

KE SUN

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BIOGRAPHY

I am a rising 4th year Ph.D. student in Computer Science and Engineering at the University of California, San Diego, advised by Prof. Xinyu Zhang. My research interests are broadly including mobile computing, IoT security & privacy, human-computer interaction and speech processing. Currently, my research focuses on hardware/ software co-design for multimodal and crossmodal era for wearable devices and IoT.

EDUCATION

University of California, San Diego

Sep 2019 - Present

Ph.D. in Computer Engineering

Advisor: Prof. Xinyu Zhang

Nanjing University

Sep 2016 - Jun 2019

M.S. in Computer Science and Engineering

Advisor: Prof. Wei Wang

Nanjing University of Aeronautics and Astronautics

Sep 2012 - Jun 2016

B.S. in Computer Science and Engineering

Undergraduate President Award, Undergraduate Achievement Award

PROJECT

1. Multi-modal Sensing and Applications

- Speech Enhancement using audible and inaudible channels (MobiCom'21)
- Facial Gesture Reconstruction with Sparse Near-Eye Biopotential Transducers (IPSN'21)
- mmWave Radar Aided Egomotion Estimation via Deep Sensor Fusion (SenSys'20)
- Depth-aware Finger Tapping on Virtual Display via Camera/Ultrasound Fusion (MobiSys 18)

2. HCI Systems using Ultrasound Signals

- One-shot Learning for In-air Gesture (INFOCOM'20, TMC'22)
- Sensing Touch Gestures (MobiCom'18)
- In-air Gesture Tracking (MobiCom'16, SECON'18, TMC'19) **MIT Technology Review**

3. Healthcare and Environmental Sensing using Ultrasound

- Ultrasound-based ambient temperature-field monitoring (UbiComp'22)
- Ultrasound-based long-range vital sign (respiratory and heartbeat) monitoring (UbiComp'22)

4. IoT Security & Privacy

- Speech Privacy Protection against Voice Assistant (SenSys'20)
- LTE based Keystroke Monitoring (INFOCOM'20)
- Heartbeat-based Authentication (UbiComp'18)

SELECTED PUBLICATION

Conference Papers:

1. VECTOR: Velocity Based Temperature-field Monitoring with Distributed Acoustic Devices
Haoran Wan, Lei Wang, Ting Zhao, **Ke Sun**, Shuyu Shi, Haipeng Dai, Guihai Chen, Haodong Liu, Wei Wang
ACM IMWUT (UbiComp) 2022, Sep 2022.

2. LoEar: Push the Range Limit of Acoustic Sensing for Vital Sign Monitoring
Lei Wang, Wei Li, **Ke Sun**, Fusang Zhang, Tao Gu, Chenren Xu, Daqing Zhang
ACM IMWUT (UbiComp) 2022, Sep 2022.
3. UltraSE: Single-Channel Speech Enhancement Using Ultrasound
Ke Sun, Xinyu Zhang
ACM MobiCom 2021, Oct 2021.
4. ExGSense: Toward Facial Gesture Sensing and Reconstruction with a Sparse Near-Eye Sensor Array
Chen Chen, **Ke Sun**, Xinyu Zhang
ACM/IEEE IPSN 2021, May 2021.
5. “Alexa, Stop Spying on Me”: Speech Privacy Protection Against Voice Assistants
Ke Sun, Chen Chen, Xinyu Zhang
ACM SenSys 2020, Nov 2020.
6. milliEgo: Single-chip mmWave Radar Aided Egomotion Estimation via Deep Sensor Fusion
Chris Xiaoxuan Lu, Muhamad Risqi U. Saputra, Peijun Zhao, Yasin Almalioglu, Pedro P. B. de Gusmao, Changhao Chen, **Ke Sun**, Niki Trigoni, Andrew Markham
ACM SenSys 2020, Nov 2020.
7. Dynamic Speed Warping: Similarity-Based One-shot Learning for Device-free Gesture Signals
Xun Wang, **Ke Sun**, Ting Zhao, Wei Wang, Qing Gu
IEEE INFOCOM 2020, Apr 2020.
8. SpiderMon: Towards Using Cell Towers as Illuminating Sources for Keystroke Monitoring
Kang Ling, Yuntang Liu, **Ke Sun**, Wei Wang, Lei Xie, Qing Gu
IEEE INFOCOM 2020, Apr 2020.
9. VSkin: Sensing Touch Gestures on Surfaces of Mobile Devices Using Acoustic Signals
Ke Sun, Ting Zhao, Wei Wang, Lei Xie
ACM MobiCom 2018, Oct 2018.
10. Unlock With Your Heart: Heartbeat-based Authentication on Commercial Mobile Phones
Lei Wang, Kang Huang, **Ke Sun**, Wei Wang, Chen Tian, Lei Xie, Qing Gu
ACM IMWUT (UbiComp) 2018, Oct 2018.
11. Charging Task Scheduling for Directional Wireless Charger Networks
Haipeng Dai, **Ke Sun**, Alex X. Liu, Lijun Zhang, Jiaqi Zheng and Guihai Chen
ACM ICPP, Aug 2018.
12. Depth Aware Finger Tapping on Virtual Displays
Ke Sun, Wei Wang, Alex X. Liu, Haipeng Dai
ACM MobiSys 2018, Jun 2018.
13. WiTrace: Centimeter-Level Passive Gesture Tracking Using WiFi Signals
Lei Wang, **Ke Sun**, Haipeng Dai, Alex X. Liu, Xiaoyu Wang
IEEE SECON 2018, Jun 2018.
14. Device-free Gesture Tracking Using Acoustic Signals
Wei Wang, Alex X. Liu, **Ke Sun**
ACM MobiCom 2016, Oct 2016. (MIT Technology Review)

Journal Papers:

1. DSW: One-shot Learning Scheme for Device-free Acoustic Gesture Signals
Xun Wang, **Ke Sun**, Ting Zhao, Wei Wang, Qing Gu
IEEE Transactions on Mobile Computing, 2022.

2. Charging Task Scheduling for Directional Wireless Charger Networks
Haipeng Dai, **Ke Sun**, Alex X. Liu, Lijun Zhang, etc.
IEEE Transactions on Mobile Computing, 2020.
3. WiTrace: Centimeter-Level Passive Gesture Tracking Using OFDM Signals
Lei Wang, **Ke Sun**, Haipeng Dai, Wei Wang, Kang Huang, etc.
IEEE Transactions on Mobile Computing, 2019.

(Full List)

EXPERIENCE

Internship

- Applied Scientist Intern, Amazon Lab126 *Jun 2022 - Sep 2022*
- Applied Scientist Intern, Amazon Lab126 *Jun 2021 - Sep 2021*

Shadow Program Committee

- 2022 ACM SenSys

Reviewer

- 2022 IEEE ICASSP, ACM IMWUT (UbiComp), IEEE TMC
- 2021 ACM TOSN, IEEE TMC, ACM MobileHCI
- 2020 IEEE TMC, ACM IMWUT (UbiComp)

SELETED HONORS

- ACM MobiCom Student Travel Grant 2021
- ACM SenSys Best Poster Runner-up 2020
- ACM MobiSys Student Travel Grant 2018
- Graduate China National Scholarship (Top 3 out of 200) 2018
- Undergraduate Achievement Award (Top 20 out of 3000) 2016
- Outstanding Undergraduate Award (Top 10 out of 3000) 2016
- Undergraduate President Award (Top 10 out of 3000) 2015
- Undergraduate China National Scholarship 2014

SELETED AWARDS

- 2017 China National College Competition on Internet of Things **Finals First Prize**
Project: Ultrasound based Sensing Applications for Mobile Devices Oct 2017
- 2015 ACM-ICPC Asia Regional Contest(Chang Chun Site) **Gold Medal** Oct 2015