

# TENG WEI

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## RESEARCH INTEREST

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- **Wireless Systems and Networking:** Designing and implementing next-generation wireless network architectures (based on millimeter-wave, 5G, vehicular networks, large-scale distributed MIMO, and physical-layer informed protocols)
- **Mobile and Ubiquitous Computing:** Designing and implementing ubiquitous sensing systems for Internet-of-Things applications (virtual/augmented reality, smart homes/buildings, wireless health, and 3D human-mobile interaction)

## EDUCATION

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**University of Wisconsin – Madison** *Sep. 2013 – Aug. 2018*

PhD. Dissertator, Electrical and Computer Engineering

Advisor: Professor Xinyu Zhang

Thesis: Designing Sensing-Augmented Wireless Systems for the Internet of Things

Research Area: Wireless Networking, Millimeter-wave Networks, Wireless Sensing/Tracking and Human-mobile Interaction.

Graduate Courses: Real-time Computing System, Machine Learning, Mobile and Wireless Networking, Wireless Communications, Probability Theory and Stochastic Processes, etc.

**Shanghai Jiao Tong University, China** *Sep. 2009 – Jun. 2013*

B.S., Electrical Engineering

Overall GPA: 90.40/100, Ranking: 4/230

Undergraduate Courses: Communication Principles, Signals and Systems, Data Structure, EM Fields and Waves, Digital Signal Processing, Computer Network, etc.

## EMPLOYMENT

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**Google** *Seattle, WA, USA*

Software Engineering. Manager: David Chu *Aug. 2018 – NOW*

Daydream, Virtual Reality. Remote cloud rendering and streaming.

**Google** *Seattle, WA, USA*

Software Engineering Intern. Host: David Chu, Zengbin Zhang *May 2017 – Sep. 2017*

Develop toolsets and conduct in-field experiments to evaluate, understand, and diagnose the performance of VR streaming over the wireless network.

**Microsoft Research** *Redmond, WA, USA*

Research Intern. Host: Krishna Chintalapudi, Yongguang Zhang *May 2016 – Aug. 2016*

Researched and built prototypes for 60 GHz wireless communication application.

## PUBLICATIONS

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### Conference Papers:

- [C14] Renjie Zhao, Timothy Woodford, **Teng Wei**, Xinyu Zhang, “*M<sup>3</sup>: A Massive MIMO Millimeter-Wave Software Radio*”, In submission to ACM International Conference on Mobile Computing and Networking (**MobiCom**), London, United Kingdom, Sep. 2020
- [C13] Yi Yang, Anfu Zhou, Dongzhu Xu, Shaoyuan Yang, Lele WU, Huadong Ma, **Teng Wei**, Jianhua Liu, “*mmMuxing: Pushing the Limit of Spatial Reuse in Directional Millimeter-wave Wireless Networks*,” In submission to IEEE Conference on Computer Communications (**INFOCOM**), Beijing, China, Apr. 2020
- [C12] Anfu Zhou, Shaoqing Xu, Song Wang, Jingqi Huang, Shaoyuan Yang, **Teng Wei**, Xinyu Zhang, Huadong Ma, “*Robot Navigation in Radio Beam Space: Leveraging Robotic Intelligence for Seamless mmWave Network Coverage*,” Proceedings of the Twentieth ACM International Symposium on Mobile Ad Hoc Networking and Computing (**MobiHoc**), Catania, Italy, Jul. 2019  
(37 out of 156 submissions, acceptance ratio: 23.7%)
- [C11] Anfu Zhou, Leilei Wu, Shaoqing Xu, Huadong Ma, **Teng Wei**, and Xinyu Zhang, “*Following the Shadow: Agile 3-D Beam-Steering for 60 GHz Wireless Networks*,” IEEE Conference on Computer Communications (**INFOCOM**), Honolulu, HI, USA, Apr. 2018  
(309 out of 1606 submissions, acceptance ratio: 19.2%)
- [C10] **Teng Wei** and Xinyu Zhang, “*Pose Information Assisted 60 GHz Networks: Towards Seamless Coverage and Mobility Support*,” ACM International Conference on Mobile Computing and Networking (**MobiCom**), Snowbird, Utah, USA, Oct. 2017  
(35 out of 186 submissions, acceptance ratio: 19%)
- [C9] **Teng Wei** and Xinyu Zhang, “*Facilitating Robust 60 GHz Network Deployment By Sensing Ambient Reflectors*,” USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Boston, MA, USA, Mar. 2017  
(46 out of 253 submissions, acceptance ratio: 18%)
- [C8] **Teng Wei** and Xinyu Zhang, “*Gyro in the Air: Tracking 3D Orientation of Batteryless Internet-of-Things*,” ACM International Conference on Mobile Computing and Networking (**MobiCom**), New York, NY, USA, Oct. 2016  
(32 out of 226 submissions, acceptance ratio: 14%)
- [C7] **Teng Wei** and Xinyu Zhang, “*Random Access Signaling for Network MIMO Uplink*,” IEEE Conference on Computer Communications (**INFOCOM**), San Francisco, CA, USA, Apr. 2016  
(300 out of 1644 submissions, acceptance ratio: 18%)
- [C6] **Teng Wei**, Shu Wang, Anfu Zhou and Xinyu Zhang, “*Acoustic Eavesdropping through Wireless Vibrometry*,” ACM International Conference on Mobile Computing and Networking (**MobiCom**), Paris, France, Sep. 2015  
(38 out of 207 submissions, acceptance ratio: 18%)
- [C5] **Teng Wei**, and Xinyu Zhang, “*mTrack: High-Precision Passive Tracking Using Millimeter Wave Radios*,” ACM International Conference on Mobile Computing and Networking (**MobiCom**), Paris, France, Sep. 2015  
(38 out of 207 submissions, acceptance ratio: 18%)
- [C4] Anfu Zhou, **Teng Wei**, Xinyu Zhang, Min Liu and Zhongcheng Li, “*Signpost: Scalable MU-MIMO Signaling with Zero CSI Feedback*,” ACM International Symposium on Mobile Ad Hoc Networking and Computing (**MobiHoc**), Hangzhou, China, Jun. 2015  
(37 out of 250 submissions, acceptance ratio: 14.8%)

- [C3] **Teng Wei**, Sanjib Sur, and Xinyu Zhang, “*Bringing Multi-Antenna Gain to Energy-Constrained Wireless Devices*,” ACM/IEEE Conference on Information Processing in Sensor Networks (**IPSN**), Seattle, WA, USA, Apr. 2015  
(316 out of 1640 submissions, acceptance ratio: 19.2%)
- [C2] **Teng Wei**, Sanjib Sur, and Xinyu Zhang, “*Autodirective Audio Capturing Through a Synchronized Smartphone Array*,” ACM International Conference on Mobile Systems, Applications, and Services (**MobiSys**), Bretton Woods, NH, USA, Jun. 2014  
(25 out of 185 submissions, acceptance ratio: 13.5%)
- [C1] **Teng Wei**, Gaofei Sun, Xinbing Wang and Mohsen Guizani, “*Opportunistic Access for Cooperative Cognitive Radio Networks with Requirement Constraint*,” IEEE International Conference on Communications (**ICC**), Budapest, Hungary, Jun. 2013  
(948 out of 2422 submissions, acceptance rate 39.1%)

#### Journal:

- [J2] Anfu Zhou, **Teng Wei**, Xinyu Zhang, Huadong Ma, “*Guidepost: Scalable MU-MIMO User Selection via Indirect Channel Orthogonality Evaluation*,” IEEE Transactions on Mobile Computing (TMC) 18 (7), 1556-1570 2019
- [J1] Anfu Zhou, **Teng Wei**, Xinyu Zhang, Huadong Ma, “*FastND: Accelerating Directional Neighbor Discovery for 60-GHz Millimeter-Wave Wireless Networks*,” IEEE/ACM Transactions on Networking (TON) 26 (5), 2282-2295, 2018

#### Book Chapter:

- [B1] **Teng Wei**, Xinyu Zhang, “*Chapter 11: Repurposing Millimeter-Wave Communication Devices for High-Precision Wireless Sensing*,” In submission to The Institution of Engineering and Technology (IET). Book title “Short-Range Micro-Motion Sensing: Hardware, signal processing and machine learning”

#### Invited Paper:

- [I1] **Teng Wei**, and Xinyu Zhang, “*Gyro in the Air: Tracking 3D Orientation of Batteryless Internet of Things*,” GetMobile: Mobile Comp. and Comm., May 2017

#### Demo:

- [D1] **Teng Wei**, and Xinyu Zhang, “*Tracking Orientation of Batteryless Internet-of-Things Using RFID Tags: Demo*,” ACM International Conference on Mobile Computing and Networking (**MobiCom**), New York, NY, USA, Oct. 2016

#### Poster:

- [R5] Arunkumar Ravichandran, Ish Kumar Jain, Rana Hegazy, **Teng Wei**, Dinesh Bharadia, “*Facilitating Low Latency and Reliable VR over Heterogeneous Wireless Networks*,” Proceedings of the 24th Annual International Conference on Mobile Computing and Networking (MobiCom). 2018
- [R4] Chuhan Gao, **Teng Wei**, Xinyu Zhang, Suman Banerjee, “*Multipath Content Delivery Framework for Legacy WiFi and WiGig Networks*,” Third Workshop of NSF Millimeter-Wave RCN, Tucson, AZ, USA, Jan. 2018
- [R3] **Teng Wei**, and Xinyu Zhang, “*Enabling Seamless Coverage and Mobility Support for 60 GHz Networks*,” Western Electrical and Computer Engineering Department Heads Association, San Diego, CA, USA, Nov. 2017

- **[R2] Teng Wei**, and Xinyu Zhang, “*Pose Information Assisted 60 GHz Networks: Towards Seamless Coverage and Mobility Support*,” CWC Research Review and Planning Meeting, San Diego, CA, USA, Nov. 2017
- **[R1] Teng Wei**, and Sanjib Sur, “*Dia: AutoDirective Audio Capturing Through a Synchronized Smartphone Array*,” Qualcomm Innovation Competition, Madison, WI, USA, Apr. 2014

#### Patents:

- **[P4]** Xinyu Zhang, **Teng Wei**, Shu Wang, Anfu Zhou, “*Wireless Vibrometer with Antenna Array*,” U.S. Utility Patent No. 15/185,692, 2017
- **[P3]** Xinyu Zhang, Sanjib Sur, and **Teng Wei**, “*Radio Frequency Communication with Antenna Index Coding*,” U.S. Utility Patent No. 14/921346, 2015
- **[P2]** Gaofei Sun, **Teng Wei** and XinXin Feng, “*Global Sensing Information Aided Opportunistic Spectrum Access in Cognitive Radio Networks*,” China Patent No. 201210166476.3, 2012
- **[P1]** Xinping Guan, Yanxi Wang, Cailian Chen, **Teng Wei**, and Suyan Wang, “*Three Dimensional Localization and Remote Query System Based on Wireless Sensor Networks*,” China Patent No. 201210054563.X, 2011

#### ADVISING & MENTORING

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<b>Fall 2019</b>	Qianru Li, Google Summer Intern
<b>Fall 2018</b>	Nicholas Lunceford, Google Engineering Resident
<b>Fall 2017</b>	Sungen Chiu Sequential Search for mmWave Initial Access with Single RF-chain and 1-bit ADC
<b>Fall 2017</b>	Arunkumar Ravichandran Scalable Millimeter Wave Communication
<b>Fall 2017</b>	Chuhan Gao Multipath Content Delivery Framework for Legacy WiFi and WiGig Networks
<b>Fall 2016</b>	Jialiang Zhang 60 GHz Software Radio Platform With a Reconfigurable Phased-Array Antenna
<b>Fall 2016</b>	Burak Varici Tracking 3D Orientation of Batteryless Internet-of-Things [C8]
<b>Fall 2015</b>	Shu Wang Autodirective Audio Capturing Through a Synchronized Smartphone Array [C6]

#### TEACHING EXPERIENCE

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<b>Fall 2016</b>	Title: Tracking 3D Orientation of Batteryless Internet-of-Things Guest Lecturer, Mobile and Wireless Networking, CS/ECE 707
<b>Fall 2015</b>	Title: High-Precision Passive Tracking Using Millimeter Wave Radios Guest Lecturer, Mobile Computing Laboratory, ECE 454
<b>2010–2012</b>	Study Representative of Administrative Class Electrical Engineering, Shanghai Jiao Tong University

## INVITED TALKS

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- Oct. 2017** Title: Towards Seamless Coverage and Mobility Support for 60 GHz Millimeter-wave Networks  
1st ACM Workshop on Millimeter-Wave Networks and Sensing Systems, Snowbird
- Sep. 2017** Title: Towards Untethered VR Streaming  
Google, Seattle
- Sep. 2016** Title: Tracking 3D Orientation of Batteryless Internet-of-Things  
Computer Engineering Seminar, ECE Department, Madison
- Oct. 2015** Title: Acoustic Eavesdropping through Wireless Vibrometry  
Computer Engineering Seminar, ECE Department, Madison
- Apr. 2014** Title: Autodirective Audio Capturing Through a Synchronized Smartphone Array  
Computer Engineering Seminar, ECE Department, Madison

## HONORS AND AWARDS

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- 2017** Student Travel Grant Award – NSDI 2017
- 2016** Student Travel Grant Award – INFOCOM 2016
- 2015** Student Travel Grant Award – MobiCom 2015
- 2014** Finalist in Qualcomm Innovation Competition
- 2013–2014** Chancellor’s Opportunity Fellowship, University of Wisconsin - Madison
- 2010–2012** Model Student of Academic Records Scholarship in SJTU, Level B (Top 5%)
- 2010–2011** Toshiba Scholarship (Top 2%)
- 2010–2011** Contemporary Undergraduate Mathematical Contest in Modeling (3rd Place)
- 2009–2010** National Scholarship (Top 1%)
- 2009–2010** Model Student of Academic Records Scholarship in SJTU, Level A (Top 1%)
- 2009–2010** 27th National Undergraduate Physics Competition (2nd Place)

## TECHNICAL STRENGTHS

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- Computer Languages** C/C++, Python, C#, Matlab, Shell, Java, Latex, HTML, PHP
- Software Skills and Platforms** WARPLab software-defined radio, USRP and GNUradio  
Linux wireless driver and networking stacks  
Impinj RFID system  
Socket networking programming in Linux  
Embedded system development on ARM platform  
NS-3 network simulation

## PROFESSIONAL SERVICE

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**2017** ACM S3 Workshop Chair  
**2017** MobiSys PhD Forum TPC member  
**2014–2017** External Reviewer of conferences and journals  
 IEEE SECON 2014-2016  
 ACM CHI 2017  
 ACM CoNext 2015 and 2017  
 ACM HotWireless 2014-2016  
 IEEE ICNP 2015-2017  
 IEEE INFOCOM 2016-2018  
 ACM MobiCom 2015-2017  
 ACM SIGCOMM 2017  
 IEEE Transactions on Networking  
 IEEE Transactions on Wireless Communications  
**2016–2017** Reviewer of IEEE Sensors 2017  
 IEEE Transactions of Signal Processing 2016  
**2018** IEEE Transactions on Mobile Computing  
 Daydream Research  
 Google Faculty Award

## REFEREES

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