Reza Mosayebi

Staff Engineer, Synopsys Inc., Mississauga, ON, Canada

+1(604)338-6320 rezamosayebi90@gmail.com LinedIn Github

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

As part of the System and Architecture team in R&D, I help develop high-speed serial-link transceivers. My responsibilities include creating the physical layer transceiver architecture, specifying link budgets, and defining block-level specifications for advanced high-speed data protocols. My key duties include:

- Contributing to the design and development of SerDes IP architecture for PCIe6 and Ethernet, including the analog front-end equalizer (AFE), clock data recovery (CDR), feed-forward equalizer (FFE), decision feedback equalizer (DFE), and maximum likelihood sequence detection (MLSD).
- Conducting comprehensive performance simulations to evaluate link margins, bit error rates (BER), signal-to-noise ratios (SNR), inter-symbol interference (ISI), and jitter tolerance across various operational scenarios. I have extensive experience in analyzing link budgets for both NRZ and PAM4 high-speed serial links.
- Mastering advanced adaptation algorithms and collaborating closely with Analog, Digital, DSP designers, and Firmware engineers to ensure accurate implementation.
- Developing expertise in high-speed receiver/transmitter (Rx/Tx) SerDes PHY circuit topologies, including a deep understanding of Tx/Rx equalization techniques, CDR architectures, and loop dynamics. I am well-versed in high-speed serial data protocols such as PCIe and Ethernet.

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

- 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