DONALD S. WILLIAMSON

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RESEARCH AND TEACHING INTERESTS

My research broadly addresses ways that enable computers to process, understand, and respond to sound information. I have specific interests in the areas of speech separation, speech recognition, speaker identification, and music processing, to name a few, where I am interested in using these methods in real-world devices, such as cell phones, hearing aids, and robots. A combination of machine learning, signal processing, and statistical-based techniques are used. I have developed and taught graduate level courses on machine perception and speech processing. I've also taught graduate and undergraduate courses on machine learning.

EDUCATION

Ph.D.	Computer Science and Engineering Advisor: DeLiang Wang, Professor Thesis: *Deep Learning Methods for Improving the Perceptual Quality of Noisy and Reverberant Speech*	The Ohio State University	2016
M.S.	Computer Science and Engineering	The Ohio State University	2014
M.S.	Electrical Engineering Advisor: Youngmoo Kim, (Assistant) Professor Thesis: *Automatic Music Similarity Assessment and Recommendation*	Drexel University	2007
B.EE	Electrical Engineering Minors: Math., Computer and Information Science Honors: *cum laude*	University of Delaware	2005

PROFESSIONAL APPOINTMENTS

2016 - present	**Assistant Professor**, Indiana University, Computer Science Affiliate: Center for Algorithms and Machine Learning Affiliate: Cognitive Science Program
2012 - 2016	**Research Associate**, The Ohio State University, Computer Science and Engineering
2014 (summer)	**Research Intern**, Audience, Inc. (Knowles), Advanced Research Team
2007 - 2010	**Member Engineering Staff**, Lockheed Martin, Moorestown NJ
2005 - 2007	**Research Assistant**, Drexel University, Electrical and Computer Engineering

PUBLICATIONS: PEER REVIEWED

[16] Z. Zhang, **D. Williamson**, and Y. Shen, "Impact of Amplification on Speech Enhancement Algorithms using an Objective Evaluation Metric," in *Proc. International Congress on Acoustics (ICA)*, (to appear), 2019

[15] Z. Zhang, Y. Shen, and **D. Williamson**, "Objective comparison of speech enhancement algorithms with hearing loss simulation," in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing*, (to appear), 2019

[14] K. Berkson,..., S. Kübler, **D. Williamson**, and M. Anderson, "Building a Common Voice Corpus for Laiholh (Hakha Chin)," in *Proc. Workshop on the Use of Computational Methods in the Study of Endangered Languages (ComputEL)*, pp. 5-10, 2019.

[13] **D. Williamson**,"Monaural speech separation using a phase-aware deep denoising auto encoder," in *Proc. IEEE International Workshop on Machine Learning for Signal Processing*, 2018.

[12] X. Dong and **D. Williamson**, "Long-term SNR estimation using noise residuals and a two-stage deep-learning framework," in *Proc. International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA)*, pp. 351-360, 2018.

[11] **D. Williamson** and D. L. Wang, "Time-Frequency Masking in the Complex Domain for Speech Dereverberation and Denoising," *IEEE/ACM Trans. on Audio, Speech, and Lang. Process.*, vol. 25, pp. 1492-1501, 2017.

[10] F. Mayer, **D. Williamson**, P. Mowlaee, and D. L. Wang, "Impact of Phase Estimation on Single-Channel Source Separation Based on Time-Frequency Masking," *Journal of the Acoustical Society of America*, vol. 141, pp. 4668-4679, 2017.

[9] **D. Williamson** and D. L. Wang, "Speech Dereverberation and Denoising using Complex Ratio Masks" in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 5590-5594, 2017.

[8] **D. Williamson**, Y. Wang, and D. L. Wang, "Complex ratio masking for joint enhancement of magnitude and phase" in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 5220-5224, 2016.

[7] **D. Williamson**, Y. Wang, and D. L. Wang, "Complex ratio masking for monaural speech separation," *IEEE/ACM Trans. on Audio, Speech, and Lang. Process.*, vol. 24, pp. 483-492, 2016.

[6] **D. Williamson**, Y. Wang, and D. L. Wang, "Estimating nonnegative matrix model activations with deep neural networks to increase perceptual speech quality," *Journal of the Acoustical Society of America*, vol. 138, pp. 1399-1407, 2015.

[5] **D. Williamson**, Y. Wang, and D. L. Wang, "Deep neural networks for estimating speech model activations," in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 5113-5117, 2015.

[4] **D. Williamson**, Y. Wang, and D. L. Wang, "Reconstruction techniques for improving the perceptual quality of binary masked speech," *Journal of the Acoustical Society of America*, vol. 136, pp. 892-902, 2014.

[3] **D. Williamson**, Y. Wang, and D. L. Wang, "A two-stage approach for improving the perceptual quality of separated speech" in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 7084-7088, 2014.

[2] **D. Williamson**, Y. Wang, and D. L. Wang, "A sparse representation approach for perceptual quality improvement of separated speech" in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 7015-7019, 2013.

[1] Y. Kim, **D. Williamson**, and S. Pilli, "Towards quantifying the album effect in artist classification," in *Proc. International Conference on Music Information Retrieval*, Victoria, Canada, 2006 (online abstract).

UNPUBLISHED THESES

[2] D. Williamson, *Deep Learning Methods for Improving the Perceptual Quality of Noisy and Reverberant Speech*, Ph.D. Dissertation, Department of Computer Science and Engineering, The Ohio State University, Columbus, OH, 2016.

[1] D. Williamson, *Automatic Music Similarity Assessment and Recommendation*, M.S. Thesis, Department of Electrical and Computer Engineering, Drexel University, Philadelphia, PA, 2007.

RESEARCH SUPPORT

2018-2020	NSF CRII (PI, RI-1755844): *Towards Human-Level Assessment of Speech Quality and Intelligibility in Real-World Environments*	$174,995.00
2017-2020	IU Grand Challenge - Precision Health Initiative (PHI)	$110,000.00
2017	NVIDIA GPU Grant Program, donation of two Titan Xp GPUs (∼$2,000 value).	

INVITED PRESENTATIONS AND POSTERS

[10]	*Deep Learning for the Enhancement and Evaluation of Noisy Speech*, Center for Algorithms and Machine Learning Seminar, Indiana University	2018
[9]	*Deep Learning for Auditory Environment Analysis*, Air Force's Science and Technology 2030 workshop, Indiana University	2018
[8]	*Speech Dereverberation and Denoising using Complex Ratio Masks* (poster), Midwest Music and Audio Day (MMAD), Northwestern University, Evanston, IL	2017
[7]	*Separating Speech from Background Noise using a Deep Neural Network and a Complex Mask*, Intelligent and Interactive Systems Talk Series, Indiana University	2016
[6]	*Applied Machine Learning for Machine Listening*, Indiana University, Bloomington, IN	2016
[5]	*Improving the Perceptual Quality of Speech In Noisy Environments*, Communication Disorders Technology, Inc., Bloomington, IN	2016
[4]	*Reconstruction Techniques for Improving the Perceptual Quality of Masked Speech*, Audience, Inc. (Knowles), Mountain View, CA	2014
[3]	*Sparse Reconstruction for Improving the Perceptual Quality of Binary Masked Speech*, Midwest Cognitive Science Conference	2013
[2]	*Music Similarity Analysis* (poster), Research Day, Drexel University	2007
[1]	*Improving the iPod: Automatic Identification and Classification of Music* (poster), Research Day, Drexel University	2006

TEACHING ACTIVITIES

Courses Developed (at Indiana University, Computer Science)

CSCI-B659: Machine Perception and Audition (graduate)	2016
CSCI-B659: Deep Learning for Speech Processing (graduate)	2018

Courses Taught (at Indiana University, Computer Science)

CSCI-B555: Machine Learning (graduate)	2017, 2019
CSCI-B455: Principles of Machine Learning (undergraduate)	2018

Courses Taught (at The Ohio State University, Computer Science and Engineering)

CSE-101: Computer-Assisted Problem Solving (undergraduate)	2012

UNIVERSITY SERVICE

Colloquium Committee, Computer Science	2018 - present
Faculty Affairs Committee, Computer Science	2018 - present
Admissions and Awards Committee, Computer Science	2016 - 2018
Grant Thornton (GT) Scholar, SICE	2019 -present

Precision Health Initiative (PHI) Hiring Committee	2018, 2019
OurCS HelloResearch co-project lead, SICE	2018

PROFESSIONAL SERVICE

Technical Program committee, INTERSPEECH	2018
Reviewer, INTERSPEECH	2018 - present
Reviewer, IEEE Access	2018 - present
Reviewer, Speech Communication	2018 - present
Reviewer, The Journal of the Acoustical Society of America (JASA)	2017 - present
Reviewer, Transactions of the International Society for Music Information Retrieval	2017 - present
Reviewer, EURASIP Journal on Audio, Speech, and Music Processing	2016 - present
Reviewer, Trends in Hearing	2015 - present
Reviewer, IEEE Transactions on Audio Speech and Language Processing	2014 - present
Reviewer, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)	2014 - present
Reviewer, Springer Journal of Circuits, Systems, and Signal Processing	2014 - present

PROFESSIONAL MEMBERSHIPS

Association for Computing Machinery (ACM)	2017 - present
American Society for Engineering Education (ASEE)	2015 - present
Institute of Electrical and Electronics Engineers (IEEE)	2013 - present
IEEE, Signal Processing Society	2013 - present
IEEE, Robotics and Automation Society	2015 - present
Upsilon Pi Epsilon Honor Society	2010 - present
Tau Beta Pi Engineering Honor Society	2004 - present
National Society of Black Engineers (NSBE)	2002 - 2005
Golden Key International Honor Society	

STUDENT ADVISING

Graduate advisees

Xuan Dong (Ph.D. candidate, CS)	2017 - present
Khandokar Md. Nayem (Ph.D. student, CS)	2017 - present
Zhuohuang Zhang (Ph.D. student, SPHS and CS)	2017 - present
Iman Nabiyouni (Ph.D. student, SoPH and CS)	2017 - present
Grace Li (Ph.D. student, ISE)	2018 - present
Yuchen Liu (Ph.D. student, CS)	2018 - present
Ziyu Violet Xiang (M.S. student, CS)	2018 - present
Harshit Krishnakumar (M.S. student, DS)	2017 - 2018

Undergraduate advisees

Vikrant Garg, GTAP program	2018
Tianqi Cai (CS)	2018
Brandon Hummel (CS)	2018

Ph.D. Dissertation Committee

Jangwon Lee (Informatics)	2018

Ph.D. Advisory Committee

Zeeshan Ali Sayyed	2018
Kai Zhen	2018
Jangwon Lee	2017
Ishtiak Zaman	2017
Kurt Zimmer	2017
Mark Jenne	2017

AWARDS AND HONORS

Graduate Research Award, The Ohio State University	2016
Dean's Graduate Enrichment Fellowship, The Ohio State University	2010 - 2016
FOCUS Fellows Program, Georgia Institute of Technology	2015
NSF Bridge to the Doctorate Fellow, Drexel University	2005 - 2007
Honorable Mention, Research Day Poster Award, Drexel University	2006
African American Students of Distinction Award, University of Delaware	2002 - 2005
RISE Outstanding Academic Achievement Award, University of Delaware	2002 - 2005
Engineering Scholars Program, University of Delaware	2003 - 2004
Merit Scholarship, University of Delaware	2001 - 2005
MBNA Delaware Scholar, University of Delaware	2001 - 2005
RISE Corporate Friends Award, University of Delaware	
RISE Conectiv Power Award, University of Delaware	