Qijia Shao

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Research Interests

My research involves the application-driven aspects in **Mobile Computing** and **Human-Computer Interaction**. I develop novel sensing systems and robust data analytic techniques to lower the barrier of acquiring and interpreting human physical (e.g., force, velocity, vision) and physiological signals (e.g., ECG, EMG, impedance), enabling applications on healthcare, education and interaction. My research methodology is interdisciplinary, in the sense that I draw inspiration from other disciplines such as clinical and health sciences, cognitive science, material science, and electrical engineering.

Education

2018-2024(Expected) **Columbia University**
Ph.D. Candidate in Computer Science
Advisors: **Prof. Xia Zhou and Prof. Fred Jiang**
Research Interests: **Mobile Computing and HCI**

2018-2022 **Dartmouth College**
Master of Science in Computer Science (Conferred during Ph.D. program)
Transferred to Columbia University
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**

Selected Honors & Awards

2024 ACM MobiSys Best Paper Award
2024 ACM MobiSys Best Demo Award
2024 NSF Rising Stars in Cyber-Physical Systems
2024 ACM MobiSys Rising Stars, Best Presentation Award
2024 NSF Travel Grant
2023 ACM MobiCom Best Demo Award
2023 ACM UbiComp Best Teaser Award
2022 ACM MobiSys Travel Grant
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 Award at UESTC
2016, 2017 National Scholarship, by the Ministry of Education of China

Industry Experience

Summer 2023 **Research Intern**, *Samsung Research America, Mountain View*
Mentors: Dr. Li Zhu and Dr. Jilong Kuang
- Led a project on mitigating the cross-user performance variation of rPPG-based SpO2 estimation.
- Awarded a Samsung A1 patent.
- The proposed method is **being deployed to Samsung products** (phones and TVs).
- Published a **ICASSP'24** paper.

Summer 2022 **Research Intern**, *Snap Research, NYC*
Mentors: Dr. Jian Wang and Dr. Shree Nayar
- Led a project on reducing the motion-to-photon latency for AR/VR.
- The proposed technique is on the roadmap for Snapchat App.
- Published the N-euro Predictor paper (**UbiComp'23**).

Summer 2021 **Research Intern**, *Signify (Philips Research), Remote*
Mentor: Dr. Jin Yu
- Led a project on sensor data processing.
- Built a scalable and robust probabilistic model and implemented the whole pipeline.
- Improved the system performance by 19% and filed a patent.

Teaching Experience

Fall 2023 **Guest Lecturer**, *Columbia University*
- Computational Fabrics: From Motion Sensing to Physiological Sensing

Fall 2023 **Guest Lecturer**, *North Carolina State University*
- Lowering Barriers to Education, Interaction and Health with Physical and Physiological Sensing

Spring 2023 **Guest Lecturer**, *Lehigh University*
Computational Fabrics: Weaving Sensing into Everyday Life

Winter 2021 **Guest Lecturer**, *Dartmouth College*
- Next-Generation Mobile Platform – Computational Fabrics

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

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

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

Mentoring Experience

2024-Now **Iris Xu**, *Columbia CS Undergraduate, one paper in preparation*

2022-Now **Jiting Liu**, *Columbia CS Master Student, a MobiSys'24 paper*

2022-2023 **Meiqi Zhao**, *Columbia CS Undergraduate, one paper in preparation, now Machine Learning Software Engineering at Ambi Robotics*

Summer 2023 **Krithika Subramanian**, *Amazon SURE Research Intern, Penn State CS Undergraduate*

2021-2022 **Maxine Perroni-Schar**, *Dartmouth CS Undergraduate, a Mobisys'22 paper, now Ph.D. student at MIT*

2020 Summer **Xinyu Shi**, *Visiting Student from Xiamen University, a UbiComp'21 paper, now Ph.D. student at University of Waterloo*

2019-2020 **Themistoklis K Haris**, *Dartmouth CS Undergraduate, a UbiComp'21 paper, now Ph.D. student at Boston University*

2019-2020 **Christina Lu**, *Dartmouth CS Undergraduate, now Ph.D. student at University of Oxford*

2019 **Siqi Wang**, *Visiting Student from SJTU, a UbiComp'19 paper, now Ph.D. student at New York University*

Service

Reviewers **ACM UbiComp/IMWUT**, *2020, 2021, 2022, 2023, 2024*
ACM CHI, *2020, 2023, 2024*
ACM MobiCom, *2024*
ACM UIST, *2024*
ACM MobileHCI, *2024*
IEEE ICRA, *2023*
IEEE Transactions on Mobile Computing, *2023*

Volunteers **JEDI (Justice, Equity, Diversity, and Inclusion) Ambassadors**, *ACM UbiComp 2023*
Student Volunteer for Website, *ACM MobiSys 2021*
MS Applicant Reviewer, *Columbia University*
President, *Non-profit Organization for Supporting Economically Disadvantaged Primary School Students*, 2015-2017

Publications

† **Co-primary authors**

[18] **Qijia Shao**, Jiting Liu, Emily Bejerano, Ho Man Colman, Jingping Nie, Xiaofan Jiang, Xia Zhou. Joey: Supporting Kangaroo Mother Care with Computational Fabric. *Proceedings of the 22nd Annual International Conference on Mobile Systems, Applications, and Services. June 2024* (**MobiSys 2024**)

[17] **Qijia Shao**, Li Zhu, Mohsin Ahmed, Korosh Vatanparvar, Migyeong Gwak, Nafiul Rashid, Jungmok Bae, Jilong Kuang, and Alex Gao. Normalization is All You Need: Robust Full-Range Contactless SpO2 Estimation with an RGB Camera Across Users. *2024 IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP 2024**)*

[16] **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**)

[15] Charles J. Carver†, **Qijia Shao**†, 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**)

[14] **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**)

[13] **Qijia Shao**, Amy Sniffen, Julien Blanchet, Megan Elizabeth Hillis, Xinyu Shi, 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**)

[12] Julien Blanchet, Megan E. Hillis, Yeongji Lee, **Qijia Shao**, Xia Zhou, David J. M. Kraemer, and Devin Balkcom. LearnThatDance: Augmenting TikTok Dance Challenge Videos with an Interactive Practice Support System Powered by Automatically Generated Lesson Plans. *In Adjunct Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology* **(UIST '23 Adjunct)**

[11] Alberto Quattrini Li, Charles J. Carver, **Qijia Shao**, Xia Zhou, and Srihari Nelakuditi. Communication for Underwater Robots: Recent Trends. *Current Robotics Reports 4, no. 2 (2023): 13-22.*

[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**)

[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**)

References

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