

Shun Cao, Ph.D.

Assistant Professor
School of Management
Binghamton University

Email: scao12@binghamton.edu | **Phone:** +1 (607) 651-4662 | **Address:** Vestal, NY

Professional Summary

- Assistant Professor specializing in Multi-agent Systems, Data Analytics, and Organizational Strategy.
- Expertise in applying Computer Modeling & Simulations, GenAI, and complex network theory to solve challenges in organizations, logistics, traffic systems, and various business processes.
- Brings 5 years of industrial experience as a Product Engineer & Manager in the aerospace sector, complementing academic rigor with practical operations management insights.
- Experienced instructor in Advanced Computational Tools, Production & Service Operations and Data Analytics.

Education

Ph.D., Systems Science – Binghamton University, State University of New York, USA, 2021

Dissertation: *Analysis and Simulation of Dynamics of Complex Social Systems*

Advisor: Prof. Hiroki Sayama

M.S., Space Propulsion Systems – China Academy of Space Technology, China, 2012

B.S., Aircraft Power Engineering – Nanjing University of Aeronautics and Astronautics, China, 2006

Academic & Industrial Appointments

Assistant Professor – School of Management, Binghamton University, 2026–present.

Conducts funded research on AI for management.

Teaches undergraduate courses in Advanced Computer Tools in MIS.

Assistant Professor – Department of Information Science Technology, University of Houston, 2021–2026

Conducts funded research on transportation networks and organizational systems.

Teaches undergraduate courses in Operations and Modeling.

Space Product Engineer & Manager – China Academy of Space Technology, China, 2012–2017

Managed engineering product lifecycles and technical operations in a high-stakes aerospace environment.

Research Interests

- **AI, Organizations, and Decision-Making** – Multi-agent systems, coordination, human–AI interaction, and managerial decision support.
- **Transportation & Logistics** – Network resilience, V2X traffic systems, and infrastructure risk analysis.

- **Operations Management** – Manufacturing process optimization and quality control.
- **Methodologies:** Network Science, Machine Learning, Data Analytics & GenAI.

Publications

I. Organizational Dynamics & Decision Systems

- [1] Liu, Y., Liu, Z., **Cao, S.** (2025). Acquire, Build, or Partner? An Agent-Based Framework to Facilitate Decision-Making on Companies' Entry Strategies to Incorporate Disruptive Technology in Current Operations. *Technological Forecasting and Social Change*. (under review)
- [2] Sayama, H., & **Cao, S.** (2024, September). High-Resolution Agent-Based Modeling of Campus Population Behaviors for Pandemic Response Planning. In *International Conference on Parallel Processing and Applied Mathematics* (pp. 261-275). Cham: Springer Nature Switzerland.
- [3] **Cao, S.** (2023). Effects of Search Strategies on Collective Problem-Solving. *Mathematics*, 11(22), 4642.
- [4] **Cao, S.**, MacLaren, N. G., Cao, Y., Marshall, J., Dong, Y., Yammarino, F. J., ... & Ruark, G. A. (2022). Group Size and Group Performance in Small Collaborative Team Settings: An Agent-Based Simulation Model of Collaborative Decision-Making Dynamics. *Complexity*, 2022(1), 8265296.
- [5] MacLaren, N., Yammarino, F. J., Dionne, S. D., Sayama, H., Mumford, M. D., Connelly, S., ..., **Cao, S.**, Dong, Y., Maupin, C. K., Eckardt, R., & Ruark, G. (2021). Leaders as Interrupters: An Examination of Simultaneous Speech in Informal Groups. In *Academy of Management Proceedings* (Vol. 2021, No. 1, p. 14697). Briarcliff Manor, NY 10510: Academy of Management.
- [6] MacLaren, N., Yammarino, F. J., Dionne, S. D., Sayama, H., Mumford, M. D., Connelly, S., ..., **Cao, S.**, Dong, Y., Maupin, C. K., Eckardt, R., & Ruark, G. (2020). Networks of Interruptions: Simultaneous Speech and Leader Emergence in Informal Groups.
- [7] MacLaren, N., Yammarino, F. J., Dionne, S. D., Sayama, H., Mumford, M. D., Connelly, S., ..., **Cao, S.**, Dong, Y., Maupin, C. K., Eckardt, R., & Ruark, G. (2020). Leader Identification through Networks of Conversational Interruptions.
- [8] **Cao, S.**, MacLaren, N. G., Cao, Y., Dong, Y., Sayama, H., Yammarino, F. J., ... & Ruark, G. A. (2020). An Agent-Based Model of Leader Emergence and Leadership Perception within a Collective. *Complexity*, 2020(1), 6857891.

II. Data Analytics

- [1] **Cao, S.**, Samindla, A., Wang, K., Liu, Y., Ye, X., & Wu, L. (2026). Do Roads Create Crime Boundaries? Modeling Crime Rate Disparities Across Adjacent Communities. *Journal of Applied Security Research*, 21(3), 380-413.
- [2] **Cao, S.** (2025). Study state dynamics of team passing networks in soccer games. *Journal of Sports Sciences*, 43(1), 33-47.
- [3] **Cao, S.** (2024). Passing path predicts shooting outcome in football. *Scientific Reports*, 14(1), 9572.
- [4] **Cao, S.** (2024). Spatial partitioning of the football pitch based on successful passing paths. *International Journal of Sports Science & Coaching*, 19(4), 1688-1696.

- [5] **Cao, S.**, & Sayama, H. (2020). Detecting dynamic states of temporal networks using connection series tensors. *Complexity*, 2020(1), 9649310.

III. Logistics, Transportation & Manufacturing Operations

- [1] **Cao, S.**, Konka, R., Liu, Y., Zhang, Y., Verma, R. M. (2025). The Pitfall of Advanced V2X Traffic Systems: Evidence from a Mesoscopic Model of Spillback in Urban Arterials. *Transportation Research Part C: Emerging Technologies*. (under review)
- [2] **Cao, S.**, Sayama, H., Cheng, C. (2025). Predicting Network Failure: A Percolation Framework for Flood Impact on Community Access and Resilience. *Risk Analysis*. (under review)
- [3] Konka, R., Verma, R. M., **Cao, S.**, & Zhang, Y. (2025, May). An Agent-Based Model for Evaluating Connected and Autonomous Vehicles, Collective Behaviors and Traffic System Performance. In *2025 IEEE Security and Privacy Workshops (SPW)* (pp. 335-345). IEEE.
- [4] **Cao, S.**, Parvizioman, I., Yang, H., Park, S., & Won, D. (2019). Prediction of component shifts in pick and place process of surface mount technology using support vector regression. *Procedia Manufacturing*, 39, 210-217.
- [5] Parvizioman, I., **Cao, S.**, Yang, H., Park, S., & Won, D. (2019). Data-driven prediction model of components shift during reflow process in surface mount technology. *Procedia Manufacturing*, 38, 100-107.
- [6] Parvizioman, I., **Cao, S.**, Yang, H., Park, S., & Won, D. (2019). Optimization of passive chip components placement with self-alignment effect for advanced surface mounting technology. *Procedia Manufacturing*, 39, 202-209.
- [7] **Cao, S.**, Parvizioman, I., Park, S., & Won, D. (2019). Statistical Analysis for Component Shift in pick and place process of Surface Mount Technology. *Procedia Manufacturing*, 38, 217-224.

Grants & Funding

U.S. Department of Transportation – CYBER-CARE Center

Assessing Cascading Failures Caused by Cyber-attacks in Future Traffic Systems

Role: PI | \$207,910 | 2024–2026 | Funded

– Investigates how cyber disruptions affect the resilience of large-scale connected vehicles in transportation networks, with implications for strategic risk management, resilience planning, organizational adaptation, and AI-vehicles.

Teaching Experience

Binghamton University (as Instructor)

Advanced Comp. Tools – CQS-311 (2026–Present)

Introduction to Modeling of Social Systems – TLIM 4397) (2022)

University of Houston (as Instructor)

Production & Service Operation – TLIM 4341 (2021–Present)

Introduction to Modeling of Social Systems – TLIM 4397) (2022)

Binghamton University, State University of New York (as Teaching Assistant)

Applied Probability and Statistics – SSIE 501 (Graduate, 2017)

Additive Manufacturing Process and Systems – SSIE 582 (Graduate, 2018)

Professional Service

Editorial Board Member – PLOS ONE.

Reviewer – Scientific Reports, IEEE Transactions on Computational Social Systems, International Journal of Data Science and Analytics, PLOS ONE, Complexity, etc.

Committee Service – Faculty Search Committee (TT), University of Houston.
Academic Honesty Hearing Committee, University of Houston.

Supervision & Mentoring

Ph.D. Co-advisor to one doctoral student (2024 – Present).

Mentored four graduate and one undergraduate research assistant across multiple research projects (2024 – Present).

Technical Skills

Programming – Python, Mathematica, Julia, C, MATLAB, R, etc.

Language – Fluent in written and spoken English/Chinese.