Matthew Maciejewski

Curriculum Vitae

✉ *matt@mmaciejewski.com*

Research Specialization

speech & audio processing, deep learning, statistical modeling, signal processing

Software Skills

Languages	Python, Bash, Awk, C++, MATLAB
Toolkits	PyTorch, Kaldi ASR, TensorFlow, Chainer
Infrastructure	Git, AWS, Oracle Grid Engine, Slurm, Apache Spark

Education

2014–2021 **Ph.D., Electrical and Computer Engineering**, *Johns Hopkins University*, Baltimore, MD.
Advisors: Sanjeev Khudanpur and Shinji Watanabe
Dissertation Topic: speech separation in noisy and reverberant conditions

2014–2017 **M.S., Electrical and Computer Engineering**, *Johns Hopkins University*, Baltimore, MD.

2010–2014 **B.S., Electrical and Computer Engineering**, *Carnegie Mellon University*, Pittsburgh, PA.

Experience

07/2021–04/2023 **Research Scientist**, *Amazon Alexa AI*, Cambridge, MA.
Research in acoustic event detection and acoustic scene classification. Leveraged knowledge distillation and data mining to deploy improved event detectors with a lower on-device resource footprint. Mentored interns who entirely received return offers.

09/2014–07/2021 **Research Assistant**, *Department of Electrical and Computer Engineering, Johns Hopkins University*, Baltimore, MD.
Research in speech processing with emphasis on conversational speech, primarily far-field speech separation. This also includes speaker diarization, speaker recognition, and speech enhancement, and results in contributions to the Kaldi ASR toolkit.

01/2020–04/2020 **CHiME-6 Challenge Participant**, *JHU Center for Language and Speech Processing (CLSP)*, Baltimore, MD.
Contributed speech separation for the JHU CHiME-6 Challenge submission.

09/2019–11/2019 **Research Intern**, *Mitsubishi Electric Research Laboratories (MERL)*, Cambridge, MA.
Worked on noisy and reverberant speech separation, releasing the WHAMR! corpus and improved performance through cascaded model architecture.

05/2018–08/2018 **CHiME-5 Challenge Participant**, *JHU Center for Language and Speech Processing (CLSP)*, Baltimore, MD.
Worked on dereverberation and speech separation for the Hitachi-JHU CHiME-5 Challenge submission, which finished in 2nd place.

06/2017–08/2017 **JSALT 2017 Participant**, *Carnegie Mellon University*, Pittsburgh, PA.
Worked on establishing and improving performance of diarization systems on wide-band, conversational, far-field speech.

05/2016–09/2016 **Software Engineer Intern**, *Spoken Communications*, Seattle, WA.
Made improvements to the speech activity detection system and ported the speaker verification code to a new C++ framework.

09/2013–05/2014 **Undergraduate Researcher**, *Carnegie Mellon University*, Pittsburgh, PA.
Worked on dereverberation of speech signals in binaural recordings.

Publications

2023 **Matthew Maciejewski**, J. Shi, S. Watanabe, S. Khudanpur. *A Dilemma of Ground Truth in Noisy Speech Separation and an Approach to Lessen the Impact of Imperfect Training Data*. Computer Speech & Language. 2023

2021 **Matthew Maciejewski**. *Towards Single-Channel Speech Separation in Noise and Reverberation*. [Doctoral dissertation]. Johns Hopkins University. 2021

2021 **Matthew Maciejewski**, S. Watanabe, S. Khudanpur. *Speaker Verification-Based Evaluation of Single-Channel Speech Separation*. Interspeech. 2021

2021 **Matthew Maciejewski**, J. Shi, S. Watanabe, S. Khudanpur. *Training Noisy Single-Channel Speech Separation with Noisy Oracle Sources: A Large Gap and a Small Step*. IEEE ICASSP. 2021

2020 **Matthew Maciejewski**, G. Wichern, E. McQuinn, J. Le Roux. *WHAMR!: Noisy and Reverberant Single-Channel Speech Separation*. IEEE ICASSP. 2020

2020 A. Arora, D. Raj, A.S. Subramanian, K. Li, B. Ben-Yair, **Matthew Maciejewski**, P. Żelasko, P. Garcia, S. Watanabe, S. Khudanpur. *The JHU Multi-Microphone Multi-Speaker ASR System for the CHiME-6 Challenge*. arXiv. 2020

2019 **Matthew Maciejewski**, G. Sell, Y. Fujita, L.P. Garcia-Perera, S. Watanabe, and S. Khudanpur. *Analysis of Robustness of Deep Single-Channel Speech Separation Using Corpora Constructed From Multiple Domains*. IEEE WASPAA. 2019

2018 N. Kanda, R. Ikeshita, S. Horiguchi, Y. Fujita, K. Nagamatsu, X. Wang, V. Manohar, N.E.Y. Soplin, **Matthew Maciejewski**, S.J. Chen, A.S. Subramanian, R. Li, Z. Wang, J. Naradowsky, L.P. Garcia-Perera, G. Sell. *The Hitachi/JHU CHiME-5 system: Advances in speech recognition for everyday home environments using multiple microphone arrays*. Interspeech. 2018

2018 G. Sell, D. Snyder, A. McCree, D. Garcia-Romero, J. Villalba, **Matthew Maciejewski**, V. Manohar, N. Dehak, D. Povey, S. Watanabe, and S. Khudanpur. *Diarization is Hard: Some Experiences and Lessons Learned for the JHU Team in the Inaugural DIHARD Challenge*. Interspeech. 2018

2018 **Matthew Maciejewski**, D. Snyder, V. Manohar, N. Dehak, and S. Khudanpur. *Characterizing Performance of Speaker Diarization Systems on Far-field Speech using Standard Methods*. IEEE ICASSP. 2018

2018 N. Ryant, E. Bergelson, K. Church, A. Cristia, J. Du, S. Ganapathy, S. Khudanpur, D. Kowalski, M. Krishnamoorthy, R. Kulshreshta, M. Liberman, Y.D. Lu, **Matthew Maciejewski**, F. Metze, J. Profant, L. Sun, Y. Tsaok, Z. Yum. *Enhancement and Analysis of Conversational Speech: JSALT 2017*. IEEE ICASSP. 2018

2016 E. Chodroff, **Matthew Maciejewski**, J. Trmal, S. Khudanpur, J. Godfrey. *New release of Mixer-6: Improved validity for phonetic study of speaker variation and identification*. LREC. 2016

2015 H. Hermansky, L. Burget, J. Cohen, E. Dupoux, N. Feldman, J. Godfrey, S. Khudanpur, **Matthew Maciejewski**, S.H. Mallidi, A. Menon, T. Ogawa, V. Peddinti, R. Rose, R. Stern, M. Wiesner, K. Veselý. *Towards machines that know when they do not know: Summary of work done at 2014 Frederick Jelinek Memorial Workshop*. IEEE ICASSP. 2015

2015 H.M. Park, **Matthew Maciejewski**, C. Kim, R. Stern. *Robust automatic speech recognition in reverberation: onset enhancement versus binaural source separation*. The Journal of the Acoustical Society of America. 2015

2014 H.M. Park, **Matthew Maciejewski**, C. Kim, R. Stern. *Robust speech recognition in reverberant environments using subband-based steady-state monaural and binaural suppression*. Interspeech. 2014

Projects

03/2021–Present **Model Compression of On-Device Acoustic Event Detection**, Led an effort to migrate on-device acoustic event detection systems to a lower-footprint model, enabling the development of detectors for new events.

03/2020–07/2021 **Semi-Supervised Noisy Speech Separation**, Documented and analyzed degradation in speech separation performance when training on synthetic mixtures of naturally noisy speech. Developed training objectives for learning partitioning of speech and noise without annotation, improving training.

07/2019–07/2021 **Condition-Robust Speech Separation**, Produced and released synthetic noisy and reverberant speech separation dataset WHAMR! Developed cascaded models for improved training of speech separation in these conditions.

05/2017–07/2021 **Far-field Diarization**, Developed diarization systems for wideband far-field speech. Participated in JHU HLTCOE's submission to the inagural DIHARD diarization challenge, achieving 1st and 3rd place for the two tracks.

09/2017–01/2018 **Diarization in the Kaldi Toolkit**, Led the effort to merge development speaker diarization code into the main Kaldi release.

09/2014–07/2017 **Cleanup, Annotation, and Evaluation Framework from Mixer 6**, Was involved in an effort to use automatic and human effort to improve annotation and transcription of parts of the Mixer 6 corpus. Developed a procedure to prioritize subsets of the corpus for use in speaker recognition evaluation.