in the following areas:

Operating System
Hardware and Reconfigurable Architectures
Embedded Systems

Networking and Pervasive Computing

The group conducts research in the following areas:

Sensor Networks
Wireless Mesh Networks
Mobile Networks

High Performance Computing, Programming Languages And Compilers

The group conducts research in the following areas:

Parallel and Distribute Computing
Programming Languages and Compilers
Multilingual Typography

Databases and Service Oriented Computing

The group conducts research in the following areas:

Data Streams and Spatial Data Processing
Service-Oriented Computing and Web Services
XML and Web Information Systems
Data Mining and Warehousing
Bioinformatics

Software Engineering

The group conducts research in the following areas:

Empirical Software Engineering
Formal Methods
Development Environments
Human Computer Interaction

Theory of Computing and Algorithms

The group conducts research in the following areas:

Quantum Computing
Theory of Computer Security and Distributed Systems
Computational Complexity, Algorithms

COMPUTING FACILITIES AND SPECIALIST LABORATORIES

The School has well-equipped computer laboratories for coursework teaching and student projects, including a number of specialist laboratories. In total there exists a network of approximately 700 computers for teaching, research and administration.

This consists of:

200 mostly Intel-based computers in 10 generic teaching laboratories running Linux,
60 computers in an WindowsXP-based teaching lab,
20 computers running Mac OS X in a teaching lab,
40 Linux computers reserved for thesis students,
50 computers in specialist teaching laboratories (see below),
45 computers in 3 virtual laboratories for teaching (see below),
30 locally developed research machines of various kinds,
150 systems of various hardware and software configurations for academic staff and research students,
50 computers for administration and systems support,
35 Linux-based servers providing a number of server functions,
33 computers in two Linux clusters for research.

The School operates a wireless network for use by staff and students. In addition the School operates a modem pool for staff and senior students and provides a limited amount of free access to the University's dial-up facility to coursework students.

The School is committed to regular upgrades of its facilities, and invests over \$1million per year on equipment replacement.

A number of staff and students are active and well known within the Open Source Community. The current maintainer of Linux NFS is a member of the School (and Linux NFS is run on production file servers).

The **specialist teaching laboratories** are:

The **Advanced Networks Laboratory** comprises of 30 Linux hosts connected via a network whose topology and outside connectivity can be controlled by a dedicated switch/router.

The **Human Computer Interaction Laboratory** is equipped with 20 iMac G5 Macintosh computers and is used in the introductory Human Computer Interaction course. Mac OS X and the Cocoa environment forms the foundation of an advanced course concentrating on the design, implementation and evaluation of user interfaces. The laboratory is designed to be an innovative teaching environment providing a classroom where each student has a computer and their design work is displayed on the walls.

The **virtual teaching laboratories** are:

The **Distributed Systems Laboratory**, consisting of 20 rack-mounted computers with a private back-end network used for teaching distributed systems. The School's Operating Systems Research Group is co-located with the Embedded, Real-Time and Operating Systems Research Programs of NICTA on NICTA premises. It has excellent facilities including test and development platforms based on embedded ARM, MIPS, x86, Blackfin and other DSP processors, various single- and multi-processor x86 and Itanium machines and clusters, multiprocessor POWER4/5 platforms, reflow soldering and de-soldering high-end oscilloscope, and other test and measuring equipment.

The **Wireless and Network Security Laboratory**, consisting of two groups of eight computers, a switch, two hubs, a wireless hub and a gateway in a secure environment to demonstrate and experiment with network security.

The **Security Vulnerability Laboratory**, consisting of eight virtual computers running on a server used for practical experiments in aspects of host security.

There are a number of Portable Laboratory Kits used by various classes, consisting of small USB-connected packages and which can be connected to a laboratory computer or taken home and used connected to a computer elsewhere. These are:

The **Advanced Operating Systems Kit**, consisting a small ARM-based computer used to build and test practical operating systems.

The **Micro Laboratory Kit**, used to program a microprocessor to control a number of real-time devices.

The **FPGA Kit**, consisting of a Field Programmable Gate Array which can be used for a number of exercises including designing and building a microprocessor.

There are a number of special research facilities:

The **Human Computer Interaction or Usability Laboratory** supports human-computer-interaction teaching and research providing a controlled environment in which formal usability evaluations can be conducted. The space consists of an acoustically treated experimental room and observation area allowing observers to monitor and record user interaction. Eye tracking equipment is used to measure how people interact with visual data.

The **Network Research Laboratory** is equipped with state of the art commercial ATM Switches, High Speed Routers, Ethernet Switches and several experimental FreeBSD/Linux based routers and commercial test equipment. It is used for research in the areas of Quality of Service Management in the Internet: Differentiated Services Network, Multimedia transmission in the Internet, Pricing and Billing of Services in the Internet, Web performance management and mobile/wireless protocols.

The **Distributed Operating Systems Laboratory** features a number of U4600's, MIPS-based SGI workstations and single- and multiprocessor Alpha machines as well as a number of locally developed StongARM-based wearable computers called *PLEB*. The facility is used for research in Microkernels and microkernel-based systems, operating systems for 64-bit architectures, operating system support for distributed and ubiquitous computing and scalable operating systems for symmetric multiprocessor architectures.

The **Robotics Laboratory** is funded by the ARC Centre of Excellence for Autonomous Systems. It supports research in cognitive robotics, machine learning, human-robot interaction, multi-agent cooperation and robots for search and rescue. The facilities include a rescue robot test arena, a humanoid robotics laboratory and a RoboCup soccer field. They house a variety of robots including a Yujin RobHaz DT-3, several ActiveMedia Pioneer robots, Denso robot arms with attached Barrett Hand, Sony Aibos and a Robotiss bipedal robot. These are equipped with sensors such as 3D cameras, stereo and panoramic cameras, laser range finders, tactile and microphone arrays.

The **Visual Information Processing** Laboratory contains a number of high-performance SGI workstations for image processing and indexing research.

The **PCB Prototyping Facility** supports the fabrication of printed circuit boards with up to six layers for a number of research activities.

An alternative fibre-based high-speed network links the School's research and teaching facilities, which is used for networking, distributed systems research as well as for experiments in alternative teaching methods.