# Shun Cao

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## EDUCATION

**State University of New York at Binghamton** Binghamton, NY

**Ph.D.** of Science in Systems Science and Theory (GPA 4.0/4.0) Sept. 2017 – Expected May 2021

Research Concentrations: Complex Systems, Network Science, Data Mining, Optimization, Smart Manufacturing

**China Academy of Space Technology** Beijing, CN

**Master** of Engineering in Space Propulsion System Sept. 2009 – June 2012

Research Concentrations: Simulation and Experimental Study of Space Propulsion System

**Nanjing University of Aeronautics and Astronautics** Nanjing, CN

**Bachelor** of Engineering in Aircraft Power Engineering Sept. 2002 ~ Jul. 2006

## RESEARCH EXPERIENCES & HIGHLIGHTED PROJECTS

[1] ***Diversity, Network Structure and the Effectiveness of Collective Design and Innovation,*** funded by NSF Science of Organizations (SoO) and Systems Science (SYS) Programs (In Progress), Center for Collective Dynamics of Complex Systems (SUNY-Binghamton).

[2] ***Collective Planning and Leadership for the U.S. Army***, funded by Army Research Institute (ARI) For Behavior and Social Science (In Progress), Center for Leadership Studies & Center for Collective Dynamics of Complex Systems (SUNY-Binghamton).

[3] ***Detecting Hidden States of Temporal Network,*** PhD research project (In Progress), Department of Systems Science and Industrial Engineering (SUNY-Binghamton).

[4] ***Data-Driven Quality Control for Surface-Mount Technology Production***, funded by Koh Young Technology Inc., Department of Systems Science and Industrial Engineering (SUNY-Binghamton).

[5] ***Cost-Sensitive Feature Selection Using Mixed Integer Programming,*** PhD research project, Department of Systems Science and Industrial Engineering (SUNY-Binghamton).

[6] ***Development of Space Thruster and Magnetic Valves*** for Chinese Beidou Navigation Satellite System and Shenzhou Spacecraft, etc. China Academy of Space Technology (CN).

## TECHNICAL SKILLS & SPECIALTIES

- Expertise in analysis and modeling of complex systems and collective dynamics.
- Professent in network data mining, graph similarity, agent-based model.
- Statistics, data mining, machine learning, optimization.
- Python, C, MySQL, Networkx, Gephi, Julia, Tableau.
- Experienced in managing multiple priorities and projects.

## EMPLOYMENT HISTORY

**State University of New York at Binghamton** Binghamton, NY

***Research/Teaching Assistant*** Aug. 2017 – Present

- Working as a research assistant and taking charging of data analysis for collective design and innovation.
- Constructed an agent-based model to simulate the leader emergence and collective performances in the initially leaderless collectives.
- Used machine learning and optimization methods to predict the quality of PCB and optimized the parameters of machines in Surface-mount technology.
- Developed new algorithms for feature selection with considering feature's cost which showed high performance of tending to select the low-cost subset of features with high prediction accuracy.
- Served as a teaching assistant for two courses: Applied Probability & Statistics and Additive Manufacturing; presented 2 lectures during the semester; graded assigned homework and held weekly office hours for two class over 20 students respectively.

**China Academy of Space Technology,** developing over 80% satellites and spacecraft in China Beijing, CN

***Product Manager & Engineer*** Sept. 2010 – May 2017

- Served as a space product manager and led a cross-functional team (designer, manufacturing engineer, test engineer, operator, and other specialists) to finish the developing multiple advanced space thrusters and magnetic valves for Chinese Beidou Navigation Satellite System and Shenzhou spacecraft.
- Served as a product manager, led a cross-functional team to optimize the production line, to improve 50% efficiency and reduce 16% defective for space valves and thrusters
- Designed (3-person team) a new model of bipropellant thruster for Chang'e 4 (Chinese lunar exploration mission) and two magnetic valves for satellites.
- Worked with manufacturing engineers and operators, developed an intelligent assembly method for magnetic valves, and improved about 50% assembling efficiency.
- Worked with test engineer, improved multiple tests procedures for thrusters and magnetic valves.

**Multiple Manufacturing Companies,** Beijing & Anhui, CN

***Mechanical Engineer*** July. 2006 – Aug. 2009

- Developed the automobile VVT system and designed the proportional solenoid valve for VVT system.
- Programmed the controllers of car production lines .
- Designed the nonstandard parts and tools for the specific production lines.
- Installed and debugged the robots

## Publications & Academic Activities

[1] Conference Proceeding: Shun Cao, Irandokht Parviziomran, Seungbae Park, Daehan Won, Statistical Analysis for Component Shift in Pick and Place Process of Surface Mount Technology, proceedings of the 29th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM2019), June 24-28, 2019, Limerick, Ireland.

[2] Conference Proceeding: Irandokht Parviziomran, Shun Cao, Krishnaswami Srihari, Daehan Won, Data-Driven Prediction Model of Components Shift during Reflow, proceedings of the 29th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM2019), June 24-28, 2019, Limerick, Ireland.

[3] Conference Proceeding: Shun Cao, Irandokht Parviziomran, Seungbae Park, Daehan Won, Prediction of Component Shifts in Pick and Place Process of Surface Mount Technology Using Support Vector Regression, proceedings of the 25th

International Conference on Production Research Manufacturing Innovation: Cyber Physical Manufacturing, August 9-14, 2019, Chicago, Illinois (USA).

[4] Conference Proceeding: Irandokht Parviziomran, Shun Cao, Haeyong Yang, Seungbae Parkc, Daehan Won, Optimization of Passive Chip Components Placement with Self-Alignment Effect for Advanced Surface Mounting Technology, proceedings of the 25th International Conference on Production Research Manufacturing Innovation: Cyber Physical Manufacturing, August 9-14, 2019, Chicago, Illinois (USA).

[5] Conference presentation: Shun Cao and Daehan Won, Cost-sensitive Feature Selection Using Mixed Integer Programming, presented as a talk at the 2018 annual conference of the Institute for Operations Research and the Management Sciences (INFORMS 2018).

[6] Journal: 曹顺, 陈健, and 汪凤山. "双组元推力器喷注角度对液膜分布的影响分析." 空间控制技术与应用 6 (2012).

[7] Journal: 曹顺, 汪凤山, and 陈健. "双组元推力器雾化燃烧过程数值模拟及液膜冷却作用分析." 空间控制技术与应用 38.2 (2012): 58-62.