

Yanbing Mao

264 Computing Applications Bldg, 605 E Springfield Ave, Champaign, IL 61820

✉ ybmao@illinois.edu

☎ 607-232-4867

🏠 [My Website](#)

🎓 [Google Scholar](#)

RESEARCH INTERESTS

- Self-Driving Vehicles
- Networked Cyber-Physical Systems
- Social Networks and Social Learning

PROFESSIONAL APPOINTMENTS

Advanced Controls Research Laboratory & Department of Computer Science, UIUC

Postdoctoral Research Associate

Oct. 2019–Present

Host: Prof. Naira Hovakimyan and Prof. Lui Sha

Advanced Controls Research Laboratory & Coordinated Science Laboratory, UIUC

Visiting Researcher

Oct. 2018–Jan. 2019

Host: Prof. Naira Hovakimyan

State University of New York at Binghamton

Research Assistant and Teaching Assistant

Sept. 2015–Sept. 2019

Host: Prof. Emrah Akyol and Prof. Ziang Zhang

Oregon State University

Research Assistant

Jan. 2014–Mar. 2015

Host: Prof. Haizhong Wang

EDUCATION

State University of New York at Binghamton

Ph.D. in Electrical and Computer Engineering

Binghamton, NY

Sept. 2015–Sept. 2019

Thesis: Control-and Game-Theoretic Approaches to Secure Networked Systems

Committee: E. Akyol (Chair), N. Hovakimyan, H. Sayama, Z. Zhang

University of Electronic Science and Technology of China

M.E. in Circuits and Systems

Chengdu, Sichuan

Sept. 2010–Jul. 2013

Liaocheng University

B.E. in Electronic Information Science and Technology

Liaocheng, Shandong

Sept. 2006–Jul. 2010

GRANT EXPERIENCE

C3.ai Digital Transformation Institute: Health Security: Resilient Social Community to Mitigate Pandemic

2020

- Leading Contributor
- Members: Naira Hovakimyan (PI), Tarek Abdelzaher (Co-PI), Hyojung Kang (Co-PI), Andrei R. Akhmetzhanov (Co-PI)

Department of Defense: Foundations of Social Information Dynamics and Control

2020

- Leading Contributor
- Members: Tarek Abdelzaher (PI), Naira Hovakimyan (Co-PI), Evangelos Theodorou (Co-PI),

Christian Lebiere (Co-PI), Heng Ji (Co-PI), Hanghang Tong (Co-PI)

NSF CPS: SPEEDD: Safety Promised Energy Efficient Delivery 2020

- Leading Contributor
- Members: Naira Hovakimyan (PI), Tarek Abdelzaher (Co-PI), Lui Sha (Co-PI)

NSF S&CC: Info-Vaccine Against Infodemic for Health Security 2021

- Leading Contributor
- Members: Naira Hovakimyan (PI), Tarek Abdelzaher (Co-PI), Evangelos Theodorou (Co-PI), Lav R. Varshney (Co-PI), Yuguo Chen (Co-PI)

RESEARCH PROJECTS

NSF #1932529 CPS: Virtual Sully: Autopilot with Multilevel Adaptation for Handling Large Uncertainties

Leading Postdoctoral Researcher

Oct. 2019–Present

NSF #1739732 CPS: Against Coordinated Cyber and Physical Attacks: Unified Theory and Technologies

Defense Developer

Oct. 2018–Oct. 2020

NSF #1663460 CMMI: Sampled Data Driven Attack Detection and Adaptation for Security in Control Systems

Defense Developer

Oct. 2018–Oct. 2020

SUNY Interdisciplinary Collaboration Grant: Mathematical Models of Media Bias, Polarization and Misinformation Spread Over Networks

Leading Researcher

Dec. 2018–Sep. 2019

SUNY Collective Dynamics Seed Grant: Secure Networked CPS via Topology Switching

Leading Researcher

Oct. 2017–Oct. 2018

PUBLICATIONS

Journal Papers.....

1. Jiyang Chen, **Yanbing Mao**, Shuochao Yao, Lui Sha, and Naira Hovakimyan, "Multi-Objective Optimization for Energy- and Timing-Aware Safe Operation of Autonomous Vehicles in Unforeseen Environments," *in preparation*.
2. **Yanbing Mao**, Naira Hovakimyan, Tarek Abdelzaher, and Evangelos Theodorou, "Social System Inference from Noisy Observations," *submitted to IEEE Transactions on Control of Network Systems (Special Issue on Dynamics and Behaviors in Social Networks)*. [[pdf](#)]
3. **Yanbing Mao**, Naira Hovakimyan, Petros Voulgaris, and Lui Sha, "Finite-Time Model-Learning Based \mathcal{L}_1 -Simplex for Integrated TCS and ABS," *submitted to IEEE Transactions on Vehicular Technology*. [[pdf](#)]
4. **Yanbing Mao**, Naira Hovakimyan, Petros Voulgaris, and Lui Sha, "Finite-Time Model Inference from A Single Noisy Trajectory," *submitted to IEEE Transactions on Automatic Control*. [[pdf](#)]
5. **Yanbing Mao**, Emrah Akyol, and Ziang Zhang, "Strategic Topology Switching for Secure Control of Multi-Agent Systems," *submitted to IEEE Transactions on Automatic Control (Under 2nd Review Round)*. [[pdf](#)]
6. **Yanbing Mao**, Emrah Akyol, and Naira Hovakimyan, "Impact of Confirmation Bias on Competitive Information Spread in Social Networks," *to appear in IEEE Transactions on Control of Network Systems*. [[pdf](#)]

7. **Yanbing Mao**, Hamidreza Jafarnejadsani, Pan Zhao, Emrah Akyol, and Naira Hovakimyan, "Novel Stealthy Attack and Defense Strategies for Networked Control Systems," *IEEE Transactions on Automatic Control (Special Issue on Security and Privacy of Distributed Algorithms and Network Systems)*, vol. 65, no. 9, pp. 3847–3862, 2020. [[doi](#)] & [[pdf](#)]
8. **Yanbing Mao**, and Emrah Akyol, "On Inference of Network Topology and Confirmation Bias in Cyber-Social Networks," *IEEE Transactions on Signal and Information Processing over Networks (Special Issue on Network Topology Inference)*, vol. 6, pp. 633–644, 2020. [[doi](#)] & [[pdf](#)]
9. **Yanbing Mao**, Sadegh Bolouki, and Emrah Akyol, "Spread of Information With Confirmation Bias in Cyber-Social Networks," *IEEE Transactions on Network Science and Engineering (Special Issue on Network of Cyber-Social Networks: Modeling, Analyses, and Control)*, vol. 7, no. 2, pp. 688–700, 2020. [[doi](#)] & [[pdf](#)]
10. **Yanbing Mao**, and Ziang Zhang, "Asymptotic Frequency Synchronization of Kuramoto Model by Step Force," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 50, no. 8, pp. 2768–2778, 2020. [[doi](#)]
11. **Yanbing Mao**, Hongbin Zhang, and Ziang Zhang, "Finite-Time Stabilization of Discrete-Time Switched Nonlinear Systems Without Stable Subsystems via Optimal Switching Signal Design," *IEEE Transactions on Fuzzy Systems*, vol. 25, no. 1, pp. 172–180, 2017. [[doi](#)]
12. **Yanbing Mao**, Hongbin Zhang, and Shengyuan Xu, "The Exponential Stability and Asynchronous Stabilization of a Class of Switched Nonlinear System Via the T-S Fuzzy Model," *IEEE Transactions on Fuzzy Systems*, vol. 22, no. 4, pp. 817–828, 2014. [[doi](#)]

Conference Papers.....

1. Pan Zhao, **Yanbing Mao**, Chuyuan Tao, Naira Hovakimyan, and Xiaofeng Wang, "Adaptive Robust Quadratic Programs using Control Lyapunov and Barrier Functions," *to appear in the 59th IEEE Conference on Decision and Control*, Jeju Island, Republic of Korea, 2020. [[pdf](#)]
2. **Yanbing Mao**, and Emrah Akyol, "Competitive Information Spread with Confirmation Bias," *in 53rd Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, USA, pp. 391–395, 2019. [[doi](#)]
3. **Yanbing Mao**, and Emrah Akyol, "On Network Topology Inference of Social Networks," *in 57th Annual Allerton Conference on Communication, Control, and Computing*, UIUC, USA, pp. 804–809, 2019. [[doi](#)]
4. **Yanbing Mao**, Hamidreza Jafarnejadsani, Pan Zhao, Emrah Akyol, and Naira Hovakimyan, "Detectability of Intermittent Zero-Dynamics Attack in Networked Control Systems," *in 58th IEEE Conference on Decision and Control*, Nice, France, pp. 5605–5610, 2019. [[doi](#)]
5. **Yanbing Mao**, Emrah Akyol, and Ziang Zhang, "A Novel Defense Strategy Against Zero-Dynamics Attacks in Multi-Agent Systems," *in 58th IEEE Conference on Decision and Control*, Nice, France, pp. 3563–3568, 2019. [[doi](#)]
6. **Yanbing Mao**, and Emrah Akyol, "Detectability of Cooperative Zero-Dynamics Attack," *in 56th Annual Allerton Conference on Communication, Control, and Computing*, UIUC, USA, pp. 227–234, 2018. [[doi](#)]
7. **Yanbing Mao**, and Emrah Akyol, "Synchronization of Coupled Harmonic Oscillators by Time-Dependent Topology Switching," *in 7th IFAC Workshop on Distributed Estimation and Control in Networked Systems*, Groningen, Netherlands, 2018. [[pdf](#)]
8. **Yanbing Mao**, Emrah Akyol, and Ziang Zhang, "Second-Order Consensus for Multi-Agent Systems by Time-Dependent Topology Switching," *in 57th IEEE Conference on Decision and Control*, Miami Beach, USA, pp. 6151–6156, 2018. [[doi](#)]
9. **Yanbing Mao**, Sadegh Bolouki, and Emrah Akyol, "On the Evolution of Public Opinion in the Presence of Confirmation Bias," *in 57th IEEE Conference on Decision and Control*, Miami Beach, USA, pp. 5352–5357, 2018. [[doi](#)]
10. **Yanbing Mao**, and Ziang Zhang, "Second-Order Consensus For Multi-Agent Systems By State-

Dependent Topology Switching," in *2018 Annual American Control Conference*, Milwaukee, USA, pp. 3392–3397, 2018. [doi]

11. **Yanbing Mao**, and Ziang Zhang, "Distributed Frequency Synchronization and Phase-Difference Tracking for Kuramoto Oscillators and Its Application to Islanded Microgrids," in *55th IEEE Conference on Decision and Control*, Las Vegas, USA, pp. 4364–4369, 2016. [doi]

TEACHING EXPERIENCE

Teaching Assistant <i>EECE315 Electronics</i>	State University of New York at Binghamton, Department of ECE <i>2017 Fall</i>
---	--

Teaching Assistant <i>EECE260 Electric Circuits</i>	State University of New York at Binghamton, Department of ECE <i>2018 Spring</i>
---	--

MENTORSHIP EXPERIENCE

Yuliang Gu (Ph.D. project, UIUC) <i>Project: "Model-Learning Based Safe Operation of Self-Driving Vehicles"</i>	Fall 2020–Present
---	--------------------------

Jiyang Chen (Ph.D. project, UIUC) <i>Project: "Resource-Efficient Safe Operation of Intelligent Cyber-Physical Systems"</i>	Fall 2020–Present
---	--------------------------

MAJOR TALKS

"Topology Switching for Secure Networked Control Systems" <i>Center for Collective Dynamics of Complex Systems at Binghamton University–SUNY, Invited Talk</i>	2019
--	-------------

"On Network Topology Inference of Social Networks" <i>57th Annual Allerton Conference on Communication, Control, and Computing</i>	2019
--	-------------

"Detectability of Cooperative Zero-Dynamics Attack" <i>56th Annual Allerton Conference on Communication, Control, and Computing</i>	2018
---	-------------

"On the Evolution of Public Opinion in the Presence of Confirmation Bias" <i>57th IEEE Conference on Decision and Control</i>	2018
---	-------------

"Second-Order Consensus by State-Dependent Topology Switching" <i>2018 Annual American Control Conference</i>	2018
---	-------------

"Second-Order Consensus by Time-Dependent Topology Switching" <i>57th IEEE Conference on Decision and Control</i>	2018
---	-------------

"Distributed Frequency Synchronization and Phase-Difference Tracking" <i>55th IEEE Conference on Decision and Control</i>	2016
---	-------------

PROFESSIONAL SERVICE

Reviewer for Journals.....

- IEEE Transactions on Automatic Control
- IEEE Transactions on Network Science and Engineering
- IEEE Transactions on Cybernetics
- IEEE Transactions on Industrial Electronics
- IEEE Transactions on Fuzzy Systems
- IEEE Transactions on Systems, Man, and Cybernetics: Systems

- International Journal of Robust and Nonlinear Control
- Automatica
- Asian Journal of Control

Reviewer for Conferences.....

- IEEE Conference on Decision and Control (2016, 2017, 2018, 2019, 2020)
- American Control Conference (2018, 2019, 2020, 2021)

Session Chair/Co-Chair.....

Session Title: Control of Networks I. 57th IEEE Conference on Decision and Control, Miami Beach, FL, USA, December 17-19, 2018

AWARDS

- | | |
|--------------------------------------|---|
| ○ Foundation Travel Award | State University of New York at Binghamton (2018) |
| ○ Travel Award | 55th IEEE Conference on Decision and Control (2016) |
| ○ Outstanding Graduate Student Award | Electronic Science and Technology of China (2013) |