YUANYUAN SHI

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EDUCATION

University of Washington — **Seattle, WA**
Ph.D. Candidate in Electrical and Computer Engineering — Sep 2015 - Jun 2020 (expected)

University of Washington — **Seattle, WA**
Master of Science in Statistics — Sep 2016 - Dec 2019
Master of Science in Electrical and Computer Engineering — Sep 2015 - Jun 2018

Nanjing University — **Nanjing, China**
Bachelor of Engineering in Automation — Sep 2011 - Jun 2015
Summer Research at University of Toronto, Canada — Jun 2014 - Sep 2014

RESEARCH INTERESTS

My research interests are in the area of cyber-physical and energy systems, from the perspective of machine learning, optimization, and control.

PUBLICATIONS

Preprints

[1]. **Y. Shi**, M., Qi, C. Ma, R. Yuan, D. Wu, and Z.M. Shen, "A Practical End-to-End Inventory Management Model with Deep Learning," submitted to *Management Science*.

[2]. **Y. Shi**, B. Zhang, "Learning in Cournot Games with Limited Information Feedback", *arXiv*.

[3]. Y. Chen, **Y. Shi**, and B. Zhang, "Data-Driven Optimal Voltage Regulation", submitted to *Power Systems Computation Conference (PSCC)*, 2020.

Journal Papers

[4]. **Y. Shi**, B. Xu, Y. Tan, D. Kirschen, and B. Zhang, "Optimal Battery Control Under Cycle Aging Mechanisms in Pay for Performance Settings," in *IEEE Transactions on Automatic Control*, 2019.

[5]. B. Xu, **Y. Shi**, D. S. Kirschen, and B. Zhang, "Optimal Battery Participation in Frequency Regulation Markets," in *IEEE Transactions on Power Systems*, 2018

[6]. **Y. Shi**, B. Xu, D. Wang, and B. Zhang, "Using Battery Storage for Peak Shaving and Frequency Regulation: Joint Optimization for Superlinear Gains," in *IEEE Transactions on Power Systems*, 2017.

[7]. L. Zhou, **Y. Shi**, J. Wang, and P. Yang, "A Balanced Heuristic Mechanism for Multirobot Task Allocation of Intelligent Warehouses," in *Journal of Mathematical Problems in Engineering*, 2014.

Conference Papers

[8]. D. Mankowitz, N. Levine, R. Jeong, A. Abdolmaleki, J. Springenberg, **Y. Shi**, J. Kay, T. Hester, T. Mann, and M. Riedmiller, "Robust Reinforcement Learning for Continuous Control with Model Misspecification", accepted by *International Conference on Learning Representations (ICLR)*, 2020.

[9]. **Y. Shi**, K. Xiao, D.J. Mankowitz, R. Jeong, N. Levine, S. Gowal, T. Mann, and T. Hester, "Data-Driven Robust Reinforcement Learning for Continuous Control", in *Safety and Robustness in Decision Making Workshop, Neural Information Processing Systems (NeurIPS)*, 2019.

[10]. K. Xiao, S. Gowal, T. Hester, R. Jeong, D.J. Mankowitz, **Y. Shi**, and T.W. Weng, "Learning Neural Dynamics Simulators With Adversarial Specification Training", in *Safety and Robustness in Decision Making Workshop, Neural Information Processing Systems (NeurIPS)*, 2019.

[11]. Y. Chen*, **Y. Shi***, and B. Zhang, "Optimal Control Via Neural Networks: A Convex Approach", in *International Conference on Learning Representations (ICLR)*, 2019.

[12]. **Y. Shi**, B. Xu, Y. Tan, and B. Zhang, "A convex cycle-based degradation model for battery energy storage planning and operation", in *Proceedings of American Control Conference (ACC)*, 2018

[13]. B. Xu, **Y. Shi**, D. Kirschen, and B. Zhang, "Optimal regulation response of batteries under cycle aging mechanisms," in *Proceedings of IEEE Conference on Decision and Control (CDC)*, 2017

[14]. Y. Chen, **Y. Shi**, and B. Zhang. "Modeling and Optimization of Complex Building Energy Systems with Deep Neural Networks.", in *Asilomar Conference*, 2017.

[15]. **Y. Shi**, B. Xu, B. Zhang, and D. Wang, "Leveraging energy storage to optimize data center electricity cost in emerging power markets.", in *Proceedings of the Seventh International Conference on Future Energy Systems*, ACM (e-Energy), 2016.

INVITED TALKS

[1]. "Data-driven Control for Energy Systems", Department of Industrial Engineering and Operations Research, University of California, Berkeley, 2019/11. Hosted by Prof. Javad Lavaei.

[2]. "Data-driven Control for Energy Systems", Intelligent System and Control Forum, Nanjing University, China, 2019/10. Hosted by Prof. Chunlin Chen.

[3]. "Data-driven Robust Reinforcement Learning for Continuous Control", DeepMind for Google (DMG) Team Meeting, DeepMind, UK, 2019/09. Hosted by Praveen Srinivasan.

[4]. "Optimal Control via Neural Networks", Grid Science Winter School and Conference, Los Alamos National Laboratory, New Mexico, 2019/01. Hosted by Dr. Deepjyoti Deka.

[5]. "End-to-End Model for Inventory Management", INFORMS Annual Meeting, Arizona, 2018/11.

[6]. "Modeling and Optimization of Complex Building Systems with Recurrent Neural Networks", INFORMS Annual Meeting, Texas, 2017/10.

INDUSTRY EXPERIENCES

Research Intern, DeepMind 2019/06-2019/09
Mentors: Dr.Daniel J. Mankowitz, Dr. Timothy Mann, Dr. Todd Hester

· We proposed a novel framework for incorporating robustness into continuous control RL algorithms under model uncertainties. It showed improved robust performance in various robotic control tasks.

Research Intern, JD.com Silicon Valley Research Center 2018/06-2018/09
Mentors: Prof. Zuojun (Max) Shen, Dr. Rong Yuan, Dr. Di Wu

· We studied the optimal inventory control problem under environmental uncertainties. A new one-step end-to-end (E2E) framework is proposed that outputs order decisions directly from features via a modular neural network. It achieved over 10% cost saving in JD.com production testing.

Power System Research Intern, Doosan GridTech 2017/06-2017/08
Mentor: Dr. Tess Williams

· Built optimization models and sensitivity analysis for multiple distributed energy resource projects;
· Built statistical and machine learning models for day-ahead electricity price prediction.

HONORS & AWARDS

Irene C. Peden Electrical Engineering Fellowship, University of Washington, 2019
National Science Foundation (NSF) iREDEFINE Award, NSF, 2019
Rising Stars in EECS, MIT, 2018
Malvar Endowed Fellowship in Electrical Engineering, University of Washington, 2018
Clean Energy Institute (CEI) Fellowship, University of Washington, 2017
Keith & Nancy Rattie Endowed Fellowship, University of Washington, 2016
China National Scholarship, Ministry of Educaction in China, 10/2014
Mitacs Canada Globalink Research Fellowship, 06/2014
Travel Grants and Awards: 2019 International Conference on Learning Representations (ICLR), 2019 D. E. Shaw Exploration Fellowship, 2019 Grid Science Winter School and Conference, 2018 Clean Energy Institute Travel Award

SERVICES

Journal Reviewer: IEEE Transactions on Power Systems, IEEE Transactions on Smart Grid, IEEE Transactions on Power Delivery, Journal of Energy Storage, IET Smart Grid

Conference Reviewer: ICLR 2020, ACC 2020, PSCC 2020, IJCAI 2019, SmartGridComm 2019, PES General Meeting 2018

Graduate Student Representative, Curriculum Committee of Electrical and Computer Engineering Department, University of Washington

Outreach: Clean Energy Institute Ambassador for K-12 Students