

Morteza Banagar

PERSONAL INFORMATION

224Y Qualcomm Building Q
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Permanent Resident of the United States

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WORK EXPERIENCE

Qualcomm Technologies, Inc.

Title: Senior Engineer May 2022 – Present
Focus: 5G NR Uplink (Systems and Timeline)

- Triaging, bring up, and commercialization support along with debugging UL systems issues for multiple generations of Qualcomm modems
- Algorithm design and support for RSRP-based antenna switching: (i) UL-MIMO, (ii) bailout mechanisms, (iii) SUL bands, and (iv) tuner-based antenna switching (*two patents to be filed*)
- Algorithm design and support for Rel. 16 and Rel. 17 UL Tx switching: Handling DL interruption (*filed a patent*)
- Rel. 17 SRS carrier switching: Handling both SRS CS and UL Tx switching
- Modem timeline (Python-based simulator): Code development and UL clock delivery
- Developing a Python-based automation tool that parses TEX files to generate YAML config files
- Mentoring new hires

Title: System Engineering Intern Summer 2020 & Summer 2021
Focus: DPD

- PA forward modeling and DPD kernel char
- PA linearization using DPD techniques, such as ILA and DLA

Sepehr, Co.

Title: System Engineer Nov. 2014 – Nov. 2017
Focus: Signal Processing

- Designing components of wireless transceivers: digital filters, matched filtering, windowing, etc.
- Denoising signals using tools from machine learning
- Object/text detection in image (OCR)
- Curve fitting and nonlinear optimization in Matlab

SOFTWARE SKILLS

Programming: Python, MATLAB
Technical: Git, Qualcomm's internal software for log analysis, debugging, etc.
Applications: L^AT_EX, MS Word/PowerPoint/Excel/Visio

EDUCATION

Virginia Tech, Blacksburg, VA, USA

Doctor of Philosophy in Electrical Engineering Jan. 2018 – May 2022

- Dissertation: "Drone Cellular Networks: Fundamentals, Modeling, and Analysis"
- Advisor: Harpreet S. Dhillon

University of Tehran, Tehran, Iran

Master of Science in Electrical Engineering – Communication Systems Sep. 2012 – Sep. 2014

- Thesis: "A Stochastic Geometric Approach for the Analysis and Design of Cognitive Device-to-Device Networks" (in Farsi)
- Advisor: Behrouz Maham

University of Tehran, Tehran, Iran

Bachelor of Science in Electrical Engineering – Telecommunications Sep. 2008 – Sep. 2012

- Project: "Carrier and Symbol Synchronization Techniques" (in Farsi)
- Advisor: Ali Olfat

RESEARCH INTERESTS

5G NR, MIMO Networks, Non-Terrestrial Networks and UAVs, Stochastic Geometry

BOOK
CHAPTERS

[BC1] **M. Banagar**, V. V. Chetlur, and H. S. Dhillon, “Stochastic geometry-based performance analysis of drone cellular networks,” in *UAV Communications for 5G and Beyond*, New York: Wiley, Dec. 2020, ch. 9, pp. 231-254.

JOURNAL
PUBLICATIONS

[J6] **M. Banagar** and H. S. Dhillon, “Fundamentals of wobbling and hardware impairments-aware air-to-ground channel model,” *IEEE Trans. Veh. Technol.*, vol. 73, no. 12, pp. 17946-17962, Dec. 2024.

[J5] **M. Banagar** and H. S. Dhillon, “3D two-hop cellular networks with wireless backhauled UAVs: Modeling and fundamentals,” *IEEE Trans. Wireless Commun.*, vol. 21, no. 8, pp. 6417-6433, Aug. 2022.

[J4] **M. Banagar**, H. S. Dhillon, and A. F. Molisch, “Impact of UAV wobbling on the air-to-ground wireless channel,” *IEEE Trans. Veh. Technol.*, vol. 69, no. 11, pp. 14025-14030, Nov. 2020

[J3] **M. Banagar** and H. S. Dhillon, “Performance characterization of canonical mobility models in drone cellular networks,” *IEEE Trans. Wireless Commun.*, vol. 19, no. 7, pp. 4994-5009, July 2020.

[J2] **M. Banagar**, V. V. Chetlur, and H. S. Dhillon, “Handover probability in drone cellular networks,” *IEEE Wireless Commun. Lett.*, vol. 9, no. 7, pp. 933-937, July 2020.

[J1] **M. Banagar**, B. Maham, P. Popovski, and F. Pantisano, “Power distribution of device-to-device communications in underlaid cellular networks,” *IEEE Wireless Commun. Lett.*, vol. 5, no. 2, pp. 204-207, Apr. 2016.

CONFERENCE
PUBLICATIONS

[C7] **M. Banagar** and H. S. Dhillon, “Wobbling and impairments-aware channel model and its implications on high-frequency UAV links,” in *IEEE Global Commun. Conf. (GlobeCom)*, Rio de Janeiro, Brazil, Dec. 2022, pp. 5983-5988.

[C6] **M. Banagar** and H. S. Dhillon, “Fundamentals of 3D two-hop cellular networks analysis with wireless backhauled UAVs,” in *IEEE Global Commun. Conf. (GlobeCom)*, Madrid, Spain, Dec. 2021, pp. 1-6.

[C5] **M. Banagar** and H. S. Dhillon, “Fundamentals of drone cellular network analysis under random waypoint mobility model,” in *IEEE Global Commun. Conf. (GlobeCom)*, Waikoloa Village, HI, USA, Dec. 2019, pp. 1-6.

[C4] **M. Banagar** and H. S. Dhillon, “3GPP-inspired stochastic geometry-based mobility model for a drone cellular network,” in *IEEE Global Commun. Conf. (GlobeCom)*, Waikoloa Village, HI, USA, Dec. 2019, pp. 1-6.

[C3] **M. Banagar**, B. Maham, and V. Shah-Mansouri, “Bounds on the coverage probability of heterogeneous cellular networks,” in *IEEE Int. Conf. Commun. (ICC) Workshops*, Kuala-Lampur, Malaysia, May 2016, pp. 755-759.

[C2] A. Eshraghi, B. Maham, Z. Han, and **M. Banagar**, “Efficiency and coverage improvement of active RFID two-hop relay systems,” in *IEEE Wireless Commun. Netw. Conf. (WCNC)*, Istanbul, Turkey, Apr. 2014, pp. 2002-2007.

[C1] N. Zarmehi, **M. Banagar**, and M. A. Akhaee, “Optimum decoder for an additive video watermarking with Laplacian noise in H.264,” in *IEEE Int. Conf. Inform. Security Cryptology*, Yazd, Iran, Aug. 2013, pp. 1-5.