

STEPHEN XIA

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PROFESSIONAL EXPERIENCE

University of California, Berkeley - EECS Department	Berkeley, CA, USA
Columbia University - Department of Electrical Engineering	New York, NY, USA
Postdoctoral Scholar	10/2022 - Present
Advisor: Dr. Prabal Dutta and Dr. Xiaofan (Fred) Jiang	
IBM Research	Yorktown Heights, NY, USA
Research Intern	Summer 2020, Summer 2021
Apple Inc.	Cupertino, CA, USA
CoreMotion Data Engineering Intern	Summer 2019
National Instruments	Austin, TX, USA
Software Engineering Intern	Summer 2015
Hewlett-Packard	Houston, TX, USA
Technical Software Intern	Summer 2014

EDUCATION

Columbia University	New York, NY, USA
Ph.D. Electrical Engineering	09/2016 - 10/2022
Advisor: Dr. Xiaofan (Fred) Jiang	
Rice University	Houston, TX, USA
B.S. Electrical Engineering	09/2013 - 05/2016
University Honors, Eta Kappa Nu	

AWARDS

- EE Collaborative Research Award - Columbia University 2022
- Best Demo Runner Up - ACM SenSys 2022
- Best Demo Award - ACM SenSys 2021
- Best Demo Award - ACM/IEEE IPSN 2020
- Best Demo Award - ACM/IEEE IoTDI 2018
- Best Presentation Award - IEEE VNC 2018
- Second Place, App Contest - IEEE VNC 2018
- Best Demo Runner Up - ACM SenSys 2016
- Best ECE Senior Design Project - Rice University ECE Corporate Affiliates Day 2016
- Best ECE Undergraduate Demo - Rice University ECE Corporate Affiliates Day 2016
- Third Place - IEEE Region V Student Paper Competition - 2016
- Third Place - K21 Prize, Rice University Research Symposium 2015
- First Place - IEEE Region V Student Paper Competition 2015

NEWS AND MEDIA HIGHLIGHTS

- EurekAlert! 2022 - [Cheaper, faster, safer way to screen temperatures](#)
- New York Post 2019 - [Smart headphones could save pedestrians from being hit by cars](#)
- IEEE Spectrum 2019 - [AI System Warns Pedestrians Wearing Headphones About Passing Cars](#)
- Fast Company 2019 - [These headphones aren't pretty, but they just might save your life](#)
- Mashable 2019 - [Headphones designed to save your life from reckless drivers](#)

- Gizmodo 2019 - [These Noise-Canceling Headphones Will Alert You to All the Dangers You Can't Hear](#)
- The Telegraph 2019 - [‘Smart’ headphones designed to save pedestrian lives](#)
- Engineering.com 2019 - [This Intelligent Headphone System Could Potentially Minimize Pedestrian Deaths](#)
- India Times 2019 - [Researchers Build Headphones That Alerts You While Walking, May Save You From Deadly Accidents](#)
- IEEE Signal Processing Magazine 2018 - [Signal Processing Supports a New Wave of Audio Research](#)

INVITED TALKS

- **State University of New York at Buffalo (SUNY-Buffalo) 2022**
Embedded Intelligence and Sensing for Safer, Healthier, and Smarter Environments
- **Columbia University School of Engineering and Applied Sciences 2022**
Lecture: Embedded Acoustic Intelligence Towards Smarter and Healthier Environments
- **University of Michigan, Ann Arbor 2022**
Embedded Intelligence Towards Smarter and Healthier Environments
- **University of Notre Dame, South Bend 2022**
Embedded Intelligence Towards Smarter and Healthier Environments
- **IBM T.J. Watson Research Center, Yorktown 2019**
Intelligent Acoustic Wearables for Urban Safety
- **Columbia University Business School, New York 2018**
Lecture: Conductive Thread-based Textile Sensing

PROFESSIONAL SERVICE

Leadership Roles

- General Co-Chair, CML-IOT Workshop 2022
- TPC Co-Chair, ACM IASA Workshop 2022

Organizing Committee

- Publicity Chair, ACM/IEEE IPSN 2023
- Publicity Chair, ACM EWSN 2022
- Publicity Chair, ACM BuildSys 2021
- Web Chair, IEEE/ACM CHASE 2020
- Web Chair, ACM SenSys 2019

Technical Program Committee

- IEEE ICDCS 2023
- ACM WWW 2023
- Shadow TPC Member, ACM SenSys 2022
- IEEE/ACM CHASE 2020, 2021

Reviewer

- ACM Transactions on Sensor Networks (TOSN) 2022
- IEEE Transactions on Mobile Computing (TMC) 2022
- ACM IMWUT 2022
- ACM SIGEnergy EIR Newsletter 2021, 2022
- ACM MobiSys 2020, 2021
- AIChallengeIoT Workshop 2020, 2022
- IEEE SMARTCOMP 2019
- ACM e-Energy 2019
- ACM/IEEE IoTDI 2018, 2019
- ACM/IEEE IPSN 2018
- IEEE Internet of Things Journal 2018
- ACM SenSys 2017, 2018, 2022

- ACM BuildSys 2017, 2020

TEACHING AND OUTREACH

Columbia University

Teaching Assistant

- EECS E6765: Internet of Things - Systems and Physical Data Analytics Spring 2017, Spring 2018
- EECS E4764: IoT - Intelligent and Connected Systems Fall 2016, Fall 2017

Rice University

Course Assistant

- ELEC 327 - Digital Systems Laboratory Spring 2016
- Discrete Time Signals and Systems on edX Spring 2015
- Fundamentals of Electrical Engineering on edX Spring 2014

Selected Mentorship

- Alfonso Rivas Summer 2022
project: Thermal Camera-based Fever Screening
- Nia Cole Summer 2022
project: AI Stethoscope
- Chenye Yang (Now PhD student at UC Davis) Summer 2021 - Fall 2021
project: AI for Smart Homes
- Asmita Goyanka (Now at Apple Inc.) Fall 2018 - Spring 2019
project: ML and Embedded Systems for Acoustics
- Ao Liang (Now MS student at UC Berkeley) Summer 2018
project: Wireless Localization in Urban Environments
- Laixi Shi (Now PhD student at CMU) Summer 2017
project: ML and Embedded Systems for Acoustics
- Rishikanth Chandrasekaran (Now PhD student at UC San Diego) Fall 2016 - Spring 2017
project: ML and Embedded Systems for Acoustics
- Jordan Misael Vega (Now at Goldman Sachs) Spring 2017
project: Activity Recognition on Mobile Devices
- Yan Lu (Now at Facebook) Fall 2016
project: Activity Recognition on Mobile Devices

Outreach and Other Activities

- **Girls Science Day - Women in Science at Columbia** 2019 - Present
Hosted a series of workshops for female middle school students teaching them the physics of acoustic + wireless signals and how to build sensing and artificial intelligence systems to improve our physical and daily lives.
- **Graduate Students of Electrical Engineering at Columbia (GEEC)** 07/2018 - 01/2020
Secretary and Founding Member
GEEC is the graduate student government for Electrical Engineering at Columbia University dedicated to helping EE/CE graduate students academically, socially, and professionally.
- **Society of Women Engineers Workshops** 2017, 2018
Hosted two workshops teaching female high school students about the properties of acoustic signals.

EXPERIENCE

Intelligent and Connected Systems Lab, Columbia University

09/2016 - Present

Research Assistant

- *Smart Home Edge AI*: Developed an intelligent “plug-and-play” system that easily integrates into home wireless ecosystems that automatically discovers + localizes smart resources (i.e. smart sensors, drones, smart TV, etc.) and jointly utilizes them to provide more complex and high level services.

- *Acoustic Wearables for Urban Safety*: Developed wearables that leverage novel, robust, and low-latency algorithms (signal processing, adaptive filtering + beamforming, and machine learning) on microphone arrays to reliably detect, localize, and warn users in advance of oncoming vehicles, even in noisy environments. Created a general platform for audio filtering and enhancement for resource-constrained mobile and embedded platforms.
- *Smart Health*: Developed a leg shaking detection platform for mobile devices that uses accelerometer data and novel signal processing and machine learning techniques to detect and learn the characteristics of a user's leg shaking habit. Developed a novel conductive thread-based textile sensor, capable of being embedded comfortably into everyday clothing, that accurately measures a person's perspiration level for smart health, fitness, comfort, and building applications.

**IBM Research
Research Intern**

Summer 2020, Summer 2021

- Designed a graph neural network and deep reinforcement learning-based system for dynamic and efficient network slicing in 5G networks.
- Formulated, designed, and evaluated physics-informed neural networks for acoustics to improve the performance of models in scenarios with scarce training data.

**Apple Inc.
CoreMotion Data Engineering Intern**

Summer 2019

- Developed big data pipelines for machine learning and deep learning applications using Spark and TensorFlow.

**Rice University
Undergraduate Researcher**

Spring 2015, Spring 2016

- Spring 2016, *Best ECE Senior Design Project and Best ECE Undergraduate Demo* - For the wireless neural recorder, a 1cm^3 wireless transmitter that records and transmits electrocorticography data.
- Spring 2016, *IEEE Region V Student Paper Competition Third Place* - Analysis and evaluation of defense mechanisms for denial-of-service attacks on WiFi LANs on the Wireless Open Access Research Platform (WARP).
- Spring 2015, *IEEE Region V Student Paper Competition First Place* - For the work titled: *Selective Transparent Headphones*; a system that utilizes neural networks to separate and propagate a single sound source to the user.

**National Instruments
Software Engineer Intern**

Summer 2015

- Wrote driver-level code for generating and testing corrective filters for NI Vector Signal Transceiver function generators.

**Hewlett-Packard
Technical Software Intern**

Summer 2014

- Wrote firmware for HP Smart Array RAID controllers and developed automation for testing firmware.
- Developed automated services for searching and sorting customer case issues to resolve Smart Array controller failures.

PUBLICATIONS

Xia, S. & Jiang, X., (2022). AvA: An Adaptive Audio Filtering Architecture for Enhancing Mobile, Embedded, and Cyber-Physical Systems. In *Proceedings of the 21st International Conference on Information Processing in Sensor Networks (IPSN 2022)*. ACM/IEEE.

Hou, K., Liu, Y., Wei, P., Yang, C., Kang, H., Xia, S., Spada, T., Rundle, A., & Jiang, X., (2022). A Low-Cost In-situ System for Continuous Multi-Person Fever Screening. In *Proceedings of the 21st International Conference on Information Processing in Sensor Networks (IPSN 2022)*. ACM/IEEE.

Nie, J., Zhao, M., Xia, S., Sun, X., Shao, H., Fan, Y., Preindl, M., & Jiang, X., (2022). AI Therapist for Daily Functioning Assessment and Intervention using Smart Home Devices. In *Proceedings of the 20th ACM Conference on Embedded Networked Sensor Systems (SenSys 2022)*. ACM.

[Best Demo - Runner Up Award]

Hou, K., Xia, S., Bejerano, E., & Jiang, X., (2022). AI Stethoscope for Home Self-Diagnosis with AR Guidance. In *Proceedings of the 20th ACM Conference on Embedded Networked Sensor Systems (SenSys 2022)*. ACM.

- Liu, Y., Nie, J., Xia, S., Sun, J., Wei, P., & Jiang, X., (2022). SoFIT: Self-Orienting Camera Network for Floor Mapping and Indoor Tracking. In *18th International Conference on Distributed Computing in Sensor Systems (DCOSS 2022)*. IEEE.
- Hou, K., Xia, S., & Jiang, X., (2022). BuMA: Non-Intrusive Breathing Detection using Microphone Array. In *Proceedings of the 1st ACM International Workshop on Intelligent Acoustic Systems and Applications (IASA 2022)*. ACM.
- Nie, J., Shao, H., Zhao, M., Xia, S., Preindl, M., & Jiang, X., (2022). Conversational AI Therapist for Daily Function Screening in Home Environments. In *Proceedings of the 1st ACM International Workshop on Intelligent Acoustic Systems and Applications (IASA 2022)*. ACM.
- Liu, Y., Xia, S., Nie, J., Wei, P., Shu, Z., Chang, J. A., & Jiang, X., (2022). aiMSE: Toward an AI-Based Online Mental Status Examination. In *IEEE Pervasive Computing*. IEEE.
- Zhang S., Li Y., Zhang S., Shahabi F., Xia, S., Deng, Y., & Alshurafa, N., (2022). Deep Learning in Human Activity Recognition with Wearable Sensors: A Review on Advances. In *Sensors*. MDPI.
- Liu, Y., Zhao, M., Xia, S., Wu, E., & Jiang, X., (2022). A Sensorless Drone-based System for Mapping Indoor 3D Airflow Gradients: Demo Abstract. In *Proceedings of the 20th Annual International Conference on Mobile Systems, Applications and Services (MobiSys 2022)*. ACM.
- Zhao, M., Liu, Y., Dhupar, A., Hou, K., Xia, S., & Jiang, X., (2022). A Modular and Reconfigurable Sensing and Actuation Platform for Smarter Environments and Drones: Demo Abstract. In *Proceedings of the 20th Annual International Conference on Mobile Systems, Applications and Services (MobiSys 2022)*. ACM.
- Xia, S., Chandrasekaran, R., Liu Y., Yang C., Rosing T. S., & Jiang, X., (2021). Demo Abstract: A Drone-based System for Intelligent and Autonomous Homes. In *Proceedings of the 19th ACM Conference on Embedded Networked Sensor Systems (SenSys 2021)*. ACM.
[Best Demo Award]
- Nie, J., Liu, Y., Hu, Y., Wang, Y., Xia, S., Preindl, M., & Jiang, X., (2021). SPIDERS+: A light-weight, wireless, and low-cost glasses-based wearable platform for emotion sensing and bio-signal acquisition. In *Pervasive and Mobile Computing*. Elsevier.
- Xia, S., Nie, J., & Jiang, X., (2021). CSafe: An Intelligent Audio Wearable Platform for Improving Construction Worker Safety in Urban Environments. In *Proceedings of the 20th International Conference on Information Processing in Sensor Networks (IPSN 2021)*. ACM/IEEE.
- Xia, S. & Jiang, X., (2021). Improving Acoustic Detection and Classification in Mobile and Embedded Platforms: Poster Abstract. In *Proceedings of the 20th International Conference on Information Processing in Sensor Networks (IPSN 2021)*. ACM/IEEE.
- Xia, S. & Jiang, X., (2020). PAMS: Improving Privacy in Audio-Based Mobile Systems. In *Proceedings of the 2nd International Workshop on Challenges in Artificial Intelligence and Machine Learning for Internet of Things (AIChallengeIoT 2020)*. ACM.
- Hu, Y., Nie, J., Wang, Y., Xia, S., & Jiang, X., (2020). Demo Abstract: Wireless Glasses for Non-contact Facial Expression Monitoring. In *2020 19th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN 2020)*. ACM/IEEE.
[Best Demo Award]
- Nie, J., Hu, Y., Wang, Y., Xia, S., & Jiang, X., (2020). SPIDERS: Low-Cost Wireless Glasses for Continuous In-Situ Bio-Signal Acquisition and Emotion Recognition. In *2020 IEEE/ACM Fifth International Conference on Internet-of-Things Design and Implementation (IoTDI 2020)*. ACM/IEEE.
- Wei, P., Xia, S., Chen, R., Qian, J., Li, C., & Jiang, X., (2020). A Deep-Reinforcement-Learning-Based Recommender System for Occupant-Driven Energy Optimization in Commercial Buildings. In *Internet of Things Journal*. IEEE.
- Xia, S., Godoy, D. d., Islam, B., Islam, M. T., Nirjon, S., Kinget, P. R., & Jiang, X., (2019). Improving Pedestrian Safety in Cities Using Intelligent Wearable Systems. In *Internet of Things Journal*. IEEE.
- Xia, S., Godoy, D. d., Islam, B., Islam, M. T., Nirjon, S., Kinget, P. R., & Jiang, X., (2018). A Smartphone-Based System for Improving Pedestrian Safety. In *2018 IEEE Vehicular Networking Conference (VNC 2018)*. IEEE.
[Best Presentation Award][Runner-Up Best App]

Jia, J., Yu, J., Hanumesh, R. S., Xia, S., Wei, P., Choi, H., & Jiang, X., (2018). Intelligent and privacy-preserving medication adherence system. In *Smart Health*. Elsevier.

Xia, S., Wei, P., Vega, J. M., & Jiang, X., (2018). SPINDLES+: An adaptive and personalized system for leg shake detection. In *SmartHealth*. Elsevier.

Wei, P., Chen, X., Vega, J. M., Xia, S., Chandrasekaran, R., & Jiang, X., (2018). A Scalable System for Apportionment and Tracking of Energy Footprints in Commercial Buildings. In *Transactions on Sensor Networks*. ACM.

Jia, J., Xu, C., Pan, S., Xia, S., Wei, P., Noh, H. Y., Zhang, P., & Jiang, X., (2018). Conductive Thread-Based Textile Sensor for Continuous Perspiration Level Monitoring. In *Sensors*. MDPI.

Jia, J., Xu, C., Pan, S., Xia, S., Wei, P., Noh, H. Y., Zhang, P., & Jiang, X., (2018). Moisture Based Perspiration Level Estimation. In *Proceedings of the 2018 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2018 ACM International Symposium on Wearable Computers (UbiComp 2018)*. ACM.

Wei, P., Xia, S., & Jiang, X., (2018). Energy Saving Recommendations and User Location Modeling in Commercial Buildings. In *Proceedings of the 26th Conference on User Modeling, Adaptation and Personalization (UMAP 2018)*. ACM.

Godoy, D. d., Islam, B., Xia, S., Islam, M. T., Chandrasekaran, R., Chen, Y., Nirjon, S., Kinget, P. R., & Jiang, X., (2018). PAWS: A Wearable Acoustic System for Pedestrian Safety. In *2018 IEEE/ACM Third International Conference on Internet-of-Things Design and Implementation (IoTDI 2018)*. ACM/IEEE.

Godoy, D. d., Xia, S., Fernandez, W. P., Jiang, X., & Kinget, P. R., (2018). Demo Abstract: An Ultra-Low-Power Custom Integrated Circuit based Sound-Source Localization System. In *2018 IEEE/ACM Third International Conference on Internet-of-Things Design and Implementation (IoTDI 2018)*. ACM/IEEE.

[Best Demo Award]

Wei, P., Chen, X., Vega, J., Xia, S., Chandrasekaran, R., & Jiang, X., (2017). ePrints: A Real-Time and Scalable System for Fair Apportionment and Tracking of Personal Energy Footprints in Commercial Buildings. In *Proceedings of the 4th ACM International Conference on Systems for Energy-Efficient Built Environments (BuildSys 2017)*. ACM.

[Best Paper - Runner Up Award]

Xia, S., Lu, Y., Wei, P., & Jiang, X., (2017). SPINDLES: A Smartphone Platform for Intelligent Detection and Notification of Leg Shaking. In *Proceedings of the 2017 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2017 ACM International Symposium on Wearable Computers (UbiComp 2017)*. ACM.

Chandrasekaran, R., Godoy, D. d., Xia, S., Islam, M. T., Islam, B., Nirjon, S., Kinget, P., & Jiang, X., (2016). SEUS: A Wearable Multi-Channel Acoustic Headset Platform to Improve Pedestrian Safety: Demo Abstract. In *Proceedings of the 14th ACM Conference on Embedded Network Sensor Systems CD-ROM (SenSys 2016)*. ACM.

[Best Demo - Runner Up Award]