Qijia Shao

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Research Interests

My research involves the application-driven aspects in **Mobile Computing** and **Human-Computer Interaction**. I work at the intersection of software and hardware with multiple modalities of signals. My recent work is mainly about fusing physical sensing and physiological sensing, enabling various applications around humans and robots (e.g., mobile health, AR/VR, localization, activity/behavior monitoring, and interaction).

Education

2022-2024(Expected) **Columbia University**.
Ph.D. Candidate in Computer Science
Advisor: **Prof. Xia Zhou**
Research Interests: **Mobile Computing and HCI**

2018-2022 **Dartmouth College**.
Master of Science in Computer Science (During Ph.D.)
Advisors: **Prof. Xia Zhou and Prof. Devin Balkcom**
Research Interests: **Mobile Computing and HCI**

2014-2018 **University of Electronic Science and Technology of China**.
Bachelor of Engineering in Computer Engineering, Yingcai Honours College (for top 5%)
Advisor: **Prof. Jun Wang**
GPA: **3.99/4.0**, Avg.Score: **91.3/100**

Experience

Summer 2023 **Research Intern**, *Samsung Research America, Mountain View*.
Mentors: Dr. Li Zhu and Dr. Jilong Kuang
- rPPG signal processing.
- Improve cross-user performance.

Summer 2022 **Research Intern**, *Snap Research, NYC*.
Mentors: Dr. Jian Wang and Dr. Shree Nayar
- Lead a project on reducing the motion-to-photon latency for AR/VR.
- Proposed a neural network-based filter for human motion trajectory smoothing and prediction.
- Deployed the proposed network to a FTVR system, which simulate the view-point-dependent experience of a real window .
- Designed and conducted a user study for validating the improvement in the actual user experience.
- Published the N-euro Predictor paper (UbiComp'23).

Summer 2021 **Research Intern**, *Signify (Philips Research), Remote*.
Mentor: Dr. Jing Yu
- Performed in-depth statistical analysis for different sensor data and figured out the bottleneck of the previous algorithm.
- Designed and implemented different Machine Learning algorithms with pilot study data.
- Built a scalable and robust probabilistic model and implemented the whole pipeline to take sensor data and make inferences.
- Improved the system performance by **19%** and submitted a patent.

Spring 2023 **Teaching Assistance**, *Computer Vision II: Learning, Columbia*.
- held office hours; wrote solutions for homeworks/projects

Spring 2021 **Teaching Assistance**, *Computer Networks, Dartmouth*.
- held office hours; wrote solutions for projects; lead the project discussion as a shepherd.

Fall 2018 **Teaching Assistance**, *Machine Learning and Statistical Data Analysis, Dartmouth*.
- held office hours; graded and wrote solutions for assignments and exams; explained the exams.

Technical Skills & Academic Experience

Programming: Python, C/C++, C#, Matlab, R , VHDL

Hardware: Micro-controllers, PCB design/layout, prototype soldering, ADC/DAC, amplifier

System & Tools: Linux, Unity, Git, LaTeX, 3D Printing

Machine Learning: Scikit-learn, deep learning (PyTorch/TensorFlow)

Academic Experience: Reviewer for CHI'20'23, UbiComp'20'21'22, ICRA'23.

Selected Honors & Awards

2022 Grand Prize at Dartmouth Innovation and Technology Festival

2020 ACM HotMobile 2020 Best Demo Award

2018 Dartmouth Fellowship

2018 Excellent Undergraduate Student at UESTC

2018 Outstanding Undergraduate Thesis at UESTC

2016, 2017 National Scholarship, by the Ministry of Education of China

Publications

† **Co-primary authors**

[14] **Qijia Shao**†, Jian Wang†, Bing Zhou, Vu An Tran, Gurunandan Krishnan and Shree Nayar.
N-euro Predictor: A Neural Network Approach for Smoothing and Predicting Motion Trajectory
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Vol. 7, No. 3, Article 120, 2023. (**UbiComp 2023**)

[13] **Qijia Shao**†, Charles J. Carver†, Samuel Lensgraf, Amy Sniffen, Maxine Perroni-Scharf, Hunter Gallant, Alberto Quattrini Li, Xia Zhou.
Sunflower: Locating Underwater Robots From the Air
Proceedings of the 20th Annual International Conference on Mobile Systems, Applications, and Services. June 2022. (**MobiSys 2022**)

[12] **Qijia Shao**†, Vimal Kakaraparthi†, Charles J. Carver, Tien Pham, Nam Bui, VP Nguyen, Xia Zhou, Tam Vu.
FaceSense: Sensing Face Touch with an Ear-worn System.
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Vol. 5, No. 3, Article 110, 2021. (**UbiComp 2021**)

[11] **Qijia Shao**, Amy Sniffen, Julien Blanchet, Megan Elizabeth Hillis, Themistoklis K Haris, Jason Liu, Lorna C. Quandt, James Mahoney, David J. M. Kraemer, Xia Zhou, and Devin Balkcom.
Teaching American Sign Language in Mixed Reality.
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Vol. 4, No. 4, Article 152, 2020. (**UbiComp 2021**)

[10] Charles J. Carver, Hadleigh Schwartz, **Qijia Shao**, Nicholas Shade, Joseph Lazzaro, Xiaoxin Wang, Jifeng Liu, Eric Fossum, Xia Zhou.
Catch Me If You Can: Laser Tethering with Highly Mobile Targets
Proceedings of the 21st Usenix Conference on Networked Systems Design and Implementation (**NSDI 2024**)

[9] Julien Blanchet, Megan Hillis, Yeongji Lee, **Qijia Shao**, Xia Zhou, David Kraemer, and Devin Balkcom.
Automatic Generation and Teaching of Dance Lessons from Video.
International Workshop on Mobile Computing Systems and Applications (**HotMobile 2023**)

[8] Megan Hillis, Brianna Aubrey, Julien Blanchet, **Qijia Shao**, Xia Zhou, David Kraemer, and Devin Balkcom.
Overlapping semantic representations of sign and speech in novice sign language learners
Proceedings of the 44th Annual Conference of the Cognitive Science Society (**CogSci 2022**)

[7] Pin-Sung Ku, **Qijia Shao**, Te-Yen Wu, Jun Gong, Ziyan Zhu, Xia Zhou, and Xing-Dong Yang.
ThreadSense: Locating Touch on an Extremely Thin Interactive Thread.
The ACM CHI Conference on Human Factors in Computing Systems. (**CHI 2020**)

[6] Zhao Tian, Charles J. Carver, **Qijia Shao**, Monika Roznere, Alberto Quattrini Li, and Xia Zhou.
PolarTag: Invisible Data with Light Polarization.
International Workshop on Mobile Computing Systems and Applications (**HotMobile 2020**)
Best Demo Award

[5] Ruibo Liu, **Qijia Shao**, Siqi Wang, Christina Ru, Devin Balkcom, and Xia Zhou.
Reconstructing Human Joint Motion with Computational Fabrics.
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Vol. 3, No. 1, 2019. (**UbiComp 2019**)

[4] Wei Li, Jun Wang, Guosheng Yang, Yue Zuo, **Qijia Shao**, Shaoqian Li.
Energy efficiency maximization oriented resource allocation in 5G ultra-dense network: Centralized and distributed algorithm.
***Computer Communication**, vol. 130, pp. 10-19, 2018*

[3] Guosheng Yang, Jun Wang, Guoyong Zhang, **Qijia Shao**, Shaoqian Li.
Joint Estimation of Timing and Carrier Phase Offsets for MSK Signals in Alpha-Stable Noise.
***IEEE Communication Letters**, vol. 22, no. 1, pp. 89-92, 2018*

[2] Guoyong Zhang, Jun Wang, Guosheng Yang, **Qijia Shao**, Shaoqian Li.
Nonlinear Processing for Correlation Detection in Symmetric Alpha-Stable Noise.
***IEEE Signal Processing Letters**, vol. 25, no. 1, pp. 120-124, 2018*

[1] Guosheng Yang, Jun Wang, Guoyong Zhang, **Qijia Shao**, Shaoqian Li.
Performance Analysis and Algorithm Design for Synchronization in Alpha-Stable Impulsive Noise.
IEEE Global Communications Conference (**GlobeCom 2017**)