

# JIE WANG

St. Louis, MO

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

## EDUCATION

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**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

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- **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.
- N. Patwari, M. G. Weldegebriel, **J. Wang**, F. Mitchell, A. Singh, C. Jeng, J. Van der Merwe, and K. Webb, “Demo: POWDER over-the-air digital communications virtual learning lab,” in *IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, 2024. To appear.
- M. G. Weldegebriel, **J. Wang**, N. Patwari, J. Van der Merwe, and K. Webb, “Demo: POWDER Over-the-air Pseudonymity,” in *IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, 2024. To appear.
- M. G. Weldegebriel, **J. Wang**, N. Zhang, G. Hellbourg, and N. Patwari, “Watermarking of OFDM for Pseudonymity: 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, “Pseudonymity: 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

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### **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 of impact.
- Studied quantitatively how power limit and uplink traffic characteristics affect the system’s performance.
- Proposed reinforcement learning (RL) for intelligent decision-making on user scheduling and resource allocation.

### **Research Assistant, Washington University in St. Louis**

Sept. 2019 - present

*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 environmental and the SDR platform’s transmissions for shared spectrum compliance.
- Implemented the system’s close-loop control which separates mixed source signals, and automatically turns off the transmitters in violation.
- Deployed the system on POWDER, a city-scale open SDR wireless testbed since 2021 for monitoring 19 SDR platforms in real time.
- Evaluated the system’s separation performance and system-wide alert accuracy over 27-month operation.
- Discussed the potential adversarial behavior and proposed a countermeasure to achieve a high probability of malicious violation detection.

*Project:* Channel Estimation via Loss Field (CELF): Accurate Site-Trained Modeling for Shadowing Prediction

- Proposed a machine learning (ML)-driven and explainable spatial loss field model for improved shadow fading and interference prediction.
- Investigated different ML and empirical approaches to compare their prediction performance to CELF.
- Validated CELF via latency and precision metrics using both indoor and outdoor real-world datasets.

*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 extensively at various locations and with different subjects.

*Project:* Received Power Based Device-free Localization and Tracking

- Simulated link crossing speed estimation for indoor localization and tracking via received power.
- Implemented a wireless sensor network for testing via custom-designed embedded systems programming.

**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 to measure laterite ores' dielectric properties under different temperatures.
- Estimated the relative complex permittivity of laterite ores using the designed neural network algorithm.

## ACADEMIC SERVICE

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- 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

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- 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% Lixin Tang Scholarship, 2017.

## SKILLS

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- **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.