Shaoran Li

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Education

PhD Student, Electrical Engineering — *Sept. 2017–Present*
Virginia Tech, Virginia, 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, P.R. China — *GPA: 87.95/100*

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

Interships

Software Enginnering Intern, NVIDIA — *May 2021–Aug. 2021*
- Design deep learning-based solution for 5G Aerial
- Algorithm tests and performance analysis in simulated 5G-NR scenarios

Research Experiences

Wireless networking in presence of uncertainty

Provide probabilistic guarantees when uncertain parameters are only known by mean and covariance
- 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 Transactions on Networking, 2021*
- S. Li, Y. T. Hou, W. Lou, B. Jalaian, S. Russell, B. MacCall, "Optimal Power Control with Channel Uncertainty in Ad Hoc Networks", *IEEE/AFCEA MILCOM 2019, Best Paper Award*
  - *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 strict timing requirement
- Y. Huang, S. Li, Y. Chen, Y. T. Hou, W. Lou, J. Delfeld, 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, B. MacCall, "A Real-Time Solution for Underlay Coexistence with Channel Uncertainty", *IEEE GLOBECOM 2019*
  - *Problem: Maximize spectral efficiency of secondary users in underlay coexistence*
  - *Timing: 150 μs on NVIDIA Quadro P6000, and 80 μs on NVIDIA Tesla V100*
- 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*
  - *Problem: 5G proportional fair scheduler for ~100 users*
  - *Timing: 125 μs on NVIDIA Quadro P6000, and 60 μs on NVIDIA Tesla V100*

Link-level transceiver implementation on FPGA platforms

Typically six components: encoder/decoder, interleaver/deinterleaver, modulation/demodulation
- Sparse Code Multiple Access (SCMA) transceiver on Stratix V

  - All hardware programming and connection with MATLAB GUI
- Fast-than-Nyquist (FTN) transceiver on Stratix IV
- DPSK/FM transceiver on Kintex-7
- OFDM transceiver on Cyclone IV (Transmitter) and Stratix IV (Receiver)

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

- C. Li, Q. Liu, S. Li, Y. Chen, Y. T. Hou, 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, W. Lou, "Minimizing Age of Information under General Models for IoT Data Collection," *IEEE Transactions on Network Science and Engineering, accepted, 2019*
- S. Li, Z. Wu, H. Che, "Faster-than-Nyquist System Based on Novel Shaping Waveforms", *IEEE IMCCC 2016*
- Z. Wu, Hui Che, S. Li, "Spectral efficiency and parameter optimization analysis for faster-than-Nyquist signaling", *System Engineering and Electronics, 2016*

Skills

- Experienced knowledge in wireless networking, 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
- Software: Visual Studio, Matlab, Spyder, Modelsim, Quartus, and Vivado

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

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