Sadjad Alikhani

Email | Phone | LinkedIn | GitHub | Hugging Face | LWM | Google Scholar

Research Interests

- Wireless communications, mathematical optimization, machine learning, digital twins

Education

- **Arizona State University** — Tempe, United States
  Doctor of Philosophy in Electrical Engineering — *January 2024 – Present*
  Supervisor: *Professor Ahmed Alkhateeb*

- **University of Tehran** — Tehran, Iran
  Master of Science in Communications Engineering — *November 2020 – September 2023*
  Thesis title: *Joint active and passive beamforming via reduced channel state information in reconfigurable intelligent surface assisted multiuser multiple input multiple output systems*
  Supervisor: *Professor Amir Masoud Rabiei*

- **Ferdowsi University of Mashhad** — Mashhad, Iran
  Bachelor of Science in Electrical Engineering — *September 2016 – September 2020*
  Thesis title: *Detection, demodulation, and displaying digital video broadcasting terrestrial television signals with software defined radio*
  Supervisor: *Professor Mehdi Saberi*

Publications

- S. Alikhani, A. Malhotra, S. Hamidi-Rad, and A. Alkhateeb, "LWM-Temporal: Sparse spatio-temporal attention for wireless channel representation learning," accepted at *IEEE ICC*, 2026.
- N. Kim, S. Alikhani, and A. Alkhateeb, "LWM-Spectro: A foundation model for wireless baseband signal spectrograms," arXiv preprint arXiv:2601.08780, 2026.
- J. Morais, S. Alikhani, A. Malhotra, S. Hamidi-Rad, and A. Alkhateeb, "Wireless Dataset Similarity: Measuring Distances in Supervised and Unsupervised Machine Learning," arXiv preprint arXiv:2601.01023, 2026.
- S. Alikhani, G. Charan, and A. Alkhateeb, "LWM: A pre-trained wireless foundation model for universal feature extraction," in *IEEE ICMLCN*, 2025, pp. 1–6.
- S. Alikhani and A. Alkhateeb, "Digital twin aided channel estimation: Zone specific subspace prediction and calibration," in *IEEE ICMLCN*, 2025, pp. 1–6.
- S. Alikhani, G. Charan, and A. Alkhateeb, "Large wireless model: A foundation model for wireless channels," arXiv preprint arXiv:2411.08872, 2024.
- J. Morais, S. Alikhani, A. Malhotra, S. Hamidi-Rad, and A. Alkhateeb, "A dataset similarity evaluation framework for wireless communications and sensing," in *Proceedings of Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California, United States, 2024.
- S. Alikhani and A. Alkhateeb, "Digital twin aided reconfigurable intelligent surface communication: Robust beamforming and interference management," in *IEEE VTC*, 2024, pp. 1–6.
- S. Alikhani and A. Alkhateeb, "Digital twin for spectrum sharing and coexistence: Coordinating the uncoordinated," in *IEEE SPAWC*, 2024, pp. 796–800.

Research Experience

- **Arizona State University** — Tempe, United States
  Research Associate, Wireless Intelligence Lab (Professor Ahmed Alkhateeb) — *January 2024 – Present*
  - **Focus**: Working on foundation models for wireless channels, digital twin aided systems, and dataset similarity

- **Nokia Bell Labs** — Murray Hill, United States (remote)
  Research Intern — *June 2025 – August 2025*
  - **Focus**: Developed a large-scale multi-modal DT dataset pipeline and used it to pretrain environment-aware foundation models for communication and sensing

- **University of Erlangen–Nuremberg** — Erlangen, Germany (remote)
  Research Assistant (Professor Ralf Müller) — *September 2022 – November 2022*
  - **Focus**: Designed and simulated algorithms for RIS-aided MIMO communication under limited CSI

Service and Teaching Experience

- **Arizona State University** — Tempe, United States
  Competition Organizer — *May 2025 – October 2025*
  - **LWM Multi-Task Optimization Challenge**: Co-organized the ITU Large Wireless Models challenge, prepared the competition package, supported participants, and evaluated submissions from sixty-five teams.
- **Arizona State University** — Tempe, United States
  Peer Reviewer — *January 2024 – Present*
  - **Journal**: IEEE TCCN, TCOM, TSP, TWC
  - **Conference**: IEEE SPAWC, ICC
- **University of Tehran** — Tehran, Iran
  Teaching Assistant — *September 2022 – January 2023*
  - **Courses**: Neural networks, Advanced Communication Theory
  - **Responsibilities**: Prepared a hands on introduction to reinforcement learning with Python, designed an assignment, and graded assignments for more than eighty students
- **Ferdowsi University of Mashhad** — Mashhad, Iran
  Teaching Assistant — *September 2017 – January 2021*
  - **Courses**: Electrical circuits, signals and systems, principles of communication systems, principles of electrical engineering, general mathematics
  - **Responsibilities**: Tutored approximately sixty students per semester, provided problem solving assistance, supported weekly sessions, graded assignments, and prepared quizzes and projects

Skills

- **Technical**: Python, MATLAB; PyTorch, TensorFlow, CVX; Wireless InSite, Sionna-RT, CARLA Simulator, Blender
- **Soft**: Problem solving, teamwork, communication, leadership, adaptability

Awards and Honors

- Emerging Talents Initiative grant, University of Erlangen–Nuremberg, September 2022
- Finalist, Iranian Electrical Engineering Olympiad, September 2020

Selected Academic Projects

- **Precoding with reduced CSI in RIS-aided MIMO**: Studied precoding strategies for RIS-assisted MIMO systems under limited CSI using convex optimization tools.
- **Proactive eavesdropping in RIS-assisted communications**: Developed optimization-based methods for proactive eavesdropping using alternating optimization and semidefinite relaxation.
- **Music genre classification and clustering**: Built a dataset of Persian songs, extracted features, and performed supervised and unsupervised learning for music genre analysis using classical machine learning models.
- **Low-complexity non-convex optimization**: Designed an RL-based algorithm to solve non-convex optimization problems in RIS-aided communications and compared it with conventional methods.
- **Simulation of signal processing papers**: Reproduced results from journal papers on semi blind channel estimation and adaptive beamforming using MATLAB based simulations.
- **Smart restaurant model**: Designed a smart restaurant prototype with a website, radio frequency identification based entry, database backed ordering, and customer notification pipeline.
- **Detection and demodulation of digital video broadcasting terrestrial signals**: Implemented demodulation, error correction, and decompression of digital video broadcasting terrestrial television signals using software defined radio.
- **Network design**: Designed and simulated network architectures with virtual local area networks, spanning tree, subnetting, trunking, file transfer protocol, and open shortest path first routing in Cisco Packet Tracer.

Selected Courses

- Mathematical foundations of machine learning, neural networks, machine learning, adaptive filters theory, detection and estimation theory