Appendix 1

SELF-EVALUATION REPORT
(5 YEAR)

Centre of Excellence in Telecommunications

DIRECTOR: Branka Vucetic

DATE: 9/7/2015
1. Aims and Objectives


The aims of The Centre in the previous five year period were:
(1) to carry out world class research in wireless communications and networking; (2) to disseminate research output in premier international journals and conferences; (3) to establish a collaboration program with industry and world leading research institutions and (4) to produce world class graduates in the field of wireless communication and networking.

Academic Staff:
- Prof Branka Vucetic, Fellow IEEE, Fellow IEAust (Centre Director)
- Prof Abbas Jamalipour, Fellow IEEE, Fellow IEICE, Fellow IEAust (Centre Deputy Director)
- A/Prof. Yonghui Li, Associate Professor, ARC Future Fellow
- Dr Zihuai Lin, Lecturer
- Dr Wibowo Hardjawana, Lecturer and DECRA Fellow

Research Staff
- Dr Zhendong Zhou, Part Time Research Fellow
- Mr Obada Al-Khatib, Research Associate
- Mr He Chen, Research Fellow

2. Achievements

The Centre has been very successful in attracting national/international competitive research grants and publishing high quality journal papers. It has also been very active in collaborations with world leading research institutions, including King’s College London, University of Texas Austin, University of British Columbia, Southampton University, Tokyo Institute of Technology, Peking University, Harbin Institute of Technology, Chinese Academy of Sciences, Beihang University, Tohoku University, Northeastern University China, etc. There has been a strong program of collaboration with industry, with both national and international partners, including Energy Australia (Ausgrid), Huawei and ZTE.

Postgraduate Research Completion:
In the past five years, 26 PhD and 5 MPhil students at The Centre successfully completed their research candidatures, as shown in the list below. Majority of graduates have found employment in large companies and universities in Australia and around the world.

1. Bahareh Nazari, PhD, Completed 2015
2. Robert Webster, MPhil, Completed 2014
3. Smitha Shivshankar, PhD, Completed 2014
4. Saber Jafarizadeh, PhD, Completed 2014
5. Md Tanvir Hoque, MPhil, Completed 2014
6. Nusrat Ahmed Surobhi, PhD, Completed 2014
7. Md. Farhad Hossain, PhD, Completed 2013
8. Pat Taweewat, PhD, Completed 2013
9. Nejla Ghaboosi, PhD, Completed 2012
10. Tadeusz Wysocki, PhD, Completed 2011
11. Mu Qi, MER, Completed 2011
12. Fan Bai, PhD, Completed 2011
13. Fazirulhisyam Hashim, PhD, Completed 2010
14. Farshad Javadi, PhD, Completed 2010
15. Yazhou Ma, PhD, Completed 2010
16. He Chen, PhD, Completed 2015
17. Mahyar Shirvanimoghaddam, PhD, Completed 2014
18. Yuanyuan Wang, expected 2015
19. Manli Qian, Joint PhD w. ICT/CAS, Completed 2014
20. Siavash Bayat, PhD, Completed 2012
21. Shahriar Rahman, PhD, Completed 2013
22. Shuang Tian, PhD, Completed 2013
23. Qimin You, PhD, Completed 2013
24. Raed Manna, PhD, Completed 2013
25. Bin Guo, MSc, Completed 2010
26. Raymond Louie, PhD, Completed 2010
27. Xinyi Li, MSc, Completed 2010
28. Kun Pang, PhD, UPA scholarship, Completed 2013
29. Qiong Zhao, PhD, Completed 2013
30. Kolyan Taev, PhD, Completed 2014
16. Obada Al-Khatib, PhD, Completed 2015

Research Publications
The Centre has produced significant research and professional outputs in terms of publications in high quality top-ranked journals and conferences. The following list shows The Centre’s 109 journal publications since 2010. There were also 150 conference papers presented at premier international conferences since 2010, which are not shown here due to limited space. During the same period, The Centre has published two books, 6 book chapters, and applied for 3 patents.
Wireless Networking Area:

1. A. Al-Hourani, S. Kandeepan, and A. Jamalipour, “Stochastic geometry study on device to device communication as a disaster relief solution,” IEEE Transactions on Vehicular Technology (accepted 21/6/15).


26. Q. Song, Z. Ning, S. Wang, and A. Jamalipour, “Link stability estimation based on link connectivity changes in...


Wireless Communications Area:


pp. 764-777.


Competitive Research Grants – 33 awarded for a total of AUD$8,184,383
- Y. Li, B. Vucetic, and P. Wang, “Agile and efficient machine to machine communication systems,” ARC Linkage Grant, 2015-2018, $520,000, ($360,000 from ARC, $160,000 from Industry partner).
- Y. Li and B. Vucetic, EIE Internal Grant and Faculty of Engineering and IT Major Equipment Scheme 2015, General Reconfigurable Multi-Cell Multiple-Antennas Wireless Open-Access Research Platform, $107,250
- B. Vucetic and W. Hardjawana, Design of transceivers and power allocation schemes for massive MIMO systems, Sydney University Bridging Grant, 2014, 30,000.
- Z. Lin, Inter-cell interference elimination for future heterogeneous networks, Faculty of Engineering and IT Early Career Researcher and Newly Appointed Staff Development Scheme, University of Sydney, 2014. Amount granted: 42,000AUD.
- X. Wei and Z. Lin, Enabling green wireless multimedia communications for the next generation mobile internet through Australia-Korea Collaborative Research, Australia-Korea Foundation, Department of Foreign Affairs and Trade (DFAT), 2013-2014. Amount granted: 15,000 AUD.
- Y. Li, Wide area massive access for machine to machine communications, the University of Sydney bridging support grant, $30,000, 2014.
- Y. Li, Channel Code Design for Physical-Layer Network Coding Systems, The University of Sydney International Visiting Fellowship, $15,500, 2014
- Y. Li, Gigabit Wireless Multiple Access at E-band, ARC Discovery Project, 2012-2014, $330,000.
- Guoqiang Mao and Wei Zhang, Large-scale highly dynamic wireless networks: architecture and communication strategies design, ARC Discovery, $300,000, 2012-2014
- Dylan Lu and Yonghui Li, New Generation of Power Electronics Interface for Smart Metering, the Australian Strategic Technology Program, $50,000, 2013-2014.
- A. Jamalipour, Wireless Distributed Networks, Univ. of Sydney Bridging Support Grant, 2013
- V. Agelidis, B. Vucetic and Y. Li, An intelligent integrated energy communication system, $960,000, 2009-2013.
- Brian DO Anderson, Changbin Yu and Guoqiang Mao, Spatially distributed complex multiagent systems, ARC Discovery Project, $600,000, 2011-2015.
- Guoqiang Mao, Distributed Control and Estimation in Networked Environments, National ICT Australia (NICTA) - Defence Science and Technology Organization (DSTO) joint project award, $346,737, 2012-2014
- Yonghui Li, CSIRO OCE PhD Scholarship, Cognitive Radio Techniques in Multi-hop Wireless Broadband Services, $75,000, 2009-2012.
- Branka Vucetic, Dr Yonghui Li, Dr Mischa Dohler, Dynamic Spectrum Access in Multi-Hop Wireless Broadband Networks, ARC Discovery grant, $953,000, 2008-2012.
- Branka Vucetic and Zhendong Zhou, Network code division multiplexing in multi-system wireless networks, ARC Discovery Project 2010-2012, $360,000.
- Yonghui Li, Efficient Distributed Coding in Wireless Networks, ARC Discovery Project, $200,000, 2009-2011.
- D. Lu, D. Hill, B. Vucetic, A Modular Wireless Communication System for a Micro-Power Grid, MESS Sydney University, $35,000, EnergyAustralia, $50,000.
- Brian D. O. Anderson, Guoqiang Mao, Baris Fidan, and Changbin Yu, Coordination, Control, Localization and Health Characterization of Autonomous Multi-Agent Swarms, National ICT Australia (NICTA) - Defence Science and Technology Office Research (DSTO) joint project award, $1,239,000, 2008-2011.

International Collaborations, Student Exchange, Visiting Scholars and Industry Collaboration
The Centre focuses on international collaborations with leading universities and companies around the world. Since 2010, we have had more than 20 PhD exchange programs with the world leading universities, such as Peking University (China), Harbin Institute of Technology (China), Hong Kong Polytechnic University, Federal University of Santa Catarina (Brazil), BUAA, universities of Innsbruck (Austria), Ecole Polytechnique of Montreal (Canada), West Virginia University (USA), and University of British Columbia (Canada). During the same period we also hosted more than 40 visiting scholars from top universities including Harvard, Toulouse, Tohoku universities, Rensselaer Polytechnic Institute, Harbin Institute of Technology, Tokyo Institute of Technology, Hong Kong Chinese University of Hong Kong, Southampton University, Chinese Academy of Science, etc. An extensive collaboration program with Australian and global communication industry has been developed with four Linkage and one directly funded industry grant.

International Conference and Journal Special Issue Organisation
The Centre organized or hosted many major international conferences in Sydney and Australia since 2010, including the followings:
- 22nd International Conference on Telecommunications (ICT2015), Sydney, Australia (Centre’s staff were General Chair and Technical Program chairs)
- International Conferences on Signal Processing and Communication Systems (ICSPCS2014), Gold Coast, Australia (General Chair-Jamalipour)
- IEEE International Conference on Communications (ICC 2014), Sydney, Australia (Technical Program Chair-Jamalipour)
- IEEE/CIC International Conference on Communications in China (ICCC2013), Xi’an, China (General Chair-Jamalipour)
- IEEE 23rd International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC 2012), Sydney, Australia (Technical Program Chair-Jamalipour)
- Australasian Telecommunication Networks and Applications Conference (ATNAC2011), Melbourne, Australia (General Co-chair-Jamalipour)
- IEEE Wireless Communications and Networking Conference (WCNC2010), Sydney, Australia (General Chair-Jamalipour)
- International Conference on Telecommunications ICT’2014 Co-Chair
- TPC co-chair, Smart grid for smart city (SGSC 2015), Toronto Canada 2015

During the same period, we have organized 12 special issues in major journals including Proceedings of the IEEE, IEEE Communications, IEEE Transactions on Smart Grid, IEEE Vehicular Technology Magazine, and IEEE Transactions on Emerging Topics in Computing, IEEE Journal of Selected Topics in Signal Processing, and IEEE Network Magazine.

International Awards and Positions (Prof Branka Vucetic)
- Prof B. Vucetic, Member of the IEEE Communications Society Awards Committee
- Prof B. Vucetic, Visiting Professor at the Chinese Academy of Sciences, Beijing, Beijing University of Aeronautics and Astronautics and Beijing University of Post and Telecommunications
- Prof B. Vucetic, Visiting Professor at the Fujian University of Technology
Prof Vucetic, Member of the Monitoring & Assessment Panel for the Institute of Network Coding, Hong Kong
Prof Vucetic, A/Prof. Yonghui Li, 2014 IEEE ICC best paper award, "Millimeter Wave Wireless Transmission at E-band Channels with Uniform Linear Antenna Arrays: Beyond the Rayleigh Distance", Sydney, June 10-15th
Prof Vucetic, 2012 IEEE ICC best paper award (with Z. Zhou and K. Teav)
Prof Vucetic, Member of the Australian Academy of Science, National Committee for ICS
Prof Vucetic, Hong Kong Research Grant Council External Assessor
Prof Vucetic served as the Laureate Fellows Assessor
Prof Vucetic served as ARC EMI College of Expert Panel member (2011-2013)
Prof Vucetic served as City University Hong Kong Research Committee External Assessor
Prof Vucetic is a University Grants Committee project reviewer, Hong Kong

International Awards and Positions (Prof A Jamalipour)
- Research Advisor, The National Information & Communication Technology, NICT, Japan
- Adjunct Professor, University of Canberra, Australia
- Board of Governor Member, IEEE Vehicular Technology Society (2014-16)
- Visiting Professor, Nankai University, China
- Visiting Professor, Nanjing University of Post and Telecommunications, China
- Vice President – Conferences, IEEE Communications Society (2012-13)
- Visiting Professor, University of Newcastle, Upon Tyne, United Kingdom
- Visiting Professor, RIEC, Tohoku University, Japan
- Designated Professor, Niigata University, Japan
- Best Paper Award, IEEE International Conference on Communications in China (ICCC2012), 2012
- Best Paper Award, IEEE Wireless Communications and Networking Conference (WCNC2011), 2011
- Top Associate Editor, IEEE Transactions on Vehicular Technology, 2010, 2011
- Best Editor Award, ETRI Journal, 2010
- IEEE Communications Society Harold Sobol Award for Exemplary Service to Meetings & Conferences, 2010
- Distinguished Visiting Fellowship, The Royal Academy of Engineering, UK, 2010
- Vice-Chancellor’s Award for Systems that Achieve Collective Excellence, Univ. of Sydney, 2010
- IEICE Fellow (For contributions to design and development of mobile wireless communications networks), 2010

International Awards and Positions (A/Prof Yonghui Li)
- IEEE Wireless Days Conferences (WD) best paper award, November 2014, Rio de Janeiro, Brazil
- IEEE International Conference on Communications (ICC) best paper award (top 1%) 2014
- INFOCOM 2014 best student poster paper finalist
- Being nominated twice for IEEE Transactions on Wireless Communications Marconi Best Journal Paper Award.
- Australian ARC Future Fellow, 2012
- Visiting Professor, Beijing University of Post and Telecommunications (2015)

3. Financial statement
The Centre has been funded through research grants as shown above. There is no other separate funding/account.

4. Five-year plan
For the next five years we plan to continue with advanced research and development in the area of wireless communications and networking, continue to grow the number of students and research funding. In particular, we will focus on developing new models, algorithms and technologies for the next generation of wireless cellular networks 5G. We will investigate the use of waveforms, signal processing and multiple antennas to improve spectral efficiency in 5G. Efficient use of the overall radio spectrum will be addressed with software defined networking and network virtualization.

Recently, we started research in a new areas of wireless networks for the Internet of Things and quantum coding and communications. We are applying for an ARC Centre of Excellence in Energy Internet, together with the EIE Centre of Power Engineering and several other research partners from Australia and overseas. This is a multidisciplinary research program, where one of the main research directions is development of wireless cellular networks for the Internet of Things. We are already engaged in multidisciplinary research on wireless sensor networks with the School of Chemistry and we plan to apply for industry grants in multidisciplinary research on quantum computing and communications with the School of Physics. In addition, we plan to extend our collaborations with major universities in Australia and overseas through joint research projects, joint postgraduate research supervision, and short-term visits.