Reza Mosayebi

Staff Engineer, Synopsys, Mississauga, ON, Canada

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PROFESSIONAL SUMMARY	Experienced researcher with a strong background in optical, wireless, and biomedical communication systems. Expertise in digital signal processing (DSP) and machine learning (ML) applications. Skilled in developing high-speed serial-link transceivers, creating physical layer transceiver architectures, and specifying link budgets and block-level specifications for serializer/deserializer (SerDes) IP components for Ethernet and PCIe6. Proficient in high-level modeling, performance simulations, jitter tolerance investigations, and developing adaptation algorithms. Eager to leverage my DSP and ML skills in a challenging role to drive technological innovation.

RELEVANT SKILLS AND KNOWLEDGE

- **High-Speed SerDes Systems**: Expertise in developing physical layer transceiver architectures, specifying link budgets, and defining block-level specifications for SerDes IP components for Ethernet and PCIe6. Proficient in high-level modeling (analytical and time domain), performance simulations, jitter tolerance investigations, and developing DSP and adaptation algorithms.
- **Optical/Wireless Communications & DSP**: Highly skilled in fiber optic and 5G systems, with mastery in advanced DSP algorithms including channel estimation, linear and decision-feedback equalizers, optimal and near-optimal detection schemes, multi-user massive MIMO systems, beamforming and precoding, power control and power allocation, effective nonlinearity mitigation, interference cancellation, and phase and timing recovery.
- **Error Correction**: Extensive experience in developing real-time decoders for forward error correction (FEC) codes, including LDPC, TPC, BCH, Reed-Solomon, and Convolutional codes.
- **Machine Learning**: Proficient in ML techniques such as transfer learning (TL), deep neural networks (DNNs), long short-term memory (LSTM), and convolutional neural networks (CNNs), using PyTorch, across various applications like classification, regression, and dimension reduction.
- **Programming**: Expert in MATLAB, Python, and C++ programming.

WORK EXPERIENCE

Synposys Inc, Mississauga, Canada
Staff Analog & Mixed-Signal Circuit Design Engineer   Mar. 2024 – Present

I am part of the R&D group developing high speed serial-link transceivers and,more specifically, part of the System and Architecture team responsible for creating the physical layer transceiver architecture, to specify link budgets and block level specifications for all the SerDes IP components for Ethernet and PCIe6. My duties are:

- Participate in developing SerDes IP architecture for PCIe6 and Ethernet, including analog front-end equalizer (AFE), clock data recovery (CDR), feed-forward equalizer (FFE), decision feedback equalizer (DFE), maximum likelihood sequence detection (MLSD), etc.
- Conduct several performance simulations in terms of link margins, BER, SNR, ISI and jitter tolerance analysis under different corners.
- Develop adaptation algorithms and work with Analog/Digital/DSP designers and FirmWare engineers to ensure proper implementation.

The University of British Columbia, Vancouver, Canada
Postdoctoral Research Fellow   Mar. 2022 – Feb. 2024

- Crafted a DNN scheme to simultaneously mitigate PDL and nonlinearity in optical communication. Achieved a substantial 0.3 dB improvement in Q-factor compared to the state-of-the-art model.
- Leveraged TL to fine-tune the DNN for optical network enhancement, effectively managing PDL and RSOP-induced time-varying changes, resulting in a remarkable 1 dB Q-factor improvement.
- Constructed NN-based solutions to enhance carrier phase recovery in optical fiber communication, significantly improving signal to noise ratio performance.
- Introduced an anomaly detection strategy in optical communication systems, proactively enhancing network reliability and minimizing potential issues.

Postdoctoral Teaching Fellow Jan. 2023 – Apr. 2023
- Instructor for the "Error Control Coding for Communications and Computers" course.

The University of Pompeu Fabra, Barcelona, Spain
Postdoctoral Fellow Sep. 2019 – Sep. 2021
- Devised a linear receiver for cell-free C-RANs, enhancing interference rejection, outperforming MF beamforming, while maintaining lower computational costs and scalability compared to MMSE.
- Assessed precoding techniques for massive MIMO C-RAN downlink, confirming that pseudo-inversion is near-optimal in various operational regimes, balancing performance and computational cost.
- Developed scalable policies for uplink power control and downlink power allocation in cell-free networks, enabling a tunable trade-off between performance and fairness by adjusting parameters.

Faraz Ertebat, Co., Tehran, Iran
Senior System Engineer Apr. 2018 – Jun. 2019
- Specialized in object localization utilizing TDOAs and FDOAs measurements.
- Led project management while concurrently providing mentorship to several engineers.

System Engineer (part-time) Jul. 2012 – Jul. 2017
- Engineered sophisticated receivers for wireless communication systems, encapsulating aspects like modulation recognition, resampling, timing and phase recovery, FEC codes decoding (including LDPC, TPC, BCH, Reed-Solomon, and Convolutional codes).
- Explored and implemented interference cancellation methods in satellite communication systems.

EDUCATION

Sharif University of Technology, Tehran, Iran

Doctor of Philosophy in Electrical Engineering Feb. 2014 – Sep. 2018
- Thesis: "Efficient detection schemes in molecular communication (MC) networks"

Master of Science in Electrical Engineering – Communication Systems Sep. 2012 – Feb. 2014
- Thesis: "Efficient methods for transmission and reception of information in MC systems"

Bachelor of Science in Electrical Engineering – Communications Sep. 2008 – Sep. 2012
- Research: "Effective NN models for the classification of human chromosomes"

SELECTED PUBLICATIONS

[J1] **R. Mosayebi** and L. Lampe, "Deep neural network for joint nonlinearity compensation and polarization tracking in the presence of PDL," *Journal of Lightwave Technology*, vol. 42, no. 10, pp. 3747-3759, 15 May 2024.

[J2] **R. Mosayebi**, M. Mojahedian, and A. Lozano, "Linear interference cancellation for the cell-free C-RAN uplink," in *IEEE Transactions on Wireless Communications*, vol. 20, no. 3, pp. 1544-1556, Mar. 2021.

[J3] R Nikbakht, **R. Mosayebi**, and A. Lozano, "Uplink fractional power control and downlink power allocation for cell-free networks," *IEEE Wireless Communications Letters*, vol. 9, no. 6, pp. 774-777, Jan. 2020.

[J4] **R. Mosayebi**, H. Arjmandi, A. Gohari, M. Nasiri-Kenari, and U. Mitra, "Receivers for diffusion based molecular communication: Exploiting memory and sampling Rate," *IEEE Journal on Selected Areas in Communications*, vol. 32, no. 12, pp. 2368-2380, Dec. 2014.

Full list of publications available at: [GoogleScholar].

HONORS AND AWARDS

Exemplary Reviewer of IEEE TRANSACTIONS ON COMMUNICATIONS	2022
Exemplary Reviewer of IEEE COMMUNICATIONS LETTERS	2020
Ranked **123rd** in the *Iran National Matriculation Exam* out of more than 280,000 Candidates	2008