

YU YANG

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POSITION

University of California, Berkeley

Aug. 2018 - Present

Postdoctoral Scholar

Berkeley Education Alliance for Research in Singapore (BEARS), Singapore

Advisor: Prof. Costas J. Spanos (UC Berkeley) and Prof. Guoqiang Hu (NTU)

EDUCATION

Tsinghua University, Beijing, China

Sept. 2013 - Jul. 2018

PhD in Department of Automation

Advisor: Prof. Xiaohong Guan and Prof. (Samuel) Qing-Shan Jia

Huazhong University of Science and Technology, Wuhan, China

Sept. 2009 - Jul. 2013

BS in School of Artificial Intelligent and Automation

GPA: 91.83/100

RESEARCH INTERESTS

I have mainly focused on developing adaptive and computationally efficient control methods for large-scale dynamic networked systems including smart buildings, smart grids and cyber physical systems. My research topics have stretched the following areas:

- . Decentralize or distributed convex or nonconvex optimization, decentralized decision-making
- . Event-based optimization
- . Stochastic optimization, Markov decision process, reinforcement learning
- . Data-driven analysis and control of complex dynamic systems

I also have strong interest in game theory (noncooperative game, coalition game), transactive energy or transactive control, and market design with their applications to future deregulated energy market.

PROJECTS OUTLINE

1. Energy storage models for Singapore context, supported by Building Efficiency and Sustainability in the Tropics 2 (NRF of Singapore, headed by Prof. Costas J. Spanos), *2018 - present*.

- . Investigating the value of energy storage in Singapore context
- . Exploring the effective sharing paradigms of energy storage resources in Singapore energy market
- . Developing fair distribution or allocation models for the value of storage among the different stakeholders to ensure stable coalitions

2. Adaptive and computationally efficient algorithms for energy-efficient air-conditioning and mechanical ventilation (ACMV) controllers, supported by Building Efficiency and Sustainability in the Tropics 2 (NRF of Singapore, headed by Prof. Costas J. Spanos), *2018 - present*.

- . Developed an off-line learning algorithm for the control policies of ACMV systems to manage the uncertain demand of occupants based on reinforcement learning
- . Proposed a decentralized control method for multi-zone ACMV systems to maintain thermal comfort

- . Developed a two-phase distributed control method for multi-zone ACMV systems to manage thermal comfort and IAQ simultaneously.

3. Scalable coordination of electric vehicle (EV) charging in microgrid of buildings, support by National Natural Science Foundation of China, 2015 - 2018

- . Data-driven analysis of the stochastic EV charging behaviors and the potential of roof-top wind power generation in cities via a case study.
- . Established a distributed algorithm to learn the scheduling policies of EV charging in buildings based on reinforcement learning
- . Developed an EV-based decentralized method for the coordination of EV charging with distributed renewable energy in microgrids of buildings

4. Data-driven analysis of energy consumption behaviors of Occupants in buildings, support by National Natural Science Foundation of China, 2014 - 2015.

- . Built an experimental platform to collect the data of individual occupants that relates to their energy consumption patterns in buildings
- . Developed a data-driven model to improve the prediction accuracy of occupant's energy consumption by incorporating multi-dimensional information

PUBLICATIONS

Preprints

- . **Y. Yang**, G. Hu, and C. J. Spanos, "HVAC Energy Cost Optimization for a Multi-zone Building via A Decentralized Approach," accepted by *IEEE Transactions on Automation Science and Engineering*, to appear, 2020 (arXiv:1905.10934v1).
- . **Y. Yang**, G. Hu, and C. J. Spanos, "Stochastic Optimal Control of HVAC system for Energy-efficient Buildings," conditionally accepted by *IEEE Transactions on Control Systems Technology*, 2020 (arXiv:1911.00840v1).
- . **Y. Yang**, S. Srinivasan, G. Hu, and C. J. Spanos, "Distributed Control of Multi-zone HVAC Systems Considering Indoor Air Quality" submitted to *IEEE Transactions on Control System Technology*, under 2nd round peer review, 2020 (arXiv:2003.08208v1).
- . **Y. Yang**, G. Hu, and C. J. Spanos, "A Proximal Linearization-based Decentralized Method for Nonconvex Problems with Nonlinear Constraints", under submission, 2020 (arXiv:2001.00767v1).

Selected Journal Papers

- . **Y. Yang**, Q.-S. Jia, X. Guan, X. Zhang, Z. Qiu, and G. Deconinck, "Decentralized EV-based Charging Optimization With Building Integrated Wind Energy," *IEEE Transactions on Automation Science and Engineering*, vol. 16, no. 3, pp. 1002-1017, 2018.
- . **Y. Yang**, Q.-S. Jia, G. Deconinck, X. Guan, Z. Qiu, and Z. Hu, "Distributed Coordination of EV Charging with Renewable Energy in a Microgrid of Buildings," *IEEE Transactions on Smart Grid*, vol. 9, no. 6, pp. 6253-6264, 2017.
- . Q.-S. Jia, **Y. Yang**, L. Xia, and X. Guan, "A Tutorial on Event-Based Optimization With Application in Energy Internet," *Control Theory & Applications*, vol. 35, no. 1, pp. 32-40, 2018.

Conference Papers

- . **Y. Yang**, Q.-S. Jia, and X. Guan, "Stochastic Coordination of Aggregated Electric Vehicle Charging With On-site Wind Power at Multiple Buildings," *56th IEEE Conference on Decision and Control*, pp. 4434-4439, Melbourne, Australia, Dec. 12-15, 2017.

- . **Y. Yang**, Q.-S. Jia, and X. Guan, "The joint scheduling of EV charging load with building mounted wind power using simulation-based policy improvement," *IEEE International Symposium on Flexible Automation*, pp. 165-170, Cleveland, Ohio, USA, Aug. 1-3, 2016.
- . **Y. Yang**, Q.-S. Jia, and X. Guan, "Improving the Prediction Accuracy of Building Energy Consumption using Location of Occupant-A Case Study," *IEEE International Conference on Industrial Technology*, pp.1550-1555, Taipei, China, Mar. 14-17, 2016.

PRESENTATIONS

- . *Stochastic Coordination of Aggregated Electric Vehicle Charging With On-site Wind Power at Multiple Buildings*, Conference talk, hosted by 56th IEEE Conference on Decision and Control, Melbourne, Australia, Dec. 12-15, 2017.
- . *Analysis and Coordination of Supply and Demand in Energy Internet*, Invited talk, hosted by Northeastern University, Shenyang, China, Jun. 12, 2017.
- . *The joint scheduling of EV charging load with building mounted wind power using simulation-based policy improvement*, Invited talk, hosted by Doctoral Forum of Department of Automation, Tsinghua University, Beijing, China, May 14, 2016.

HONORS AND AWARDS

Outstanding Graduates, Huazhong University of Science and Technology, 2013.

National Encouragement scholarship, Huazhong University of Science and Technology, 2012.

First Prize of the ADI Electronic Technology Design Contest, Huazhong University of Science and Technology, 2012.

National Scholarship, Huazhong University of Science and Technology, 2011.

Scholarship of Academic Excellence, Huazhong University of Science and Technology, 2011.

National Encouragement Scholarship, Huazhong University of Science and Technology, 2010.

Scholarship of Academic Excellence, Huazhong University of Science and Technology, 2010.

ACADEMIC SERVICE

- . **Accociate Editor** of the 16th IEEE International Conference on Control & Automation, 2020.
- . **Reviewer** of various international journals and conferences since 2013, such as IEEE Control Systems Letters (L-CSS) (**Outstanding Reviewer Award for 2019**), IEEE Transactions on Control Systems Technology, IEEE Transactions on Smart Grid, IEEE Transactions on Automation Science and Engineering, IEEE Transactions on Automatic Control, IEEE Conference on Decision and Control, American Control Conference, IEEE International Conference on Automation Science and Engineering, etc.

INDUSTRY PRACTICE

JD's Company, Beijing, China (E-commerce) *Jul. 2017 - Oct. 2017*
We developed an visualization simulation platform for the logistics information of orders.

Zhongming Electronic Industrial Company, Guangdong, China *Jul. 2015 - Aug. 2015*
We developed a software for the design and calculation of sensor size for the engineers

TEACHING EXPERIENCE

- . Teaching assistant, **Computer Network's Theory and Applications** (undergraduate course), Tsinghua University, 2017.

- . Teaching assistant, **C++ Program Design** (undergraduate course), Tsinghua University, 2016.
- . Teaching assistant, **Data Structure** (undergraduate course), Tsinghua University, 2015.

VISITING EXPERIENCE

University of Leuven, Leuven, Belgium

Mar. 2016 - May 2016

Visiting Prof. Geert Deconinck, Department of Electrical Engineering

HOBBIES

Reading and writing, regular exercises.