Xinyu Wu **Tel:** (+1)857-209-1712 **Email:** xinyuwu1@mit.edu **Personal Site:** https://xinyuwusjtu.github.io/wxy/

Programming: Matlab (major, in research); C++, Python (minor, in projects) **Github Site:** https://github.com/xinyuwusjtu

EDUCATION

Massachusetts Institute of Technology (MIT), Laboratory of Information and Decision Systems (LIDS)

- **Ph.D.** in Aeronautics and Astronautics & Interdisciplinary Doctoral Program in Statistics (IDPS) Sept. 2020 - Present
- **M.S.** in Aeronautics and Astronautics Sept. 2018 - Aug. 2020
- **Research Interests:** Network Robustness, Control, and Optimization **Advisor:** Eytan Modiano **GPA:** 5.0/5.0

Shanghai Jiao Tong University (SJTU), Electronic Engineering Sept. 2014 - Jun. 2018

- **Thesis:** Theoretical Analysis and Algorithm Design for Social Network De-Anonymization **(Outstanding Thesis, top 1%)**

SELECTED PUBLICATIONS

- **Xinyu Wu**, Dan Wu, Eytan Modiano, "Overload Balancing in Switched Networks with Finite Buffers", submitted to *IEEE International Conference on Computer Communications (INFOCOM) 2022*.
- **Xinyu Wu**, Dan Wu, Eytan Modiano, "An Ordinary Differential Equation Framework for Stability Analysis of Networks with Finite Buffers", submitted to *IEEE Conference on Decision and Control (CDC)*.
- **Xinyu Wu**, Dan Wu, Eytan Modiano, "Predicting Failure Cascades in Large Scale Power Systems via the Influence Model Framework", *IEEE Transactions on Power Systems*, vol. 36, no. 5, pp. 4778-4790, 2021.
- **Xinyu Wu**, Zhongzhao Hu, Xinzhe Fu, Luoyi Fu, Xinbing Wang, Songwu Lu, "Social Network De-Anonymization with Overlapping Communities: Analysis, Algorithm, and Experiments", *IEEE International Conference on Computer Communications (INFOCOM)*, Honolulu, USA, Apr. 15^{th}-19^{th}, 2018.
- **Xinyu Wu**, Xiaohua Tian, Xinbing Wang, "Large-scale Wireless Fingerprints Prediction for Cellular Network Positioning'', *IEEE INFOCOM*, 2018. (extended version in *IEEE Transactions on Mobile Computing*, vol. 19, no. 2, pp. 450-465, 2019)

RESEARCH EXPERIENCES

Overload Balancing in Switched Networks with Finite Buffers | MIT | Advisor: Eytan Modiano Oct. 2020 – Jul. 2021

- Showed that the well-known backpressure algorithm does not balance the queue overload in data networks with finite buffers.
- Proved and verified that a policy combining maxweight scheduling with backpressure best balances queue overload in single-hop data networks (server farms, crossbar switches, etc.), even in the case of limited service capacity or local queue information.

Overloading Prevention in Finite-Buffer Communication Systems | MIT | Advisor: Eytan Modiano Mar. 2020 – Mar. 2021

- Proved a sufficient condition for local transmission policy to avoid queue overloading in single-commodity finite-buffer networks, which generalized a set of policies, for example: policy based on backpressure; policy based on buffer occupancy.
- Extended the sufficient condition to multi-commodity systems with either sliced or shared queue buffers, and further quantified the negative effect of finite buffer over queue overloading prevention in single-hop networks.

Failure Cascade Prediction and Analysis in Power Systems | MIT | Advisor: Eytan Modiano Nov. 2018 - Jan. 2020

- Learned the underlying influence among power components through Monte-Carlo approach & quadratic programming.
- Predicted failure cascades based on the learned influence and threshold estimation, with failure size prediction error <7% and the final state error <10% for DC/AC power systems with size ~3000 nodes, using only <3.4% of all cascade samples.
- Identified critical power components with $O(n^2)$ time based on the learned influence, where prior works cost at least $O(n^{2.373})$.

Social Network De-Anonymization | SJTU | Advisor: Luoyi Fu & Xinbing Wang Mar. 2017 - May. 2018

- Developed an optimization framework for de-anonymization based on the mean square error with approximation ratio = 2.
- Put forward a heuristic algorithm based on the convex-concave optimization to solve the de-anonymization problem.
- Identified at most ~90% anonymized users on the Microsoft Academic Graphs with at most 2000 nodes via our mechanism.

Wireless Fingerprinting Prediction and Localization | SJTU | Advisor: Xiaohua Tian Sept. 2016 - Mar. 2017

- Modeled the fingerprint prediction as a matrix completion problem, and proposed an algorithm based on the Stiefel manifold for prediction based on Singular Value Decomposition and QR Decomposition.
- Designed a sliding-window mechanism to overcome the sparsity of fingerprints in real implementation.
- Showed that 71% and 98% users can be localized within an error of 100m and 300m respectively in a $69.8km^2$ urban region.

SELECTED HONORS

- MIT AeroAstro MathWorks Fellowship, awarded to students with strong experiences in MathWorks products 2021
- Oge Ho-Ching and Han-Ching Fund Award Fellowship, MIT 2020

TEACHING ASSISTANTSHIP

- **Communication Systems & Networks (MIT):** ARQ Protocol; Data Network Routing; Queueing System, etc. Spring 2020
- **Algorithm & Complexity (SJTU)**: Dynamic Programming; Graph Algorithm; Linear Programming, etc. Spring 2018