Curriculum Vitae

Wen Zhang
Research Professor
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Positions

- **Research Professor (March 2016-present)**
  School of Marine Science and Technology, Northwestern Polytechnical University, Xi'an, China

- **Research Fellow (Apr. 2012-Feb. 2016)**
  College of Engineering and Computer Science, The Australian National University, Canberra, Australia

- **OCE Postdoctoral Fellowship (Feb. 2010-Mar. 2012)**
  CSIRO Process Science and Engineering Division, Lucas Heights Science and Technology Centre, NSW, Australia

Education

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

Awards, Grants and Scholarships

- **NSFC Grant No61671380**, *"Theory and design of multi-zone sound field reproduction"*, Sole Chief Investigator, 580,000 CNY, 2017-2020.
- **ARC Linkage Project Grant LP160100379**, *"Spatial sound control for testing multi-channel audio devices"*, Chief Investigator with Prof. Thushara D. Abhayapala and A/Prof. Glenn Dickins, $318,000, 2017-2020.
- **ANU Major Equipment Grant 15MEC35**, *"Dodecahedron speaker array for 3D sound field control and reproduction"*, 1st named Chief Investigator with Prof. Thushara D. Abhayapala, A/Prof. Henry Gardner, and Dr. Samantha Bennett, $50,000, 2015.
- **ARC DECRA Fellowship DE150100363**, *"The cocktail party problem: Advancing binaural localisation techniques"*, Sole Chief Investigator, $330,000, 2015-2017.
- **ARC Discovery Project Grant DP140103412**, *"Active sound control and noise reduction over space"*, Chief Investigator with Prof. Thushara D. Abhayapala and Prof. Walter Kellermann, $370,000, 2014-2016.
- **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 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.

Journal Publications

[J1] 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.

[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, 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.

[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", in *Minerals Engineering*, vol. 36-38, pp. 45-52, Oct. 2012.

[J5] S.J. Spencer, R. Bruniges, G. Roberts, 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", in *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", in *Journal of the Acoustical Society of America*, vol. 133, no. 5, pp. 2523-2527, May 2013.

[J7] D.S. Talagala, W. Zhang, and T.D. Abhayapala, "Broadband DOA estimation using sensor arrays on complex-shaped rigid bodies", in *IEEE Trans. Audio, Speech, and Language Processing*, vol. 21, no. 8, pp. 1573-1585, Aug. 2013.

[J8] D.S. Talagala, W. Zhang, T.D. Abhayapala, and A. Kamineni, "Binaural sound source localization using the frequency diversity of the head-related transfer function", in *Journal of the Acoustical Society of America*, vol. 135, no. 3, pp. 1207-1217, March 2014.

[J9] W. Zhang and T.D. Abhayapala, "Three dimensional sound field reproduction using multiple circular loudspeaker arrays: Functional analysis guided approach", in *IEEE/ACM Trans. Audio, Speech, and Language Processing*, vol. 22. no. 7, pp. 1184-1194, July 2014.

[J10] D.S. Talagala, W. Zhang, and T.D. Abhayapala, "Efficient multi-channel adaptive room compensation for spatial soundfield reproduction using a modal decomposition", in *IEEE/ACM Trans. Audio, Speech, and Language Processing*, vol, 22, no. 10, pp. 1522-1532, Oct. 2014.

[J11] T. Betlehem, W. Zhang, M. Poletti, and T.D. Abhayapala, "Personal sound zones: Delivering interface free audio to multiple listeners", in *IEEE Signal Processing Magazine*, vol, 32, no. 2, pp. 81-91, March 2015.

[J12] B. Bu, T. Abhayapala, C. Bao, and W. Zhang, "Parameterization of the three-dimensional room transfer function in horizontal plane", in *Journal of the Acoustical Society of America Express Letters* , vol. 138, no. 3, EL286, Sep. 2015.

[J13] H. Chen, T.D. Abhayapala, and W. Zhang, "Theory and design of compact hybrid microphone arrays on two-dimensional planes for three-dimensional soundfild analysis", in *Journal of the Acoustical Society of America*, vol. 138, no. 5, pp. 3081-3092, Nov. 2015.

[J14] W. Zhang, T.D. Abhayapala, T. Betlehem, and F.M. Fazi, "Analysis and control of multi-zone sound field reproduction using modal-domain approach", in *Journal of the Acoustical Society of America*, vol. 140, no. 3, pp. 2134-2144, Sept. 2016.

[J15] P.N. Samarasinghe, W. Zhang, and T.D. Abhayapala, "Recent advances in active noise control inside automobile cabins: Toward quieter cars", in *IEEE Signal Processing Magazine*, vol, 33, no. 6, pp. 61-73, Nov. 2016.

[J16] J. Zhang, T.D. Abhayapala, P.N. Samarasinghe, W. Zhang, and S. Jiang, "Multichannel active noise control for spatially sparse noise fields", in *Journal of the Acoustical Society of America Express Letters*, vol. 140, no. 6, EL510-516, Dec. 2016.

[J17] H. Chen, T.D. Abhayapala, P.N. Samarasinghe, and W. Zhang, "Direct-to-reverberant energy ratio estimation using a first-order microphone", in *IEEE/ACM Trans. Audio, Speech, and Language Processing*, vol. 25. no. 2, pp. 226-237, Feb. 2017.

Conference Publications

[**C1**] 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.

[**C2**] 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.

[**C3**] 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.

[**C4**] 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.

[**C5**] 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.

[**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, 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.

[**C8**] 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.

[**C9**] 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.

[**C10**] 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.

[**C11**] D.S. Talagala, W. Zhang, and T.D. Abhayapala, "Active acoustic echo cancellation in spatial sound field reproduction", in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Vacouver, Canada, May 2013, pp. 620-624.

[**C12**] D.S. Talagala, W. Zhang, and T.D. Abhayapala, "Robustness analysis of room equalization for soundfield reproduction within a region", *International Congress on Acoustics (ICA)*, Montreal, Canada, June 2013. (invited paper)

[**C13**] W. Zhang, T.D. Abhayapala, R.A. Kennedy, and M. Zhang, "Towards optimal functional representation of head-related transfer functions in the horizontal plane", *International Congress on Acoustics (ICA)*, Montreal, Canada, June 2013. (invited paper)

[**C14**] W. Zhang, T.D. Abhayapala, and F.M. Fazi, "Functional analysis guided approach for sound field reproduction with flexible loudspeaker layouts", in *Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, USA, Oct. 2013, pp. 1-4.

[**C15**] R.A. Kennedy, W. Zhang, and T.D. Abhayapala, "Comparison of spherical harmonics based 3D-HRTF functional models", in *Proc. International Conference on Signal Processing and Communication Systems (ICSPCS)*, Gold Coast, Australia, Dec. 2013, pp. 7 pages.

[**C16**] D.S. Talagala, X. Wu, W. Zhang, and T.D. Abhayapala, "Binaural localization of speech sources in the median plane using Cepstral HRTF extraction", in *Proc. European Signal Processing Conference (EUSIPCO)*, Lisbon, Portugal, Sep. 2014, pp. 2055-2059.

[**C17**] W. Zhang and T.D. Abhayapala, "2.5D sound field reproduction in higher order Ambisonics", in *Proc. International Workshop on Acoustic Signal Processing (IWAENC)*, French Riviera, France, Sep. 2014, pp. 342-346.

[**C18**] H. Chen, T.D. Abhayapala, and W. Zhang, "Enhanced sound field reproduction within prioritized control region", in *Proc. INTER-NOISE and NOISE-CON Congress and Conference*, Melbourne, Australia, Oct. 2014, vol. 249, no. 3, pp. 4055-4064.

[**C19**] X. Wu, D.S. Talagala, W. Zhang, and T.D. Abhayapala, "Binaural localization of speech sources in 3D using a composite feature vector of the HRTF", in *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Brisbane, Australia, April 2015, pp. 2654-2658.

[**C20**] H. Chen, T.D. Abhayapala, and W. Zhang, "3D sound field analysis using circular higher-order microphone array", in *Proc. European Signal Processing Conference (EUSIPCO)*, Nice, France, Sep. 2015, pp. 1158-1162.

[**C21**] J. Zhang, W. Zhang, and T.D. Abhayapala, "Noise Cancellation over Spatial Regions using Adaptive Wave Domain Processing", in *Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, USA, Oct. 2015, pp. 1-5.

[**C22**] H. Chen, P. Samarasinghe, T.D. Abhayapala, and W. Zhang, "Spatial Noise Cancellation Inside Cars: Performance Analysis and Experimental Results", *Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, USA, Oct. 2015, pp. 1-5.

[**C23**] H. Chen, P. Samarasinghe, T.D. Abhayapala, and W. Zhang, "Estimation of the direct-to-reverberant energy ratio using a spherical microphone array", presentation at *The Acoustic Characterisation of Environments (ACE) Challenge workshop* during WASPAA, New Paltz, NY, USA, Oct. 2015.

[**C24**] G. Dickins, H. Chen, and W. Zhang, "Soundfield control for consumer device testing", in *Proc. nternational Conference on Signal Processing and Communication Systems (ICSPCS)*, Cairns, Australia, Dec. 2015, pp.1-5.

[**C25**] J. Zhang, T.D. Abhayapala, P. Samarasinghe, W. Zhang, and, S. Jiang, "Sparse Complex FxLMS for Active Noise Cancellation over Spatial Regions", in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Shanghai, China, March 2016, pp. 524-528.

[**C26**] X. Wu, D. Talagala, W. Zhang, and T.D. Abhayapala, "Spatial Feature Learning for Robust Binaural Sound Source Localization using a Composite Feature Vector", in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Shanghai, China, March 2016, pp. 6320-6324.

[**C27**] W. Zhang, C. Hofmann, M. Bürger, T.D. Abhayapala, and W. Kellerman, "Online secondary path modelling in wave-domain active noise control", in *Proc. EEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, (accepted on Dec. 13 2016 for publication), New Orleans, USA, March 2017.

Patents

[**P1**] H. Chen, T.D. Abhayapala, W. Zhang, Planar sensor array, WIPO Patent Application WO/2016/011479.

[**P2**] S.J. Spencer, P. Coghill, W. Zhang, A method and a device for acoustic estimation of bubble properties, WIPO Patent Application WO/2016/029268.