

# Resume

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## Career Objectives

To gain a researching and teaching position at a major research university, where my research experience in spatial audio/array signal processing will add value to the organization.

## Education

- ◇ **PhD in Electrical Engineering**, The Australian National University, Canberra, Australia.  
Thesis: *“Measurement and modelling of Head-Related Transfer Function for spatial audio synthesis”*, 2010.
- ◇ **ME in Electrical Engineering**, First-Class Honours (GPA: 86.4/100), The Australian National University, Canberra, Australia.  
Thesis: *“Space-frequency channel characterization of ultra-wideband wireless communications”*, 2005.
- ◇ **BE in Telecommunication Engineering**, First-Class Honours (GPA: 89.7/100), Xidian University, Xi'an, China, 2003.

## Highlights

- ◇ **20 Peer-reviewed Publications** (including 5 published journal articles, 2 in press journal papers and 11 international conference papers)+ 2 submitted journal papers.
- ◇ **The Student Travel Grant (U\$500) Awarded by IEEE Signal Processing Society** to attend 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) for the high quality of the paper.
- ◇ **International Collaboration** with A/Prof. Ramani Duraiswami from University of Maryland, College Park, USA and Prof. Walter Kellermann from University of Erlangen-Nuremberg, Germany.
- ◇ **Lecture and HDR Student Supervisor**, College of Engineering and Computer Science, ANU, 2012-present.

## Research Interests

General: Arrayl Signal Processing, Spatial Audio and Acoustic Signal Processing, Physical Layer Aspects of Telecommunications.

Detailed: HRTF (Head-Related Transfer Function) Measurement and Modelling, Spatial Audio, Virtual Acoustics and Surround Sound Systems, Source Localization and Separation, Sphere Signal Processing, Signal Extrapolation, Channel Modelling of Wireless Communication Systems,.

## Professional Skills

- ◇ Six-year research experience in spatial audio and array signal processing.
- ◇ Demonstrated ability in wave-equation based computational modelling and spatial-frequency & spatial-temporal data analysis.
- ◇ Practical experience on acoustic experimentation, i.e., dummy head recording and underwater bubble acoustic experimentation.
- ◇ Teaching and high degree research (HDR) student supervision experience.
- ◇ Exceptional written and oral communication skills with ability to develop excellent interpersonal relationships and achieve collaborative team performance.

## Positions

### ◇ **Research Fellow (Apr. 2012-present)**

*College of Engineering and Computer Science, The Australian National University, Canberra, Australia*

Responsibilities:

- Work on ARC project of robust signal processing theory for synthesis and analysis of spatial wavefields.
- Teaching of undergraduate course, ENGN 4537/6537 Discrete-time Signal Processing.
- Supervising of honours students and graduate research students.
- Prepare grant applications and write journal/conference papers.

### ◇ **OCE Postdoctoral Fellowship (Feb. 2010-Mar. 2012)**

*CSIRO Process Science and Engineering Division, Lucas Heights Science and Technology Centre, NSW, Australia*

Responsibilities:

- Conduct in-depth feasibility and analysis of acoustic emission/ultrasound based process monitoring techniques.
- Design, conduct experiments and data analysis on projects to investigate acoustics of bubbles and particles in fluids.
- Write technical reports, journal papers and conference presentations.
- Preparation of grant applications from internal and external agencies.

◇ **PhD Scholar (March 2006-Feb.2010)**

*College of Engineering and Computer Science, The Australian National University, Canberra, Australia*

Responsibilities:

- Model-based Head-Related Transfer Function modelling for spatial audio synthesis.
- Hardware implementation of acoustic measurement algorithms on NI data acquisition card and PC sound card for dummy head HRTF recording.
- Tutor/Lab demonstrator and honours student supervisor.
- Prepare grant applications and journal papers.

## Awards, Grants and Scholarships

- ◇ **2008 IEEE ICASSP Student Travel Grant**, 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), “*Iterative extrapolation algorithm for data reconstruction over sphere*”, awarded the student travel grant (U\$500) for the high quality of the paper.
- ◇ **Australian National University PhD Scholarship**, ANU, 2006-2009.
- ◇ **Australian National University-National ICT Australia Ltd Supplementary Scholarship**, ANU-NICTA, 2006-2009.
- ◇ **Travel Grant**, ANU Vice-Chancellor’s Higher Degree Research Travel Grant (A\$5500) + ACoRN International Attendance and Visit Grant (A\$4000), to attend 2008 IEEE ICASSP (Las Vegas, USA) and visit A/Prof. Ramani Duraiswami at the Perceptual Interfaces and Reality Laboratory, UMIACS, University of Maryland (College Park, USA), Apr. 2008.
- ◇ **Travel Grant**, ANU Vice-Chancellor’s Higher Degree Research Travel Grant (A\$1000) + ACoRN International Attendance and Visit Grant (A\$6000), to attend the 31 Audio Engineering Society conference (London, UK) and visit Dr. Mark Poletti at Gracefield Research Centre, Industrial Research Limited (Lower Hutt, New Zealand), June-July 2007.
- ◇ **Travel Grant**, ACoRN Domestic Attendance Grant (A\$1500), to attend 2006 Australian Communication Theory Workshop (AusCTW), Adelaide, Jan. 2006.
- ◇ **Chancellor’s letter of Commendation**, ANU, 2004-2005.
- ◇ **Third Prize in National Mathematical Contest**, China, 2002.

## Talks and Seminars

- ◇ **Seminar**, “*Acoustics of Bubbles and Particles in Fluids*”, Research School of Engineering, ANU, Apr. 2012.
- ◇ **Paper Presentation**, “*On measurement of bubble solids mass loading: an acoustic technique*”, at Flotation’11, Cape Town, South Africa, Nov. 2011.
- ◇ **Paper Presentation**, “*Modal expansion of HRTFs: Continuous representation in frequency-range-angle*”, at 2009 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Taipei, Taiwan, Apr. 2009.

- ◇ **Seminar**, “*Modal expansion of HRTFs: Continuous representation in frequency-range-angle*”, RSISE, ANU, Mar. 2009.
- ◇ **Seminar**, “*Modal analysis and synthesis of the Head-Related Transfer Function*”, Perceptual Interfaces and Reality Laboratory, University of Maryland, College Park, USA, Apr. 2008.
- ◇ **Paper Presentation**, “*Iterative extrapolation algorithm for data reconstruction over sphere*”, at 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Las Vegas, USA, Apr. 2008.
- ◇ **Seminar**, “*Horizontal plane HRTF reproduction using continuous Fourier-Bessel functions*”, Gracefield Research Centre, Industrial Research Limited, Lower Hutt, New Zealand, July 2007.
- ◇ **Paper Presentation**, “*Horizontal plane HRTF reproduction using continuous Fourier-Bessel functions*”, at the 31st Audio Engineering Society (AES) international conference on “New directions in high resolution audio”, London, UK, June 2007.
- ◇ **Seminar**, “*Continuous functional representation of Head-Related Transfer Function*”, Canberra Research Lab, National ICT Australia, Canberra, Australia, Dec. 2006.

## Professional Activities

- ◇ Editorial board member, Science Journal of Circuits, Systems and Signal Processing, 2013-present.
- ◇ Affiliate member, IEEE Signal Processing Society Sensor Array and Multichannel Technical Committee, 2013-present.
- ◇ Member, Institute of Electrical & Electronics Engineers (IEEE), 2010-Present.
- ◇ Member, Journal of the Acoustical Society of America (JASA), 2010-Present.
- ◇ Student Member, IEEE and JASA, 2007-2009.
- ◇ Member of ARC Communication Research Network (ACoRN), 2006-present.
- ◇ Reviewer of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2013.
- ◇ Reviewer of IEEE Antennas and Wireless Propagation Letters, 2012.
- ◇ Reviewer of European Signal Processing Conference (EUSIPCO), 2012.
- ◇ Reviewer of IEEE Vehicular Technology Conference (VTC)-Spring, 2010.
- ◇ Reviewer of EURASIP Journal on Advances in Signal Processing, 2009.
- ◇ Reviewer of Acoustics Australia, 2009.
- ◇ Reviewer of IEEE Transaction on Vehicular Technology, 2006-2007.
- ◇ Reviewer of Australian Communications Theory Workshop (AusCTW), 2005,2009,2013.
- ◇ Visit to A/Prof. Ramani Duraiswami at Perceptual Interfaces and Reality Laboratory, UMI-ACS, University of Maryland, College Park, USA, Apr. 2008.

- ◇ Visit to Dr. Mark Poletti at Gracefield Research Centre, Industrial Research Limited, Lower Hutt, New Zealand, July 2007.

## Teaching and Supervision Experience

- ◇ **Training**, Foundation of University Teaching and Learning, Centre for Higher Education, Learning and Teaching, ANU, Oct.-Nov. 2012.
- ◇ **Training**, The Graduate Teaching Programme, Research Student Development Centre, ANU, June-Oct. 2006.
- ◇ **Lecturer**, CECS, ANU, Discrete-time Signal Processing (ENGN 4537/6537) , Feb-Jun. 2013.
- ◇ **HDR Student Supervision**, Mr. Dumidu Talagala, PhD (co-supervisor), Source Localization, ANU, 2012.
- ◇ **HDR Student Supervision**, Mr. Xiang Wu, MPhil (main supervisor), HRTF based Speech Source Separation and Localization, ANU, 2013.

## Publications

- [J1] W. Zhang, M. Zhang, R.A. Kennedy and T.D. Abhayapala, “On high resolution head-related transfer function measurements: An efficient sampling scheme”, in *IEEE Trans. Audio, Speech, and Language Processing*, vol. 20, no. 2, pp. 575-584, Feb. 2012.
- [J2] W. Zhang, T.D. Abhayapala, R.A. Kennedy, and R. Duraiswami, “Insights into head-related transfer function: Spatial dimensionality and continuous representations”, in *Journal of the Acoustical Society of America*, vol. 127, no. 4, pp. 2347-57, Apr. 2010.
- [J3] W. Zhang, R.A. Kennedy, and T.D. Abhayapala, “Efficient continuous HRTF model using data independent basis functions: Experimentally guided approach”, in *IEEE Trans. Audio, Speech, and Language Processing*, vol. 17, no. 4, pp. 819-829, May 2009.
- [J4] W. Zhang, S.J. Spencer, and P. Coghill, “An acoustic technique for measurement of bubble solids mass loading (a) Fundamental study of single bubble”, *Minerals Engineering*, vol. 36-38, pp. 45-52, Oct. 2012.
- [J5] S.J. Spencer, R. Bruniges, G. Roberts<sup>1</sup>, V. Sharp, A. Catanzano, W.J. Bruckard, K.J. Davey and W. Zhang, “An acoustic technique for measurement of bubble solids mass loading (b) Monitoring of Jameson Cell flotation performance by passive acoustic emissions”, *Minerals Engineering*, vol. 36-38, pp. 21-30, Oct. 2012.
- [J6] W. Zhang, S.J. Spencer, and P. Coghill, “Characterisation of acoustic emissions resulting from particle collision with a stationary bubble”, to appear in *Journal of the Acoustical Society of America*.
- [J7] D. Talagala, W. Zhang, and T.D. Abhayapala, “Broadband DOA estimation using sensor arrays on complex-shaped rigid bodies”, to appear in *IEEE Trans. Audio, Speech, and Language Processing*.
- [J8] W. Zhang, and T.D. Abhayapala, “Three dimensional sound field reproduction using multiple circular loudspeaker arrays: Functional analysis guided approach”, submitted to *IEEE Trans. Audio, Speech, and Language Processing*, Feb. 2013.

- [J9] D. Talagala, W. Zhang, and T.D. Abhayapala, "Multi-Channel adaptive room equalization and echo suppression in soundfield reproduction", submitted to *IEEE Trans. Audio, Speech, and Language Processing*, Feb. 2013.
- [C1] D. Talagala, W. Zhang, and T.D. Abhayapala, "Active Acoustic Echo Cancellation in spatial soundfield reproduction", accepted by *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Vancouver, Canada, 2013.
- [C2] M. Zhang, R.A. Kennedy, T.D. Abhayapala, and W. Zhang, "Statistical method to identify key anthropometric parameters in HRTF individualization", in *Proc. the 3rd Joint Workshop on Hands-free Speech Communication and Microphone Arrays (HSCMA'11)*, Edinburgh, UK, May 2011, pp. 213-218.
- [C3] M. Zhang, R.A. Kennedy, T.D. Abhayapala, and W. Zhang, "Internal structure identification of random process using principal component analysis", in *Proc. the 4th International Conference on Signal Processing and Communication Systems (ICSPCS'2010)*, Gold Coast, Australia, Dec. 2010, pp. 6 pages.
- [C4] M. Zhang, W. Zhang, R.A. Kennedy, and T.D. Abhayapala, "HRTF measurement on KEMAR manikin", in *Proc. ACOUSTICS 2009 (Australian Acoustical Society)*, Adelaide, Australia, Nov. 2009, pp. 8 pages.
- [C5] W. Zhang, T.D. Abhayapala, R.A. Kennedy, and R. Duraiswami, "Modal expansion of HRTFs: Continuous representation in frequency-range-angle", in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Taipei, Taiwan, Apr. 2009, pp. 285-288.
- [C6] R.A. Kennedy, W. Zhang, and T.D. Abhayapala, "Spherical harmonic analysis and model-limited extrapolation on the sphere: Integral equation formulation", in *Proc. the 2nd International Conference on Signal Processing and Communication Systems (ICSPCS'2008)*, Gold Coast, Australia, Dec. 2008, pp. 6 pages.
- [C7] W. Zhang, R.A. Kennedy, and T.D. Abhayapala, "Iterative extrapolation algorithm for data reconstruction over sphere", in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Las Vegas, USA, Apr. 2008, pp. 3733-3736.
- [C8] W. Zhang, R.A. Kennedy, and T.D. Abhayapala, "Signal estimation from incomplete data on the sphere", in *Proc. IEEE 9th Australian Communication Theory Workshop (AusCTW'07)*, Christchurch, New Zealand, Feb. 2008, pp. 39-44.
- [C9] W. Zhang, T.D. Abhayapala, and R.A. Kennedy, "Horizontal plane HRTF reproduction using continuous Fourier-Bessel functions", in *Proc. the 31st Audio Engineering Society (AES) international conference on "New directions in high resolution audio"*, London, UK, Jun. 2007, pp. 9 pages.
- [C10] W. Zhang, T.D. Abhayapala, and J. Zhang, "UWB Spatial-frequency channel characterization", in *Proc. 63rd IEEE Vehicular Technology Conference (VTC)*, vol. 6, Melbourne, Australia, May 2006, pp. 2732-2736.
- [C11] W. Zhang, T.D. Abhayapala, and J. Zhang, "Frequency dependency in UWB channel modelling", in *Proc. 8th International Symposium on DSP and Communication Systems (DSPCS'2005) & 4th Workshop on the Internet, Telecommunications and Signal Processing (WITSP'2005)*, Sunshine Coast, Australia, Dec. 2005, pp. 248-252.