Ali Rasteh

Research Assistant & Ph.D. Candidate, NYU Wireless

Contact Information

he/him **linkedin.com/in/ali-rasteh-483a7770** **ali-rasteh.github.io**

Work Experience

Research Assistant — Full-time Dec 2022–present

New York University (NYU), Wireless Center

Supervisor: Sundeep Rangan

- Researching Wireless Spectrum Sensing, AI/ML for 6G Wireless, Efficient Hardware for Spectrum Sensing, and 6G FR3 Channel Modeling.
- Engineered a FR3 Software Defined Radio utilizing Xilinx RFSoC4x2 FPGA board. Developed a Python-based controller software, alongside Vivado/Vitis HLS/Verilog firmware for the Zynq SoC within 6 months.
- Published 4 high-quality technical papers within 1 year. Improved the computational efficiency of the wireless spectrum detection by an order of magnitude.
- Designed advanced Spatial and Systolic Array architectures using HLS/Verilog/Python simulations, alongside optimized methods for spectrum sensing, achieving a 110% performance improvement over the SOTA.

Communication Systems Research Intern — Full-time May 2025-Aug 2025

Sharp Laboratories of America, Inc.

- Developed and validated 3GPP TR 38.901 Release 18/19-compliant channel models (indoor-office, SMa, near-field), including full-scale calibrations and BS/UT antenna modeling, implemented in Python (NVIDIA Sionna) and MATLAB; contributed to 3GPP TR 38.901 Release 19.
- Enhanced NVIDIA Sionna's Python code-base by implementing new scenarios and models, resolving critical issues (e.g., topology generation, O2I modeling), and introducing structural improvements to increase robustness and accuracy resulting in over 10K lines of code.

Technical Lead, Access Network Products Team — Full-time Nov 2018–Mar 2022

Sina Communication Systems Co.

- Led a team of 14 developers in the successful development of a GPON mini-OLT (Optical Access Network/FTTX) from concept to industrialization in 24 months.
- Supervised hardware schematic and PCB design, FPGA VHDL development, C/C++ development on Embedded Linux, SDK integration for key ASICs, Java Spring-based backend software development, and Web UI development using the Angular framework.

Machine Learning Researcher (Remote) — Part-time Sep 2019-Sep 2021

CNRS and University of Toulouse

- Researched Internet traffic classification using Spiking Neural Networks in Python/PyTorch, improved SOAT accuracy by 8.5%.
- Conducted research on image classification using Spiking Neural Networks, with a focus on latency-based methods using Python/PyTorch.

Technical Lead, POTN-DWDM Hardware Design Team — Full-time Apr 2017–Nov 2018

Sina Communication Systems Co.

- Led a team of 10 developers in the successful development of the POTN-DWDM hardware infrastructure, achieving project milestones within 18 months.
- Supervised schematic and PCB design, FPGA VHDL development, C/C++ development, and SDK integration on Embedded Linux. Improved the product's throughput by 150%.

Hardware, FPGA, and Embedded Linux Developer — Full-time Oct 2015–Apr 2017

Sina Communication Systems Co.

- Successfully designed high-speed circuit schematics (10 Gbps-100 Gbps), supervised the PCB design process, developed VHDL FPGA firmware for Spartan-6 FPGA, and created C/C++ based Embedded Linux firmware for a PowerPC CPU as a COM on Muxponder cards in the POTN-DWDM project.

Education

Ph.D. in Electrical and Computer Engineering (Dec 2022-Dec 2026)
New York University (NYU), Wireless Center *Brooklyn, NY, USA*

- **Research focus:** Wireless Spectrum Sensing, AI/ML for 6G Wireless, Development of Efficient Hardware and Methods for Spectrum Sensing, and 6G FR3 Channel Modeling, **Supervisor: Sundeep Rangan**.
- **GPA**: 4.0/4.0

Research Assistant, Electrical Engineering Sep 2017-Dec 2022
Sharif University of Technology *Tehran, Iran*

- **Research focus:** Developing a framework for investigating the effect of uncertain parameters on the convergence of the third generation of neural networks

M.Sc. in Electrical Engineering Sep 2015-Sep 2017
Sharif University of Technology *Tehran, Iran*

- **Thesis subject:** Analysis and design of a high-speed embedded SRAM.

B.Sc. in Electrical Engineering Sep 2011-Sep 2015
Sharif University of Technology *Tehran, Iran*

- **Thesis subject:** Eye-gaze detection headset for assistive technology.

Skills

- **Software Design:** Python, C++, C, MATLAB, TCL, Perl, Bash-Scripting, Object-Oriented Programming
- **Tools/Frameworks:** Docker, Git, Kubernetes, Pytorch, TensorFlow, Numpy, Keras, OpenCV, Scikit-Learn, Simulink
- **Parallel Computing:** CUDA, OpenMP
- **Hardware Description Languages:** Verilog, SystemVerilog, VHDL
- **EDA/CAD tools:** Vivado Design Suite/Vitis HLS, Cadence Virtuoso, Altium PCB Design, ModelSim, HyperLynx PCB Simulation, ISE Design Suite, Quartus, Spectre/Ocean, OrCAD PSpice, HSPICE, Silvaco
- **Operating Systems:** Linux, UNIX, Linux Driver/Kernel Module, Embedded Linux, Yocto/LTIB
- **Wireless Comm & Comm Networks:** Signal Processing, Network Security (IDS/IPS), LTE/5G/6G, OFDM, MIMO, Beamforming, mmWave, NVIDIA Sionna, NS-3, Wireshark, USRP, LabVIEW, SDR, Channel Coding/Modulation, Cognitive Radio, Network Architecture, TCP/UDP/IP, SDN/NFV
- **Hardware Design:** FPGA/ASIC, Schematic/PCB Design, Analog/Digital Circuit, Signal Integrity, Instruction Set Architecture, Processor Design, Pipeline Design, Cache, Memory Management, System-on-Chip, Parallel Computing
- **Soft Skills & others:** Collaboration in Multidisciplinary Teams, Problem-Solving, Documentation, Project Management, Cross-Functional Team Leadership, Adaptability, Troubleshooting/Debugging, Analytical Thinking, AI/Machine Learning, Deep Learning, Pycharm, Visual Studio , Microsoft Project, Jira, Redmine

Awards & Scholarships

- Awarded competitive **full-funding scholarships** for Ph.D. studies at New York University (**NYU**), University of Southern California (**USC**), and **Northeastern University**
- Received the **Outstanding Paper Award (top 10 papers)** at the 2025 Asilomar Conference on Signals, Systems, and Computers for excellence in research and technical contribution.
- Recognized with the **Best Demo Prize** at the prestigious **Nokia/NYU Brooklyn 6G Summit 2024** for excellence in 6G innovation and demonstration
- Achieved top national rankings in competitive university entrance exams: **68th out of over 420,000** for the Engineering major (B.Sc., 2011), **25th out of 50,000** for Electrical Engineering (M.Sc., 2015), and **3rd out of 3,000** for Electrical Engineering (Ph.D., 2017)

Projects

- Near-Field Measurement System for Upper Mid-Band (FR3) Wireless Communication-Python/FPGA/Vivado/Verilog (2024) (**Link**)
- 3GPP TR38.901 Calibration-Python/NVIDIA Sionna (2025) (**Link**)
- 6G Prototyping in the Upper Mid-Band (7-24 GHz)-Python/FPGA/Vivado/Verilog (2025) (**Link**)
- Multi-Band Channel Sensing in the Upper Mid-Band (FR3)-Python/MATLAB/Vivado (2025)
- Encrypted Internet Traffic Classification Using a Supervised Spiking Neural Network-Python/PyTorch/TensorFlow (2022) (**Link**)

- TRAPS: Real-time Anomaly Detection (IDS) in Cyber-Physical Systems-Python/C++/MATLAB (2023) (**Link**)
- Analysis and Design of a High-Speed Embedded SRAM-HSPICE (2017) (**Link**)
- RoDINO:Enhancing Robustness of Vision Transformers with Adversarial Training-Python/PyTorch(2023) (**Link**)
- Eye-Gaze Detection Headset for Assistive Technology-MATLAB (2015) (**Link**)
- Streaming Decryption Engine Security and Side-Channel Analysis-C/C++ (2023)(**Link**)
- Vision and IMU-Based Robot Localization and Navigation-MATLAB (2024) (**Link**)
- Deep Neural Network for Visual Question Answering-Python/PyTorch (2017)
- GPU-Based Acceleration of the FFT Algorithm Using CUDA Programming-C++/CUDA (2016) (**Link**)
- C++ Implementation of a Visual Game with Graphical User Interface (2014) (**Link**)
- Transistor-Level Design and Simulation of a Viterbi Decoder-Cadence Virtuoso (2015) (**Link**)
- Circuit-Level Design and Simulation of a 10-bit Pipeline ADC-Cadence Virtuoso (2016) (**Link**)
- FPGA and ASIC Implementation of a JPEG Encoder Using Verilog HDL (2015) (**Link**)
- Design and Simulation of a Complete 5GHz RF Receiver for WLAN Applications-Cadence Virtuoso(2016) (**Link**)
- Augmented Reality System with 3D Object Placement via Edge Detection-Python/PyTorch/OpenCV (2018) (**Link**)
- Design and Simulation of a High-Performance Sample and Hold Circuit for 13-bit ADCs-Cadence Virtuoso (2015)

Publications

Rasteh, A., Kiani, A., Mezzavilla, M., & Rangan, S. (2025). Scalable Long-Term Beamforming for Massive Multi-User MIMO. arXiv preprint arXiv:2511.09464.

Rasteh, A., & Rangan, S. (2025). Computationally efficient signal detection with unknown bandwidths. arXiv preprint arXiv:2504.09342.

Rasteh, A. & Rangan, S. (2025). Low-Complexity Detection of Signals under Unknown Bandwidth Constraints. Presented In 2025 59th Asilomar Conference on Signals, Systems, and Computers.

Mezzavilla, M., **Rasteh, A.**, Zappe, M., Zappe, E., Dhananjay, A., & Rangan, S. (2025). 6G Prototyping in the Upper Mid-Band (7-24 GHz). In 2025 IEEE Wireless Communications and Networking Conference (WCNC) (pp. 1-3). IEEE.

Rasteh, A., Hari, R. P., Guo, H., Mezzavilla, M., & Rangan, S. (2024). Near-Field Measurement System for the Upper Mid-Band. Presented In 2024 58th Asilomar Conference on Signals, Systems, and Computers.

Bomfin, R., **Rasteh, A.**, et al.(2025). Multi-Band Channel Sensing in the Upper Mid-Band (FR3). In GLOBECOM 2025-2025 IEEE Global Communications Conference. IEEE.

Rasteh, A., Delpech, F., Aguilar-Melchor, C., Zimmer, R., Shouraki, S. B., & Masquelier, T. (2022). Encrypted internet traffic classification using a supervised spiking neural network. Neurocomputing, 503, 272-282.

Krishnamurthy, P., **Rasteh, A.**, Karri, R., & Khorrami, F. (2024). Tracking Real-time Anomalies in Cyber-Physical Systems Through Dynamic Behavioral Analysis., Submitted to IEEE Transactions on Smart Grid.

Volunteer Experiences

Chair, Student Union Council (Dec 2013-Dec 2014)
Sharif University of Technology, Electrical Engineering Department

- Led efforts to address student concerns by liaising with department management and resolving issues.

Administrative co-chair and executive sponsorship co-chair (Dec 2014-Sep 2015)
SharifCup 2015 (University Robotic competitions, Sharif University of Technology)

- Led efforts in securing sponsorships and raising funds to support the competition. Successfully managed relationships with sponsors while overseeing the organization and logistics of the competition venue to ensure smooth operations.

Member, Resana (Dec 2014-Sep 2015)
Scientific and cultural group, Electrical Engineering Department, Sharif University of Technology (Resana)