Peng Zan

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EDUCATION

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

WORK EXPERIENCE

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

INTEREST

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

PROJECTS

WiFi Sensing and Internet of Things (IoT)   02/2020 - Present
WiFi-Sensing for Home Automation/Security/Wellbeing   Algorithm Team, Origin Wireless AI
- Designed and optimized motion localization algorithm for WiFi-sensing devices.
- Built data processing tools by Python for customers to process and visualize data.

Wifi-Sensing Device Manufacture Automation   Hardware Team, Origin Wireless AI
- Designed and automated a manufacture workflow by Python to build WiFi-sensing devices.
- Reduced time consumption of building up one set of devices from about 40 min to 5 min.
- Built 155 sets of devices for Verizon Communications Inc. to support their development and testing.

Real-Time Tracking with IMU Sensors on Mobile Devices   Algorithm Team, Origin Wireless AI
- 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.
- Tested the Apps, optimized the tracking algorithm, achieved centimeter-level accuracy.

DNN-based Speech Enhancement   06/2019 - 08/2019
Signal Processing Research, Starkey   Internship research
- Designed and conducted subjective listening experiment to test DNN-based speech enhancement algorithms.
- Analyzed experimental data and compared DNN algorithms.

Joint Approach of Auditory Attention Decoding and Speech Enhancement [C1]   05/2019 - 08/2019
Signal Processing Research, Starkey   Internship research
- Designed and conducted electroencephalography (EEG) experiment to simulate a cocktail party scenario.
- Collected auditory responses while subjects switch attention from one speaker to another.
- Developed algorithm for joint approach of attention decoding and speech enhancement.

Mutual Information Analysis of Auditory Brain Responses and Effects of Aging [J1][J2] 01/2018 - 05/2019
Computational Sensorimotor Systems Lab, UMD   Thesis research
- Developed a novel approach based on information theory to decode phase-locked response from M/EEG recording.
- Revealed speech over-representation in the aging midbrain [J2] and cortical [J1] marker of behaviors.
- Algorithm programmed in Matlab, source-space analysis done in Python and statistics conducted in R.

Machine Learning Applications in Auditory Research [J3][J4][J5]   06/2017 - 12/2017
Computational Sensorimotor Systems Lab, UMD   Independent research
- Implemented KNN and CNN for schizophrenia detection based on auditory steady-state response features (code).
- 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].

- 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, LaTeX, 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 Journel 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 Journel 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

[R4] Neuroscience Letters   04/2021

[R5] IEEE Signal Processing Letters   05/2021

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