

Appointments

- Assistant Professor** of Electrical & Computer Engineering
University of Utah *Sept. 2018 - Present*
Salt Lake City, UT, USA
- NSERC Postdoc Fellow** in Energy & Resources Group
University of California, Berkeley *Sept. 2016 - Sept. 2018*
Berkeley, CA, USA

Education

- Ph.D.** in Mechanical Engineering *Apr. 2016*
University of Victoria *Victoria, BC, Canada*
– Dissertation: “Modeling and Control of Controllable Electric Loads in Smart Grid”
- M.A.Sc.** in Mechanical Engineering *Jun. 2012*
University of Victoria *Victoria, BC, Canada*
– Thesis: “Energy Efficient Operation Strategy Design for the Combined Cooling, Heating, and Power System”
- Exchange** in Power Mechanical Engineering *Sept. 2008 - Jan. 2009*
National Tsing Hua University *Hsinchu, Taiwan*
– Project: “Fast Algorithm for Differential Image Rebuilding”
- B.Eng.** in Control Science & Engineering *Jun. 2010*
Harbin Institute of Technology *Harbin, China*
– Thesis: “ZigBee Wireless Location Technology-Based 3D Real-Time Simulation”

Research Interests

- Power and Energy Systems
 - ▷ Dynamic modeling, system identification, time-series analysis, forecasting, and control of distributed energy resources for grid integration
 - ▷ Harmonious vehicle-grid integration for the provision of distribution- and transmission-level services and benefits
 - ▷ Privacy preservation and cyber security in smart grid and decentralized power system
 - ▷ Intelligent integrated energy management system design and control for smart buildings and microgrids
 - ▷ Risk-sharing electricity market through energy insurance for reliable operations of decarbonized power grid
- Optimization and Control
 - ▷ Efficient decentralized and distributed optimization for problems with massive datasets
 - ▷ Scalable, privacy-preserving, and secure decentralized and distributed multi-agent cooperative optimization

- ▷ Control theory including optimal control, robust control, and model predictive control (MPC) in both stochastic and deterministic fashions
- ▷ Filtering and control for networked control systems
- Cyber-Physical Systems (CPSs)
 - ▷ Mechanisms, detection, and mitigation of algorithmic cyber attacks
 - ▷ Impact-aware proactive cyber defense system
 - ▷ Security-aware resilient controller
 - ▷ Zero-trust architecture
- Energy Justice in Native and Under-Served Communities
 - ▷ Off-grid and grid-tied clean energy solutions on native lands
 - ▷ Capacity building and digital literacy in Native American communities
 - ▷ Socio-technical solutions to energy justice and energy sovereignty in native lands

Grants

- *Energizing Dinétah*
 - Funding Agency: US Department of Energy
 - Award Amount: \$100,000 to University of Utah (25% to Liu)
 - Duration: 9/2023 – 8/2024
 - Role: PI
- *Ojo Encino Shaandiin Solar Project* (selected for award; under negotiation)
 - Funding Agency: US Department of Energy
 - Award Amount: \$576,872 to University of Utah (41% to Liu)
 - Duration: 1/2024 – 12/2026
 - Role: Co-PI; Lead PI at University of Utah
- *Conference: Conference Grant for North American Power Symposium (NAPS) 2022 Attendees*
 - Funding Agency: National Science Foundation
 - Award Amount: \$25,000 (100% to Liu)
 - Duration: 9/2022 – 8/2023
 - Role: PI
- *Electrifying and Broadbanding the Comb Ridge/El Capitan Community in Kayenta (Microgrid-Kayenta)*
 - Funding Agency: US Department of Energy
 - Award Amount: \$344,616 to University of Utah (33% to Liu)
 - Duration: 09/2022 – 08/2025
 - Role: Co-PI; Lead PI at University of Utah
- *CAREER: Scalable and Secure Control of Distributed Grid-Edge Resources for Enhanced Grid Reliability*
 - Funding Agency: National Science Foundation
 - Award Amount: \$500,079 (100% to Liu)
 - Duration: 02/2022 – 01/2027
 - Role: PI

- *Visual-Enhanced Cooperative Traffic Operations (VECTOR) System*
 - Funding Agency: US Department of Energy
 - Award Amount: \$651,760 to University of Utah (36% to Liu)
 - Duration: 10/2021 – 12/2025
 - Role: Co-PI; Lead PI at University of Utah

Research Experience

- **University of Utah** Salt Lake City, UT, USA
Assistant Professor, Department of Electrical & Computer Engineering *Sept. 2018 – present*
 - ▷ Multi-agent cooperative control and optimization (supported by NSF)
 - Development of cryptology-based and non-cryptology-based privacy-preserving decentralized multi-agent cooperative distributed optimization algorithms
 - Development of two-facet scalable decentralized optimization algorithms for strongly coupled multi-agent cooperative optimization
 - Development of multi-agent reinforcement learning approaches
 - Development of vectors, detection methods, and mitigation strategies for for-purpose cyber attacks targeting decentralized/distributed multi-agent cooperative optimization algorithms
 - ▷ Decentralized and distributed control of distributed energy resources (DERs) in coordinated and transactive energy markets (supported by NSF)
 - Development of chance-constrained decentralized optimization algorithms for DER control
 - Development of DER control paradigms with intrinsic cyber security features
 - Development of new algorithm-based mechanisms for transactive energy markets
 - ▷ Optimization and control of smart vehicles in both transportation and power networks
 - Siting and sizing of electric vehicle charging stations under both transportation and power network constraints
 - Operation control of smart connected electric vehicles considering both transportation and power networks
 - ▷ Cyber security of connected automated vehicles (CAV) (supported by DOE)
 - Development of cryptology-based privacy preservation measures for coordination and control of CAVs
 - Development of hybrid software-hardware cyber security measures for coordination and control of CAVs
 - ▷ Microgrid design and energy justice on native lands (supported by DOE)
 - Design of hybrid centralized-decentralized solar-based microgrid in Navajo Nation
 - Discovery of socio-technical barriers to energy sovereignty on native lands
- **University of California, Berkeley** Berkeley, CA, USA
NSERC Postdoc Fellow, Energy & Resources Group *Sept. 2016 – Aug. 2018*
 - ▷ An open source architecture software platform for plug-in EV smart charging in California residential and small commercial settings (supported by California Energy Commission)

- Initiative development of a novel and generic shrunken-primal-dual subgradient (SPDS) algorithm for optimization problems with non-separable objective functions, and globally and locally coupled constraints
- Establishment of a decentralized EV charging control framework under distribution network constraints including nodal voltage magnitudes and transformer overloading
- Development of a decentralized EV charging control framework that can accommodate EV drivers' local objectives and constraints
- Distributed and hierarchical coordination to mitigate feeder impacts
- ▷ Achieving clean power system flexibility: Sensing, modeling, and optimal control (supported by NSF)
 - Development and implementation of a reinforcement learning controller under the supervision of MPC for residential flexible electric loads facilitating renewable energy generation
 - Scalable data-driven models and control of electric loads
 - Mitigation of under-over voltages which is an indirect mean to balance demand supply locally

• **University of Victoria**

Victoria, BC, Canada

Research Assistant, Applied Control & Information Processing Laboratory and Institute for Integrated Energy Systems

Sept. 2010 – Apr. 2016

- ▷ Aggregation and charging control of EVs (supported by NSERC)
 - Development of a novel aggregation and control framework that well positions EVs in cyber-physical systems
 - Establishment of a charging-index based control paradigm for the provision of valley-filling
- ▷ Modeling and control of thermostatically controlled loads (TCLs) for demand response (supported by NSERC)
 - Development of direct and stochastic aggregation models for a large population of TCLs
 - Development of centralized and cooperative distributed MPC (C-DMPC) for regulation services under device lockout effects
 - Development of practical control dispatching approaches for proposed control schemes
- ▷ Operation strategy design for combined cooling, heating, and power (CCHP) systems
 - Development of a balance-space-based operation strategy for CCHP systems
 - Development of an energy-hub model for CCHP systems and design of optimal operation strategies
 - Design and implementation of an OLS-TSRLS algorithm that accurately identifies the ARMAX short-term load forecasting model
- ▷ Networked control systems (NCSs)
 - Design of T-S fuzzy \mathcal{H}_2 and \mathcal{H}_∞ filters for nonlinear sampled-data system considering both input and output time delays
 - Design of \mathcal{H}_∞ switched filtering for NCSs
 - Development of \mathcal{H}_∞ tracking controller for nonlinear NCSs

Honors/Awards

- Winner of US Department of Energy Energizing Rural Communities Prize 2023
- Second Prize of The Wilkes Center for Climate Science and Policy Student Innovation Prize (Advisor) 2023
- Official Recognition from US Secretary of Energy for Contributions in Bringing Power to Navajo Nation 2022
- University of Utah Career Impact Award Winner 2022
- NSF CAREER Award 2022
- Winner of DOE JUMP into STEM Challenge on Resilience for All in the Wake of Disaster (Advisor of the University of Utah Team) 2021
- Best Student Paper Award in 2021 4th IEEE International Conference on Industrial Cyber-Physical Systems (PhD Student - Xiang Huo) 2021
- Best Paper Award in 2021 52nd North American Power Symposium 2021
- Top 15% Graduate Teacher Award in College of Engineering at the University of Utah 2020
- IEEE Transactions on Smart Grid Best Reviewer 2018
- Nominee of Governor General's Gold Medal 2017
- Natural Sciences and Engineering Research Council of Canada (NSERC) Postdoctoral Fellowship (PDF) 2016-2018
- NSERC Postgraduate Scholarship–Doctoral (PGS–D) 2014-2016
- Howard E. Petch Research Award 2014-2016
- Nominee of David H. Turpin Research Award 2015
- Nominee of David F. Strong Research Award 2015
- IEEE Control Systems Society Student Travel Support 2015
- University of Victoria Travel Grant 2015
- 3MT[®] Finalist and 1st place in Engineering Heat 2015
- President's Research Award 2014
- University of Victoria Travel Grant 2014
- Albert Hung Chao Hong Research Award 2013
- Melva J. Hanson Graduate Research Award 2013
- Nominee of Lieutenant Governor's Silver Medal 2013
- Charles S. Humphrey Graduate Student Award 2012
- University of Victoria Graduate Award (First Class) 2012
- University of Victoria Travel Grant 2012
- University of Victoria Graduate Award (First Class) 2010
- China National Petroleum Corporation (CNPC) Scholarship for Excellent Student 2008
- Merit Student Scholarship 2007
- First place in Harbin Institute of Technology Scholarship (4 times) 2006-2010

- Harbin Institute of Technology Special Scholarship (5 times) 2006-2010

Teaching Experiences

- **University of Utah** (Overall evaluation 5.7/6) Salt Lake City, UT, USA
Instructor, Electrical & Computer Engineering
 - ▷ ECE 5960/6960: Convex Optimization 2020-2022 Spring & 2023 Fall
 - ▷ ECE 5960/6960: Linear Systems 2019-2021 Fall
 - ▷ ECE 6960: Introduction to Model Predictive Control 2019 Spring
- **University of California, Berkeley** (Overall evaluation 4.5/5) Berkeley, CA, USA
Lecturer, Energy & Resources Group 2016 Fall
 - ▷ ER 292A: Tools of the Trade
- **University of Victoria** (Overall evaluation 6.75/7) Victoria, BC, Canada
Lecturer, Department of Mechanical Engineering 2013 Fall
 - ▷ MECH 380: Automatic Control Engineering

Mentorship

- **University of Utah** Salt Lake City, UT, USA
 Mahan Fakouri Fard, *Ph.D.*, Electrical & Computer Engineering 2021 Spring – present
 Md Golam Dastgir, *Ph.D.*, Electrical & Computer Engineering 2021 Spring – 2022 Fall
 Xiang Huo, *Ph.D.*, Electrical & Computer Engineering 2019 Fall – present
 Songyuan Yu, *Visiting Ph.D.*, Electrical & Computer Engineering 2019 Fall – 2020 Fall
- **University of California, Berkeley** Berkeley, CA, USA
 Phillippe K. Phanivong, *M.A.*, Energy & Resources Group 2016 Fall – 2018 Fall

Publications

- **Books**
 - [B1] Y. Shi, **M. Liu**, and F. Fang, *Combined Cooling, Heating, and Power Systems: Modeling, Optimization, and Operation*, John Wiley & Sons, Aug. 2017, ISBN: 978-1-119-28335-5.
- **Journal papers that are under preparation**
 - [J25] M. Fakouri Fard and **M. Liu**, “Exploration of for-purpose algorithmic cyber attacks in distributed multi-agent cooperative optimization,” prepared for *IEEE Transactions on Automatic Control*, 2023.
 - [J24] X. Huo, M. Fakouri Fard and **M. Liu**, “Privacy and security in distributed resources optimization: An overview,” prepared for *Advances in Applied Energy*, 2023.
- **Journal papers that are under review**

[J23] X. Huo and **M. Liu**, "Privacy-preserving distributed energy resource control with decentralized cloud computing," submitted to *IEEE Transactions on Control of Network Systems*, 2023.

• **Refereed journal papers that have been published/accepted for publication**

[J22] X. Huo, J. Dong, B. Cui, B. Liu, J. Lian, and **M. Liu**, "Two-level decentralized-centralized control of distributed energy resources in grid-interactive efficient buildings," *IEEE Control Systems Letters*, vol. 7, pp. 997-1002, 2023.

[J21] X. Huo and **M. Liu**, "Distributed privacy-preserving electric vehicle charging control based on secret sharing," *Electric Power Systems Research*, vol. 211, pp. 108357, 2022.

[J20] X. Huo and **M. Liu**, "Two-facet scalable cooperative optimization of multi-agent systems in the networked environment," *IEEE Transactions on Control Systems Technology*, vol. 30, no. 6, pp. 2317-2332, 2022.

[J19] X. Huo and **M. Liu**, "Encrypted decentralized multi-agent optimization for privacy preservation in cyber-physical systems," *IEEE Transactions on Industrial Informatics*, vol. 19, no. 1, pp. 750-761, 2023.

[J18] B. Azin, X. Yang, N. Marković, and **M. Liu**, "Infrastructure enabled and electrified automation: Charging facility planning for cleaner smart mobility," *Transportation Research Part D: Transport and Environment*, vol. 101, pp. 103079, 2021.

[J17] X. Huo and **M. Liu**, "Privacy-preserving decentralized multi-agent cooperative optimization – paradigm design and privacy analysis," *IEEE Control Systems Letters*, vol. 6, pp. 824-829, 2021.

[J16] F. Fang, S. Yu, and **M. Liu**, "An improved Shapley value-based profit allocation method for CHP-VPP," *Energy*, vol. 213, pp. 1-15, 2020.

[J15] **M. Liu**, S. Peeters, B. Claessens, and D. S. Callaway, "Trajectory tracking with an aggregation of domestic hot water heaters: Combining model-based and model-free control in a commercial deployment," *IEEE Transactions on Smart Grid*, vol. 10, no. 5, pp. 5686-5695, 2019.

[J14] **M. Liu**, P. K. Phanivong, Y. Shi, and D. S. Callaway, "Decentralized charging control of electric vehicles in residential distribution networks," *IEEE Transactions on Control Systems Technology*, vol. 27, no. 1, pp. 266-281, 2019.

[J13] X. Liu, **M. Liu**, and Y. Shi, "Event triggered model predictive control: A less conservative result," *Journal of the Franklin Institute*, vol. 355, no. 18, pp. 9053-9071, 2018.

[J12] **M. Liu**, Y. Shi, and H. Gao, "Aggregation and charging control of PHEVs in smart grid: A cyber-physical perspective," *Proceedings of the IEEE*, vol. 104, no. 5, pp. 1071-1085, 2016.

[J11] **M. Liu** and Y. Shi, "Model predictive control for thermostatically controlled appliances providing balancing service," *IEEE Transactions on Control Systems Technology*, vol. 24, no. 6, pp. 2082-2093, 2016.

[J10] **M. Liu**, Y. Shi, and X. Liu, "Distributed MPC of aggregated heterogeneous thermostatically controlled loads in smart grid," *IEEE Transactions on Industrial Electronics*, vol. 63, no. 2, pp. 1120-1129, 2016.

[J9] **M. Liu** and Y. Shi, "Model predictive control of aggregated heterogeneous second-order thermostatically controlled loads for ancillary services," *IEEE Transactions on Power Systems*, vol. 31, no. 3, pp. 1963-1971, 2016.

- [J8] **M. Liu**, Y. Shi and F. Fang, "Load forecasting and operation strategy design for CCHP systems using forecasted loads," *IEEE Transactions on Control Systems Technology*, vol. 23, no. 5, pp. 1672-1684, 2015.
- [J7] **M. Liu**, Y. Shi and F. Fang, "Combined cooling, heating and power systems: A survey," *Renewable & Sustainable Energy Reviews*, vol. 35, pp. 1-22, 2014.
- [J6] **M. Liu**, Y. Shi and X. Liu, "T-S fuzzy-model-based \mathcal{H}_2 and \mathcal{H}_∞ filtering for networked control systems with two-channel Markovian random delays," *Digital Signal Processing*, vol. 27, pp. 167-174, 2014.
- [J5] H. Zhang, **M. Liu**, J. Sheng, and Y. Shi, "Extended LMI representatives for stability and stabilization of discrete-time Takagi-Sugeno fuzzy systems," *Optimal Control Applications and Methods*, vol. 35, no. 6, pp. 647-655, 2014.
- [J4] **M. Liu**, Y. Shi, and F. Fang, "Optimal power flow and PGU capacity of CCHP systems using a matrix approach," *Applied Energy*, vol. 102, pp. 794-802, 2013.
- [J3] H. Zhang, Y. Shi, and **M. Liu**, " \mathcal{H}_∞ step tracking control for networked discrete-time nonlinear systems with integral and predictive actions," *IEEE Transactions on Industrial Informatics*, vol. 9, no. 1, pp. 337-345, 2013.
- [J2] H. Zhang, Y. Shi, and **M. Liu**, " \mathcal{H}_∞ switched filtering for networked systems based on delay occurrence probabilities," *ASME Journal of Dynamic Systems, Measurement, and Control*, vol. 135, no. 6, pp. 061002, 2013.
- [J1] **M. Liu**, Y. Shi, F. Fang, "A new operation strategy for CCHP systems with hybrid chillers," *Applied Energy*, vol. 95, pp. 164-173, 2012.

- **Refereed conference papers that have been accepted or published**

- [C21] J. Cho, **M. Liu**, Y. Zhou, and R.-R. Chen, "Multi-agent recurrent deterministic policy gradient with inter-agent communication (MARDPG-IAC)," accepted, in *Proceedings of the Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, USA, October 29-November 3, 2023.
- [C20] B. Kuang, T. Sanni, Y. Shi, **M. Liu**, W. Shao, and J. Chen, "Investigation of the importance of residential energy end use in normal days and natural disasters," accepted, in *Proceedings of the ASCE International Conference on Computing in Civil Engineering*, Corvallis, OR, USA, June 25-28, 2023.
- [C19] X. Huo and **M. Liu**, "On privacy preservation of electric vehicle charging control via state obfuscation," in *Proceedings of the IEEE Conference on Decision and Control*, Singapore, December 13-15, 2023.
- [C18] M. Fakouri Fard, X. Huo, and **M. Liu**, "Exploration of for-purpose decentralized algorithmic cyber attacks in EV charging control," in *Proceedings of the IEEE International Symposium on Industrial Electronics*, Helsinki, Finland, June 19-21, 2023.
- [C17] M. Dastgir, X. Huo, and **M. Liu**, "Multi-agent reinforcement learning based electric vehicle charging control for grid-level services," in *Proceedings of IEEE Annual Conference of the IEEE Industrial Electronics Society*, Brussels, Belgium, October 17 - 20, 2022.

- [C16] X. Rui, **M. Liu**, M. Sahraei-Ardakani, and T. R. Nudell “ADMM-based distributed DC optimal power flow with power flow control,” in *Proceedings of North American Power Symposium*, Salt Lake City, Utah, USA, October 9 - 11, 2022.
- [C15] X. Huo and **M. Liu**, “A secret-sharing based privacy-preserving distributed energy resource control framework,” in *Proceedings of IEEE International Symposium on Industrial Electronics*, Anchorage, Alaska, USA, June 1 - 3, 2022.
- [C14] M. Fakouri Fard, M. Sahraei-Ardakani, G. Ou, and **M. Liu**, “Targeted hardening of electric distribution system components for enhanced resilience against earthquakes,” in *Proceedings of IEEE International Symposium on Industrial Electronics*, Anchorage, Alaska, USA, June 1 - 3, 2022.
- [C13] J. Cho, **M. Liu**, Y. Zhou, and R.-R. Chen, “Communication-free two-stage multi-agent DDGP under partial states and observations,” in *Proceedings of the Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, USA, October 31 - November 3, 2021.
- [C12] X. Huo and **M. Liu**, “A novel cryptography-based privacy-preserving decentralized optimization paradigm,” in *Proceedings of the IEEE International Conference on Industrial Cyber-Physical Systems*, Victoria, BC, Canada, May 10-12, 2021.
- [C11] X. Huo and **M. Liu**, “Privacy-preserving decentralized optimization using homomorphic encryption,” in *Proceedings of the IFAC Cyber-Physical and Human Systems*, Beijing, China, December 3-5, 2020.
- [C10] F. Jafarishiadeh, **M. Liu**, and M. Sahraei-Ardakani, “Preventive de-icing of transmission lines in changing weather conditions,” in *Proceedings of the North American Power Symposium*, Tempe, AZ, USA, April 11-14, 2021.
- [C9] X. Huo and **M. Liu**, “Decentralized electric vehicle charging control via a novel shrunken primal-multi-dual subgradient (SPMDS) algorithm,” in *Proceedings of the IEEE Conference on Decision and Control*, Jeju Island, Republic of Korea, December 14-18, 2020.
- [C8] K. Plewe, A. Smith, and **M. Liu**, “A supervisory model predictive control framework for dual temperature setpoint optimization,” in *Proceedings of the American Control Conference*, Denver, CO, July 1-13, 2020, pp. 1900-1906.
- [C7] **M. Liu**, “Chance-constrained SPDS-based decentralized control of distributed energy resources,” in *Proceedings of IEEE Conference on Decision and Control*, Nice, France, December 11-13, 2019.
- [C6] **M. Liu** and M. Sahraei-Ardakani, “Chance-constrained shrunken-primal-dual subgradient (CC-SPDS) approach for decentralized electric vehicle charging control,” in *Proceedings of IEEE PES Innovative Smart Grid Technology Asia*, Chengdu China, May 21-24, 2019.
- [C5] **M. Liu**, P. K. Phanivong, and D. S. Callaway, “Customer- and network-aware decentralized EV charging control,” in *Proceedings of Power Systems Computation Conference*, Dublin, Ireland, June 11–15, 2018.
- [C4] **M. Liu**, P. K. Phanivong, and D. S. Callaway, “Electric vehicle charging control in residential distribution network: A decentralized event-driven realization,” in *Proceedings of IEEE Conference on Decision & Control*, Melbourne, Australia, December 12–15, 2017.
- [C3] **M. Liu** and Y. Shi, “Optimal control of aggregated heterogeneous thermostatically controlled loads for regulation services,” in *Proceedings of IEEE Conference on Decision & Control*, Osaka, Japan, December 15–18, 2015.

[C2] M. Liu and Y. Shi, "Distributed model predictive control of thermostatically controlled appliances for providing load balancing service," in *Proceedings of IEEE Conference on Decision & Control*, Los Angeles, California, USA, December 15–17, 2014.

[C1] M. Liu and Y. Shi, "An energy efficient optimal operation strategy design for CCHP systems," in *Proceedings of CSME International Congress*, Winnipeg, Manitoba, Canada, June 4–6, 2012.

Presentations

• Workshops

- ▷ "Power System and Green Energy," Salt Lake Valley Youth Center, Salt Lake City, UT, 2023

• Invited Talks

- ▷ "Electrifying and Broadbanding the Comb Ridge/El Capitan Community in Kayenta Chapter of the Navajo Nation," invited by U.S. Secretary of Energy, Kayenta, AZ, 2022.
- ▷ "Connecting homes on the Navajo Nation and other tribal communities," in IEEE Power and Energy Society General Meeting, Orlando, FL, 2023.
- ▷ "Connecting Diné Communities: Challenges, Opportunities, and Pathways," in IEEE Power and Energy Society General Meeting, Denver, CO, 2022.
- ▷ "Coordinating Grid-Edge Resources for Grid Services: Scalability and Security," invited by Pacific Northwest National Laboratory, Richland, WA, 2021.
- ▷ "Coordinating Grid-Edge Resources for Grid Services: Scalability and Security," invited by Northeastern University, Shenyang, China, 2021.
- ▷ "Coordinating Grid-Edge Resources for Grid Services: Scalability and Security," invited by Northeastern Petroleum University, Daqing, China, 2021.
- ▷ "Control and Optimization in Networked Environment – From Power and Energy Systems to Cyber-Physical Systems," invited by *Xidian University*, Xi'an, China, 2019.
- ▷ "Control and Optimization in Networked Environment – From Power and Energy Systems to Cyber-Physical Systems," invited by *Nanjing University of Aeronautics and Astronautics*, Nanjing, China, 2019.
- ▷ "Control and Optimization in Networked Environment – From Power and Energy Systems to Cyber-Physical Systems," invited by *Nanjing University of Science and Technology*, Nanjing, China, 2019.
- ▷ "Control and Optimization in Networked Environment – From Power and Energy Systems to Cyber-Physical Systems," invited by *Northwestern Polytechnical University*, Xi'an, China, 2019.
- ▷ "Control and Optimization in Networked Environment – From Power and Energy Systems to Cyber-Physical Systems," invited by *Nanjing University of Posts and Telecommunications*, Nanjing, China, 2019.
- ▷ "Decentralized and Distributed Control and Optimization in Large-Scale Power Systems," invited by *Department of Automation, Shanghai Jiaotong University*, Shanghai, China, 2018.
- ▷ "Decentralized and Distributed Control and Optimization in Large-Scale Power Systems," invited by *China State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources*, Beijing, China, 2018.
- ▷ "Decentralized and Distributed Control and Optimization in Large-Scale Power Systems," invited by *Transportation Science and Engineering Department, Beihang University*, Beijing, China, 2018.

- ▷ “Customer- and network-aware decentralized EV charging control,” in *Power System Computation Conference*, Dublin, Ireland, 2018.
- ▷ “Electric vehicle charging control in residential distribution network: A decentralized event-driven realization,” in *IEEE Conference on Decision & Control*, Melbourne, Australia, 2017.
- ▷ “Decentralized charging control of electric vehicles in residential distribution networks,” invited by *Department of Mechanical Engineering*, University of Victoria, Victoria, BC, Canada, 2017.
- ▷ “Decentralized charging control of electric vehicles in residential distribution networks,” invited by *Berkeley Energy & Climate Institute*, University of California, Berkeley, Berkeley, CA, USA, 2017.
- ▷ “Optimal control of aggregated heterogeneous thermostatically controlled loads for regulation services,” in *IEEE Conference on Decision & Control*, Osaka, Japan, 2015.
- ▷ “Make smart grid smarter,” in *UVic Graduate Student Orientation*, University of Victoria, Victoria, BC, Canada, 2015.
- ▷ “Make smart grid smarter,” in *3MT[®] Competition*, University of Victoria, Victoria, BC, Canada, 2015.
- ▷ “Distributed model predictive control of thermostatically controlled appliances for providing load balancing service,” in *IEEE Conference on Decision & Control*, Los Angeles, CA, USA, 2014.
- ▷ “An energy efficient optimal operation strategy design for CCHP systems,” in *CSME International Congress*, Winnipeg, MB, Canada, 2012.
- **Poster**
 - ▷ “Modelling and control in demand response,” in *IESVic Alumni Workshop*, Victoria, BC, Canada, 2015.
 - ▷ “A new optimal operation strategy for CCHP systems,” in *Canada–China Clean Energy Conference: Sustainable Transportation*, Victoria, BC, Canada, 2013.

Professional Activities

- **Panel Reviewer for**
 - ▷ *National Academies of Sciences, Engineering, and Medicine*
- **Associate Editor for**

Journals:

 - ▷ *Frontiers in Energy Research – Smart Grids*
 - ▷ *Advances in Applied Energy* (Young Editorial Board Member)
 - ▷ *Canadian Journal of Electrical and Computer Engineering*
 - ▷ *IEEE Open Journal of the Industrial Electronics Society*
- **Guest Editor for**
 - ▷ *Frontiers in Energy Research – Smart Grids: Advances in Flexible Resource Control and Optimization for High Renewable Penetrated Power System*
 - ▷ *Frontiers in Energy Research – Smart Grids: Resilient Optimal Dispatch Operations for Modern Power Systems with High-level Renewable Energy-based Sources*
 - ▷ *IET Control Theory and Applications: Knowledge-Based Control and Optimization for Smart Energy Systems*
- **Conference Chairs for**

- ▷ Special Session Chair for 2024 IEEE International Conference on Industrial Cyber-Physical Systems
- ▷ Publication Chair for 2023 IEEE Industrial Electronics Society Annual On-Line Conference
- ▷ Young Professional Chair for 2023 IEEE International Conference on Industrial Cyber-Physical Systems
- ▷ General Co-Chair for 2022 North American Power Symposium
- ▷ Track Chair of Power Systems for 2022 IEEE International Symposium on Industrial Electronics
- ▷ Special Session Chair for 2022 IEEE International Conference on Industrial Cyber-Physical Systems
- ▷ Publication Chair for 2021 IEEE International Conference on Industrial Cyber-Physical Systems
- ▷ Track Chair of Power Systems and Smart Grid for 2019 International Symposium on Industrial Electronics

- **Reviewer for**

- Journals:**

- IEEE Transactions on Industrial Electronics*
 - IEEE Transactions on Control Systems Technology*
 - IEEE Transactions on Power Systems*
 - IEEE Transactions on Mechatronics*
 - IEEE Transactions on Smart Grid*
 - IEEE Transactions on Cybernetics*
 - IEEE Transactions on Fuzzy Systems*
 - Proceedings of the IEEE*
 - IEEE Access*
 - IEEE Power Engineering Letters*
 - Applied Energy*
 - Advances in Applied Energy*
 - ASME Journal of Dynamic Systems, Measurement and Control*
 - Journal of Mechanical Science and Technology*
 - Circuits, Systems & Signal Processing*
 - Journal of the Franklin Institute*
 - Energies*
 - Information Sciences*
 - Journal of Control Science and Engineering*
 - Journal of Modern Power System and Clear Energy*
 - Journal of Electrical Power & Energy Systems*
 - Journal of Environmental Informatics*
 - KSII Transactions on Internet and Information Systems*

- Conferences:**

- IEEE Conference on Decision and Control (CDC)*
 - American Control Conference (ACC)*
 - IEEE International Conference on Advanced Intelligent Mechatronics*
 - IEEE International Symposium on Industrial Electronics*
 - IEEE International Conference on Industrial Cyber-Physical Systems*
 - European Control Conference*
 - ASME Dynamic Systems and Control Conference*

- **Committee Member of**

- ▷ Graduate Committee: Department of Electrical and Computer Engineering, University of Utah, 2021-present
- ▷ Outreach and Marketing Committee: Department of Electrical and Computer Engineering, University of Utah, 2020-present
- ▷ Faculty Search Committee (Co-Chair): Department of Electrical and Computer Engineering, University of Utah, 2022
- ▷ Technical Committee on Energy Systems: Control Systems Society, IEEE, 2022-present.
- ▷ Technical Committee on Power Generation: Control Systems Society, IEEE, 2022-present.
- ▷ Power and Energy Education Committee: Power and Energy Society, IEEE, 2019-present.
- ▷ Technical Committee on Industrial Cyber-Physical Systems: Industrial Engineering Society, IEEE, 2016-present.
- ▷ Department Chair Search Committee: Department of Mechanical Engineering, University of Victoria, 2016.
- ▷ Wighton Engineering Product Development Fund: Faculty of Engineering, University of Victoria, 2014.

- **Member of**

- ▷ Institute of Electrical and Electronics Engineers (IEEE): *Member* of CSS, PES, and IES (since 2010)
- ▷ Nááts'ílid Initiative: *Member* (since 2022)