Abbas Khalili

Contact Information

NYU Tandon School of Eng.,
ECE Department,
370 Jay Street, Brooklyn, NY, 11201

Cell. Phone: (+1) 917-915-2429
E-mail: ako274@nyu.edu

Target Job

Internship in the telecommunications industry

Professional Experience

3+ years research experience with wireless systems

- MmWave Systems, OFDM, LTE, MIMO, TDD Massive MIMO, FDD Massive MIMO, Full Duplex, One-bit ADC, low resolution DAC, Beamforming, Analog Beam Alignment
- Performance analysis and evaluation
- Research on quantized MIMO (3 years)
- Research on analog beam alignment (1 year)
- MmWave and microwave systems for 5G (3 years)

Education

Ph.D. Candidate, Electrical Engineering, **GPA**: 3.98/4.0   2018 - present
NYU Tandon School of Engineering, New York, USA
Advisor: Prof. Elza Erkip

- **Research topics**:
    - Communication over MIMO Channels with Quantization Constraints
    - Optimal beam design for analog beam alignment.

M.Sc. Electrical Engineering, **GPA**: 3.975/4.0   2016 - 2018
NYU Tandon School of Engineering, New York, USA
Advisor: Prof. Elza Erkip

- **Thesis Title**: On MIMO Channel Capacity with Output Quantization Constraints.

B.Sc. Electrical Engineering, **GPA**: 18.48/20   2012 - 2016
University of Tehran, Tehran, Iran
Advisor: Prof. Amir Masoude Rabiei

- **Thesis Title**: Effect of Geometric Poission Distribution of Users on Spectrum Sensing Performance.

Research Interests

Wireless Communications, Signal Processing, Information Theory, Machine Learning, Data Analysis

Professional Experiences

NYU WIRELESS, NYU Tandon School of Engineering, New York

- Performance bounds and achievability schemes on multi-user analog beam alignment under the supervision of Prof. Elza Erkip, [2019- present]
    - Provided upper and lower-bounds on the performance of non-interactive beam alignment methods.
    - Developed methods for designing probing beams achieving the optimal performance.
- Capacity bounds for Gaussian MIMO channels in presence of low resolution ADCs at receiver, under the supervision of Prof. Elza Erkip, [Summer 2017- present]
    - Provided capacity analysis and derived achievable rate for various transmission schemes.

- Developed different receiver architectures that achieve optimal transmission rates under different conditions.

- Capacity bounds for two-hop Wyner model interference channel with full duplex relaying., under supervision of Prof. Elza Erkip, [spring 2016 summer 2017]

  - Studied and simulated different transmission schemes.

Technical skills	C++, Python, Pytorch, Tensor Flow, MATLAB, CVX, Simulink, Machine learning, Numerical Optimization, Massive MIMO

Selected Course Projects

- Implementation of a deep compression algorithm on a fully connected neural network in Tensor Flow, Advanced Machine Learning, [Spring 2017]

- Simulation of a communications system with a distorted channel using PCs sound card, Summer Internship, University of Tehran, [Summer 2015]

  - Object oriented implementation of receiver, transmitter, channel in MATLAB and testing different modulation schemes.

- Research on visible light communication including channel model simulation and study of modulation schemes under supervision of Prof. Farshad Lahouti.

- Implementation of Data Encryption Standard (DES) Algorithm using C++, Advanced Programming.

- Built and programmed a line-tracking robot.

Publication

A. Khalili, S. Rini, L. Barletta, E. Erkip and Y. C. Eldar, "On MIMO Channel Capacity with Output Quantization Constraints," IEEE International Symposium on Information Theory (ISIT), Vail, CO, 2018, pp. 1355-1359.

A. Khalili, F. Shirani, E. Erkip and Y. C. Eldar, "Tradeoff Between Delay and High SNR Capacity in Quantized MIMO Systems" IEEE International Symposium on Information Theory (ISIT), Paris, France, 2019, pp. 597-601.

A. Khalili, F. Shirani, E. Erkip and Y. C. Eldar, "On Multitermial Communication over MIMO Channels with One-bit Quantizers at the Receiver", IEEE International Symposium on Information Theory (ISIT), Paris, France, 2019, pp. 602-606.

Submissions and Preprints

A. Khalili, S. Shahsavari, F. Shirani, E. Erkip and Y. C. Eldar, "On Throughput of Millimeter Wave MIMO Systems with Low Resolution ADCs", Submitted to 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP).

A. Khalili, S. Shahsavari, M. A. (Amir) Khojastepour, and E. Erkip, "On Optimal Multi-user Beam Alignment in Millimeter Wave Wireless Systems", Submitted to 2020 IEEE International Symposium on Information Theory (ISIT).

S. Dutta, **A. Khalili**, E. Erkip, and S. Rangan, "Capacity Bounds for Communication Systems with Quantization and Spectral Constraints", Submitted to 2020 IEEE International Symposium on Information Theory (ISIT).

Awards

- Ernst Weber Fellowship at NYU Tandon [2018]

- Certificate of Merit for Academic Achievement from New York University Tandon School of Engineering [2017].

- Samuel Morse fellowship from New Your University [2016].

Selected Courses   Principles of Massive MIMO, Numerical Optimization, Advance Machine learning, Digital Communications, Information Theory, Stochastic Calculus, Methods of Applied Math, Probability and Stochastic Processes, Detection and Estimation, Digital Signal Processing.

References   Dr. Elza Erkip (Email: elza@nyu.edu), E.C.E. Dept., New York University
Dr. Sundeep Rangan (Email: srangan@nyu.edu), E.C.E. Dept., New York University
Dr. Yonina C. Eldar (Email: yonina.eldar@weizmann.ac.il), M.C.S. Dept., Weizmann Institute of Science