JUNFENG GUAN

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RESEARCH INTERESTS

Wireless Networks, Computer Systems, Internet of Things, RF/mmWave Circuits, Machine Learning

EDUCATION

École Polytechnique Fédérale de Lausanne (EPFL) Mar. 2023 - Present
Postdoctoral Researcher - SENS Lab *Advisor: Prof. Haitham Hassanieh*

University of Illinois Urbana-Champaign May. 2017 - Aug. 2022
Doctor of Philosophy in Electrical and Computer Engineering *Advisor: Prof. Haitham Hassanieh*
Thesis: High-Performance Wireless Perception Using Deep Learning and MEMS Devices [pdf]

University of Illinois Urbana-Champaign Aug. 2013 - May. 2017
Bachelor of Science in Electrical Engineering (with Highest Honors) *Advisor: Prof. Songbin Gong*

MAIN CONFERENCE AND JOURNAL PUBLICATIONS

15. **[Preprint'23]** Y. Hao*, S. Madani*, J. Guan, M. Alloulah, S. Gupta, H. Hassanieh. "Bootstrapping Autonomous Radars with Self-Supervised Learning." *arXiv*, 2023. (*coprimary authors)

14. **[ICASSP'23]** Junfeng Guan, Sohrab Madani, Waleed Ahmed, Samah Hussien, Saurabh Gupta, Haitham Hassanieh. "Exploiting Virtual Array Diversity For Accurate Radar Detection." *IEEE International Conference on Acoustics, Speech and Signal Processing*, 2023. [pdf]

13. **[IPSN'23]** Ishani Janveja, Jiaming Wang, Junfeng Guan, Suraj Jog, Haitham Hassanieh. "WINC: A Wireless IoT Network for Multi-Noise Source Cancellation." *ACM/IEEE International Conference on Information Processing in Sensor Networks*, 2023. [pdf]

12. **[ECCV'22]** Junfeng Guan*, Sohrab Madani*, Waleed Ahmed*, Saurabh Gupta, Haitham Hassanieh. "Radatron: Accurate Detection Using Multi-Resolution Cascaded MIMO Radar." *European Conference on Computer Vision*, 2022. [pdf] (*coprimary authors)

11. **[NSDI'22]** Suraj Jog, Junfeng Guan, Sohrab Madani, Ruochen Lu, Songbin Gong, Haitham Hassanieh. "Enabling IoT Self-Localization Using Ambient 5G Signals." *USENIX Symposium on Networked Systems Design and Implementation*, 2022. [pdf]

10. **[NSDI'21]** Junfeng Guan, Jitian Zhang, Ruochen Lu, Hyungjoo Seo, Jin Zhou, Songbin Gong, Haitham Hassanieh. "Efficient Wideband Spectrum Sensing Using MEMS Acoustic Resonators." *USENIX Symposium on Networked Systems Design and Implementation*, 2021. [pdf] [ACM SIGMOBILE Research Highlights]

9. **[TMTT'21]** Junfeng Guan, Arun Paidimarri, Alberto Valdes-Garcia, Bodhisatwa Sadhu. "3D Imaging Using Millimeter Wave 5G Signal Reflections." *IEEE Transactions on Microwave Theory and Techniques*, 2021. [pdf]

8. **[CVPR'20]** Junfeng Guan, Sohrab Madani, Suraj Jog, Saurabh Gupta, Haitham Hassanieh. "Through Fog High Resolution Imaging Using Millimeter Wave Radar." *IEEE Conference on Computer Vision and Pattern Recognition*, 2020. [pdf]

7. **[RFIC'20]** Junfeng Guan, Arun Paidimarri, Alberto Valdes-Garcia, Bodhisatwa Sadhu. "3D Imaging using mmWave 5G Signals." *IEEE Radio Frequency Integrated Circuits Symposium*, 2020. [pdf] [Best Industrial Paper Finalists]

6. **[NSDI'19]** Suraj Jog, Jiaming Wang, Junfeng Guan, Thomas Moon, Haitham Hassanieh, Romit Roy Choudhury. "Many-to-Many Beam Alignment in Millimeter Wave Networks." *USENIX Symposium on Networked Systems Design and Implementation*, 2019. [pdf]

5. **[VLSI'19]** Thomas Moon, Junfeng Guan, Haitham Hassanieh. "Online Millimeter Wave Phased Array Calibration Based on Channel Estimation." *IEEE VLSI Test Symposium*, 2019. [pdf]

4. **[SIGCOMM'18]** Sheng Shen, Nirupam Roy, Junfeng Guan, Haitham Hassanieh, Romit Roy Choudhury. "MUTE: Bringing IoT to Noise Cancellation." *ACM SIGCOMM*, 2018. [pdf]

3. **[IMS'17]** Brandon Arakawa, Liuqing Gao, Yansong Yang, Junfeng Guan, Anming Gao, Ruochen Lu, Songbin Gong. "Simultaneous Wireless Power Transfer and Communication to Chip-Scale Devices." *IEEE International Microwave Symposium*, 2017. [pdf]

2. **[IMS'17]** Ali Kourani, Yong-Ha Song, Brandon Arakawa, Ruochen Lu, Junfeng Guan, Anming Gao, Songbin Gong. "A 150 MHz Voltage Controlled Oscillator using Lithium Niobate RF-MEMS Resonator." *IEEE International Microwave Symposium*, 2017. [pdf]

POSTERS AND ARTICLES

4. **[SIGCOMM'22 Poster]** Junfeng Guan, Suraj Jog, Sohrab Madani, Ruochen Lu, Songbin Gong, Haitham Hassanieh. "Enabling IoT Self-Localization Using Ambient 5G mmWave Signals." *ACM SIGCOMM*, 2022. [pdf]

3. **[GetMobile'21]** Junfeng Guan, Jitian Zhang, Ruochen Lu, Hyungjoo Seo, Jin Zhou, Songbin Gong, Haitham Hassanieh. "Efficient Wideband Spectrum Sensing Using MEMS Acoustic Resonators." *ACM GetMobile: Mobile Computing and Communications*, 2021. [pdf]

2. **[IEEE D&T'20]** Thomas Moon, Junfeng Guan, Haitham Hassanieh. "Know Your Channel First, then Calibrate Your mmWave Phased Array." *IEEE Design & Test Magazine*, 2020. [pdf]

1. **[MobiCom'18 Poster]** Sheng Shen, Nirupam Roy, Junfeng Guan, Haitham Hassanieh, Romit Roy Choudhury. "Networked Acoustics Around Human Ears." *ACM MobiCom*, 2018. [pdf]

SELECTED HONORS AND AWARDS

ACM SIGMOBILE Research Highlights	2021
Qualcomm Innovation Fellowship [website]	2020
RFIC'20 Industry Best Paper Finalists	2020
Highest Honors at Graduation, UIUC ECE	2017
Edward C. Jordan Award, UIUC ECE	2017

PATENTS

L3. Saeed Reza Khosravirad, Junfeng Guan, Harish Viswanathan, Jakub Sapis. "Resource Allocation in Joint Communication and Sensing." *Patent Pending: US-20230284122-A1*, 2023.[pdf]

L2. Junfeng Guan, Bodhisatwa Sadhu, Arun Paidimarri, Asaf Tzadok, Alberto Valdes Garcia. "Imaging With Wireless Communication Signals." *Patent Pending: US-20210215814-A1*, 2021.[pdf]

L1. Junfeng Guan, Sohrab Madani, Suraj Jog, Saurabh Gupta, Haitham Hassanieh. "Neural Network-Based Millimeter-Wave Imaging System." *Patent Granted: US-20210192762-A1*, 2021.[pdf]

PROFESSIONAL EXPERIENCE

Nokia Bell Labs — Jun. 2021 - Aug. 2021
Radio Systems Bell Labs Summer Intern — *Murray Hill, NJ (Remote)*

- Developed channel modeling, waveform simulation, and signal processing pipeline for JCAS in 5G/6G.
- Designed and implemented an object detection neural network for traffic monitoring in a JCAS system.
- Publications & Patents: L3.

IBM Research May. 2019 - Aug. 2019
Graduate Research Intern *Thomas J. Watson Research Center, Yorktown Heights, NY*

- Designed a high-resolution 3D imaging system using 5G-compatible OFDM-based JCAS waveforms.
- Built a JCAS-enabled 5G base station prototype using 28 GHz software-defined phased array radio.
- Publications & Patents: [TMTT'21], [RFIC'20], L2.

TEACHING EXPERIENCE

- Course Designing Team - Communications Project (EPFL COM 304) Sep. 2023 - Present
- Teaching Assistant - Wireless Communications (ZJU T&E USS 2020) Jul. 2020
- Teaching Assistant - Communication Networks (UIUC CS/ECE 438) Aug. 2019 - Dec. 2019
- Lab Teaching Assistant - Communication System Lab (UIUC ECE 463) Aug. 2018 - Dec. 2018

INVITED TALKS AND TUTORIALS

- "Pushing the Capabilities of Millimeter-Wave Imaging and Sensing with AI", *Workshop on AI/ML Techniques for Wireless Comm. and Radar*, *International Microwave Symposium (IMS)*, June, 2024.
- "Tutorial: Introduction to 4D Radar", *IEEE Intelligent Vehicles Symposium (IV)*, June, 2024.

SERVICES

- Shadow Program Committee - ACM SenSys 2022
- Conference Reviewer:
  - IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR) 2023, 2024
  - IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2024
  - IEEE Vehicular Technology Conference (VTC) 2023 Fall
  - International Conference on Computer Vision (ICCV) 2023
  - European Conference on Computer Vision (ECCV) 2022
  - IEEE Globecom Workshops 2022
- Journal Reviewer:
  - IEEE Transactions on Microwave Theory and Techniques (TMTT)
  - IEEE Transactions on Instrumentation and Measurement
  - IEEE Transactions on Mobile Computing
  - IEEE Network Magazine
  - IEEE Access
  - International Journal of Wireless Information Networks
- Panelist - ACM S^3 2023 Workshop

SUPERVISION OF JUNIOR RESEARCHERS

- Camilla De Zan, EPFL Master's Thesis Project, Spring 2024
- Yiduo Hao. "Bootstrapping Autonomous Radars with Self-Supervised Learning." *Under Rev.*, 2024.
- Franck Khayat, EPFL Master's Semester Project, Fall 2023
- Cyril Golaz, EPFL Master's Semester Project, Fall 2023
- Dhairya Jigar Shah, EPFL Summer Intern, Summer 2023
- Chagari Koushal Kumar Reddy, EPFL Summer Intern, Summer 2023
- Jeremy Joël Weill. "CubeSAT X-Band SDR Design." *EPFL Master's Semester Project*, 2023.

- Samah Hussien. "Exploiting Virtual Array Diversity For Accurate Radar Detection." *ICASSP*, 2023.
- Ishani Janveja. "WINC: A Wireless IoT Network for Multi-Noise Source Cancellation." *IPSN*, 2022.
- Waleed Ahmed. "Accurate Detection for Self-Driving Cars Using Multi-Resolution MIMO Radar." *UIUC CS Master's Thesis*, 2022.
- Jitian Zhang. "Mitigating Radar Interference via Time Hopping." *UIUC ECE Master's Thesis*, 2022.
- Akshay Bhamidipati. "A Wireless Approach to Streaming of XR Traffic." *UIUC Undergrad. Thesis*, 2022.
- Karthik Prasad. "Real-Time Spoofing of Radio Altimeters." *UIUC Undergrad. Independent Study*, 2022.
- Hailan Shanbhag. "A Scalable Software-Defined Phased Array Using Commercial 60 GHz Chipset." *UIUC Undergrad. Thesis*, 2021.
- Luting Chen. "High-Resolution Millimeter-Wave Imaging for Humans." *UIUC Undergrad. Thesis*, 2019.

EXTRACURRICULAR & LEADERSHIP ACTIVITIES

UIUC US-China Innovation and Development Forum — Jan. 2016 - Apr. 2017
Co-Founder & Executive President — *Urbana, IL*

New Student Program at UIUC — Apr. 2015 - Sep. 2016
Orientation Leader — *Urbana, IL*

Chinese Students and Scholars Association (CSSA) at UIUC — Aug. 2013 - May 2017
Vice President, Secretary General — *Urbana, IL*

Overseas China Education Foundation (OCEF) — Jul. 2014 - Aug. 2014
Volunteer Teacher — *Huining County, Gansu Province, China*

REFERENCES

- **Prof. Haitham Hassanieh**
  Associate Professor, École Polytechnique Fédérale de Lausanne (EPFL)
  School of Computer and Communication Sciences
  Website: https://people.epfl.ch/haitham.alhassanieh
- **Prof. Romit Roy Chouhury**
  Professor, University of Illinois Urbana-Champaign
  Department of Electrical and Computer Engineering & Computer Science
  Website: http://croy.web.engr.illinois.edu
- **Prof. Saurabh Gupta**
  Assistant Professor, University of Illinois Urbana-Champaign
  Department of Electrical and Computer Engineering
  Website: http://saurabhg.web.illinois.edu
- **Prof. Songbin Gong**
  Associate Professor, University of Illinois Urbana-Champaign
  Department of Electrical and Computer Engineering
  Website: http://ilirm.ece.illinois.edu/a_professor.html
- **Dr. Alberto Valdes Garcia**
  Principal Research Scientist, IBM T. J. Watson Research Center
  Manager, RF Circuits and Systems
  Website: https://researcher.watson.ibm.com/researcher/view.php?person=us-avaldes