Personal Information

Name	Ambuj Varshney
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Overview

I founded the WEISER group at the National University of Singapore.

- **Mentorship:** Currently advise **six** PhD students and **three** master's students. Graduated **one** PhD student, **two** postdoctoral researchers, **sixteen** master's students, and supervised over **twenty** undergraduate students.
- **Funding:** Secured over **1.2 million USD** across **seven** grants, including a Google Research Scholar Award and the ABB Research Award (300,000 USD)—the largest endowment by a commercial organization for early-career researchers.
- **Publications:** Published in flagship venues such as ACM MobiCom, MobiSys, SenSys, IEEE/ACM Transactions on Networking, and IMWUT. Received a Best Paper Award and multiple Best Demonstration Awards.
- **Industry Impact:** International Patent (Sole Inventor) cited as foundational prior art by **14+** patents from Nokia, Vivo Mobile, KAIST, and Oppo.
- **Teaching:** Courses in embedded systems and wireless networking.

Academic Appointments and Experience

2022–Present **National University of Singapore**
Assistant Professor
Department of Computer Science
School of Computing

2020–2022 **University of California, Berkeley**
Postdoctoral Scholar
Mentor: Prof. Prabal Dutta

2021 **Royal Institute of Technology (KTH)**
Visiting Researcher (on leave from UC Berkeley)

2018–2020 **Uppsala University**
Postdoctoral Scholar

2012 **NXP Semiconductors**
Software Engineer
Embedded Wireless Networks / Low-Power Wireless Group

2011–2012 **Dhirubhai Ambani Institute of ICT**
Research Engineer
Networked Embedded Systems Lab
Mentor: Prof. Prabhat Ranjan (Ph.D., UC Berkeley, 1986)

Education

2012–2018 **Ph.D., Computer Science**
Uppsala University
Dissertation: *Enabling Sustainable Networked Embedded Systems*
Advisor: Prof. Thiemo Voigt (Uppsala University and RI.SE SICS, Sweden)
Co-advisor: Prof. Luca Mottola (Politecnico di Milano, Italy and RI.SE SICS, Sweden)
Opponent: Prof. Prabal Dutta (University of California, Berkeley, USA)
Honors: Dissertation awarded the ABB Research Award in Honor of Hubertus von Grünberg (2019).
Selection rate: approximately 1 in 60.
Endowment of 300,000 USD.

2007–2011 **B.Tech., Information and Communication Technology**
Dhirubhai Ambani Institute of Information and Communication Technology

Research Grants

2024 **From Supply Chains to Personal Belongings: Designing Zero-Battery Trackers**.
Google Research Scholar Award.
Role: Principal Investigator (Sole PI).
Amount: 35,000 USD (Unrestricted Gift).

2023–2026 **Tackling the Challenge of Energy-Efficient Reception to Enable the Next Billion IoT Devices**.
Ministry of Education (Singapore) Tier 1 Grant.
Role: Principal Investigator (Sole PI).
Amount: 250,000 SGD.

2022–2025 **Enabling Continuous, Real-time Monitoring of Human Vitals through Battery-free Tunnel Diode Sensors**.
NUS ARTIC Center.
Role: Principal Investigator (Sole PI).
Amount: 214,000 SGD.

2022–2024 **Enabling Non-Intrusive Monitoring of Internet of Things**.
NUS-NCS Joint Center.
Role: Principal Investigator (PI) with Co-PI Shantanu (NCS).
Amount: 465,000 SGD.

2022–2026 **Enabling Sustainable and Large-Scale Wireless Networks of Embedded Systems**.
NUS ODPRT (Start-up Grant).
Role: Principal Investigator (Sole PI).
Amount: 250,000 SGD.

2019–2022 **Towards Future Factories: Enabling Sustainable Sensing**.
ABB Research Award in Honor of Hubertus von Grünberg.
Role: Awardee (Hosted at UC Berkeley).
Amount: 300,000 USD.

2018–2019 **Enabling Factories of the Future Using Sustainable Sensing**.
VINNOVA (Swedish Innovation Agency).
Role: Principal Investigator (Sole PI).
Hosted at Uppsala University.
Amount: 499,000 SEK (approx. 50,000 USD).

Awards and Honors

Research Awards

2024 **Google Research Scholar Award**.

Proposal: *From Supply Chains to Personal Belongings: Designing Zero-Battery Trackers*.

The only faculty member outside North America awarded in the Systems and Networking category for this year.

2024 **Best Demonstration Award (Runner-up)**.

ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN).

2023 **Best Demonstration Award**.

ACM International Conference on Mobile Systems, Applications, and Services (MobiSys).

2021 **FORM+FUND Fellow**.

University of California, Berkeley (Spring Cohort).

2019 **ABB Research Award in Honor of Hubertus von Grünberg**.

Recipient of a 300,000 USD endowment.

Awarded by Peter Voser (Chairman/CEO of ABB).

The largest endowment offered by a commercial organization for early-career researchers.

2019 **Attractive Innovation Project**.

Uppsala University Innovation (Selected as Top 15 Project).

2018 **Breakthrough Ideas Grant**.

Swedish Innovation Agency (Vinnova).

2018 **Best Demonstration Award**.

ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec).

2017 **Best Paper Award**.

ACM Workshop on Visible Light Communication Systems (VLCS), co-located with MobiCom.

Honors to Mentored Students

2025 **Rising Star** (Awarded to mentee Rajashekar).
ACM MobiSys 2025.

2024 **NUS Computing Innovation Prize** (Awarded to mentee Nobel Ng).
For Best Undergraduate Thesis.
Selected by NUS and Singapore Computer Society.

2023 **Winner, Undergraduate Category**.
ACM Student Research Competition (SRC) at MobiCom.

2023 **Third Place, Undergraduate Category**.
ACM Student Research Competition (SRC) at MobiCom.

2020–2021 **N^2Women Young Researcher Fellowship**.
Awarded to mentee Wenqing Yan (also Best Poster at SenSys 2020/2021).

2017 **Winner, Graduate Category**.
ACM Student Research Competition (SRC) at MobiCom.

Postdoctoral and Doctoral Supervision

Doctoral Students (Current)

2023–2027 **Pramuka Sooriyapatabandige** (NUS).
Role: Sole primary advisor.

2023–2027 **Chinthalapani Rajashekar Reddy** (NUS).
Role: Sole primary advisor.

2023–2028 **Kandala Savitha Viswanadh** (NUS).
Role: Sole primary advisor.

2024–2028 **Dhairya Shah** (NUS).
Role: Sole primary advisor.

2026–2030 **Spanddhana Sara** (NUS).
Role: Sole primary advisor.

2025–2030 **Anna Seiderer** (Uppsala University).
Role: Co-supervisor (with Prof. Christian Rohner).

Postdoctoral Researchers (Alumni)

2025–2026 **Dr. Amalinda Gamage**.
Background: Ph.D., Nanyang Technological University (with Prof. Mo Li).

2023–2024 **Dr. Manoj Gulati**.
Background: Ph.D., IIIT Delhi.
Visiting Scholar at University of Washington (with Prof. Shwetak Patel).
Placement: Principal Application Engineer, Western Digital.

Doctoral Students (Alumni)

2018–2024 **Dr. Wenqing Yan** (Uppsala University).
Co-supervised with Prof. Christian Rohner and Prof. Thiemo Voigt.
Thesis: *Design and Identification of Wireless Transmitters for a Low-Power and Secure IoT*.
Opponent: Prof. Haitham Hassanieh (EPFL).
Committee: Prof. Niki Trigoni (Oxford), Prof. Danny Hughes (KU Leuven).
Placement: Experienced Researcher, Ericsson Research, Sweden.

Master's Student Supervision (Thesis and Capstone)

Current Students (National University of Singapore)

2025–Present **Tikyi Min Khant Naing**.
Topic: Exploring machine learning (TinyML) on embedded devices.

2025–Present **Meng Xianyu**.
Topic: Rethinking embedded cameras using image and language models.

2025–Present **Li Shuaixian**.
Topic: Rethinking embedded cameras using image and language models.

Alumni (National University of Singapore)

2025 **Andre Teo Ser Yeong**
2025 **Huang Keyi**
2025 **Dennis Patrick Warfield**
2024 **Henrikus Theorizchy Cleven**
2024 **Hew Sock Fang**
2024 **Wu Zihao**
2024 **Chee Han Quan, Edison**
2023 **Qiao Yukai**
2023 **Yusril Izza**
2023 **Goh Sheen An**
2023 **Lim Soon Lee**

Alumni (Uppsala University)

2017–2019 **Andreas Soleiman**.
Thesis: Battery-free Visible Light Sensing.
Placement: Ph.D. Student at MIT (Prof. Fadel Adib).

2018 **Sam Hilamia**.
Thesis: Battery-free Radio Tomographic Imaging.
Placement: Ph.D. Student at Uppsala University.

2018 **Gustav Eriksson**.
Thesis: Towards Long-Range Backscatter Communication Using Tunnel Diode Amplifiers.
Placement: Engineer at Intertek Semko.

2016–2017 **Oliver Harms**.
Thesis: Modulation Schemes in Ambient Backscatter Communication.
Placement: Ph.D. Student at Chalmers University.

2016 **Elena Di Lascio**.
Thesis: A Battery-free Indoor Localization System.
Placement: Ph.D. Student at USI Lugano, Switzerland.

Undergraduate Supervision (UROP, Research)

2025 (Ongoing) **Koh Wei Long, Dylan**.
Project: Backhauling Networks and Internet of Things.

2025 **Chai Jia Xuan**.
Project: Networking mixed reality headsets through LiFi (visible light communication).

2024 **Zhang Lanyu**.
Project: Tracking of everyday activities from voice to vision using large language and image models.

Undergraduate Supervision (Final Year Projects)

Academic Year 2024/2025

Wang Minhong.
Project: Building an Embedded Operating System (Tiku).

Fu Yiqiao.
Project: Building an Embedded Operating System (Tiku).

Sean Wang.
Project: Earth Computers.

Daniel Goh Chin Hao.
Project: Backhauling Networks and Internet of Things.

Academic Year 2023/2024

Steven Antya Orvala Waskito.
Project: OTTER: Sensor Data Processing and Analysis Using Large Language Models (CEG).

Leong Huen Weng.
Project: Tracking of Everyday Activities from Voice to Vision Using Large Language Models (CEG).

Yang Jiacheng.
Project: Battery-free Sensing and Communication through Tunnel Diodes.

Goh Jun Yi.
Project: Networking Mixed Reality Headsets through LiFi.

Tan Guo Xuan, Marcus.
Project: Networking Mixed Reality Headsets through LiFi.

Tang Ethan Yidong.
Project: Networking Internet of Things through Backhauling Networks.

Kaemon Ng Chongyu.
Project: Networking Internet of Things through Backhauling Networks.

Li Po Hsien.

Project: Language Models Distributed on Edge Devices.

Academic Year 2022/2023

Lim Chang Quan Thaddeus.

Project: Heartbeat and Breathing Sensing Using Low-Power Wireless Signals (CEG).

Led to IEEE RFID 2024 publication.

Marcus Tang Xin Kye.

Project: Making Internet of Things Devices Interact with ChatGPT.

Heng Chen Kai, Darren.

Project: Sustainable Internet of Things on Capacitors.

Hu Yuxin.

Project: Brain Machine Interface.

Nobel Ang.

Project: Connecting IoT Devices to Edge and Cloud Devices.

Wong Chee Hong.

Project: Computing on Internet of Things Devices.

Juliet Teoh Qian Ying.

Project: Computing on Internet of Things Devices.

Research Assistants and Other Alumni

Simon Olofsson.

Role: Research Assistant.

Project: Convergecast Using Directional Antennas.

Achievement: Co-authored EWSN 2019 paper.

Placement: Ph.D. at Imperial College London; subsequently at Meta.

David Hakansson.

Role: Bachelor Thesis Student.

Thesis: Energy Harvesting Environment Control.

Academic Service

Conference Organization and Leadership

2026 Special Session Co-Chair, Beyond Conventional Backscatter (with Prof. Gregory Durgin), IEEE RFID.

2025 Posters and Demos Co-Chair, ACM EWSN (with Thomas Watteyne).

2023 Web Chair, ACM MobiCom.

2022 Session Chair, IEEE INFOCOM.

2020 Publicity Chair, IEEE SECON.

2019 Posters Co-Chair, ACM/IEEE IPSN (with Nirupama Bulusu).

2019 Panelist, Ph.D. Forum, ACM/IEEE IPSN (with Olga Saukh and Anthony Rowe).

Technical Program Committee Membership

2026 TPC Member ACM/IEEE SenSys, ACM MobiSys, IEEE SECON.

2025 TPC Member ACM SenSys, IEEE INFOCOM, ACM IMC.

2024 TPC Member ACM IMC, ACM SenSys, IEEE INFOCOM, ACM EWSN.

2019–2023 TPC Member IEEE INFOCOM (2021, 2022, 2023), ACM/IEEE IoTDI (2020, 2023), IEEE ICDCS (2019, 2021), IEEE DCOSS (2020, 2021).

Invited and Conference Talks

2023 **Building Sticker Computers**.
Nanyang Technological University, Singapore.

2022 **ABB Research Award Conclusion Presentation**.
ABB Corporate Research Center, Switzerland.
Invited Talk. Audience included: CEO of ABB.

2021 **Tackling the Energy Asymmetry between Sensing, Computation, and Communication in Wireless Embedded Systems**.
Imperial College London, Held Virtually.

2021 **Tackling the Energy Asymmetry between Sensing, Computation, and Communication in Wireless Embedded Systems**.
National University of Singapore, Held Virtually.

2021 **Tackling the Energy Asymmetry between Sensing, Computation, and Communication in Wireless Embedded Systems**.
ETH Zurich, Held Virtually.

2021 **Tackling the Energy Asymmetry between Sensing, Computation, and Communication in Wireless Embedded Systems**.
IMDEA Networks Institute, Spain, Held Virtually.

2021 **Towards Ubiquitous Sensing: Tackling the Energy Asymmetry between Sensing, Computation, and Communication in Wireless Embedded Systems**.
Aalto University, Finland, Held Virtually.

2020 **Science and Innovation Week 2020: Green Light for the Earth**.
Exhibition, Science and Innovation Week 2020, IMDEA Networks Institute, Spain.

2020 **Enabling Sustainable and Widespread Sensing**.
ACM SigMobile India Chapter, Held Virtually.
Invited Talk.

2020 **Tunnel Emitter: Tunnel Diode based Low-Power Carrier Emitters for Backscatter Tags**.
ACM MobiCom 2020, London, UK, Held Virtually.
Conference Talk.

2020 **Two to Tango: Hybrid Light and Backscatter Networks for Next Billion Devices**.
ACM MobiSys 2020, Toronto, Canada, Held Virtually.
Conference Talk.

2020 **Enabling Ubiquitous and Sustainable Sensing Systems**.
ABB Corporate Research Center, Sweden.
Invited Talk. Host: Dr. Alf Isaksson.

2019 **ABB Research Award Presentation**.
ABB Corporate Research Center, Switzerland.
Invited Talk. Audience included: CEO of ABB – Peter Voser, and CTO of ABB – Bazmi Husain.

2019 **TunnelScatter: Low Power Communication for Sensor Tags using Tunnel Diodes**.
ACM MobiCom 2019, Los Cabos, Mexico.
Conference Talk.

2019 **Wearable Polymorphic Light Sensors**.
ACM WearSys 2019 (co-located with ACM MobiSys 2019), Seoul, South Korea.
Conference Talk.

2019 **Back to the Future: Enabling Sustainable and Ubiquitous Sensing Systems**.
IMDEA Networks Institute, Madrid, Spain.
Invited Talk. Host: Prof. Dr. Domenico Giustiniano.

2017 **LoRea: A Backscatter Architecture that Achieves a Long Communication Range**.
ACM SenSys 2017, Delft, Netherlands.
Conference Talk.

2017 **Towards Wide-Area Backscatter Networks**.
ACM HotWireless 2017 (co-located with ACM MobiCom 2017), Snowbird, Utah, USA.
Conference Talk.

2017 **Battery-free Visible Light Sensing**.

ACM VLCS 2017 (co-located with ACM MobiCom 2017), Snowbird, Utah, USA.
Conference Talk.

2017 **Networking Next Billion Devices Using Backscatter Communication**.
IoT Meetup, Stockholm, Sweden.
Invited Talk.

2015 **Directional Transmissions and Receptions for High-throughput Bulk Forwarding in Wireless Sensor Networks**.
IIIT Delhi, Delhi, India.
Invited Talk.

2015 **Directional Transmissions and Receptions for High-throughput Bulk Forwarding in Wireless Sensor Networks**.
ACM SenSys 2015, Seoul, South Korea.
Conference Talk.

2013 **Using Directional Transmissions and Receptions to Reduce Contention in Wireless Sensor Networks**.
REALWSN 2013, Como, Italy.
Conference Talk.

Selected Publications

Symbols next to author names indicate the enrollment status of students: • postdoctoral scholar, ■ doctoral (Ph.D.) student, ■ master's student, and ■ undergraduate student. Only students and scholars directly mentored by me are marked.

1. *AudioCast: Enabling Ubiquitous Connectivity for Embedded Systems through Audio-Broadcasting Low-Power Tags*. Rajashekar Reddy Chinthalapani■, Dhairya Jigar Shah■, Nobel Ang■, and Ambuj Varshney. ACM IMWUT 2025 / UbiComp 2025.

2. *Unraveling the Missing Link in Low-Power Communication: An Autodyning Receiver that Achieves a Long Range*. Sooriya Patabandige Pramuka Medaranga■, Rajashekar Reddy Chinthalapani■, Wenqing Yan■, Prabal Dutta, and Ambuj Varshney. ACM MobiSys 2025.

3. *LiFi for Low-Power and Long-Range RF Backscatter*. Muhammad Sarmad Mir, Borja G. Guzman, Ambuj Varshney, and Domenico Giustiniano. IEEE/ACM Transactions on Networking, Vol. 32, No. 3, 2024.

4. *TunnelSense: Low-Power, Non-Contact Sensing Using Tunnel Diodes*. L. C. Q. Thaddeus■, C. R. Reddy■, Y. S. Bhadauria■, Dhairya Jigar Shah■, M. Gulati•, and Ambuj Varshney. IEEE RFID 2024.

5. *PixelGen: Rethinking Embedded Cameras for Mixed-Reality*. Kunjun Li■, Manoj Gulati•, Dhairya Jigar Shah■, Steven Waskito■, Shantanu Chakrabarty, and Ambuj Varshney. ACM ImmerCom 2024 (co-located with MobiCom).
Best Demonstration Runner-up, ACM/IEEE IPSN 2024.

6. *Beyond Broadcasting: Revisiting FM Frequency-Band for Providing Connectivity to Next Billion Devices*. C. Rajashekar Reddy■, Manoj Gulati•, and Ambuj Varshney. ACM ENSsys 2023 (co-located with ACM SenSys).

7. *TunnelLiFi: Bringing LiFi to Commodity Internet of Things Devices*. Muhammad Sarmad Mir, Wenqing Yan■, Prabal Dutta, Domenico Giustiniano, and Ambuj Varshney. ACM HotMobile 2023.

8. *Radio Frequency Communication Device for Low-Power Communication*. Inventor: Ambuj Varshney (Sole Inventor). International Patent Application (PCT): WO2021040594A1.
Industry Impact: Cited as foundational prior art by 14+ patents from industry and academic leaders, including Nokia, Vivo Mobile, KAIST, and Oppo.

9. *Making Low-Power and Long-Range Wireless Backscatter Transmitters*. Ambuj Varshney. ACM GetMobile 2022. **Invited Contribution.**

10. *Judo: Addressing the Energy Asymmetry of Wireless Embedded Systems through Tunnel Diode-Based Wireless Transmitters*. Ambuj Varshney, Wenqing Yan■, and Prabal Dutta. ACM MobiSys 2022.

11. *Tunnel Emitter: Tunnel Diode-Based Low-Power Carrier Emitters for Backscatter Tags*.

Ambuj Varshney and Lorenzo Corneo. ACM MobiCom 2020.

12. *Two to Tango: Hybrid Light and Backscatter Networks for Next Billion Devices*. Ambuj Varshney*, Ander Galisteo*, and Domenico Giustiniano. ACM MobiSys 2020.
***Co-primary authors contributing equally.**

13. *TunnelScatter: Enabling Low-Power Communication for Sensor Tags Using Tunnel Diodes*. Ambuj Varshney, Andreas Soleiman, and Thiemo Voigt. ACM MobiCom 2019.

14. *Battery-Free Visible Light Sensing*. Ambuj Varshney, Andreas Soleiman, Luca Mottola, and Thiemo Voigt. ACM VLCS 2017 (co-located with MobiCom).
Best Paper Award.

15. *LoRea: A Backscatter Architecture that Achieves a Long Communication Range*. Ambuj Varshney, Oliver Harms, Carlos Perez Penichet, Christian Rohner, Frederik Hermans, and Thiemo Voigt. ACM SenSys 2017.

16. *Directional Transmissions and Receptions for High-Throughput Bulk Forwarding in Wireless Sensor Networks*. Ambuj Varshney, Luca Mottola, Mats Carlsson, and Thiemo Voigt. ACM SenSys 2015.

Full Publications in Journals, Conferences, and Workshops

1. Sooriya Patabandige Pramuka Medaranga, Rajashekar Reddy Chinthalapani, Wenqing Yan, Prabal Dutta, Ambuj Varshney. *Unraveling the Missing Link in Low-Power Communication: An Autodyning Receiver Architecture that Achieves a Long Range*. In Proceedings of the 23rd Annual International Conference on Mobile Systems, Applications, and Services (**ACM MOBISYS**), 2025.

2. C. Rajashekar Reddy, Dhairya Shah, Nobel Ang, Ambuj Varshney. *AudioCast: Enabling Ubiquitous Connectivity for Embedded Systems through Audio-broadcasting Low-power Tags*. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (**PACM IMWUT**), 2025.

3. Kunjun Li, Manoj Gulati, Dhairya Shah, Steven Waskito, Shantanu Chakrabarty, Ambuj Varshney. *PixelGen: Rethinking Embedded Cameras for Mixed-Reality*. In Proceedings of the 30th Annual International Conference on Mobile Computing and Networking (**ACM IMMERCOM 2024 co-located with MOBICOM**), 2024.

4. Lim Chang Quan Thaddeus, C. Rajashekar Reddy, Yuvraj Singh Bhadauria, Dhairya Shah, Manoj Gulati, Ambuj Varshney. *TunnelSense: Low-Power, Non-Contact Sensing Using Tunnel Diodes*. In Proceedings of the IEEE International Conference on RFID (**IEEE RFID**), 2024.

5. Muhammad Mir, Borja Genoves Guzman, Ambuj Varshney, Domenico Giustiniano. *LiFi for Low-Power and Long-Range RF Backscatter*. IEEE/ACM Transactions on Networking (**IEEE/ACM TON**), 2024.

6. C. Rajashekar Reddy, Manoj Gulati, Ambuj Varshney. *Beyond Broadcasting: Revisiting FM Frequency-band for Providing Connectivity to Next Billion Devices*. In Proceedings of the 11th International Workshop on Energy Harvesting & Energy-Neutral Sensing Systems (ENSsys), co-located with **ACM SENSYS**, 2023.

7. Muhammad Sarmad Mir, Wenqing Yan, Prabal Dutta, Domenico Giustiniano, Ambuj Varshney. *TunnelLiFi: Bringing LiFi to Commodity Internet of Things Devices*. In Proceedings of the 24th International Workshop on Mobile Computing Systems and Applications (**ACM HOTMOBILE**), 2023.

8. Ambuj Varshney, Wenqing Yan, Prabal Dutta. *Judo: Addressing the Energy Asymmetry of Wireless Embedded Systems through Tunnel Diode-Based Wireless Transmitters*. In Proceedings of the 20th ACM International Conference on Mobile Systems, Applications, and Services (**ACM MOBISYS**), 2022.

9. Ambuj Varshney. *Making Low-Power and Long-Range Wireless Backscatter Transmitters*. GetMobile: Mobile Computing and Communications (**ACM GETMOBILE**), 2022.

10. Muhammad Sarmad, Borja Genoves, Ambuj Varshney, Domenico Giustiniano. *PassiveLiFi: Rethinking LiFi for Low-Power and Long-Range RF Backscatter*. In Proceedings of the 27th Annual International Conference on Mobile Computing and Networking (**ACM MOBICOM**), 2021.

11. Revathy Narayanan, Ambuj Varshney, Panos Papadimitratos. *Securing Battery-Free Backscatter Tags through Fingerprinting*. In Proceedings of the 20th ACM Workshop on Hot Topics in Networks (**ACM HOTNETS**), 2021.

12. Ambuj Varshney, Lorenzo Corneo. *Tunnel Emitter: Tunnel Diode-Based Low-Power Carrier Emitters for Backscatter Tags*. In Proceedings of the 26th Annual International Conference on Mobile Computing and Networking (**ACM MOBICOM**), 2020.

13. Ambuj Varshney*, Ander Galisteo*, Domenico Giustiniano. *Two to Tango: Hybrid Light and Backscatter Networks for Next Billion Devices*. In Proceedings of the 18th ACM International Conference on Mobile Systems, Applications, and Services (**ACM MOBISYS**), 2020.
***Co-primary authors contributing equally.**

14. Ambuj Varshney, Andreas Soleiman, Thiemo Voigt. *TunnelScatter: Enabling Low-Power Communication for Sensor Tags Using Tunnel Diodes*. In Proceedings of the 25th Annual International Conference on Mobile Computing and Networking (**ACM MOBICOM**), 2019.

15. Ambuj Varshney. *Position: Wearable Polymorphic Light Sensors*. In Proceedings of the 5th ACM Workshop on Wearable Systems and Applications (**ACM WEARSYS**), co-located with **ACM MOBISYS**, 2019.

16. Domenico Giustiniano, Ambuj Varshney, Thiemo Voigt. *Connecting Battery-Free IoT Tags Using LED Bulbs*. In Proceedings of the 17th ACM Workshop on Hot Topics in Networks (**HOTNETS**), 2018.

17. Carlos Perez Penichet, Claro Noda, Ambuj Varshney, Thiemo Voigt. *Battery-Free 802.15.4 Receiver*. In Proceedings of the 17th International Conference on Information Processing in Sensor Networks (**ACM/IEEE IPSN**), 2018.

18. Ambuj Varshney, Oliver Harms, Carlos Perez Penichet, Christian Rohner, Frederik Hermans, Thiemo Voigt. *LoRea: A Backscatter Architecture that Achieves a Long Communication Range*. In Proceedings of the 15th ACM Conference on Embedded Networked Sensor Systems (**ACM SENSYS**), 2017.

19. Ambuj Varshney, Andreas Soleiman, Luca Mottola, Thiemo Voigt. *Battery-Free Visible Light Sensing*. In Proceedings of the 4th ACM Workshop on Visible Light Communication Systems (**ACM VLCS**), co-located with **ACM MOBICOM**, 2017.

20. Ambuj Varshney, Carlos Perez Penichet, Christian Rohner, Thiemo Voigt. *Towards Wide-Area Backscatter Networks*. In Proceedings of the 4th ACM Workshop on Hot Topics in Wireless, co-located with **ACM MOBICOM**, 2017.

21. Kasun Hewage, Ambuj Varshney, Abdalah Hilamia, Thiemo Voigt. *modBulb: A Modular Light Bulb for Visible Light Communication*. In Proceedings of the 3rd ACM Workshop on Visible Light Communication Systems (**ACM VLCS**), co-located with **ACM MOBICOM**, 2016.

22. Carlos Pérez-Penichet, Ambuj Varshney, Frederik Hermans, Christian Rohner, Thiemo Voigt. *Do Multiple Bits per Symbol Increase the Throughput of Ambient Backscatter Communications?* In Proceedings of the International Workshop on New Wireless Communication Paradigms for the Internet of Things (MadCom), co-located with EWSN, 2016.

23. Carlos Perez Penichet, Frederik Hermans, Ambuj Varshney, Thiemo Voigt. *Augmenting IoT Networks with Backscatter-Enabled Passive Sensor Tags*. In Proceedings of the 3rd ACM Workshop on Hot Topics in Wireless, co-located with **ACM MOBICOM**, 2016.

24. Ambuj Varshney, Luca Mottola, Mats Carlsson, Thiemo Voigt. *Directional Transmissions and Receptions for High-Throughput Bulk Forwarding in Wireless Sensor Networks*. In

Proceedings of the 13th ACM Conference on Embedded Networked Sensor Systems (**ACM SENSYS**), 2015.

25. Bo Wei, Ambuj Varshney, Wen Hu, Neal Patwari, Thiemo Voigt, Chun Tung Chou. *dRTI: Directional Radio Tomographic Imaging*. In Proceedings of the 14th International Conference on Information Processing in Sensor Networks (**ACM/IEEE IPSN**), 2015.

26. Ambuj Varshney, Luca Mottola, Thiemo Voigt. *Using Directional Transmissions and Receptions to Reduce Contention in Wireless Sensor Networks*. In Proceedings of the 5th International Workshop on Real-World Wireless Sensor Networks (REALWSN), 2013.

27. Juan M. Alonso, Thiemo Voigt, Ambuj Varshney. *Bounds on the Lifetime of Wireless Sensor Networks*. In Proceedings of the 5th International Workshop on Performance Control in Wireless Sensor Networks, co-located with IEEE DCOSS, 2013.

Posters, Demonstrations, and Short Publications

The following are peer-reviewed short publications (posters and demonstrations) published as part of conference proceedings.
Symbols next to author names indicate the enrollment status of students: • postdoctoral scholar, ■ doctoral (Ph.D.) student, ■ master's student, and ■ undergraduate student. Only students and scholars directly mentored by me are marked.

1. Dhairya Shah■, Rajashekar Reddy Chinthalapani■, Ambuj Varshney. *Poster: Enabling Low-power Ubiquitous Connectivity for Embedded Systems through Audio-Broadcasting Tags*. In Companion of the ACM International Joint Conference on Pervasive and Ubiquitous Computing (**ACM UBICOMP**), 2026.

2. Celes Chai Jia Xuan■, Dhairya Shah■, Ambuj Varshney. *Demo: VisibleBits: Illuminating Mixed Reality with Li-Fi Information Spotlights*. In Proceedings of the 31st Annual International Conference on Mobile Computing and Networking (**ACM MOBICOM**), 2025.

3. Rajashekar Reddy Chinthalapani, Dhairya Shah■, Ambuj Varshney. *Demo: Enabling Ubiquitous Connectivity for Embedded Systems through Audio-Broadcasting Low-power Tags*. In Proceedings of the 23rd Annual International Conference on Mobile Systems, Applications, and Services (**ACM MOBISYS**), 2025.

4. Moteen Shah■, Dhairya Shah■, Pramuka Medaranga■, Ambuj Varshney. *Poster: Li-FiAR: Networking Augmented-Reality Devices through Visible Light*. In Proceedings of the 30th Annual International Conference on Mobile Computing and Networking (**ACM MOBICOM**), 2024.

5. Savitha Viswanadh Kandala■, Ambuj Varshney. *Poster: A Framework for Training and Deploying Foundational Language Models for Embedded Sensing*. In Proceedings of the 30th Annual International Conference on Mobile Computing and Networking (**ACM MOBICOM**), 2024.

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