Ke Tan

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Research Interests

Speech enhancement, speech separation, speech dereverberation, microphone array processing, audio-visual speech enhancement and separation, acoustic echo cancellation, keyword spotting, robust speech recognition, and deep learning.

Education

- **The Ohio State University (OSU)** — Columbus, OH, United States
  Ph.D. student in Computer Science and Engineering — *Aug. 2015 - present*
- **The Ohio State University (OSU)** — Columbus, OH, United States
  M.S. in Computer Science and Engineering — *Aug. 2015 - Dec. 2019*
- **University of Science and Technology of China (USTC)** — Hefei, Anhui, China
  B.E. in Electronic Information Engineering — *Aug. 2011 - Jun. 2015*

Professional Experience

- **The Ohio State University** — Columbus, OH, United States
  Graduate Research Associate — *Jan. 2017 - present*
  - Single- and Multi-Channel Speech Enhancement and Separation
  - Supervisor: Prof. DeLiang Wang

- **Facebook Reality Labs** — Redmond, WA, United States
  Research Intern — *May 2020 - Aug. 2020*
  - Binaural Speaker Separation with Interaural Cue Preservation
  - Mentor: Dr. Buye Xu

- **Tencent AI Lab** — Bellevue, WA, United States
  Research Intern — *May 2019 - Aug. 2019*
  - Audio-Visual Speech Separation and Dereverberation
  - Mentor: Dr. Yong Xu and Dr. Dong Yu

- **Elevoc Technology** — Shenzhen, Guangdong, China
  Research Intern — *Dec. 2018 - Jan. 2019*
  - Multi-Talker Separation Using a Distributed Microphone Array
  - Mentor: Dr. Xueliang Zhang

- **Baidu USA - KITT.AI group** — Bellevue, WA, United States
  Research Intern — *May 2018 - Aug. 2018*
  - Small-Footprint Keyword Spotting with Quantization-Aware Training
  - Mentor: Dr. Guoguo Chen

- **Elevoc Technology** — Shenzhen, Guangdong, China
  Research Intern — *Apr. 2018 - May 2018*
  - A Low-Complexity Model for Monaural Speech Enhancement
  - Real-Time Speech Enhancement for Dual-Microphone Mobile Phones in Close-Talk Scenarios
  - Mentor: Dr. Xueliang Zhang

Journal/Letter Publications

[J8] **Ke Tan** and DeLiang Wang. "Towards Model Compression for Deep Learning Based Speech Enhancement", in submission to *IEEE/ACM Transactions on Audio, Speech, and Language Processing (**IEEE/ACM TASLP**)*.

[J7] **Ke Tan**, Xueliang Zhang, and DeLiang Wang. "Deep Learning Based Real-Time Speech Enhancement for Dual-Microphone Mobile Phones", in submission to *IEEE/ACM Transactions on Audio, Speech, and Language Processing (**IEEE/ACM TASLP**)*.

[J6] Eric W. Healy, **Ke Tan**, Eric M. Johnson, and DeLiang Wang. "An Effectively Causal Deep Learning Algorithm to Increase Intelligibility in Novel Noises for Hearing-Impaired Listeners", in submission to *Journal of the Acoustical Society of America (**JASA**)*.

[J5] **Ke Tan**, Buye Xu, Anurag Kumar, Eliya Nachmani, and Yossi Adi. "SAGRNN: Self-Attentive Gated RNN for Binaural Speaker Separation with Interaural Cue Preservation", in *IEEE Signal Processing Letters (**IEEE SPL**)*, vol. 28, pp. 26-30, 2021.

[J4] **Ke Tan**, Yong Xu, Shi-Xiong Zhang, Meng Yu, and Dong Yu. "Audio-Visual Speech Separation and Dereverberation with a Two-Stage Multimodal Network", in *IEEE Journal of Selected Topics in Signal Processing (**IEEE JSTSP**)*, vol. 14, pp. 542-553, 2020.

[J3] **Ke Tan** and DeLiang Wang. "Learning Complex Spectral Mapping with Gated Convolutional Recurrent Networks for Monaural Speech Enhancement", in *IEEE/ACM Transactions on Audio, Speech, and Language Processing (**IEEE/ACM TASLP**)*, vol. 28, pp. 380-390, 2020.

[J2] Peidong Wang, **Ke Tan**, and DeLiang Wang. "Bridging the Gap Between Monaural Speech Enhancement and Recognition with Distortion-Independent Acoustic Modeling", in *IEEE/ACM Transactions on Audio, Speech, and Language Processing (**IEEE/ACM TASLP**)*, vol. 28, pp. 39-48, 2020.

[J1] **Ke Tan**, Jitong Chen, and DeLiang Wang. "Gated Residual Networks with Dilated Convolutions for Monaural Speech Enhancement", in *IEEE/ACM Transactions on Audio, Speech, and Language Processing (**IEEE/ACM TASLP**)*, vol. 27, pp. 189-198, 2019.

Conference Publications

[C12] **Ke Tan**, Xueliang Zhang, and DeLiang Wang. "Real-Time Speech Enhancement for Mobile Communication Based on Dual-Channel Complex Spectral Mapping", in *IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, accepted.

[C11] **Ke Tan** and DeLiang Wang. "Compressing Deep Neural Networks for Efficient Speech Enhancement", in *IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, accepted.

[C10] **Ke Tan** and DeLiang Wang. "Improving Robustness of Deep Learning Based Monaural Speech Enhancement Against Processing Artifacts", in *IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, pp. 6914-6918, 2020.

[C9] Hao Zhang, **Ke Tan** and DeLiang Wang. "Deep Learning for Joint Acoustic Echo and Noise Cancellation with Nonlinear Distortions", in *the 20th Annual Conference of the International Speech Communication Association (**INTERSPEECH**)*, pp. 4255-4259, 2019.

[C8] Peidong Wang, **Ke Tan** and DeLiang Wang. "Bridging the Gap Between Monaural Speech Enhancement and Recognition with Distortion-Independent Acoustic Modeling", in *the 20th Annual Conference of the International Speech Communication Association (**INTERSPEECH**)*, pp. 471-475, 2019.

[C7] **Ke Tan** and DeLiang Wang. "Complex Spectral Mapping with a Convolutional Recurrent Network for Monaural Speech Enhancement", in *IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, pp. 6865-6869, 2019.

[C6] **Ke Tan**, Xueliang Zhang, and DeLiang Wang. "Real-Time Speech Enhancement Using an Efficient Convolutional Recurrent Network for Dual-Microphone Mobile Phones in Close-Talk Scenarios", in *IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, pp. 5751-5755, 2019.

[C5] Zhong-Qiu Wang, **Ke Tan**, and DeLiang Wang. "Deep Learning Based Phase Reconstruction for Speaker Separation: A Trigonometric Perspective", in *IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, pp. 71-75, 2019.

[C4] **Ke Tan** and DeLiang Wang. "A Convolutional Recurrent Neural Network for Real-Time Speech Enhancement", in *the 19th Annual Conference of the International Speech Communication Association (**INTERSPEECH**)*, pp. 3229-3233, 2018.

[C3] **Ke Tan** and DeLiang Wang. "A Two-Stage Approach to Noisy Cochannel Speech Separation with Gated Residual Networks", in *the 19th Annual Conference of the International Speech Communication Association (**INTERSPEECH**)*, pp. 3484-3488, 2018.

[C2] **Ke Tan**, Jitong Chen, and DeLiang Wang. "Gated Residual Networks with Dilated Convolutions for Supervised Speech Separation", in *IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, pp. 21-25, 2018.

[C1] Shilin Zhu, **Ke Tan**, Xinyu Zhang, Zhiqiang Liu, and Bin Liu. "MICROST: A Mixed Approach for Heart Rate Monitoring During Intensive Physical Exercise Using Wrist-Type PPG Signals", in *37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC**)*, pp. 2347-2350. IEEE, 2015.

Patents

[P2] **Ke Tan**, Xueliang Zhang, and DeLiang Wang. "An Approach to Real-Time Speech Denoising on Dual-Microphone Mobile Phones in Close-Talk Scenarios", 2019.

[P1] **Ke Tan**, Xueliang Zhang, and DeLiang Wang. "A Convolutional Recurrent Architecture for Real-Time Monaural Speech Denoising", 2018.

Presentations

- *Gated Residual Networks with Dilated Convolutions for Supervised Speech Separation*, IEEE ICASSP, Calgary, Alberta, Canada, Apr. 2018. [talk]
- *Deep Learning Based Phase Reconstruction for Speaker Separation: A Trigonometric Perspective*, IEEE ICASSP, Brighton, United Kingdom, May 2019. [talk]
- *Real-Time Speech Enhancement Using an Efficient Convolutional Recurrent Network for Dual-Microphone Mobile Phones in Close-Talk Scenarios*, IEEE ICASSP, Brighton, United Kingdom, May 2019. [talk]
- *Complex Spectral Mapping with a Convolutional Recurrent Network for Monaural Speech Enhancement*, IEEE ICASSP, Brighton, United Kingdom, May 2019. [poster]
- *Improving Robustness of Deep Learning Based Monaural Speech Enhancement Against Processing Artifacts*, IEEE ICASSP (virtually due to COVID-19 pandemic), Barcelona, Spain, May 2020. [talk]

Professional Skills

***Programming**:*

- Proficient in: Python, C++, C, MATLAB, Java
- Familiar with: HTML5, CSS, LaTeX

***Deep Learning Related Toolkits**:*
PyTorch, TensorFlow, Keras, CNTK, Kaldi, and other scientific computing libraries.

Academic Services

- Reviewer, IEEE/ACM Transactions on Audio, Speech, and Language Processing
- Reviewer, IEEE Signal Processing Letters
- Reviewer, IEEE Journal of Selected Topics in Signal Processing
- Reviewer, IEEE Communications Letters
- Reviewer, Speech Communication

Teaching Experience

- **The Ohio State University** — Columbus, OH
  Graduate Teaching Associate — *Aug. 2015 - Dec. 2016*
  - CSE 1110 - Introduction to Computing Technology
  - CSE 3421 - Introduction to Computer Architecture
  - CSE 6421 - Computer Architecture

Honors and Awards

USTC Scholarship for Outstanding Students (Gold Award)	2014
CAS Scholarship (CAS - Chinese Academy of Sciences)	2013
USTC Scholarship for Outstanding Students (Silver Award)	2012