

## Department of Computer Science



### Dr. Qingyu Liu

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 **Date: 19 April 2022 (Tuesday)**

 **Time: 10:00am – 11:00am**

 **Registration: <http://bit.ly/bucs-ereg>**

(\*Zoom details will only be provided to registrants)

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## Modeling, Analysis, and Optimization of Information Freshness for IoT Networks

### ABSTRACT

Nowadays many IoT systems integrate a plethora of devices, ranging from small sensors to autonomous vehicles. In such autonomous systems, rather than relying on an efficient transfer of “packets” between end-points, one must ensure that freshness of diverse information be guaranteed before making real-time decisions. This yields a fundamental shift from a packet-transfer-based to an information-freshness-based approach to the operation of complex distributed and networked IoT devices. In this talk, I will introduce our past research on the modeling, analysis, and optimization of information freshness, and show how they can be successfully applied to optimize the decision process of IoT networks. I will also give a roadmap for my planned research in 3-5 years in the future.

The following are 4 papers that will be covered by my talk:

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. Available at: <https://ieeexplore.ieee.org/document/9739124>
2. **Qingyu Liu**, Chengzhang Li, Y. Thomas Hou, Wenjing Lou, Jeffrey H. Reed, and Sastry Kompella. "Ao2I: Minimizing Age of Outdated Information to Improve Freshness in Data Collection", in Proc. of IEEE INFOCOM, 2-5 May, 2022, Virtual Conference.
3. Chengzhang Li, **Qingyu Liu**, Shaoran Li, Yongce Chen, Y. Thomas Hou, and Wenjing Lou. "On Scheduling with Aol Violation Tolerance", in Proc. of IEEE INFOCOM, 10-13 May, 2021, Virtual Conference. Available at: <https://ieeexplore.ieee.org/document/9488685>
4. **Qingyu Liu**, Chengzhang Li, Y. Thomas Hou, Wenjing Lou, and Sastry Kompella. "Aion: A Bandwidth Optimized Scheduler with Aol Guarantee", in Proc. of IEEE INFOCOM, 10-13 May, 2021, Virtual Conference. Available at: <https://ieeexplore.ieee.org/document/9488781>

In addition, my talk will also cover the following video demonstration (the recorded video of this demo is available for viewing at: <https://www.youtube.com/watch?v=QTqVU3QIMeE>):

1. Heng Jin, **Qingyu Liu**, Chengzhang Li, Y. Thomas Hou, and Wenjing Lou, "A Demo of Tracking, Control, and Optimization of Information Latency for Military Drone Swarm".



### BIOGRAPHY

Qingyu Liu received the B.S. degree in computer science from Qingdao University, Qingdao, China, in 2011, the M.S. degree in computer science from Tsinghua University, Beijing, China, in 2014, and the Ph.D. degree in computer engineering from Virginia Tech, Blacksburg, VA, USA, in 2019. In 2019, he joined the Bradley Department of Electrical and Computer Engineering, Virginia Tech, where he is currently a Research Assistant Professor. His research interests include wireless and mobile networks, 5G/next-G, CPS/IoT, intelligent transportation, and optimization/algorithm design in networked systems.

### ENQUIRY

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