

SONGYANG HAN

University of Connecticut, Storrs, USA
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EDUCATION

University of Connecticut (UConn) **Storrs, USA**
PhD in *Computer Science and Engineering* Supervisor: Prof. [Fei Miao](#) **Aug. 2018-Present**

- GPA: **4.0/4.0**
- Core courses: *Algorithms, Formal Methods, Machine Learning, Advanced Computer Network, Optimal & Model Predictive Control, Deep Reinforcement Learning, Cryptography*

Shanghai Jiao Tong University (SJTU) **Shanghai, China**
([University of Michigan-SJTU Joint Institute](#)) **Sep. 2015-Mar. 2018**
M.S. in *Electrical and Computer Engineering* Supervisor: Prof. [Chengbin Ma](#)

- GPA: **3.96/4.0**
- Core courses: *Game Theory, Data Mining, Engineering Optimization, Methods of Applied Mathematics I, Probability and Random Process, Mechatronic Systems Design, New Energy System*

Nanjing University (NJU) **Nanjing, China**
B.Eng. in *Automation* **Sep. 2011-Jun. 2015**

- GPA: **4.44/5.0**
- Core courses: *Principles of Automatic Control, Modern Cybernetics, Operations Research, C++, Data Structure, Database, Computer Vision, Computer Network, Signals and Systems, Digital Signal Processing, Circuit Analysis, Analog Circuit, Digital Circuit, Principles of Microcomputer*

RESEARCH EXPERIENCE

University of Connecticut
Research Assistant, supervised by Prof. Fei Miao **Aug. 2018-Present**

- Design an algorithm to exploit the advantages raised by the extended sensing capability of connected autonomous vehicles (CAVs) through beneficial information sharing.
- Analyze quantum key distribution protocols through a game theoretic framework to show improved noise tolerance and secure communication rate assuming adversaries are “rational”.
- Design a feedback deep Q-learning algorithm for a hybrid system to explore a policy for discrete state transitions while ensuring the safety of both discrete and continuous dynamics in training.
- Design an integrated information sharing and feedback DRL framework for the behavior planning of connected autonomous vehicles to improve traffic efficiency and safety.
- Design an algorithm to solve the mixed objective robust multi-agent RL problem to alleviate the non-stationary environment considering an uncertainty set of training partners’ policy uncertainty.

[Dynamic Systems Control Laboratory](#), UM-SJTU Joint Institute
Research Assistant, supervised by Prof. Chengbin Ma **Sep. 2015-Mar. 2018**

- Design a flexible energy management approach to handle the uncertainties of weather and sizing in an isolated microgrid, which would not be influenced dramatically by different weather conditions.
- Design and fabricate high efficient bidirectional DC/DC converters to conduct and validate energy management approaches in a downsized system.
- Build a hardware testbed to study reconfigurable energy systems.

Reinforcement Learning for Autonomous Driving

Research Internship, Baidu USA Apollo team

May 2020-Aug. 2020

- Summarize exiting reinforcement learning methods and the state-of-art deep learning methods used in autonomous driving.
- Write a design document for single and multi-agent RL, distributed learning, algorithm architecture and interface, and a prototype design.
- Implement RL algorithms for autonomous vehicle's planning in the Apollo platform.

Energy Management of Photovoltaic Based Charging Station

Team member, collaborating with [State Grid Corporation of China](#)

Sep. 2016-Mar. 2018

- Model photovoltaic cells and randomized irradiance profile.
- Design distributed energy management approach to control the charging power of electric vehicles, which can accelerate the charging process and protect the privacy information of electric vehicles.

Energy Management of Battery/Super Capacitor Hybrid System

Team Leader, collaborating with [Nippon Chemi-Con Corporation](#), Japan

Dec. 2016-Apr. 2017

- Improve the energy management approach of a hybrid energy storage system in a novel topology.
- Improve the system efficiency without the help from special alternator like MAZDA i-ELoop.

3D Laser Processing Based on Computer Vision

May 2013-Dec. 2014

Team Leader, sponsored by National Undergraduate Training Programs for Innovation and Entrepreneurship

- Combine a camera and structured light to model a feather in 3D, which rebuilt the feather's shape.
- Successfully extract the feather stroke with image processing methods, including Hough transform.

SELECTED PUBLICATIONS

- **Songyang Han**, Walter O. Krawec, Fei Miao. *A Game Theoretic Security Framework for Quantum Cryptography: Performance Analysis and Application*. Quantum Information Processing 19.10 (2020): 1-24.
- **Songyang Han**, Jie Fu, Fei Miao. Exploiting Beneficial Information Sharing Among Autonomous Vehicles. In 2019 IEEE 58th Conference on Decision and Control (CDC), Nice, France, Dec. 2019.
- Shuangke Liu, Ming Liu, **Songyang Han**, Xinen Zhu, Chengbin Ma. *Tunable Class-E2 DC-DC Converter with High Efficiency and Stable Output Power for 6.78 MHz Wireless Power Transfer*. IEEE Transactions on Power Electronics 33.8 (2018): 6877-6886.
- **Songyang Han**, He Yin, Amro Alsabbagh, Chengbin Ma. *A Flexible Distributed Approach to Energy Management of an Isolated Microgrid*. In 2017 IEEE 26th International Symposium on Industrial Electronics (ISIE), Edinburgh, Scotland, June 2017.
- **Songyang Han**, Xianzhong Zhou, Chunlin Chen. *Path Planning for Multi-robot Systems Using PSO and Critical Path Schedule Method*. In 2016 IEEE 13th International Conference on Networking, Sensing, and Control (ICNSC), Mexico City, Mexico, April 2016.

SKILLS

Programming: C/C++, Python, MATLAB, LabVIEW, SQL

Tools: LaTeX, Linux, Git, CARLA, NI myRIO, NI CompactRIO, Arduino, PIC, Altium Designer, Multisim, AutoCAD

SERVICE EXPERIENCE

Reviewer,

- IEEE Transactions on Industrial Informatics
- The 43rd Annual Conference of the IEEE Industrial Electronics Society (IECON 2017)
- The 58th Conference on Decision and Control (CDC 2019)
- The 2020 American Control Conference (ACC 2020)
- The 59th Conference on Decision and Control (CDC 2020)
- The 2021 American Control Conference (ACC 2021)
- 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2020)

HONOR & AWARDS

- Departmental Research Fellowship, University of Connecticut *May 2020*
- Postgraduate Academic Excellence Scholarship, Shanghai Jiao Tong University *Oct. 2016*
- Guanghai Scholarship, Shanghai Jiao Tong University *Dec. 2015*
- Outstanding Graduates of Nanjing University *May 2015*
- National Endeavor Fellowship, 3 times, Nanjing University *Dec. 2012-Dec. 2014*
- Outstanding Winner of Educational Robot Competition in China, Chinese Association for Artificial Intelligence *Nov. 2014*
- Meritorious Winner of 2014 MCM, the Consortium for Mathematics and Its Applications *May 2014*
- Outstanding Students of Nanjing University, 2 times, Nanjing University *Nov. 2012-Nov. 2013*