ZHUOHUAN LI

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EDUCATION

Rutgers University – New Brunswick, NJ *Expected May 2026*

Doctor of Philosophy, Electrical and Computer Engineering | GPA: 3.727/4.00

Advisor: Prof. Narayan Mandayam; Co-Advisor: Prof. N.K. Shankaranarayanan

- Research Focus: Wireless Communication, 5G/O-RAN Energy Efficiency, AI-RAN, Deep Learning, Adversarial Attacks
- Thesis: Measurement-Driven Energy Modeling and Optimization of Disaggregated O-RAN Networks

Rutgers University – New Brunswick, NJ *May 2022*

Master of Science, Software Engineering | GPA: 3.625/4.00

Rutgers University – New Brunswick, NJ *May 2020*

Bachelor of Science, Electrical and Computer Engineering | GPA: 3.169/4.00

Honors: Dean's List (2019–2020), WINLAB Internship Award (2020), Rutgers Fellowship Scholarship

RESEARCH INTERESTS

- Wireless Communication & Next-Generation Networks (5G/O-RAN, AI-RAN)
- Energy Efficiency in Radio Access Networks; Low-Power Sensor Hardware
- Deep Learning and Adversarial Machine Learning; Cybersecurity & Side-Channel Attacks
- End-to-End System Design and Network Optimization

PUBLICATIONS

Journal / Preprint

Shankaranarayanan, N.K., Gupta, A., Li, Z., Puthenpura, S., Sohn, J., Seskar, I., Parthasarathy, S., et al. "Energy Efficiency Testing and Modeling of a Commercial O-RAN System." arXiv preprint arXiv:2603.04435, 2026.

Han, Y., Chan, M., Wengrowski, E., Li, Z., Tippenhauer, N.O., Srivastava, M., Zonouz, S., and Garcia, L. "Why Don't You Clean Your Glasses? Perception Attacks with Dynamic Optical Perturbations." arXiv preprint arXiv:2307.13131, 2023.

Conference Proceedings (Peer-Reviewed)

Li, Z., Maddala, P., Shankaranarayanan, N.K., Seskar, I., Puthenpura, S., Stancu, A., Nunez Alvarez, C., and Albrecht, G. "Energy Efficiency Testing and Power Modeling of O-RAN Radio Units." 2025 IEEE Future Networks World Forum (FNWF), pp. 1–6. IEEE, 2025.

Shankaranarayanan, N.K., Li, Z., Seskar, I., Maddala, P., Puthenpura, S., Stancu, A., and Agarwal, A. "POET: A Platform for O-RAN Energy Efficiency Testing." 2024 IEEE 100th Vehicular Technology Conference (VTC2024-Fall), pp. 1–5. IEEE, 2024.

RESEARCH EXPERIENCE

WINLAB – Wireless Information Network Laboratory, Rutgers University *Sep 2021 – Present*
Graduate Research Assistant | PI: Prof. Narayan Mandayam & Prof. N.K. Shankaranarayanan

- Lead research on 5G O-RAN energy efficiency in collaboration with industry partners including NTIA, AT&T, and EURECOM
- Developed POET, a platform for O-RAN energy efficiency testing; conducted systematic power measurements on commercial O-RAN Radio Units across diverse traffic loads and configurations
- Built end-to-end power models incorporating traffic patterns, hardware configurations, and environmental factors; results published at IEEE FNWF 2025 and IEEE VTC 2024
- Investigated adversarial side-channel attacks and designed robust machine-learning-based defenses; developed acoustic emanation attack recovering 3D printer movements with BiLSTM model at 91.68% accuracy, then reduced attacker accuracy to <57% using novel noise-generation countermeasures
- Contributed to arXiv preprint on commercial O-RAN energy efficiency modeling, expanding the measurement dataset to large-scale field trials

WINLAB – Wireless Information Network Laboratory, Rutgers University *Jun 2021 – Aug 2021*
Research Intern | Project: Recognition of Wireless Devices using Machine Learning

- Used Software Defined Radios (SDR) to capture RF signatures from diverse wireless devices (smartphones, Bluetooth earbuds, Wi-Fi laptops)
- Trained and evaluated neural network classifiers for RF fingerprinting; quantified classification accuracy across device types
- Achieved 82.7% device recognition accuracy; findings contributed to wireless security research at WINLAB

WINLAB – Wireless Information Network Laboratory, Rutgers University *Jun 2020 – Aug 2020*
Research Intern | Project: FPGAs for Spectrum Sensing & Self-Driving Vehicles

- Implemented a matched filter in Go for FPGAs targeting spectrum sensing and modulation recognition; converted Go code for FPGA deployment
- Rebuilt matched filter in MATLAB, improving recognition accuracy by 12.5% over a baseline machine-learning method
- Designed and trained miniature autonomous vehicles for a smart-city testbed; implemented self-driving algorithms (Python/ML) enabling vehicles to react to dynamic traffic and infrastructure signals

INDUSTRY EXPERIENCE

ChangLiang Financial Technology Company *Jun 2019 – Sep 2019*
Software Engineer Intern

- Supported back-end Java development for banking loan application processing pipeline
- Managed large-scale data cleaning and migration from MySQL databases, improving data integrity for downstream analytics

SELECTED PROJECTS

Acoustic Emanations for Process Monitoring and Reverse Engineering *Jan 2022*

- Implemented Python pipeline to reconstruct 3D printer movements from acoustic microphone recordings; BiLSTM model achieved 91.68% prediction accuracy
- Designed 3 noise-generation countermeasure algorithms that reduced attacker accuracy to 33%–56%, demonstrating practical defense efficacy

ML-Model Based Investment Helper *May 2021*

- Built full-stack Django web application providing real-time stock prediction using LSTM and GRU deep learning models
- Integrated YFinance API for data ingestion and Pandas for feature engineering; deployed on cloud infrastructure

Inspired Parking Lot System *May 2020*

- Designed hardware model for an intelligent vehicle parking system; programmed Arduino microcontrollers to handle infrared sensor input, motor control, and signal light management
- Developed Java backend to manage vehicle information using AWS cloud databases

TECHNICAL SKILLS

Programming Languages: Python, Java, C, C++, Go, JavaScript, HTML/CSS, SQL

ML / Deep Learning: PyTorch, TensorFlow, LSTM, BiLSTM, GRU, CNN, Scikit-learn

Systems & Tools: Linux, AWS (S3, RDS), MySQL, Django, Pandas, PySpark, MATLAB, Arduino

Wireless & Networking: Software Defined Radio (SDR), FPGA, O-RAN, 5G NR, RF signal processing

HONORS & AWARDS

- Dean's List, Rutgers University (2019–2020)
- WINLAB Internship Award (2020)
- Rutgers Graduate Fellowship Scholarship

PROFESSIONAL AFFILIATIONS & SERVICE

- IEEE Member
- Collaborating Researcher – NTIA (National Telecommunications and Information Administration)
- Research Partner – AT&T Labs & EURECOM (European Research Center for Telecommunications)