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Chengzhang Li

I'm a fifth-year Ph.D. student in the Electrical and Computer Engineering Department at Virginia Tech, supervised by Prof. Tom Hou. My research interests include 5G, Age of Information (AoI), real-time optimization, and machine learning in wireless networks. I expect to graduate from Virginia Tech in October 2022.

Education

2017–Present Ph.D. Student
M.S. in Computer Engineering (obtained in 2020)
ECE Department at Virginia Tech, Blacksburg, VA
Advisor: Prof. Tom Hou

2013–2017 B.S. in Electronic Engineering
EE Department at Tsinghua University, Beijing, China

Internship

Summer 2022 **Software Intern - 5G Wireless**,
NVIDIA Corporation, Santa Clara, CA.

Awards

2021 **Student Travel Grant,** *IEEE INFOCOM*.
2020 **Student Travel Grant,** *IEEE INFOCOM*.
2019 **Student Travel Grant,** *IEEE ICDCS*.
2015 **University Scholarship,** *Tsinghua University*.
2014 **University Scholarship,** *Tsinghua University*.
2014 **Geru Zheng Scholarship,** *Geru Zheng Foundation*.

Skills

Languages: Proficient in Matlab, Python, C/C++
Skills: NVIDIA CUDA

Teaching

Fall 2017 & Spring 2018 **Teaching Assistant**
ECE 2704 Signal & Systems, Virginia Tech.

Professional Services

Reviewer: *IEEE/ACM ToN, IEEE TWC, IEEE TNSE, IEEE ISIT*.

Publications

Journal Articles

1. **Chengzhang Li**, Qingyu Liu, Shaoran Li, Yongce Chen, Y. Thomas Hou, Wenjing Lou, and Sastry Kompella, "Scheduling with Age of Information Guarantee," *IEEE/ACM Transactions on Networking,* 2022, to appear. Early Access DOI: 10.1109/TNET.2022.3156866
2. **Chengzhang Li**, Yan Huang, Shaoran Li, Yongce Chen, Brian A. Jalaian, Y. Thomas Hou, Wenjing Lou, Jeffrey H. Reed, and Sastry Kompella, "Minimizing AoI in a 5G-based IoT Network under Varying Channel Conditions," *IEEE Internet of Things Journal,* vol. 8, no. 19, pp. 14543–14558, Oct. 2021. DOI: 10.1109/JIOT.2021.3053914
3. **Chengzhang Li**, Shaoran Li, Yongce Chen, Y. Thomas Hou, and Wenjing Lou, "Minimizing Age of Information under General Models for IoT Data Collection," *IEEE Transactions on Network Science and Engineering*, vol. 7, no. 4, pp. 2256–2270, Oct.–Dec. 2020. DOI: 10.1109/TNSE.2019.2952764
4. Yongce Chen, Yan Huang, **Chengzhang Li**, Y. Thomas Hou, and Wenjing Lou, "Turbo-HB: A Sub-millisecond Hybrid Beamforming Design for 5G mmWave Systems," *IEEE Transactions on Mobile Computing*, 2022, to appear. Early Access DOI: 10.1109/TMC.2022.3152480
5. Yongce Chen, Shaoran Li, **Chengzhang Li**, Huacheng Zeng, Brian Jalaian, Y. Thomas Hou, and Wenjing Lou, "On DoF Conservation in MIMO Interference Cancellation based on Signal Strength in the Eigenspace," *IEEE Transactions on Mobile Computing,* 2021, to appear. Early Access DOI: 10.1109/TMC.2021.3126449
6. Shaoran Li, Yan Huang, **Chengzhang Li**, Y. Thomas Hou, Wenjing Lou, Brian Jalaian, and Stephen Russell, "Achieving Real-Time Spectrum Sharing in 5G Underlay Coexistence with Channel Uncertainty," *IEEE Transactions on Mobile Computing*, 2021, to appear. Early Access DOI: 10.1109/TMC.2021.3120945
7. Darshan A. Ravi, Vijay K. Shah, **Chengzhang Li**, Y. Thomas Hou and Jeffrey H. Reed, "RAN Slicing in Multi-MVNO Environment under Dynamic Channel Conditions," *IEEE Internet of Things Journal*, vol. 9, no. 6, pp. 4748–4757, March 2022. DOI: 10.1109/JIOT.2021.3108145
8. Shaoran Li, Yan Huang, **Chengzhang Li**, Brian A Jalaian, Y. Thomas Hou, Wenjing Lou, and Stephen Russell, "Maximize Spectrum Efficiency in Underlay Coexistence With Channel Uncertainty," *IEEE/ACM Transactions on Networking*, vol. 29, no. 2, pp. 764–778, April 2021. DOI: 10.1109/TNET.2020.3047760
9. Yan Huang, Shaoran Li, **Chengzhang Li**, Y. Thomas Hou, and Wenjing Lou, "A Deep Reinforcement Learning-based Approach to Dynamic eMBB/URLLC Multiplexing in 5G NR," *IEEE Internet of Things Journal*, vol. 7, no. 4, pp. 6439–6456, July 2020. DOI: 10.1109/JIOT.2020.2978692

Conference Papers

1. **Chengzhang Li**, Qingyu Liu, Shaoran Li, Yongce Chen, Y. Thomas Hou, and Wenjing Lou, "On Scheduling with AoI Violation Tolerance," in Proc. *IEEE INFOCOM,* 9 pages, virtual conference, May 10–13, 2021. DOI: 10.1109/INFOCOM42981.2021.9488685
2. **Chengzhang Li**, Shaoran Li, Yongce Chen, Y. Thomas Hou, and Wenjing Lou, "AoI Scheduling with Maximum Thresholds," in Proc. *IEEE INFOCOM,* pp. 436–445, virtual conference, July 6–9, 2020. DOI: 10.1109/INFOCOM41043.2020.9155514
3. **Chengzhang Li**, Yan Huang, Yongce Chen, Brian Jalaian, Y. Thomas Hou, and Wenjing Lou, "Kronos: A 5G Scheduler for AoI Minimization under Dynamic Channel Conditions," in Proc. *IEEE ICDCS,* pp. 1466–1475, Dallas, TX, July 7–10, 2019. DOI: 10.1109/ICDCS.2019.00146
4. **Chengzhang Li**, Shaoran Li, and Y. Thomas Hou, "A General Model for Minimizing Age of Information at Network Edge," in Proc. *IEEE INFOCOM,* pp. 118–126, Paris, France, April 29–May 2, 2019. DOI: 10.1109/INFOCOM.2019.8737437

5. Qingyu Liu, **Chengzhang Li**, Y. Thomas Hou, Wenjing Lou, Jeffrey Reed, and Sastry Kompella, "Ao^{2}I: Minimizing Age of Outdated Information to Improve Freshness in Data Collection," in Proc, *IEEE INFOCOM,* 10 pages, virtual conference, May 2–5, 2022, to appear.
6. Naru Jai, Shaoran Li, **Chengzhang Li**, Y. Thomas Hou, Wenjing Lou, Jeffrey Reed, and Sastry Kompella, "Optimal Channel Allocation in the CBRS Band with Shipborne Radar Incumbents," in Proc. *IEEE DySPAN,* pp. 80–88, Los Angeles, CA, Dec. 13–15, 2021. DOI: 10.1109/DySPAN53946.2021.9677308
7. Shaoran Li, **Chengzhang Li**, Yan Huang, Brian A Jalaian, Y Thomas Hou, Wenjing Lou, "Task Offloading with Uncertain Processing Cycles," in Proc. *ACM MobiHoc,* pp. 51–60, Shanghai, China, July 26–29, 2021. DOI:10.1145/3466772.3467034
8. Qingyu Liu, **Chengzhang Li**, Y. Thomas Hou, Wenjing Lou, and Sastry Kompella, "Aion: A Bandwidth Optimized Scheduler with AoI Guarantee," in Prof. *IEEE INFOCOM,* 10 pages, virtual conference, May 10–13, 2021. DOI: 10.1109/INFOCOM42981.2021.9488781
9. Yongce Chen, Yan Huang, **Chengzhang Li**, Y. Thomas Hou, and Wenjing Lou, "Turbo-HB: A Novel Design and Implementation to Achieve Ultra-Fast Hybrid Beamforming," in Proc. *IEEE INFOCOM,* pp. 1489–1498, virtual conference, July 6–9, 2020. DOI: 10.1109/INFOCOM41043.2020.9155337
10. Shaoran Li, Yan Huang, **Chengzhang Li**, Brian Jalaian, Stephen Russell, Y. Thomas Hou, Wenjing Lou, and Benjamin MacCall, "A Real-Time Solution for Underlay Coexistence with Channel Uncertainty," in Proc. *IEEE GLOBECOM,* 6 pages, Waikoloa, HI, Dec. 9–13, 2019. DOI: 10.1109/GLOBECOM38437.2019.9014147
11. Shaoran Li, Yan Huang, **Chengzhang Li**, Brian A. Jalaian, Y. Thomas Hou, and Wenjing Lou, "Coping Uncertainty in Coexistence via Exploitation of Interference Threshold Violation," in Proc. *ACM MobiHoc,* pp. 71–80, Catania, Italy, July 2–5, 2019. DOI: 10.1145/3323679.3326505
12. Yongce Chen, Shaoran Li, **Chengzhang Li**, Y. Thomas Hou, and Brian Jalaian, "To Cancel or Not to Cancel: Exploiting Interference Signal Strength in the Eigenspace for Efficient MIMO DoF Utilization," in Proc. *IEEE INFOCOM,* pp. 1954–1962, Paris, France, April 29–May 2, 2019. DOI: 10.1109/INFOCOM.2019.8737616

Manuscripts in Progress

1. **Chengzhang Li**, Qingyu Liu, Y. Thomas Hou, Wenjing Lou, Jeffery H. Reed, and Sastry Kompella, "Aequitas: A Uniformly Fair 5G Scheduler for Minimizing Outdated Information," *ACM MobiHoc* 2022, under review.
2. **Chengzhang Li**, Qingyu Liu, Y. Thomas Hou, Wenjing Lou, Jeffery H. Reed, and Sastry Kompella, "Almost Uniform Scheduling: A Unified Approach for AoI Optimization," to be submitted to *IEEE INFOCOM* 2023.
3. **Chengzhang Li**, Qingyu Liu, Shaoran Li, Yongce Chen, Y. Thomas Hou, and Wenjing Lou, "AoI Scheduling with Soft Deadlines," to be submitted to *IEEE Internet of Things Journal.*
4. P. Kheirkhah Sangdeh, **Chengzhang Li**, Hossein Pirayesh, Shichen Zhang, Huacheng Zeng, and Y. Thomas Hou, "CF4FL: A Communication Framework for Federated Learning in Transportation Systems," *IEEE Transactions on Wireless Communications,* under review.
5. Qingyu Liu, **Chengzhang Li**, Y. Thomas Hou, Wenjing Lou, Jeffery H. Reed, and Sastry Kompella, "Age of Critical Information: A Freshness Metric for Critical Data Transmission," to be submitted to *IEEE Journal on Selected Areas in Communications.*
6. Qingyu Liu, **Chengzhang Li**, Y. Thomas Hou, Wenjing Lou, Jeffery H. Reed, and Sastry Kompella, "Aion: A Bandwidth Conserving Scheduler with Data Freshness Guarantee," to be submitted to *IEEE Transactions on Mobile Computing*.

References

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