ARC Communications Research Network

Newsletter October 2007

Convenors Report

In this issue of the ACoRN Newsletter, we have a mixed bag of news. Fortunately, most of the news is good. ACoRN members were successful in numbers this year when the ARC Discovery Grants were announced. Also, our September workshop at Monash University exceeded expectations, and in October/November we have several more ACoRN events lined up.

These success stories unfortunately pales against the very sad news that our sole ACoRN industry partner LSI Logic Australia (former Agere Systems Australia, and Bell Labs Australia) has closed for business. The operation in Sydney has, from the very beginning, been a strong and valued supporter of ACoRN. Being an industry leader in ASICs design, and a willing partner in engaging with academia and the wider telecommunications research community, the LSI/Agere/Bell Labs team will be sorely missed. A sad day for our community, losing one of Australia's few significant industrial wireless comms research labs. We wish the entire team the best of luck on the journey ahead, and hope that our community will be able to hold on to the research talent, despite losing a strong industrial pillar.

On a sweeter note, the number of successful ARC Discovery Grants involving ACoRN members has increased significantly compared to last year. This year, ACoRN members are involved in at least 10 successful projects. I would especially like to congratulate Dr. Yonghui Li from University of

Sydney on winning a Queen Elizabeth II Fellowship. This is a prestigious fellowship that hopefully will secure the academic future of Dr Li. Best wishes from ACoRN to Dr Li and all successful ARC Discovery Grant applicants.

Since our last newsletter, the ACoRN Workshop on Digital Signal Processing for Optical Communications was run in late September, organised by our strong ACoRN Team at Monash University. The workshop was a great success, attracting 34 delegates from industry, research institutes and universities. A plenary talk was presented by Sander Jansen from KDDI, Japan, whose visit was supported directly by ACoRN. Given the great success of the workshop, we hope it will become an annual event in the ACoRN calendar.

In the coming months, we have two ACoRN events in Adelaide to look forward to, as well as two conference events co-sponsored by ACoRN. On October 29th, a one-day tutorial on Applications of the EM Algorithm for Localization is presented by Prof Maurice Charbit from ENST, Paris in France. The school event is organized by University of Adelaide, and will provide a great opportunity to get a fundamental understanding of the versatile EM algorithm.

Later on in November, the Australian-European Workshop on Modern Coding Techniques for Wireless Communications will be held as a 3-day workshop in Adelaide on 20-22 November. The

workshop is organized by University of South Australia and will feature three invited experts from Europe and six invited experts from Australia. The workshop will be based on a new format, where all delegates are required to give a presentation. The objective of the workshop is to establish collaborative research projects between the workshop delegates. If the workshop is successful, ACoRN will attempt to organize more such workshops in the future.

On the conference front, ACoRN is co-sponsoring the 5th ACM Conference on Embedded Networked Sensor Systems to be held in Sydney on November 6-9, and the 15th IEEE International Conference on Networks to be held in Adelaide on November 19-21. Furthermore, the workshop and submission dates have been announced for AusCTW 2008 to be held in Christchurch, New Zealand. The workshop is scheduled for January 30 to February 1, 2008, and paper submissions are due on November 1.

Finally, I am pleased to see openings for postdoctoral research fellows at Victoria University, NICTA, and CSIRO ICT Centre advertised in this issue of the ACoRN newsletter. It is encouraging to see that there are still exciting and challenging opportunities for our young research talent.

Hope to see you in Adelaide for the two ACoRN events in October and November.

Lars K. Rasmussen

ACoRN Network Convenor

ARC Discovery Grants Awarded to ACoRN Members

ACoRN members have been successful in securing ARC Discovery grants to the value of approx four million dollars. ACoRN board members and ACoRN Local Representatives were among the recipients.

o Prof AJ Grant, Dr T Chan, Prof L Rasmussen - Uni SA

o Dr S Johnson, Dr Kellett - Uni Newcastle;

o A Prof J Yuan, Dr R Malaney - UniNSW:

o Prof B Vucetic, Dr Y li Dr M Dohler -Uni Sydney;

o A Prof T Wysocki, Dr M Abolhasan - Uni Wollongong;

o Dr M Premarantne, Prof AJ Lowery, Prof G Agrawal, Prof B Jalali - Monash Uni

o Dr W Sheih, Dr B Krongold, Prof D Thomas, Dr M Brazil, A Prof J Evans, Prof R Tucker, Dr K Hinton - University of Melbourne

Congratulations to all who have secured an ARC grant.

AusCTW 2008

AusCTW 2008 will be held in the Department of Electrical and Computer Engineering, University of Canterbury, Christchurch, New Zealand. on 30, Jan 31, Feb 1, 2008. In addition to a range of speakers from Australia and New Zealand, there will be overseas speakers including Jim Cavers (Simon Fraser University, Vancouver) and Marco Chiani (University of Bologna).

Further information is available on the website http://ausctw.anu.edu.au/

News from University of Newcastle

New staff

Dr. Björn Rüffer has joined us from the University of Bremen to work with Steve Weller and Chris Kellett on their ARC Discovery Project "Dynamical systems and iterative decoding of low-density parity-check codes". Björn is going to apply methods from dynamical systems and graph theory in an interdisciplinary manner to the analysis and design of LDPC codes and to investigate their associated iterative decoding algorithms.

New ACoRN members (since January 2007)

Gunilla Elizabeth Burrowes, postgraduate student (underwater telecommunication technology); supervised by Dr. Jamil Khan

Chee Keong Ho, postgraduate student (wireless data communications); supervised by Dr. Mehmet Yuce

Dr. Chris Kellett, Lecturer. His research interests are in analysis and design of nonlinear dynamical systems with applications in telecommunications and numerical analysis.

Anthony Nikola Laskovski, postgraduate student (wireless data communications); supervised by Dr. Mehmet Yuce

Eng Hwee Ong, postgraduate student

Dr. Patrik Wahlberg, Senior Research Associate. His research interests are in time-frequency analysis, Gabor theory, pseudo-differential operators, stochastic processes, and mathematical problems in signal processing.

ARC Discovery Project Grant Success

ACoRN members Sarah Johnson and Chris Kellett had a successful ARC Discovery Project application for funding commencing in 2008: "Iterative coding for next generation networks" ($335,000 for 2008-10). This project draws together ideas from error correction and network coding to provide the technologies that will underpin next generation communication networks.

The Discipline of Electrical Engineering at Newcastle University could secure a total of five Discovery Projects, worth approximately $1.25M, in this latest funding round.
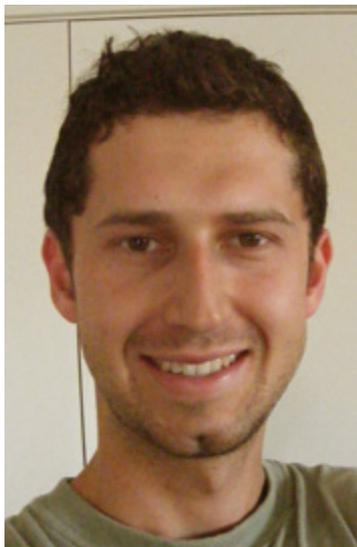
Awards

ACoRN members Sarah Johnson and Peter Schreier each received the "Pro Vice-Chancellor's Award for Research Excellence" awarded by the Faculty of Engineering and Built Environment at Newcastle University. The award carries a cash prize of $1,500.
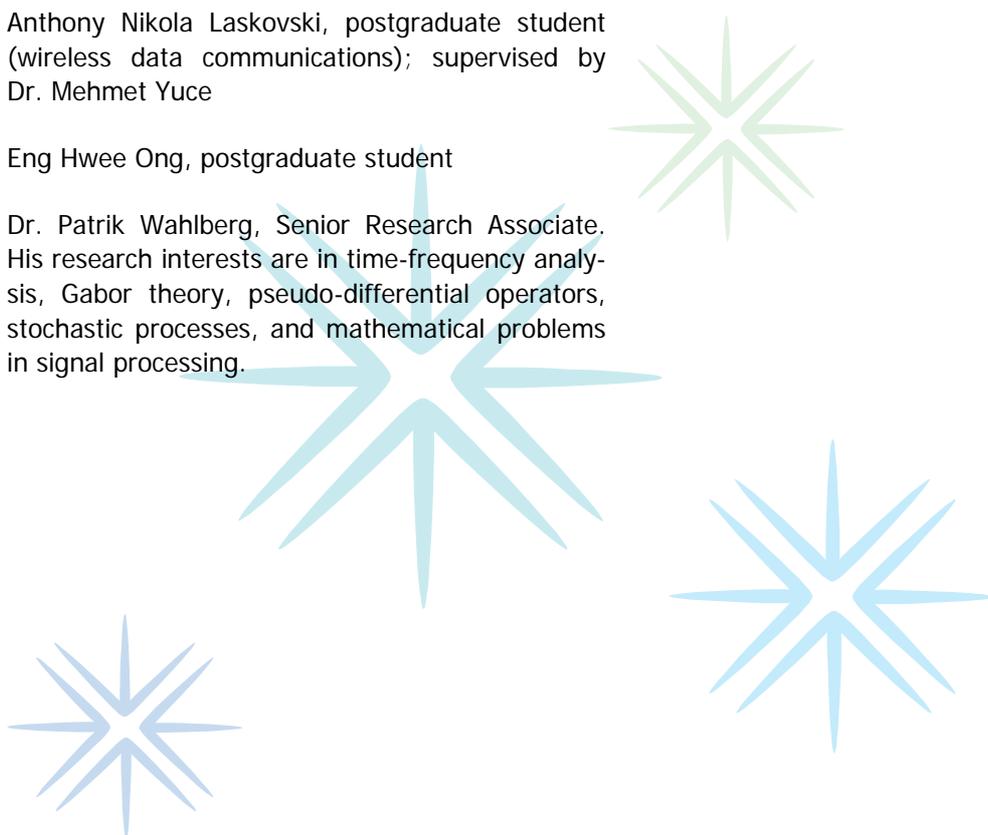
ACoRN Member Profile

Anthony Laskovski

Anthony completed high school in 2001 and began studying B Engineering (Electrical) at the University of Newcastle in 2002 having also been accepted onto the UNISS industrial scholarship program, which involved working with Energy Australia during summer university breaks and spending 15 months as a graduate engineer prior to returning to university for his Honours year. He graduated in 2006 with Honours Class I, beginning postgraduate study earlier this year.

His current research focuses on electronics in the wireless transfer of data and power to biologically implantable electronic devices, which will have applications in the field of medical diagnosis and treatment as well as contributing to more efficient health care systems. He presented some of this work at the EMBC (Engineering in Medicine and Biology Conference) earlier this year and he also has some interesting concepts which he would like to explore over the course of his PhD. He is thoroughly enjoying the creative, exciting and practical aspects of being an engineering researcher, and he is driven by the idea of achieving things which haven't been conceived before. He looks forward to a high-tech future and he is excited to be part of it.
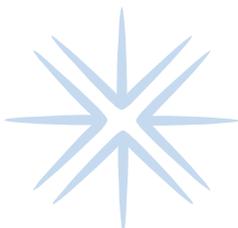
ACoRN WORKSHOPS

Applications of EM algorithm for localization School

Adelaide University, 29 October 2007

Prof Maurice Charbit is a French based expert in signal processing for communications systems. His recent work has focused on emitter location in fading multipath channels. This is significant for Australia primarily from a safety/emergency point of view, as well as applications in national security. With support of an ACoRN Visitor Travel Fellowship, he is currently visiting and working with Prof Lang White at the University of Adelaide.

The workshop will include talks on EM algorithm, Angle of Arrivals (AOA) estimation, Statistical inference on HMM (Hidden Markov Model) Bearing only tracking (BOT) and Bearing tracking on road network.

http://www.acorn.net.au/event/emschool07/

Australian-European Workshop on Modern Coding Techniques for Wireless Communications.

20th – 22nd November 2007 Adelaide

This workshop is an international cooperative R&D forum to bring together prominent researchers from Austria; Italy; National ICT Australia (NICTA); Forum for European-Australian Science and Technology cooperation (FEAST); Queensland Government; Polytechnic of Turin; Torino Wireless Foundation; Piemonte Region; Italian Embassy in Canberra; Germany and several Australian Universities, with the main objective of exploring potential opportunities of collaboration. The workshop is intended to be small and informal with most delegates being mature Ph.D. students or post-docs at the start of their career.

Four leading European researchers and six leading Australian researchers have been invited to give overview talks about past and present activities in the area, as well as detailed technical talks about recent or in-progress work (see program below). The informal format allows for extended discussions during and following talks.

Researchers (senior and junior) and research students working in the area are encouraged to attend the workshop. The small and informal format will require all attending delegates to be actively involved in the success of the workshop. Therefore all delegates must present a 30 minutes talk on recent or (preferable) in-progress work as part of attending the event. As limited slots are available in the program, researchers and research students interested in attending must submit a proposal for a talk (1/2 to 1 A4 page) for potential presentation before 1st November 2007. The proposal is to be emailed to Lars.Rasmussen@unisa.edu.au.

http://www.acorn.net.au/event/mctworkshop07/
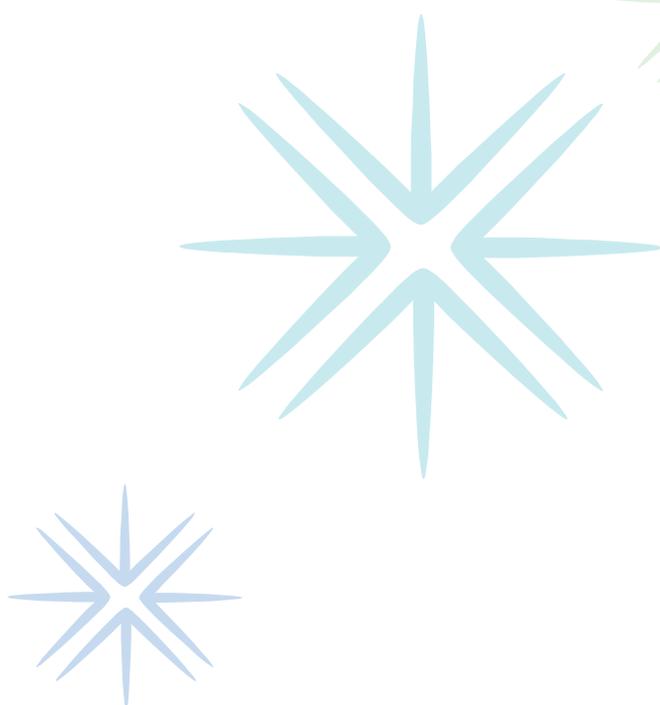
ACoRN Workshop Reports

ACoRN Digital Signal Processing for Optical Communications Workshop

Melbourne – 27–28 September 2007

This workshop was a great success. It brought together experts in digital signal processing, optical communications and wireless communications. A major theme of the conference was OFDM for optical communications. Those with an optical background learned about OFDM and about the emerging applications of DSP in the optical domain, those from a wireless OFDM background found a new field where their OFDM knowledge could be applied. Tutorial presentations on optical communications and on OFDM gave non experts an introduction to each field.

The total of 34 delegates came from NEC, Analog Devices Australia, NICTA, University of South Australia, University of Queensland, University of Melbourne and Monash University.

Internationally, the use of OFDM in optical communications has become a hot topic within the last year or so, with applications including long haul single mode fiber optical communication systems, multimode fiber systems and optical wireless systems. Australian researchers are very prominent in both theoretical and experimental work in this field. Three research groups in the world, including two from Australia, have demonstrated the use of OFDM to transmit data at multi-gigabit rates over hundreds or thousands of kilometers. The three groups use different approaches and all three were present at the workshop. Sander Jansen from KDDI in Japan was sponsored by ACoRN to come to the workshop. The local groups from Monash and Melbourne also presented talks. The differing approaches led to much lively discussion about the advantages and disadvantages of each. To gain maximum benefit from Sander Jansen's visit, his talk also doubled as an IEEE Signal Processing Chapter talk and was widely advertised within Victoria and attracted an even wider audience.

There were three talks on different technologies for DSP implementation: custom chips by Stan Skafidas of NICTA, FPGAs by Andrew Price of Monash and conventional DSPs by Simon Brewer of Analog Devices. Each of the speakers gave an excellent overview aimed at a general audience.

Their talks made clear the advantages and disadvantages of each technology.

Peter Dower and Peter Farrell gave entertaining and informative talks on aspects of Automatically Switched Optical Networks (ASONs). At first sight this topic might seem unconnected to the other themes of the workshop, but it soon became clear that these are complementary technologies: optical OFDM may make ASONs more feasible, ASONs may make optical OFDM a more attractive technology, while high speed silicon including custom chips, FPGAs and DSPs will underpin them all.

The workshop was a very successful networking event with the foundations laid for many future collaborations and research projects.

Organisers

Jean Armstrong, Monash University. Andrew Price, Monash University. Dr Ahmet Sekercioglu, Monash University. Brendon Schmidt, Monash University Xia Li, Monash University

ACoRN News

Congratulations to Yonghui Li
http://www.acorn.net.au/show/person/?788

Congratulations to Yonghui Li from University of Sydney who has been awarded a Queen Elisabeth II Fellowship. This fellowship provides the opportunitiy for established researchers to undertake research of national and international significance. Queen Elizabeth II Fellowships (QEIIs) encourage research in Australia by postdoctoral graduates of exceptional promise and proven capacity for original work. QEII are available to researchers with up to 8 years research experience since the award of the PhD or equivalent research doctorate. This is a very prestigious fellowship to win.

Congratulations to Xia Li
http://www.acorn.net.au/show/person/?758

The Zonta Club of Melbourne on Yarra is part of Zonta International a global service organisation of executives and professionals working together to advance the status of women through service and advocacy. This year the club was delighted to have as a guest speaker at the July meeting, Xia Li (who uses the English name 'Summer'), a postgraduate student at Monash University. Xia Li has been awarded a 2007 Amelia Earhart Fellowship for her research work on optical OFDM (Orthogonal Frequency Division Multiplexing): a new modulation technique for optical communications that has been patented by Monash University. The scholarship will enable Xia Li to continue with her Phd studies in Australia.

Amelia Earhart Fellowships were established in 1938 in honour of Amelia who was a member of Zonta. They are awarded by Zonta International to women pursuing Ph.D. degrees in aerospace-related sciences and engineering. The fellowships have been awarded to women in 57 different countries.

Zonta is very keen to promote this scholarship to women undertaking research in aerospace-related sciences and aerospace-related engineering projects within Australia. If you would like further details about Zonta or the scholarship, this can be obtained from the Zonta International website www.zonta.org.

Demise of LSI Logic Australia.

There certainly is never a dull moment in the telco industry!

Following a sudden and surprise announcement, LSI Logic Australia is to be closed, a consequence of the sale of the global Mobility division to Infineon. The team started back in 1998 as Bell Labs Australia, morphing to Agere Systems Australia in 2003, with a name change to LSI Logic Australia earlier this year. The group achieved such world-firsts as an ASIC for MIMO-HSDPA (High Speed Downlink Packet Access) operating at 28.8Mbps and capable of equalising frequency selective channels. They also designed the turbo decoder in the world's first mass-deployed 3G mobile handset, and much of the physical layer processing in a 3G basestation chip currently being deployed in one of the world's largest 3G networks.

The team has always valued its links with the local academic and R&D community, and has been a keen supporter of ACoRN since inception. Summer internships have been offered on a competitive basis to some of the brightest students in the country. Regrettably, despite having received numerous excellent applications for this year's awards, the internship programme will be terminated with the demise of the group. We thank everyone for supporting the programme over the last few years, and apologise to those students who applied this year.

It is a sad day when we lose one of Australia's few significant industrial wireless comms R&D labs. We can anticipate that many of the individuals from the team will continue contributing to the local R&D community over the following years.

Dr Graeme Woodward

OPPORTUNITIES

VICTORIA UNIVERSITY

POSTDOCTORAL RESEARCH FELLOWSHIPS

The Victoria University Postdoctoral Research Fellowship Scheme is a new initiative to build its research and to support outstanding early career researchers seeking to commence an academic/research career. The Scheme provides appointments of 3 years duration. Up to 10 Research Fellowships will be supported in 2008 under this Scheme at Academic Levels A and B. Salary scales are provided in the application kit. A minimum start-up grant of $12,000 will be provided to successful applicants. This will be a highly competitive scheme, and applicants are expected to have a strong track record relative to opportunity.

The scheme focuses on outstanding early career researchers who would normally be within 5 years of completing their Doctoral qualification.

The Centre for Telecommunications and Micro-Electronics (CTME) is interested in supporting a number of high quality applicants with expertise in:

1. Communications: Multi-input Multi-output (MIMO) Wireless Communications, OFDM systems, Cognitive Radio, Multi-User Detection, Information Theory.
2. Signal Processing: Estimation and Detection, Array Processing, signal processing for hardware implementation, equalization and optimization methods.
3. Networking: MAC algorithms, Cross-layer optimization, Routing Protocol for Ad Hoc and Mesh Networks.

Applications will be assessed on quality of the proposed research project and its fit with the host unit, track record (relative to opportunity) of the applicant and the research environment in the host Institute Centre or research group. It is expected that of the majority of Fellowships will be aligned with the University's areas of research strength, typically Research Centres and Institutes, although outstanding applicants from any discipline in which the University has research strengths are encouraged to apply. A complete list of areas of research strength and contacts is included in the application kit.

The Postdoctoral Research Fellowship Application kit is available from:

http://www.vu.edu.au/research/

For further information please contact Dr Phillip Conder: Email: Phillip.Conder@vu.edu.au

Researcher

BANESH Project

Canberra Research Laboratory

National ICT Australia (NICTA) is Australia's ICT Research Centre of Excellence. NICTA brings together world-class researchers and professional staff to enhance their skills and build a culture of entrepreneurship and achievement in use-inspired research. This will build Australia's ICT capacity into the future.

The BANESH (Body Area Networks of Embedded Systems for Humans) Project, in collaboration with the Australian Institute of Sport, is developing software techniques to improve coaching methods, and provide objective feedback on athlete performance while in the field.

We are seeking a self-motivated engineer to design and test body-area wireless systems operating in the frequency range of 0-6GHz. You will design and develop prototype printed circuit boards (surface mount) for use in close proximity to the human body.

The successful candidate will hold a degree qualification in Telecommunication Engineering, Electrical Engineering or equivalent, and display experience designing baseband wireless communication systems with multi-carrier and/or multi-antenna designs. You will have experience in design and testing of analog and digital circuits, radio frequency design and implementation. You will need to have demonstrated ability to work in a team of researchers and engineers, be goal orientated as well as work independently. A PhD qualification is desirable but not essential.

Applications: Please visit NICTA Careers to view the criteria essential to this role and apply online (http://nicta.com.au/director/careers.cfm)

Closing date: 25 November 2007

Post Doctoral Fellowship - Wireless Communications

The CSIRO Information & communication Technology (ICT) Centre is offering a prestigious Office of the Chief Executive (OCE) Postdoctoral Fellowship (up to 2 positions) in the area of wireless communications in dense networks. This Postdoctoral Fellowship is in support of the ICT Centre's long term research work. In particular, we are seeking a recent PhD graduate who is keen to pursue fundamental research into transmission and access aspects of ad-hoc and dense networks. The role will include propagation channel modelling, calculation of fundamental channel capacities, and derivation of practical performance limits. An important problem will be to develop new signalling schemes which will deliver high data rates, within large scale dense and ad-hoc networks; by leveraging recent advances in `multi-antenna' and `cooperative communication' research (some of which has been done within the ICT Centre).

We are seeking applicants who have earned a recent PhD in Electrical Engineering, Computer Science, Applied Mathematics, or a related discipline which involves research in wireless communications. We are looking for a solid record of publishing in international journals and conferences, and a track record of working both independently and as a member of a research team.

The successful candidate will have strong mathematical analytical abilities in communication systems, and be experienced at writing computer simulations to support their research; being proficient in at least C/C++ and/or Matlab.

Further information http://recruitment.csiro.au/asp/job_details.asp?RefNo=2007%2F1162

Modern Digital Receiver Techniques: From Theory to Practice

18–20 February 2008

Presenters: Prof. Bill Cowley and Dr Mark Reed

Mawson Lakes SA

This 3-day short course will focus on modern receiver design, including signal processing architectures, synchronisation algorithms and the inclusion of iterative (i.e. turbo) decoding methods in receiver processing. We will assume basic knowledge of digital communication techniques and will describe algorithms used for modern modulation, coding and multiple access methods. The course describes the underlying approaches used to realise terrestrial and satellite communications standard such as 3G (UMTS), WiMAX, DVB-S2 etc. It is presented by researchers who have extensive experience in this area, both with a background in theory and practical methods of receiver implementation. During the course attendees will obtain "hands-on" experience in selected areas through MATLAB-based tutorials.

Assumed knowledge: Basic digital signal processing and digital communication systems, Matlab programming.

For further information please contact
Anne-Marie Eliseo
Industry Education Manager
Telephone: +61–8–8302-3928
Email: anne-marie.eliseo@nicta.com.au

Coming Events

16-19 October 2007	ISCIT 2007 - Sydney http://www.elec.ouw.edu.au/ISCIT2007/
18-20 October 2007	APCC 2007 – Bangkok, Thailand http://www.apcc2007.com/
29 October 2007	Applications of EM algorithm for Localization – Adelaide http://www.acorn.net.au/event/emschool07/
29-31 October 2007	MILCOM 2007 – Orlando, Florida http://www.milcom.org/
6-9 November 2007	ACM SenSys 2007 – Sydney http://sensys.acm.org/2007/Home.html
19-21 November 2007	ICON 2007 – Adelaide, South Australia http://www.plevin.com.au/ICON2007/
20-22 November 2007	ACoRN Australian – European Workshop on Modern Coding Techniques for Advanced Communication Networks http://acorn.net.au/event/mctworkshop07/
26-30 November 2007	IEEE GLOBECOM http://www.comsoc.org/confs/globecom/2007/index.html
2-5 December 2007	ATNAC 2007 – NEW ZEALAND http://atnac2007.massey.ac.nz
3-6 December 2007	ISSNIP – Melbourne http://www.issnip.org/2007/index.html
17-19 December 2007	ICSPCS'2007 – Gold Coast Australia http://www.dspcs-witsp.com/icspcs_2007/cfp.html
3-4 January 2008	NetCod 2008 – The Chinese University of Hong Kong http://NetCod2008.ie.cuhk.edu.hk
30 January – 1st February 2008	AusCTW 2008 – New Zealand
18-20 February 2008	Modern Digital Receiver Techniques: From theory to practice- Adelaide http://www.nicta.com.au/business/nicta_short_courses/upcoming_courses/more_info/modern_digital_receiver_techniques_from_theory_to_practice
31 March – 3 April 2008	WCNC 2008 – Las Vegas, Nevada http://www.ieee-wcnc.org/
11-14 May 2008	VTC Spring 2008 – Singapore http://www.ieeevtc.org/vtc2008spring/index.php

For a complete list of coming events and call for papers, see the event calendar.