

# Peng Zan

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## EDUCATION

<b>Ph.D.</b> , Electrical and Computer Engineering University of Maryland, College Park, MD	12/2019 GPA 3.6
<b>M.Sc.</b> , Electrical and Computer Engineering University of Maryland, College Park, MD	08/2019 GPA 3.8
<b>B.Sc.</b> , Electrical Engineering Xi'an Jiaotong University, Xi'an, China	07/2014 GPA 90/100
<b>Exchange</b> , Electronic Engineering Chinese University of Hong Kong, Hong Kong, China	05/2013 GPA 3.7

## WORK EXPERIENCE

<b>Principal Scientist</b> Origin Wireless AI, Greenbelt	02/2021-Present MD
<b>Principal Data Scientist</b> Origin Wireless AI, Greenbelt	02/2020-02/2021 MD
<b>DSP Research Intern</b> Starkey Hearing Technologies, Eden Prairie	05/2019-08/2019 MN
<b>Graduate Research Assistant</b> University of Maryland, College Park	08/2015-05/2019 MD
<b>Graduate Teaching Assistant</b> University of Maryland, College Park	08/2014-05/2015 MD

## INTEREST

Signal Processing, Machine Learning, Auditory & Computational Neuroscience, Speech & Acoustics, Internet of Things.

## PROJECTS

<b>WiFi Sensing and Internet of Things (IoT)</b> Algorithm Team, Origin Wireless AI	02/2020 - Present WiFi-sensing for home security
<ul style="list-style-type: none"><li>Designed and optimized motion localization algorithm for WiFi-sensing devices.</li><li>Wrote Python tools for customers to process and visualize motion data.</li></ul>	
Hardware Team, Origin Wireless AI	WiFi-sensing for home security
<ul style="list-style-type: none"><li>Designed and automated a manufacture workflow by Python to build WiFi-sensing devices.</li><li>Reduced time consumption of building up one set of devices from about 40 min to 5 min.</li><li>Built 155 sets of devices for Verizon Communications Inc. to support their development and testing.</li></ul>	
Algorithm Team, Origin Wireless AI	Real-time location tracking
<ul style="list-style-type: none"><li>Built Apps for both Android and iOS using Python (Kivy and Buildozer) to track human location in real time based only on inertial measurement unit (IMU) sensor readings from mobile devices.</li><li>Tested the Apps, optimized the tracking algorithm, achieved centimeter-level accuracy.</li></ul>	
<b>DNN-based Speech Enhancement</b> Signal Processing Research, Starkey	06/2019 - 08/2019 Internship research
<ul style="list-style-type: none"><li>Designed and conducted subjective listening experiment to test DNN-based speech enhancement algorithms.</li><li>Analyzed experimental data and compared DNN algorithms.</li></ul>	
<b>Joint Approach of Auditory Attention Decoding and Speech Enhancement [C1]</b> Signal Processing Research, Starkey	05/2019 - 08/2019 Internship research
<ul style="list-style-type: none"><li>Designed and conducted electroencephalography (EEG) experiment to simulate a cocktail party scenario.</li><li>Collected auditory responses while subjects switch attention from one speaker to another.</li><li>Developed algorithm for joint approach of attention decoding and speech enhancement.</li></ul>	
<b>Mutual Information Analysis of Auditory Brain Responses and Effects of Aging [J1][J2]</b> Computational Sensorimotor Systems Lab, UMD	01/2018 - 05/2019 Thesis research
<ul style="list-style-type: none"><li>Developed a novel approach based on information theory to decode phase-locked response from M/EEG recording.</li><li>Revealed speech over-representation in the aging midbrain [J2] and cortical [J1] marker of behaviors.</li><li>Algorithm programmed in Matlab, source-space analysis done in Python and statistics conducted in R.</li></ul>	
<b>Machine Learning Applications in Auditory Research [J3][J4][J5]</b> Computational Sensorimotor Systems Lab, UMD	06/2017 - 12/2017 Independent research
<ul style="list-style-type: none"><li>Implemented KNN and CNN for schizophrenia detection based on auditory steady-state response features (code).</li><li>Designed and compared neural decoders based on maximum likelihood estimation, linear regression and neural network to study adaptive efficient coding of correlated acoustic properties in auditory cortex of ferret [J4].</li></ul>	

- Developed object and edge detection approach to extract pupillometry information from video recordings to study implicit memory for complex sounds in auditory cortex of ferret [J5].

## SKILLS

**Programming:** Python (expert), C/C++, R, Java (beginner)

**Software Tools:** Matlab (expert), SPSS, MNE-Python, Eelbrain, Tensorflow, Pytorch, L<sup>A</sup>T<sub>E</sub>X, Git (Github), Linux/Unix

**Software Engineering:** Algorithms and Data Structure (Certificate), App Development by Python

**Data Science:** Statistics, Machine Learning (Certificate), Deep Learning (Certificate)

**Data Engineering:** Database, SQL, Google Cloud Platform

**Research:** Auditory Neuroscience Experiment Design, Electroencephalography (EEG), Magnetoencephalography (MEG)

## JOURNAL PUBLICATIONS

- [J1] **Peng Zan**, Alessandro Presacco, Samira Anderson, and Jonathan Z. Simon. Exaggerated cortical representation of speech in older listeners: mutual information analysis. *Journal of Neurophysiology*, 124(4):1152-1164, Oct. 7, 2020.
- [J2] **Peng Zan**, Alessandro Presacco, Samira Anderson, and Jonathan Z. Simon. Mutual information analysis of neural representations of speech in noise in the aging midbrain. *Journal of Neurophysiology Innovative Methodology*, 122(6): 2372-2387, Dec. 4, 2019.
- [J3] Xiaoming Du, Stephanie Hare, Ann Summerfelt, Bhim Adhikari, Laura Garcia, Wyatt Marshall, **Peng Zan**, Mark Kvarta, Eric Goldwaser, Heather Bruce, Hemalatha Sampath, Peter Kochunov, Jonathan Z. Simon, L. Elliot Hong. Cortical connectomic mediations on Gamma band synchronization in schizophrenia. *Biological Psychiatry*, under review, August 2019.
- [J4] Kai Lu, Wanyi Liu, Kelsey Dutta, **Peng Zan**, Jonathan B Fritz, and Shihab A. Shamma. Adaptive efficient coding of correlated acoustic properties. *The Journal of Neuroscience*, 39(44):8664-8678, Oct. 30, 2019.
- [J5] Kai Lu, Wanyi Liu, **Peng Zan**, Stephen V. David, Jonathan B Fritz, and Shihab A. Shamma. Implicit memory for complex sounds in higher auditory cortex of the ferret. *The Journal of Neuroscience*, 38(46):9955-9966, Nov. 14, 2018.
- [J6] Junmin Liu, Yongchang Hui, and **Peng Zan**. Locally linear detail injection for pansharpening. *IEEE Access*, 5:9728-9738, June 7, 2017.
- [J7] Dai Wang, Xiaohong Guan, Jiang Wu, Pan Li, **Peng Zan**, and Hui Xu. Integrated energy exchange scheduling for microgrids with electric vehicles. *IEEE Transaction on Smart Grid*, 7(4):17621774, July 10, 2016.

## CONFERENCE PAPERS & POSTERS

- [C1] Wenqiang Pu, **Peng Zan**, Jinjun Xiao, Tao Zhang, Zhi-Quan Luo. Evaluation of joint auditory attention decoding and adaptive binaural beamforming approach for hearing devices with attention switching. *2020 IEEE International Conference on Acoustics, Speech, and Signal Processing*. 05/08/2020
- [C2] Mutual information analysis of neural representations of speech in noise in the aging midbrain  
*ARO 2019* 02/09-13/2019
- [C3] Cortical over-representation of speech in older listeners correlates with a reduction in both behavioral inhibition and speech intelligibility  
*ARO 2019* 02/09-13/2019
- [C4] Mutual information analysis of neural representations of speech in noise in the aging midbrain.  
*Auditory SPLASH* 09/08/2018
- [C5] Mutual information analysis of neural representations of speech in noise in the aging midbrain.  
*EAR 2018* 06/15/2018

## PEER REVIEWS

- [R1] IEEE Access 07/2019
- [R2] IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing 01/2020
- [R3] IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing 03/2020

## SELECTED AWARDS & HONORS

Starkey Recognition Award	Starkey, 08/2019
COMBINE Traveling Award	UMD, 12/2018
NSF-Funded COMBINE Fellowship (Computational Biological Network Program)	UMD, 09/2017
Jimmy H. C. Lin Graduate Scholarship for Entrepreneurship	UMD, 09/2014
ECE Ph.D. Fellowship Award	UMD, 09/2014