Jie Wang

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Research Interests: machine learning for wireless, dynamic spectrum sharing, and RF sensing

EDUCATION

Washington University in St. Louis Sept. 2019 - present
Ph.D. in Electrical Engineering (**GPA**: **4.0/4.0**) *Missouri, USA*
Advisor: Professor Neal Patwari

Sichuan University Sept. 2015–June 2019
B.S. in Electronics and Information Science and Technology (**GPA**: **3.8/4.0**) *Sichuan, China*

Sichuan University Sept. 2017–June 2019
B.A. in English (**GPA**: **91.4/100**) *Sichuan, China*

PUBLICATIONS

- **J. Wang**, M. G. Weldegebriel, and N. Patwari, "Channel Estimation via Loss Field: Accurate Site-Trained Modeling for Shadowing Prediction," *in IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, 2024. To appear.
- **J. Wang**, A. Orange, L. Stoller, G. Wong, J. Van der Merwe, S. K. Kasera, and N. Patwari, "Two Measure is Two Know: Calibration-free Full Duplex Monitoring for Software Radio Platforms," *in IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, 2024. To appear.
- F. Mitchell, **J. Wang**, S. K. Kasera, and A. Bhaskara, "Utilizing Confidence in Localization Predictions for Improved Spectrum Management," *in IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, 2024. To appear.
- F. Mitchell, **J. Wang**, N. Patwari, and A. Bhaskara, "Less is More: Improved Path Loss Prediction Using Simple Interpolation Models," *in IEEE DySPAN Workshop on Field Trials for Advanced Spectrum Sharing (FAST)*, 2024. To appear.
- M. G. Weldegebriel, **J. Wang**, N. Zhang, G. Hellbourg, and N. Patwari, "Watermarking of OFDM for Pseudonymetry: Analysis and Experimental Results," *in IEEE ICC Workshop on Catalyzing Spectrum Sharing via Active-Passive Coexistence (CSSAPC)*, 2024. To appear.
- M. A. Varner, F. Mitchell, **J. Wang**, K. Webb, G. D. Durgin, "Enhanced RF Modeling Accuracy Using Simple Minimum Mean-Squared Error Correction Factors," *in IEEE 2nd International Conference on Digital Twins and Parallel Intelligence (DTPI)*, pp. 1-5, 2022.
- M. G. Weldegebriel, **J. Wang**, N. Zhang and N. Patwari, "Pseudonymetry: Precise, Private Closed Loop Control for Spectrum Reuse with Passive Receivers," *in IEEE International Conference on RFID (RFID)*, pp. 91-96, 2022.
- **J. Wang**, J. Van der Merwe, and N. Patwari, "A Compliance Monitoring System for Open SDR Platforms," *in Proceedings of the 19th ACM Conference on Embedded Networked Sensor Systems (SenSys)*, pp. 351–352, 2021.
- **J. Wang**, A. S. Abrar, N. Patwari, "Received Power Based Vital Sign Monitoring," book chapter, *Academic Press*, pp. 205-230, 2021.
- W. He, Y. Huang, **J. Wang**, S. Zeng, "Homotopy Method for Optimal Motion Planning with Homotopy Class Constraints," *in IEEE Control Systems Letters*, vol. 7, pp. 1045-1050, 2023.
- W. Ma, **J. Wang**, and L. Wu, "Research on dielectric characterization of laterite ores under microwave radiation," *in Journal of Microwave Power and Electromagnetic Energy*, 52:4, 255-265, 2018.

PROFESSIONAL EXPERIENCE

Research Intern, AT&T Labs

June. 2023 - Aug. 2023

Project: System-level Simulation for LTE Uplink with Power Control and Scheduling

- Developed an LTE uplink system simulator to comprehend the factors that contribute to the uplink system.
- Studied quantitatively how transmit power limit and uplink traffic characteristics affect the system's performance.
- Proposed reinforcement learning for intelligent decision-making on user scheduling and resource allocation.

Research Assistant, Washington University in St. Louis

Sept. 2019 - present

Project: Shadow Fading Modeling for Efficient and Accurate Received Power Prediction

- Designed a statistical spatial loss model for predicting correlated shadow fading and received power.
- Investigated different machine learning approaches for spatial loss model estimation.
- Validated the proposed solution via latency and accuracy metrics using both indoor and outdoor real-world datasets.

Project: Two Measure is Two Know: Calibration-free Full Duplex Monitoring for Software Radio Platforms

- Developed a full-duplex monitoring system that enables simultaneous and continuous monitoring of the environment and platform's transmissions in a wide frequency range for shared spectrum compliance.
- Implemented the system on POWDER, a city-scale open wireless testbed for real-world Radio Frequency (RF) spectrum monitoring.
- Monitoring 19 SDR platforms on POWDER continuously for over a year with approximately 20 false alerts.

Project: Received Power Based Vital Sign Monitoring

- Implemented a received power based estimation algorithm for simultaneous respiration and pulse rate monitoring.
- Evaluated the algorithm's performance via experiments at various locations and with different subjects.

Project: Received Power Based Device-free Localization and Tracking

- Implemented custom-designed embedded system programming for wireless sensor networking and communication.
- Simulated link crossing speed estimation for indoor localization and tracking via received power.

Teaching Assistant, Washington University in St. Louis

Jan. 2021 - Dec. 2021

Course: Communications Theory and Systems (ESE 471) with Dr. Neal Patwari
Course: Probability and Stochastic Processes (ESE 520) with Dr. Vladimir P. Kurenok

Research Assistant, Sichuan University

Aug. 2017 - Dec. 2017

Project: Dielectric Characterization of Laterite Ores under Microwave Radiation

- Simulated a ridge waveguide for measuring the dielectric property of laterite ores under different temperatures.
- Estimated the relative complex permittivity of laterite ores using the designed neural network algorithm.

ACADEMIC SERVICE

- Reviewer for IEEE Transactions on Cognitive Communications and Networking, 2024.
- Reviewer for ACM Transactions on Internet of Things, 2023.
- ACM SenSys Shadow Program Committee, 2022.
- ACM IPSN US Session Host, 2020.

SELECTED HONORS AND AWARDS

- POWDER-RENEW Mobile and Wireless Week (MWW-2023) Travel Grant, 2023.
- iREDEFINE Professional Development Award, 2022.
- Top 1% Outstanding Graduate of Sichuan Province, 2018.
- Top 1% China National Scholarship, 2017/2018.
- Top 0.5% Li-xin Tang Scholarship, 2017.

SKILLS

- **Programming:** Python, C, C++, JavaScript, MATLAB, Bash.
- **Testbeds:** POWDER, PhantomNet.
- **Tools:** GNU Radio, MATLAB & Simulink, PyTorch, TensorFlow, Multisim, Altium.
- **Operating Systems:** Linux, MacOS, Windows.
- **Languages:** fluent in English, native in Chinese.