



ARC Communications Research Network

# Newsletter June 2006

## Convenors Report

A series of events have taken place in Australia since the last newsletter. In particular, the IEEE Vehicular Technology Conference was held in Melbourne in May and was a big success. Congratulations to the General Chair A/Prof. Fu-Chun Zheng from Victoria University and his organising team. ACoRN is proud to have been a sponsor of the event and very satisfied with the excellent exposure provided at the venue and on the back page of the conference program.

Two successful ACoRN events were conducted in connection with the VTC in Melbourne, namely the "Workshop on MIMO – From theory to practise" and the ACoRN/NICTA Wireless Winter School. Both events were heavily attended and received very positive feedback. Congratulations and big ACoRN thanks to Prof. Mike Faulkner for organising the MIMO workshop and to Dr. Mark Reed and Dr Leif Hanlen for, once again, organising the Wireless Winter School. Detailed reports for the ACoRN events are included in the newsletter.

Also congratulations to Matthew McKay for receiving two "best student paper awards" at the IEEE VTC and IEEE ICASSP conferences. ACoRN is particularly thrilled about the prize at ICASSP since the paper in question is the outcome of an ACoRN funded student research visit by Matthew

to University of South Australia. Let this be an inspiration for all ACoRN students to take advantage of the ACoRN student linkage program.

In July, ACoRN is organising the "ACoRN Early Career Researcher Workshop on Wireless Multihop Networking." Dr. Aruna Jayasuriya, Dr. Steven Gordon and Dr. Lavy Libman is organising the event and all ACoRN members are encourage to attend. More details are included in the newsletter. In September the ACoRN-NEWCOM workshop will take place in Vienna. Make sure that ACoRN has a strong presence at the event, as we have a unique opportunity to build up a close collaborative relationship with NEWCOM member organisations.

In November, ACoRN will organise a Spring School in Adelaide featuring Prof Alex Grant, Dr. Sarah Johnson, and Dr. Laura Cottatellucci giving tutorials in coordinated multiuser communications, LDPC coding, and random matrix theory, respectively. More details will appear soon on the ACoRN website. Finally, in December, ACoRN will organise a Workshop on Proposal Writing in Adelaide, intended for early-career researchers. The format of the workshop is still to be finalised, so keep an eye on the ACoRN website for further details.

*Lars K. Rasmussen*  
ACoRN Network Convenor



## News from CSIRO

### CSIRO Profile

The team of researchers and engineers at the CSIRO ICT Centre Wireless Laboratory are concerned with developing enabling technologies for future wireless data communication networks. Primarily we are aiming to enable vastly increased wireless data rates, user mobility, and user densities; to support applications such as high quality video over wireless internet, and advanced wireless sensor networks, amongst others.

The Lab has a number of projects including Adaptive Wireless, mm-Wave Communications, Cognitive Antennas, and mm-Wave imaging. There are over 50 people in the lab, covering all aspects of communication systems, from RF, to Digital design and programming, to signal processing and coding.

In the Adaptive Wireless project we have recently developed a signal processing and hardware demonstrator which has achieved two world firsts in high data rate wireless communications. In May 2006 we demonstrated a data rate of 600 Mbps over 40MHz of bandwidth, using 4 transmit and 4 receive antennas. This corresponds to a spectral efficiency of 15 bits per second, per unit of bandwidth (bps/Hz) – a world first for a 4x4 antenna system. Current single antenna Wi-Fi only achieves 2.7 bps/Hz. The team also successfully demonstrated downstream transmission to 4 spatially separated simultaneous users at 108 Mbps per user, where each user has a single receive antenna. This represents a four-fold increase in network capacity. This transmission is also believed to be a world-first.

The CSIRO team has strong collaborations with a number of other ACoRN members, including The University of Sydney, The University of South Australia, and The University of NSW. With the wide range of skills and capabilities within the Lab, the team is keen to grow its links. For further information, please contact Dr Iain Collings ([iain.collings@csiro.au](mailto:iain.collings@csiro.au)).

### CSIRO Links with Universities

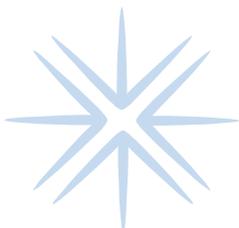
To strengthen CSIRO's links with Universities, they have recently set up agreements with 6 Australian universities, for awarding a large number of CSIRO ICT Centre postgraduate scholarships. The universities were chosen based on their geographical and research focus alignment with the ICT Centre. They are ANU, USyd, UNSW, UTS, UQ and QUT. Already some top-up scholarships have been awarded, including two at the University of Sydney in the area of communications. Congratulations to Allen Chuang and Raymond Louie. The awarding process varies from university to university, and depends on having/developing a project in alignment with CSIRO activities. For more details and assistance with applications, please contact Dr Iain Collings ([iain.collings@csiro.au](mailto:iain.collings@csiro.au)). There are plenty of opportunities to get one of these scholarships.

*Dr Iain Collings*  
CSIRO

### CSIRO Recent Success

Congratulations to the CSIRO Adaptive Wireless team, headed by Dr Iain Collings, which has been selected as a Finalist in the 2006 Engineers Australia "Engineering Excellence Awards". As part of the finalist stage, the team has put together a short (13 min) video outlining the project, which can be viewed by clicking on the following link (you will need RealPlayer, which has a free download at [www.real.com](http://www.real.com)).

<http://www.acorn.net.au/go/csirodvd1>



## ACoRN Member Profile

### Daniel J. Ryan



Daniel J. Ryan was born in Perth, Western Australia, in 1981. He received the B.E. degree with first class honours in Electrical and Electronic Engineering and the B.Sc. degree in Computer Science from the University of Western Australia, Perth, Australia, in 2003. From November 2003 to July 2004 he worked on the CSIRO MIMO Testbed, first as a CSIRO Vacation Scholar and then as an Electrical Engineer at the CSIRO ICT Centre, Sydney.

Since August 2004, he has been working towards the Ph.D. degree in Electrical Engineering from the University of Sydney. He is working under the supervision of Dr Iain Collings of the Wireless Technologies Laboratory, CSIRO ICT Centre, who also holds an honorary Associate Professorship at the University of Sydney. He is co-supervised by Dr Vaughan Clarkson from the University of Queensland. Apart from his base scholarship from Sydney University, his

Ph.D. research is supported by a CSIRO Postgraduate Scholarship and a Norman I. Price Postgraduate Scholarship from the University of Sydney.

Daniel's research has so far focused on the applications of lattices and number theory to communication problems, particularly to the problems of noncoherent sequence detection for fast-fading wireless channels and low peak-to-average multicarrier transmission for DSL. So far Daniel has had two international journal papers published including one in the IEEE Transactions on Information Theory. He has also had six international conference papers appear, including papers at ICASSP and ISIT; the flagship conferences in signal processing and information theory, respectively. Daniel was also recently awarded the "Best Student Poster Prize" for his poster "Noncoherent Lattice Decoding" at AusCTW 2006.

Recently, after presenting a paper at ICASSP in Toulouse, France, Daniel spent three weeks at Northwestern University, Illinois, USA, where he visited Prof. Michael Honig and A/Prof. Dongning Guo. This visit has resulted in a collaboration where they are researching both practical and information-theoretic aspects of limited-rate feedback in MIMO systems. As well as giving a presentation at Northwestern, Daniel made a brief sojourn at the University of Michigan, Ann Arbor where he also gave a presentation under invitation from Prof. Alfred Hero. This trip was partly funded by an ACoRN international conference attendance grant as well as a Postgraduate Research Support Scheme Grant from the University of Sydney. Before the working part of the trip began, Daniel also spent some time cycling and camping in the French Pyrenees.

He has been a reviewer for various IEEE Transactions including Information Theory and Wireless Communications, as well as serving as a reviewer for several international IEEE conferences. He recently served as a Session Chair at the IEEE Vehicular Technology Conference (VTC-Spring 2006) in Melbourne. Daniel is a student member of the IEEE, and is also a member of the IEEE Communications, Information Theory and Signal Processing societies. Daniel is also a member of ACoRN, and has been the recipient of several ACoRN grants.

## ACoRN Workshops

### Early Career Researcher Workshop on Wireless Multihop Networking

**17-18 July 2006**

#### Australian Technology Park, Sydney

The aim of the ACoRN Wireless Multihop Networking workshop is to allow Early Career Researchers in Australia, including postgraduate students, to present and discuss their current research directions in the above areas, identify peers working on similar topics, and facilitate the process of establishing successful collaborations. The workshop will have a single track of 9-12 presentations, with significant time after each presentation for questions, discussions, and uncovering any similarities with other ongoing works. The workshop will also feature keynote talks by senior researchers, a presentation on career development, and a poster session.

All papers will be included in the Proceedings of the workshop, which will be published online on the [ACoRN website](#). A complementary copy of the proceedings on CD-ROM will also be available to the participants.

For more information, visit the workshop website at: <http://www.acorn.net.au/event/ecrworkshop>

### WITSP 2006



The 5th Workshop of the Internet Telecommunications and Signal Processing, WITSP'2006 has been planned by a group of academics will be held in Hobart from 11<sup>th</sup>-13<sup>th</sup> December 2006. The main emphasis is on the use of signal processing as a tool to make the Internet operate better and more efficiently. However, the scope of the papers considered for the Workshop is not limited just to this area. Contributions are also sought from the area of networking, including protocols, security, and applications. In addition, it is expected that, several contributions will be dealing with image, video and audio processing for multimedia, and forensic applications, the security of private and corporate data, and advanced data processing algorithms.

The full Call for papers can be found at:

[http://www.dspsc-witsp.com/WITSP\\_06/WITSP2006.html](http://www.dspsc-witsp.com/WITSP_06/WITSP2006.html)

ACoRN members wishing to attend the workshop can apply for ACoRN conference grants. Any questions concerning WITSP'2006 should be directed to Assoc. Prof. Tad Wysocki at: [chair@dspsc-witsp.com](mailto:chair@dspsc-witsp.com)

### ACoRN-NEWCOM Work- shop

ACoRN has already received and approved funding for research students and researchers to attend the ACoRN NEWCOM conference. ACoRN has committed to fully fund 2 or 3 members from each eligible ACoRN organisation, so it is important that applications are forwarded to the Local ACoRN Representatives as soon as possible.

## Congratulations

### PROFESSOR ARTHUR LOWERY AND ASSOCIATE PROFESSOR JEAN ARMSTRONG



Monash University researchers have scooped the pool of prizes, including the \$100,000 Peter Doherty Prize for Innovation, at the Commercialisation Expo 2006, for their work in faster optical communications.

Professor Arthur Lowery and Associate Professor Jean Armstrong, from the Faculty of Engineering at Monash, have developed the Optical OFDM, which is the optical equivalent of ADSL. ADSL allows faster communication along telephone lines. Optical OFDM uses similar technology to speed up communications along optical fibres and infrared wireless systems.

The technology enables existing fibres to carry four times the data over longer distances without the need for modification or new infrastructure, making internet applications on existing lines much faster.

The Peter Doherty prize recognized the Optical OFDM technology as the most outstanding commercialisation opportunity submitted to the Commercialisation Expo 2006. The expo is being held in Melbourne from 18-20 June. Additionally, Professor Lowery and Dr Armstrong were awarded the sectoral \$20,000 ICT prize and the \$US4000 ANZA Technology Network Award.

<http://www.monash.edu.au/news/newsline/story/913>

### ABBAS JAMALIPOUR



The IEE Communications Society awarded the 2006 Best Tutorial Paper Award to Abbas Jamalipour, for his paper "A Tutorial on Multiple Access Technologies for Beyond 3G Mobile Networks"

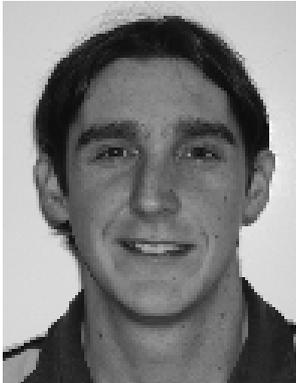
**ABBAS JAMALIPOUR** is running for office in the IEEE ComSoc society. To promote the voice of Australian research we should try to encourage the Australian ComSoc members to support him.

**Biography:** Abbas Jamalipour has been on the faculty of Sydney University, Australia since 1998. He holds a PhD from Nagoya University, Japan. He is the author for the first book on wireless IP and two other books, and has co-authored five books and over 150 journal and conference papers. Professor Jamalipour is the Editor-in-Chief IEEE Wireless Communications, a ComSoc Distinguished Lecturer, and a Fellow Member of IEAust. He has been very active within the ComSoc, currently serving as the Satellite and Space Communications TC Chair; Communications Switching and Routing TC Vice Chair; and AP Board, Coordinating Committee Chapter Vice Chair. He is a Technical Editor of the Communications Magazines and a voting member of GITC. He has been a Vice Chair of WCNC2003-2006, Chair of GLOBECOM2005 (Wireless Communications), and a symposium Co-Chair at ICC2005-2007, and GLOBECOM2006.

Abbas is also on the Executive Board of ACoRN.

## Congratulations (Ctd)

### Matthew McKay



Congratulations to Matthew McKay who won two Best Student Paper prizes at recent conferences. The first was at the IEEE International Vehicular Technology Conference (VTC) in Melbourne, where he shared the prize with his student-co-author from the University of Texas at Austin, for the paper:

A. Forenza, M.R. McKay, I.B. Collings and R.W. Heath, "Switching Between OSTBC and Spatial Multiplexing with Linear Receivers in Spatially Correlated MIMO Channels", in the Proc. of the IEEE Int. Vehicular Technology Conf. (VTC) - Spring, Melbourne, Australia, May 2006.

Matthew's second Best Student Paper prize came at the IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP), in Toulouse, France, for his paper:

M.R. McKay, A.J. Grant and I.B. Collings, "Largest Eigenvalue Statistics of Double-Correlated Complex Wishart Matrices and MIMO-MRC", in the Proc. of the IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP), Toulouse, France, May 2006.

Well done Matthew.

## Local Representatives

Many of the Local ACoRN Representatives met in Melbourne for informal discussions. Lars gave a presentation on events in 2005, and new initiatives for 2006.

The Local ACoRN Representatives discussed how ACoRN was received at their organisations, feedback from funded visits, how funding should be allocated, the ACoRN newsletter and how we could increase student mobility. Several new initiatives will be tried as a result of discussions.

Please ensure that you talk to your Local ACoRN Representative about any new ideas you have to increase collaboration between researchers.



## ACoRN Student linkage program

ACoRN is committed to facilitate and encourage student mobility. To assist in linking students with supervisors researching in similar fields ACoRN has compiled a list of supervisors and organisations that are available to host a student visit.

On the ACoRN website there is a list of potential host supervisors and their areas of expertise.

<http://www.acorn.net.au/membersonly/studentlinkage.cfm>

To register your interest in visiting one of these supervisors, simply fill out the [Student Linkage Expression of Interest](#). Your details will be collated by ACoRN and forwarded to the supervisor. Please ensure that you discuss the visit with your own supervisor before you contact ACoRN.

## Workshop Reports

### ACoRN/NICTA Wireless Winter School

The second Wireless Winter School, held at Victoria university in Melbourne, May 11-12, 2006 was timed to coincide with the Vehicular Technology Conference. The two-day school was open to postgraduate students, researchers and industry. The presenters were international experts and leaders in wireless communications, made available through co-ordinating with VTC participants: of the seven presenters, six were from overseas institutions. The school had over 30 student participant. Many of the students took advantage of Acorn sponsorship which assisted them in also attending the Vehicular Technology Conference, and a number of students visited local academics in addition to the conference and school.

The school opened with Prof. Fumiyuki Adachi, presenting work on wireless standards, with implications for future research topics. Prof Adachi was followed by Prof. Alister Burr, and Lajos Hanzo. Prof. Hanzo also provided an informal opportunity for students to discuss their own research topics, in the presence of senior academics – an opportunity not often available to research students. Students were encouraged to visit presenters in any overseas travel they undertook. The second day included Geoffrey Li, Vaughan Clarkson, Robert Heath Jr. and Antonio Foreza.

The school was sponsored by National ICT Australia and The Australian Communication Research Network. We thank the sponsors, without whom the school would not have been possible.

The school was an excellent opportunity for students, as a means to learn more about the leading-edge wireless research, as an informal method of accessing leading researchers and also as a mechanism to facilities further networking. We thank the participants for their extremely positive feedback.

Leif Hanlen and Mark Reed,



### MIMO Workshop 2006

The ACoRN MIMO workshop held in Melbourne over two days (4-5 May 2006) was successful with more than 50 participants attending from across Australia and overseas. By taking advantage of the VTC Spring 2006 conference held in Melbourne, a number of established researchers were invited to talk at the workshop. The workshop comprised of a total of seven presentations from industry and university representatives which included Prof. Geoffrey Li, Prof. Rodney Vaughan, Dr. Kishore Mehrotra, James Dowle, Dr. Thomas Haustein, Dr. Sumei Sun, A/Prof. Iain Collings and Prof. Michael Faulkner.

On each day of the workshop, MIMO-OFDM testbeds were presented by Dr. Scott Leyonhjelm (Victoria University) and Hajime Suzuki (CSIRO) which provided a fine balance between theory and practice.



Lin Lou from NICTA Canberra enjoying the Melbourne sights whilst at the VTC06 and ACoRN Winter Wireless School

## Call for Papers

Due Date	Event Name
16 June 2006	2006 IEEE Information Theory Workshop <a href="http://sist.swjtu.edu.cn/imc/itw06/">http://sist.swjtu.edu.cn/imc/itw06/</a>
17 June 2006	Information, Decision & Control <a href="http://www.plevin.com.au/idc2007">www.plevin.com.au/idc2007</a>
30 July 2006	WITSP'06 <a href="http://www.dspsc-witsp.com/WITSP_06/WITSP2006.html">http://www.dspsc-witsp.com/WITSP_06/WITSP2006.html</a>
15 Sept 2006	IEEE International Conference on Communications - Glasgow, Scotland, (ICC2007)
20 September 2006	IEEE Wireless Communications and Networking Conference (WCNC 2007) <a href="http://www.ieee-wcnc.org">http://www.ieee-wcnc.org</a>

## Coming Events

Event Date	Event Name
10-13 July 2006	ACoFT Melbourne <a href="http://www.acoft.com.au/">http://www.acoft.com.au/</a>
9-14 July 2006	ISIT 2006, Seattle <a href="http://www.isit2006.org/">http://www.isit2006.org/</a>
17-18 July 2006	ACoRN ECR Workshop on Wireless Multihop Networking – Sydney <a href="http://www.acorn.net.au/event/ecrworkshop/">http://www.acorn.net.au/event/ecrworkshop/</a>
7-9 Aug 2006	QShine 2006 –Canada <a href="http://www.qshine.org/workshops.html">http://www.qshine.org/workshops.html</a>
11-14 Sept 2006	PIMRC 06 - Finland <a href="http://www.pimrc2006.org/">http://www.pimrc2006.org/</a>
20-22 Sept 06	ACoRN NEWCOM Workshop – Vienna <a href="http://www.newcom-acorn.org/">http://www.newcom-acorn.org/</a>
October 9-12, 2006	ACE/NEWCOM Autumn School Space-Time Coding - Turin, Italy <a href="http://www.comelec.enst.fr/~ciblat/stbc_school/">http://www.comelec.enst.fr/~ciblat/stbc_school/</a>
11-13 Dec 2006	WITSP06 Hobart, Aust. <a href="http://www.dspsc-witsp.com/WITSP_06/WITSP2006.html">http://www.dspsc-witsp.com/WITSP_06/WITSP2006.html</a>
12-14 February 2007	Information, Decision and Control 2007 – Adelaide <a href="http://www.plevin.com.au/idc2007">www.plevin.com.au/idc2007</a>
11–15 March 2007	IEEE Wireless Communications and Networking Conference (WCNC 2007) - Hong Kong <a href="http://www.ieee-wcnc.org">http://www.ieee-wcnc.org</a>

