Shaoran Li

Ph.D. Candidate, Department of Electrical and Computer Engineering, Virginia Tech

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Education

Ph.D. Candidate, Electrical Engineering *Sept. 2017–Present*
Virginia Tech, Blacksburg, VA, USA *GPA: 4.0/4.0*

Master of Science, Information and Communication Engineering *Sept. 2014–Apr. 2017*
Beijing University of Posts and Telecommunications (BUPT), Beijing, China *GPA: 87.95/100*

Bachelor of Engineering (Honors Program), Information Engineering *Sept. 2010–June 2014*
Southeast University, Jiangsu, China *GPA: 86.54/100*

Interships

Software Enginnering Intern, NVIDIA *May 2021–Aug. 2021*
- Design deep learning-based solution in compliant with 3GPP standards
- Algorithm tests and performance analysis in simulated 5G-NR scenarios

Research Experiences

Wireless networking in presence of uncertainty

Provide probabilistic guarantees with uncertain network parameters
- S. Li, N. Jiang, Y. Chen, Y.T. Hou, W. Lou, and W. Xie, "D^{2}BF - Data-Driven Beamforming in MU-MIMO with Channel Uncertainty," *accepted to IEEE INFOCOM 2022*
- S. Li, C. Li, Y. Huang, Y.T. Hou and W. Lou, "On Task Offloading with Uncertain Processing Cycles in Mobile Edge Computing," *ACM MobiHoc 2021*
- S. Li, Y. Huang, C. Li, B. Jalaian, Y.T. Hou and W. Lou, "Maximize Spectrum Efficiency in Underlay Coexistence With Channel Uncertainty," *IEEE/ACM Trans. on Networking, 2021*
- S. Li, Y.T. Hou, W. Lou, B. Jalaian, S. Russell, and B. MacCall, "Optimal Power Control with Channel Uncertainty in Ad Hoc Networks," *IEEE/AFCEA MILCOM 2019, Best Paper Award in unclassified technical program*
  - *Minimize energy consumption with probabilistic data rate guarantee of Transmitter-Receiver pairs*
- S. Li, Y. Huang, C. Li, B. Jalaian, Y.T. Hou and W. Lou, "Coping Uncertainty in Coexistence via Exploitation of Interference Threshold Violation," *ACM MobiHoc 2019*

Real-time optimization in wireless networking on GPU platforms

Design and implement parallel algorithms on NVIDIA GPU with $\sim 100\ \mu s$ strict timing requirement
- S. Li, Y. Huang, C. Li, Y.T. Hou, W. Lou, B. Jalaian, and S. Russell, "Achieving Real-Time Spectrum Sharing in 5G Underlay Coexistence with Channel Uncertainty," *IEEE Trans. on Mobile Computing, 2021*
  - *Picocell scheduling and power control, $< 100\ \mu s$ on NVIDIA Tesla V100*
- Y. Huang, S. Li, Y.T. Hou, and W. Lou, "GPF+: A Novel Ultrafast GPU-Based Proportional Fair Scheduler for 5G NR," *IEEE/ACM Trans. on Networking, 2021*
- Y. Huang, S. Li, Y. Chen, Y.T. Hou, W. Lou, J. Delfeld, and V. Ditya, "GPU: A New Enabling Platform for Real-Time Optimization in Wireless Networks," *IEEE Networks, 2020*
- S. Li, Y. Huang, C. Li, B. Jalaian, S. Russell, Y.T. Hou, W. Lou, and B. MacCall, "A Real-Time Solution for Underlay Coexistence with Channel Uncertainty," *IEEE GLOBECOM 2019*
- Y. Huang, S. Li, Y.T. Hou and W. Lou, "GPF: A GPU-based Design to Achieve ~100 μs Scheduling for 5G NR," *ACM MobiCom 2018*

Link-level transceiver implementation on FPGA platforms

- SCMA transceiver, FTN transceiver, and DPSK/FM transceiver on Stratix V, Stratix IV, and Kintex-7
- OFDM transceiver on Cyclone IV (Transmitter) and Stratix IV (Receiver)

Others: Age of Information, MIMO, CBRS, and Faster-than-Nyquist sampling

- C. Li, Q. Liu, S. Li, Y. Chen, Y.T. Hou, W. Lou, S. Kompella, "Scheduling With Age of Information Guarantee," IEEE/ACM Transactions on Networking, 2022
- N. Jai, S. Li, C. Li, Y.T. Hou and W. Lou, "Optimal Channel Allocation in the CBRS Band with Shipborne Radar Incumbents," *IEEE DySPAN 2021*
- Y. Chen, S. Li, C. Li, H. Zeng, B. Jalaian, Y.T. Hou, and W. Lou, "On DoF Conservation in MIMO Interference Cancellation based on Signal Strength in the Eigenspace," *IEEE Trans. on Mobile Computing, 2021*
- C. Li, Y. Huang, S. Li, Y. Chen, B. Jalaian, Y.T. Hou, W. Lou, J.H. Reed and S. Kompella, "Minimizing AoI in a 5G-based IoT Network under Varying Channel Conditions," IEEE Internet of Things Journal, 2021
- C. Li, Q. Liu, S. Li, Y. Chen, Y.T. Hou, and W. Lou, "On Scheduling with AoI Violation Tolerance," *IEEE INFOCOM 2021*
- C. Li, S. Li, Y. Chen, Y.T. Hou, W. Lou, "AoI Scheduling with Maximum Thresholds," *IEEE INFOCOM 2020*
- Y. Huang, S. Li, C. Li, Y.T. Hou, W. Lou, "A Deep Reinforcement Learning-based Approach to Dynamic eMBB/URLLC Multiplexing in 5G NR," *IEEE Internet of Things Journal, 2020*
- C. Li, S. Li, and Y.T. Hou, "A General Model for Minimizing Age of Information at Network Edge," *IEEE INFOCOM 2019*
- Y. Chen, S. Li, C. Li, Y.T. Hou and B. Jalaian, "To Cancel or Not to Cancel: Exploiting Interference Signal Strength in the Eigenspace for Efficient MIMO DoF Utilization," *IEEE INFOCOM 2019*
- C. Li, S. Li, Y. Chen, Y.T. Hou, and W. Lou, "Minimizing Age of Information under General Models for IoT Data Collection," *IEEE Trans. on Network Science and Engineering, accepted, 2019*
- S. Li, Z. Wu, and H. Che, "Faster-than-Nyquist System Based on Novel Shaping Waveforms," *IEEE IMCCC 2016*
- Z. Wu, Hui Che, and S. Li, "Spectral efficiency and parameter optimization analysis for faster-than-Nyquist signaling," *System Engineering and Electronics, 2016*

Skills

- Experienced knowledge in wireless communication, network optimization, 4G-LTE, and 5G-NR.
- Familiar with air interface performance analysis, characterization and optimization
- Academic Language: C/C++, Python, CUDA, Matlab, Verilog HDL, and LaTeX

Honors and Awards

- Prasad Scholarship *Aug. 2019–May 2020*
- Silver Medal Award in the First 5G Algorithm Innovation Competition by the InnovateAsia FPGA Design Contest (4/184) *Dec. 2015*
- Third Prize in National Postgraduate Mathematics Contest in Modeling *Nov. 2015*
- Top Ten Annual Individuals *Dec. 2012*
- Third Prize in National Undergraduate Mathematics Contest in Modeling *Oct. 2012*
- The First Prize Scholarship×3 *Sept. 2014–Dec. 2016*

Extracurricular Activities

Graduate Teaching Assistant at Virginia Tech *Aug. 2017–May 2018*
Volunteers of Video Games Live at National Stadium (Bird's Nest), Beijing *July 2016*
Graduate Teaching Assistant at BUPT *Sept. 2014–June 2015*

References

Dr. Tom Hou, Bradley Distinguished Professor of ECE, Virginia Tech, thou@vt.edu
Dr. Wenjing Lou, W. C. English Endowed Professor of CS, Virginia Tech, wjlou@vt.edu
Dr. Chris Dick, R&D Engineering at the Intersection of 5G and AI, NVIDIA, cdick@nvidia.com