Nasim Soltani

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Research Interests

- **Applied AI/ML for Wireless Communications**: Signal Classification, RF Fingerprinting, ML-aided OFDM Receivers.

- **Next-G Wireless Communications:** Open Radio Access Networks (ORAN), 5G and beyond.

- **Deep Learning at the Edge**: Model compression and acceleration.

Education

Currently
PhD Student, Computer Engineering
The University of Texas at Austin, Austin, TX

Thesis: Deep Learning for the Physical Layer: From Signal Classification to Decoding
Advisor: Prof. Kaushik Chowdhury, Professor at The University of Texas at Austin

2016
Master of Science, Electrical Engineering-Electronics
Iran University of Science and Technology, Tehran, Iran.

Thesis: Design and Implementation of a High Throughput IIR Filter
Advisor: Prof. Sattar Mirzakuchaki, Professor at Iran University of Science and Technology

2012
Bachelor of Science, Biomedical Engineering-Bioelectrics
Azad University, Science and Research Branch, Tehran, Iran.

Thesis: A Comparative Study On LPC Coefficients of Parents' and Daughter's Voices
Advisor: Prof. Saman Parvaneh, Assistant Professor at Science and Research University.

Awards

- Conference Travel Grant (CTG) for IEEE International Conference on Machine Learning for Communication and Networking (ICMLCN), May 2025.

- ComSoc WICE travel grant for IEEE Globecom, December 2022.

- NSF travel grant for IEEE DySPAN, November 2019.

- Best paper award in International Conference on Edge Computing, Springer, Seattle, USA, 2018.

Academic Employment

Aug. 2024-present	Graduate Research Assistant at Genesys Lab. WNCG at ECE Department, The University of Texas at Austin
Aug. 2018-Aug. 2024	Graduate Research Assistant at Genesys Lab. ECE Department, Northeastern University
Jan. 2018-May 2018	Graduate Research Assistant at TeCSAR Lab. ECE Department, University of North Carolina at Charlotte
Jan. 2017-Jun. 2017	Research Assistant at Dependable systems and architectures Lab. ECE Department, Iran University of Science and Technology

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Publications

Journals and Magazines

J10. **N. Soltani**, J. Zhang, B. Salehi, D. Roy, R. Nowak, and K. Chowdhury, "Learning from the Best: Active Learning for Wireless Communications", Accepted in IEEE Wireless Communications Magazine, January 2024.

J9. G. Reus-Muns, P. Upadhyaya, U. Demir, N. Stephenson, **N. Soltani**, V. K. Shah, K. R. Chowdhury, "Sense-ORAN: O-RAN based Radar Detection in the CBRS Band," IEEE Journal on Selected Areas in Communications (JSAC), July 2023.

J8. C. Tassie, A. Gaber, V. Chaudhary, **N. Soltani**, M. Belgiovine, M. Loehning, V. Kotzsch, C. Schroeder, and K. Chowdhury, "Detection of Co-existing RF Signals in CBRS using ML: Dataset and API-based Collection Testbed," IEEE Communications Magazine Accepted May 2023.

J7. **N. Soltani**, D. Roy, K. Chowdhury, "PRONTO: Preamble Overhead Reduction with Neural Networks for Coarse Synchronization," IEEE Transactions on Wireless Communications, March 2023.

J6. B. Azari, H. Cheng, **N. Soltani**, H. Li, Y Li, M. Belgiovine, T. Imbiriba, S. D'Oro, T. Melodia, Y. Wang, P. Closas, K. Chowdhury, D. Erdogmus, "Automated deep learning-based wide-band receiver," Computer Networks. 2022 Dec 9;218:109367.

J5. **N. Soltani**, H. Cheng, M. Belgiovine, Y. Li, H. Li, B. Azari, S. D'Oro, T. Imbiriba, T. Melodia, P. Closas, Y. Wang, D. Erdogmus, and K. Chowdhury, "Neural Network-based OFDM Receiver for Resource Constrained IoT Devices," IEEE Internet of Things Magazine 5 (3), pp. 158-164, 2022.

J4. T. Jian, Y. Gong, Z. Zhan, R. Shi, **N. Soltani**, Z. Wang, J. Dy, K. Chowdhury, Y. Wang, S. Ioannidis, "Radio Frequency Fingerprinting on the Edge," IEEE Transactions on Mobile Computing. 2021 Mar 8;21(11):4078-93.

J3. **N. Soltani**, G. Reus-Muns, B. Salehi, J. Dy, S. Ioannidis, and K. Chowdhury, "RF Fingerprinting Unmanned Aerial Vehicles withNon-standard Transmitter Waveforms," IEEE Transactions on Vehicular Technology, Issue 12, Volume 69, 2020, pp. 15518-15531.

J2. **N. Soltani**, K. Sankhe, J. Dy, S. Ioannidis, and K. Chowdhury, "More is Better: Data Augmentation for Channel-Resilient RF Fingerprinting," IEEE Communications Magazine 58 (10), 66-72, 2020.

J1. T. Jian, B. Costa-Rendon, E. Ojuba, **N. Soltani**, Z. Wang, K. Sankhe, A. Gritsenko, J. Dy, K. Chowdhury, S. Ioannidis, "Deep Learning for RF Fingerprinting: A Massive Experimental Study," IEEE Internet of Things Magazine. 2020 Apr 13;3(1):50-7.

Conferences

C11. **N. Soltani**, D. LoPriore, J. Groen, K. Chowdhury, "UNICORN: URLLC Network Traffic Classification and OOD Detection for O-RAN," accepted, IEEE International Conference on Machine Learning for Communication and Networking (ICMLCN) 2025, May 26-29.

C10. T. Jian, D. Roy, B. Salehi, **N. Soltani**, K. Chowdhury, S. Ioannidis, "Communication-Aware DNN Pruning," IEEE Conference on Computer Communications (INFOCOM) 2023 May 17 (pp. 1-10).

C9. **N. Soltani**, V. Chaudhary, D. Roy, K. Chowdhury, "Finding Waldo in the CBRS Band: Signal Detection and Localization in the 3.5 GHz Spectrum," IEEE GLOBECOM 2022.

C8. **N. Soltani**, Y, Li, D. Erdogmus, Y. Wang, and K. Chowdhury, "NN-key: A Neural Network-Based Secret Key for Demapping OFDM Symbols," IEEE 19th Annual Consumer Communications and Networking Conference (CCNC), 2022.

C7. J. Gu, **N. Soltani**, Y. Naderi, K. Chowdhury, "It's a Bird, It's a Plane, It's 'That' UAV: RF Fingerprinting During Flight," 55th Asilomar Conference on Signals, Systems, and Computers, pp. 300-304, 2021.

C6. S. Mohanti, **N. Soltani**, K. Sankhe, D. Jaisinghani, M. DiFelice and K. Chowdhury, "AirID: Injecting a Custom RF Fingerprint for Enhanced UAV Identification using Deep Learning," IEEE Globecom, 7-11 December 2020, Taipei, Taiwan.

C5. A. Al-Shawabka, F. Restuccia, S. D'Oro, T. Jian, B. Costa Rendon, **N. Soltani**, J. Dy, K. Chowdhury, S. Ioannidis, and T. Melodia, "Exposing the Fingerprint: Dissecting the Impact of the Wireless Channel on Radio Fingerprinting," to appear in Proceedings of IEEE International Conference on Computer Communications (INFOCOM), Beijing, China ,2020.

C4. **N. Soltani**, K. Sankhe, S. Ioannidis, D. Jaisinghani, and K. Chowdhury, "Spectrum Awareness at the Edge: Modulation Classification using Smartphones," IEEE Dynamic Spectrum Access Networks (DySPAN), Newark, NJ, USA, 2019.

C3. J. Sanchez, **N. Soltani**, R. Chamarthi, A. Sawant, and H. Tabkhi, "A Novel 1D-Convolution Accelerator for Low-Power Real-time CNN processing on the Edge," IEEE High Performance extreme Computing Conference (HPEC), Waltham, MA USA, 2018.

C2. J. Sanchez, **N. Soltani**, P. Kulkarni, R. Chamarthi, and H. Tabkhi, "A Reconfigurable Streaming Processor for Real-Time Low-Power Execution of Convolutional Neural Networks at the Edge," International Conference on Edge Computing, Springer, "Best paper award", Seattle, USA, 2018.

C1. K. Soleimani, A. Patooghy, **N. Soltani**, L. Bu, and M. Kinsy, "Crosstalk Free Coding Systems to Protect Network on Chips Against Crosstalk Faults," IEEE International Conference on Computer Design (ICCD), Boston, MA, USA, 2017.

Technical Talks

April 2024   "Deep Learning for Next-G Wireless Communications"
IEEE TCCN Rising Star Symposium Series '24.

December 2022   "Finding Waldo in the CBRS Band: Signal Detection and Localization in the 3.5 GHz Spectrum"
IEEE GLOBECOM '22.

November 2021   "Deep learning for the physical layer"
Lightning talk at AI-Edge Institute.

January 2022   "NN-key: A Neural Network-Based Secret Key for Demapping OFDM Symbol"
IEEE CCNC '22.

October 2019   "Spectrum Awareness at the Edge: Modulation Classification using Smartphones"
IEEE DySPAN '19.

Poster Presentations

May 2025　　"UNICORN: URLLC Network Traffic Classification and OOD Detection for O-RAN"
IEEE ICMLCN, Barcelona, Spain.

October 2024　　"Lifelong learning for Open Radio Access Networks"
Student Research Showcase, WNCG group at the University of Texas at Austin, Austin, TX.

June 2024　　"Learning from the Best: Active Learning for Wireless Communications"
IMACCS workshop, AI-Edge Institute, Columbus, OH.

May 2023　　"PRONTO: Preamble Overhead Reduction with Neural Networks for Coarse Synchronization"
Industry day, Institute for Wireless IoT, Northeastern University, Boston, MA.

September 2022　"Finding Waldo in the CBRS Band: Signal Detection and Localization in the 3.5 GHz Spectrum"
AI-Edge Institute annual meeting, Columbus, OH.

October 2021　　"AI-aided OFDM Receiver and NN-key for Secure Transmission"
DARPA ERI Summit, Virutal.

Reviewer Roles

Journals　　IEEE Transactions on Wireless Communications, IEEE Transactions on Communications, IEEE Transactions on Mobile Computing, IEEE Transactions on Cognitive Communications and Networking, IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Information Forensics and Security, IEEE/ACM Transactions on Networking, IEEE Journal of Communications and Networking, Elsevier Journal of Information Security and Applications, Elsevier Computer Networks, IEEE Communications Letters, IEEE Wireless Communications Letters, Elsevier Computer Communications.

Conferences　　IEEE MSN'23, IEEE Globecom'23, INFOCOM'21, EAI Mobiquitous '19, ACM Mobicom '19, ACM GLSVLSI '18, CADS '17.

Volunteer Experience

- Program Committee (PC) member at ACM S3 workshop 2024 co-located with MobiCom

- Volunteer student in IEEE INFOCOM 2021 (Online conference)

- Volunteer student in IEEE SECON 2019 (in-person conference)

- Volunteer student in IEEE DySPAN 2019 (in-person conference)

Industry Experience

Jan. 2021-　　Robert Bosch LLC, CA, USA
Jul. 2021　　*Wireless/AI intern*

- Studying RF fingerprinting UWB radios using deep learning.

Dec 2014-　　Danesh Farazan Pardanic, Tehran, Iran
Jul 2016　　*Digital Design Engineer / FPGA Interface Developer*

- Design, Modeling and Implementation of DDR3 Interface on Xilinx FPGAs, Virtex6 and Kintex7, Acquiring a rate of:
  - 5.5 G(Byte/sec) on Virtex6
  - 10.6 G(Byte/sec) on Kintex7
- Design, Modeling and Implementation of FPGA Interface for using DDR3 RAM module as a giant external FIFO with independent read/write clocks and feasible simultaneous read/write. Maximum rate achieved:
  - 2.25 G(Byte/sec) with 256 bit user data interface on Virtex6
  - 3.55 G(Byte/sec) with 512 bit user data interface on Kintex7
- Design and Implementation of JESD204B Protocol on Kintex7
  - JESD204B is a high speed serial interface protocol for data converters (ADCs and DACs) which exploits FPGA GTX Primitives to transceive digital data
- Design and Implementation of SRAM DDR2 Interface for Virterx6 achieving a rate of 1.35 G(Byte/sec)
- Design and Implementation of USB 2.0 Interface for Virterx6
- Design and Implementation of Interface for Analog Devices and Texas Instruments ADCs and DACs on Virtex6 and Kintex7 including:
  - Serial Peripheral Interface for Data Converter initialization and register control.
  - Data management modules: Auto-delay finder, data serializer, data deserializer and etc.

Technical Skills

EDA Tools:	Proteus, Pspice, Cadence Virtuoso
Development Environments:	Visual Studio, MicroBasic, MPLAB
HDL Simulator Tools:	ModelSim, ISim
Xilinx Tools:	Xilinx ISE (PlanAhead, SystemGenerator, Chipscope), Vivado
Programming Languages:	MATLAB, C, C++, Python, Java
Hardware description:	VHDL, Verilog, Chisel
Simulators:	Access Noxim
NN design tools:	Keras-TensorFlow, TensorRT, TensorFlow Lite, PyTorch

Teaching Experience

Spring 2018 Teaching Assistant for C++ course at University of North Carolina at Charlotte

References

Kaushik Chowdhury
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in Electrical and Computer Engineering #2
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