

Mahdi Barzegar Khalilsarai

Staff Wireless Engineer, Ph.D.

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Summary

- Telecommunications expert with 7+ years of experience in wireless engineering
- Solid research background in wireless communications and signal processing
- Actively working on research for future 6G networks and on-going 5G standardization
- Research fields: MIMO systems and machine learning for wireless physical layer

Work Experience

- **Lenovo** Berlin, Germany
Wireless Staff Engineer *Mar. 2023 – Present*
- **Technische Universität Berlin** Berlin, Germany
Postdoctoral Researcher *Feb. 2021 – Feb. 2023*

Education

- **Technische Universität Berlin** Berlin, Germany
Ph.D. in Telecommunication Systems *May. 2016 – Jan. 2021*
Thesis: “Frequency Division Duplexing Massive MIMO:
Novel Theoretical Results and Efficient Algorithms” (*summa cum laude*)
Advisor: **Prof. Giuseppe Caire**
- **Sharif University of Technology** Tehran, Iran
M.Sc. in Telecommunication Systems *Sep. 2013 – May. 2015*
Thesis: “Statistical Interpolation of Non-Gaussian Autoregressive Processes”
Advisor: **Prof. Arash Amini**
- **University of Tehran** Tehran, Iran
B.Sc. in Electrical Engineering *Sep. 2009 – May. 2013*

Technical Skills

- **Programming:** MATLAB, Python (SciPy, PyTorch, scikit-learn), C++ (limited experience)
- **Telecommunications:** information theory, digital signal processing, wireless communication, wireless network standardization (RAN1).
- **Data Science:** machine learning, deep neural networks, optimization theory, high-dimensional probability theory, stochastic processes
- **Languages:** English, German, Farsi

Selected Publications (COMPLETE LIST ON GOOGLE SCHOLAR)

- **Barzegar Khalilsarai, Mahdi**, Saeid Haghighatshoar, Xiping Yi, and Giuseppe Caire. “FDD massive MIMO via UL/DL channel covariance extrapolation and active channel sparsification.” **IEEE Transactions on Wireless Communications** 18, no. 1 (2018): 121-135.
- **Barzegar Khalilsarai, Mahdi**, Yi Song, Tianyu Yang, and Giuseppe Caire. “Channel State Acquisition in FDD Massive MIMO: Rate-Distortion Bound and Effectiveness of “Analog” Feedback”, proceedings of the 2022 **IEEE International Symposium on Information Theory (ISIT)**.
- **Barzegar Khalilsarai, Mahdi**, Tianyu Yang, Saeid Haghighatshoar, Xiping Yi, and Giuseppe Caire. “Dual-Polarized FDD Massive MIMO: A Comprehensive Framework.” **IEEE Transactions on Wireless Communications** 21.2 (2021): 840-854.
- Song, Yi, **Mahdi Barzegar Khalilsarai**, Saeid Haghighatshoar, and Giuseppe Caire. “Deep Learning for Geometrically-Consistent Angular Spread Function Estimation in Massive MIMO.” proceedings of the **IEEE Global Communications Conference (Globecom)**, 2020.
- **Barzegar Khalilsarai, Mahdi**, Benedikt Gross, Stelios Stefanatos, Gerhard Wunder, Giuseppe Caire. “WiFi-Based Channel Impulse Response Estimation and Localization via Multi-Band Splicing.” proceedings of the **IEEE Global Communications Conference (Globecom)**, 2020.
- **Barzegar Khalilsarai, Mahdi**, Tianyu Yang, Saeid Haghighatshoar, and Giuseppe Caire. “Structured channel covariance estimation from limited samples in massive MIMO.” In **ICC 2020-2020 IEEE International Conference on Communications (ICC)**, pp. 1-7. IEEE, 2020.
- **Barzegar Khalilsarai, Mahdi**, Stelios Stefanatos, Gerhard Wunder, and Giuseppe Cair. “WiFi-based indoor localization via multi-band splicing and phase retrieval.” 2019 **IEEE 20th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)**. IEEE, 2019.
- Haghighatshoar, Saeid, **Mahdi Barzegar Khalilsarai**, and Giuseppe Caire. “Multi-band covariance interpolation with applications in massive MIMO.” In 2018 **IEEE International Symposium on Information Theory (ISIT)**, pp. 386-390. IEEE, 2018.
- **Barzegar Khalilsarai, Mahdi**, Saeid Haghighatshoar, Giuseppe Caire, and Gerhard Wunder. “Compressive estimation of a stochastic process with unknown autocorrelation function.” In 2017 **IEEE International Symposium on Information Theory (ISIT)**, pp. 1282-1286. IEEE, 2017.
- Tian, Chang, An Liu, **Mahdi Barzegar Khalilsarai**, Giuseppe Caire, Wu Luo, and Min-Jian Zhao. “Randomized Channel Sparsifying Hybrid Precoding for FDD Massive MIMO Systems.” **IEEE Transactions on Wireless Communications** 19.8 (2020): 5447-5460.