

Shizhen Jia

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EDUCATION

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|---|---------------------------------|
| • New York University
<i>Ph.D. candidate in Electrical Engineering, Advisor: Sundeep Rangan</i> | Sep. 2024-Present
New York |
| • New York University
<i>M.S. in Electrical Engineering</i> | Sep. 2022-Aug. 2024
New York |
| • Chongqing University
<i>B.Eng. in Electrical Engineering</i> | Sep. 2018-Jun. 2022
China |

RESEARCH PROJECTS

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| • Terrestrial–Satellite Downlink Co-Existence via Joint Detection, Channel Estimation, and Interference Nulling
<i>Advisor: Sundeep Rangan, Tools: Python, Sionna-RT</i> | Sep. 2024-Present |
| ◦ 4-stage coexistence protocol: uplink broadcast, victim detection, channel estimation, downlink nulling. | |
| ◦ Regularized null-steering beamformer via principal-eigenvector solution (gain–null trade-off). | |
| ◦ Site-specific rural macrocell evaluation with ray tracing; quantified overhead and INR/SNR trade-offs. | |
| ◦ Large INR reduction vs. no-nulling baseline; improved protection with Massive MIMO. | |
| • Distributed Uplink Anti-Jamming in LEO Mega-Constellations
<i>Advisor: Sundeep Rangan, Tools: Python, Sionna-RT</i> | May. 2025-Present |
| ◦ Formulated uplink anti-jamming as a min–max game over transmit covariance matrices (TX vs. jammer). | |
| ◦ Developed a fast solver: alternating water-filling best response (TX) + projected gradient updates (jammer) to a Nash equilibrium. | |
| ◦ Built a Starlink-geometry case study with Sionna ray tracing and realistic interference/jammer models. | |
| ◦ Showed multi-satellite cooperation (3–5 sats) improves capacity vs. single-satellite links under close-proximity dish and intelligent-array jamming. | |
| • OTA Phase Measurements: Multipath Impact & Narrowband Array Calibration
<i>Advisor: Sundeep Rangan, Collaborator: Andrea Bedin, Tools: Pi-Radio Marie Curie, RFSoC, Matlab, Python</i> | Aug. 2025-Present |
| ◦ Showed multipath phase error is often small, even with bandwidths of only a few MHz. | |
| ◦ Developed a one-shot statistical model linking multipath amplitude to phase-error behavior. | |
| ◦ Proved multipath-induced phase error is zero-mean, enabling spatial averaging via antenna movement. | |
| ◦ Quantified spatial correlation using inter-/intra-measurement std vs. displacement and convergence. | |
| ◦ Proposed a low-complexity OTA narrowband array-calibration strategy based on movement + averaging. | |
| • Interference Avoidance for FMCW Automotive Radars via Non-Cooperative Game
<i>M.S. Thesis, Advisor: Quanyan Zhu, Tools: Matlab</i> | Aug. 2023 - Aug. 2024 |
| ◦ Developed a system-level interference framework for FMCW automotive radar networks. | |
| ◦ Established an analytical collision model linking waveform timing to SINR degradation. | |
| ◦ Formulated spectrum coordination as a non-cooperative game and derived mixed-strategy equilibria. | |
| ◦ Quantified robustness gains of game-theoretic policies over heuristic baselines via simulation. | |

PUBLICATIONS

- [C.1] Shizhen Jia, Mingjun Ying, Marco Mezzavilla, Doru Calin, Theodore S Rappaport, Sundeep Rangan (2025). **Joint Detection, Channel Estimation and Interference Nulling for Terrestrial–Satellite Downlink Co-Existence in the Upper Mid-Band**. In *Proceedings of the IEEE Global Communications Conference (GLOBECOM)*, accepted. IEEE. December 2025.
- [C.2] Shizhen Jia, Mingjun Ying, Marco Mezzavilla, Theodore S Rappaport, Sundeep Rangan (2026). **Distributed Uplink Anti-Jamming in LEO Mega-Constellations via Game-Theoretic Beamforming**. In *Proceedings of the IEEE International Conference on Communications (ICC)*, accepted. IEEE. 2026.