Curriculum Vitae

Joshua Adam Taylor

Personal information

Birth date: October 14, 1983
Citizenship: US, French
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Employment

New Jersey Institute of Technology, Electrical and Computer Engineering
Associate Professor (with tenure), 2023 - present

University of Toronto, Electrical and Computer Engineering
Associate Professor (with tenure), 2018 - 2023
Percy Edward Hart Associate Professor in Electrical and Computer Engineering, 2019 - 2022
Assistant Professor, 2013 - 2018
Director, Institute for Sustainable Energy, 2018 - 2021
Associate Director, Institute for Sustainable Energy, 2015 - 2018

University of California, Berkeley, Electrical Engineering and Computer Sciences
Postdoctoral scholar, July 2011 - December 2012

Education

Massachusetts Institute of Technology, Cambridge, MA
PhD, Mechanical Engineering, May 2011
SM, Mechanical Engineering, June 2008

Carnegie Mellon University, Pittsburgh, PA
BS, Mechanical Engineering, June 2006

Publications

Books and book chapters

B1. J.A. Taylor. *Convex optimization of power systems.* Cambridge University Press, 2015
B2. J.A. Taylor and J.L. Mathieu. "Uncertainty in Demand Response—Identification, Estimation, and Learning". In: *The Operations Research Revolution.* Tutorials in Operations Research. INFORMS, 2015. Chap. 5, pp. 56–70. DOI: `10.1287/educ.2015.0137`

Journal

J1. J.A. Taylor and A.D. Dominguez-Garcia. "Active Fault Detection in Static Systems". In: *Automatic Control, IEEE Transactions on* (2024). Submitted

J2. S. Tan, A. Rapaport, D. Dochain, P. Vanrolleghem, E. Passeport, and J.A. Taylor. "Predictive control of flow rates and concentrations in sewage networks". In: *Journal of Process Control* (2024). Submitted

J3. C. Guo, M. Bodur, and J.A. Taylor. "Copositive Duality for Discrete Energy Markets". In: *Management Science* (2023). Revision submitted. URL: http://arxiv.org/abs/2101.05379

J4. J.A. Taylor, A. Rapaport, and D. Dochain. "Convex representation of metabolic networks with Michaelis-Menten kinetics". In: *Bulletin of Mathematical Biology* 86.65 (2024). DOI: 10.1007/s11538-024-01293-1

J5. A. Lesage-Landry, F. Pellerin, D.S. Callaway, and J.A. Taylor. "Optimally scheduling public safety power shutoffs". In: *Stochastic Systems* 13.4 (2023). DOI: 10.1287/stsy.2022.004

J6. R. Perryman, J.A. Taylor, and B.W. Karney. "Port-Hamiltonian based control of water distribution networks". In: *Systems & Control Letters* 170 (2022), p. 105402. DOI: 10.1016/j.sysconle.2022.105402

J7. M. Pirani, M. Hosseinzadeh, J.A. Taylor, and B. Sinopoli. "Optimal Active Fault Detection in Inverter-Based Grids". In: *Control Systems Technology, IEEE Transactions on* 31.3 (May 2023), pp. 1411–1417. DOI: 10.1109/TCST.2022.3207661

J8. S. Tan, E. Krichen, A. Rapaport, E. Passeport, and J.A. Taylor. "Fitting second-order cone constraints to microbial growth data". In: *Journal of Process Control* 118 (2022), pp. 165–169. DOI: 10.1016/j.jprocont.2022.08.018

J9. J.A. Taylor, A. Rapaport, and D. Dochain. "A sequential convex moving horizon estimator for bioprocesses". In: *Journal of Process Control* 116 (2022), pp. 19–24. DOI: 10.1016/j.jprocont.2022.05.012

J10. A. Deshpande and J.A. Taylor. "Optimal Energy Management and Storage Sizing for Electric Vehicles With Dual Storage". In: *Control Systems Technology, IEEE Transactions on* 31.2 (Mar. 2023), pp. 872–880. DOI: 10.1109/TCST.2022.3179615

J11. J.A. Taylor, A. Rapaport, and D. Dochain. "Convex Optimization of Bioprocesses". In: *Automatic Control, IEEE Transactions on* 67.9 (Sept. 2022), pp. 4932–4938. DOI: 10.1109/TAC.2022.3167310

J12. S. Tan, J.A. Taylor, and E. Passeport. "Efficient prediction of microplastic counts from mass measurements". In: *ACS ES&T Water* 2.2 (2022), pp. 299–308. DOI: 10.1021/acsestwater.1c00316

J13. J.A. Taylor and A. Rapaport. "Second-order cone optimization of the gradostat". In: *Computers & Chemical Engineering* 151 (2021), p. 107347. DOI: 10.1016/j.compchemeng.2021.107347

J14. L.A. Bobo, L. Mitridati, J.A. Taylor, J. Kazempour, and P. Pinson. "Price-Region Bids in Electricity Markets". In: *European Journal of Operational Research* 295.3 (2021), pp. 1056–1073. DOI: 10.1016/j.ejor.2021.03.024

J15. A. Lesage-Landry, J.A. Taylor, and D.S. Callaway. "Online Convex Optimization with Binary Constraints". In: *Automatic Control, IEEE Transactions on* 66.12 (2021), pp. 6164–6170. DOI: 10.1109/TAC.2021.3061625

J16. M. Pirani, J.A. Taylor, and B. Sinopoli. "Strategic Sensor Placement on Graphs". In: *Systems & Control Letters* 148 (2021), p. 104855. DOI: 10.1016/j.sysconle.2020.104855

J17. M. Pirani and J.A. Taylor. "Controllability of AC Power Networks with DC Lines". In:

Power Systems, IEEE Transactions on 36.2 (2021), pp. 1649–1651. DOI: 10.1109/TPWRS.2020.3042381

J18. A. Lesage-Landry, J.A. Taylor, and I. Shames. "Second-order Online Nonconvex Optimization". In: *Automatic Control, IEEE Transactions on* 66.10 (2021), pp. 4866–4872. DOI: 10.1109/TAC.2020.3040372

J19. A. Lesage-Landry, I. Shames, and J.A. Taylor. "Predictive Online Convex Optimization". In: *Automatica* 113 (2020), p. 108771. DOI: 10.1016/j.automatica.2019.108771

J20. A. Lesage-Landry, H. Wang, I. Shames, P. Mancarella, and J.A. Taylor. "Online Convex Optimization of Multi-energy Building-to-grid Ancillary Services". In: *Control Systems Technology, IEEE Transactions on* 28.6 (2020), pp. 2416–2431. DOI: 10.1109/TCST.2019.2944328

J21. A. Lesage-Landry, S. Chen, and J.A. Taylor. "Estimating the Frequency Coupling Matrix From Network Measurements". In: *Control of Network Systems, IEEE Transactions on* 7.2 (2020), pp. 724–733. DOI: 10.1109/TCNS.2019.2940265

J22. A. Lesage-Landry and J.A. Taylor. "A Second-order Cone Model of Transmission Planning with Alternating and Direct Current Lines". In: *European Journal of Operational Research* 281.1 (2020), pp. 174–185. DOI: 10.1016/j.ejor.2019.08.016

J23. A. Stupar, T. McRae, N. Vukadinović, A. Prodić, and J.A. Taylor. "Multi-Objective Optimization of Multi-Level DC-DC Converters Using Geometric Programming". In: *Power Electronics, IEEE Transactions on* 34.12 (Dec. 2019), pp. 11912–11939. DOI: 10.1109/TPEL.2019.2908826

J24. M. Bazrafshan, N. Gatsis, A. F. Taha, and J.A. Taylor. "Coupling Load-Following Control With OPF". in: *Smart Grid, IEEE Transactions on* 10.3 (May 2019), pp. 2495–2506. DOI: 10.1109/TSG.2018.2802723

J25. A. S. Zamzam, E. Dall'Anese, C. Zhao, J.A. Taylor, and N. D. Sidiropoulos. "Optimal Water-Power Flow-Problem: Formulation and Distributed Optimal Solution". In: *Control of Network Systems, IEEE Transactions on* 6.1 (Mar. 2019), pp. 37–47. DOI: 10.1109/TCNS.2018.2792699

J26. B. Vellaboyana and J.A. Taylor. "Optimal Decentralized Control of DC-Segmented Power Systems". In: *Automatic Control, IEEE Transactions on* 63.10 (Oct. 2018), pp. 3616–3622. DOI: 10.1109/TAC.2018.2796620

J27. A. Lesage-Landry and J.A. Taylor. "Setpoint Tracking with Partially Observed Loads". In: *Power Systems, IEEE Transactions on* 33.5 (Sept. 2018), pp. 5615–5627. DOI: 10.1109/TPWRS.2018.2804353

J28. D. Fooladivanda and J.A. Taylor. "Energy-Optimal Pump Scheduling and Water Flow". In: *Control of Network Systems, IEEE Transactions on* 5.3 (Sept. 2018), pp. 1016–1026. DOI: 10.1109/TCNS.2017.2670501

J29. A. Lesage-Landry and J.A. Taylor. "The Multi-Armed Bandit With Stochastic Plays". In: *Automatic Control, IEEE Transactions on* 63.7 (July 2018), pp. 2280–2286. ISSN: 0018-9286. DOI: 10.1109/TAC.2017.2765501

J30. S.F. Barot and J.A. Taylor. "A concise, approximate representation of a collection of loads described by polytopes". In: *International Journal of Electrical Power & Energy Systems* 84 (2017), pp. 55–63. DOI: 10.1016/j.ijepes.2016.05.001

J31. J.A. Taylor, N. Luangsomboon, and D. Fooladivanda. "Allocating Sensors and Actuators via Optimal Estimation and Control". In: *Control Systems Technology, IEEE Transactions on* 25.3 (May 2017), pp. 1060–1067. DOI: 10.1109/TCST.2016.2575799

J32. J.A. Taylor, J.L. Mathieu, D.S. Callaway, and K. Poolla. "Price and capacity competition in balancing markets with energy storage". In: *Energy Systems* 8.1 (2017), pp. 169–197. DOI:

10.1007/s12667-016-0193-9

J33. J.A. Taylor, S.V. Dhople, and D.S. Callaway. "Power systems without fuel". In: *Renewable and Sustainable Energy Reviews* 57 (May 2016), pp. 1322–1336. DOI: 10.1016/j.rser.2015.12.083

J34. S. Sun, B. Liang, M. Dong, and J.A. Taylor. "Phase Balancing Using Energy Storage in Power Grids Under Uncertainty". In: *Power Systems, IEEE Transactions on* 31.5 (Sept. 2016), pp. 3891–3903. DOI: 10.1109/TPWRS.2015.2492359

J35. S. Pirooz Azad, J.A. Taylor, and R. Iravani. "Decentralized Supplementary Control of Multiple LCC-HVDC Links". In: *Power Systems, IEEE Transactions on* 31.1 (Jan. 2016), pp. 572–580. DOI: 10.1109/TPWRS.2015.2393372

J36. J.A. Taylor. "Financial storage rights". In: *Power Systems, IEEE Transactions on* 30.2 (Mar. 2015), pp. 997–1005. DOI: 10.1109/TPWRS.2014.2339016

J37. J.A. Taylor and J.L. Mathieu. "Index Policies for Demand Response". In: *Power Systems, IEEE Transactions on* 29.3 (May 2014), pp. 1287–1295. DOI: 10.1109/TPWRS.2013.2289972

J38. J.A. Taylor, A. Nayyar, D.S. Callaway, and K. Poolla. "Consolidated Dynamic Pricing of Power System Regulation". In: *Power Systems, IEEE Transactions on* 28.4 (Nov. 2013), pp. 4692–4700. DOI: 10.1109/TPWRS.2013.2268391

J39. J.A. Taylor, D.S. Callaway, and K. Poolla. "Competitive energy storage in the presence of renewables". In: *Power Systems, IEEE Transactions on* 28.2 (May 2013), pp. 985–996. DOI: 10.1109/TPWRS.2012.2210573

J40. J.A. Taylor and F.S. Hover. "Conic AC transmission system planning". In: *Power Systems, IEEE Transactions on* 28.2 (May 2013), pp. 952–959. DOI: 10.1109/TPWRS.2012.2214490

J41. J.A. Taylor and F.S. Hover. "Convex Models of Distribution System Reconfiguration". In: *Power Systems, IEEE Transactions on* 27.3 (Aug. 2012), pp. 1407–1413. ISSN: 0885-8950. DOI: 10.1109/TPWRS.2012.2184307

J42. J.A. Taylor and F.S. Hover. "Laplacians for flow networks". In: *SIAM Journal on Discrete Mathematics* 25.3 (2011), pp. 1349–1364. DOI: DOI:10.1137/100787726

J43. J.A. Taylor and F.S. Hover. "Linear Relaxations for Transmission System Planning". In: *Power Systems, IEEE Transactions on* 26.4 (Nov. 2011), pp. 2533–2538. ISSN: 0885-8950. DOI: 10.1109/TPWRS.2011.2145395

J44. G.F. Christopher, N.N. Noharuddin, J.A. Taylor, and S.L. Anna. "Experimental observations of the squeezing-to-dripping transition in T-shaped microfluidic junctions". In: *Phys. Rev. E* 78.3 (Sept. 2008), p. 036317. DOI: 10.1103/PhysRevE.78.036317

Conference

C1. J.A. Taylor. "Information structures in AC/DC grids". In: (2024). Submitted. DOI: 10.48550/arXiv.2307.09922

C2. C. Tasiaux, D. Dochain, J.A. Taylor, A. Rapaport, and P. Vanrolleghem. "Optimization of the Paris wastewater treatment plants and sewer network: preliminary results". In: *Control Conference Africa*. 2024

C3. J.P Macht, J.A. Taylor, and F. Azhari. "Vaulting detection with the multi-model unscented Kalman filter". In: *International Conference on Automation Science and Engineering*. Submitted. 2024

C4. J.A. Taylor and A.D. Dominguez-Garcia. "Auxiliary signal-based distance protection in inverter-dominated power systems". In: *European Control Conference*. 2024

C5. M. Pirani, J.A. Taylor, and B. Sinopoli. "Attack Resilient Interconnected Second Order Systems: A Game-Theoretic Approach". In: *Decision and Control (CDC), IEEE 58th Annual*

Conference on. Dec. 2019, pp. 4391–4396. DOI: 10.1109/CDC40024.2019.9029630

C6. A. Deshpande and J.A. Taylor. "Optimal Energy Management of Electric Vehicles". In: *CIGRÉ Canada Conference*. Sept. 2019. **Best student paper award.**

C7. A. Alam and J.A. Taylor. "An Auction for Financial Storage Rights". In: *Mediterranean Conference on Power Generation, Transmission, Distribution and Energy Conversion*. Nov. 2018. DOI: 10.1049/cp.2018.1858. **2nd place, best paper award competition.**

C8. J.A. Taylor, R. Perryman, A. Bazylak, and B. Karney. "Safely landing water networks during power outages with energy storage". In: *56th Annual Allerton Conference on Communication, Control, and Computing*. Invited. Oct. 2018, pp. 346–350. DOI: 10.1109/ALLERTON.2018.8635893

C9. L. Mitridati and J.A. Taylor. "Power Systems Flexibility from District Heating Networks". In: *Power Systems Computation Conference*. June 2018, pp. 1–7. DOI: 10.23919/PSCC.2018.8442617

C10. R. Henriquez, A. Lesage Landry, J.A. Taylor, D. Olivares, and M. Negrete-Pincetic. "Managing load contract restrictions with online learning". In: *Signal and Information Processing (GlobalSIP), IEEE Global Conference on*. Nov. 2017, pp. 1035–1039. DOI: 10.1109/GlobalSIP.2017.8309118

C11. A.S. Mohamed, A. Lesage-Landry, and J.A. Taylor. "Dispatching Thermostatically Controlled Loads for Frequency Regulation Using Adversarial Multi-armed Bandits". In: *IEEE Electrical Power and Energy Conference*. Oct. 2017. DOI: 10.1109/EPEC.2017.8286168

C12. Y. Tian, N. Li, and J.A. Taylor. "Harmonic Reduction via Optimal Power Flow and the Frequency Coupling Matrix". In: *Control Technology and Applications, IEEE Conference on*. Aug. 2017, pp. 2150–2157. DOI: 10.1109/CCTA.2017.8062771

C13. A. Lesage Landry and J.A. Taylor. "Online Convex Optimization for Demand Response". In: *Bulk Power Systems Dynamics and Control Symposium (IREP)*. Aug. 2017

C14. A. Lesage Landry and J.A. Taylor. "Learning to shift thermostatically controlled loads". In: *Hawaii International Conference on System Sciences*. Jan. 2017. DOI: hdl.handle.net/10125/41522

C15. Y. Tian and J.A. Taylor. "Sparsity-promoting controller design for VSC-based microgrids". In: *Signal and Information Processing (GlobalSIP), IEEE Global Conference on*. Dec. 2016, pp. 836–840. DOI: 10.1109/GlobalSIP.2016.7905960

C16. S. Barot and J.A. Taylor. "An outer approximation of the Minkowski sum of convex conic sets with application to demand response". In: *Decision and Control (CDC), IEEE 55th Annual Conference on*. Dec. 2016, pp. 4233–4238. DOI: 10.1109/CDC.2016.7798912

C17. M. Bazrafshan, N. Gatsis, A. Taha, and J.A. Taylor. "Augmenting the optimal power flow for stability". In: *Decision and Control (CDC), IEEE 55th Annual Conference on*. Dec. 2016, pp. 4104–4109. DOI: 10.1109/CDC.2016.7798891

C18. A. Stupar, T. McRae, N. Vukadinović, A. Prodić, and J.A. Taylor. "Multi-Objective Optimization and Comparison of Multi-Level DC-DC Converters using Convex Optimization Methods". In: *European Conference on Power Electronics and Applications*. Sept. 2016, pp. 1–10. DOI: 10.1109/EPE.2016.7695665

C19. A. Stupar, J.A. Taylor, and A. Prodić. "Posynomial Models of Inductors for Optimization of Power Electronic Systems by Geometric Programming". In: *IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)*. June 2016, pp. 1–8. DOI: 10.1109/COMPEL.2016.7556660

C20. J.L. Mathieu and J.A. Taylor. "Controlling Nonlinear Batteries for Power Systems: Trading Off Performance and Battery Life". In: *Power Systems Computation Conference*. June 2016,

pp. 1–7. DOI: 10.1109/PSCC.2016.7540856

C21. J.A. Taylor and J.L. Mathieu. "Strategic Bidding in Electricity Markets with Only Renewables". In: *American Control Conference*. July 2016, pp. 5885–5890. DOI: 10.1109/ACC.2016.7526592

C22. D. Fooladivanda and J.A. Taylor. "Optimal pump scheduling and water flow in water distribution networks". In: *Decision and Control (CDC), IEEE 54th Annual Conference on*. Dec. 2015, pp. 5265–5271. DOI: 10.1109/CDC.2015.7403043

C23. D. Fooladivanda and J.A. Taylor. "Dispatching thermal power plants under water constraints". In: *53rd Annual Allerton Conference on Communication, Control, and Computing*. Sept. 2015, pp. 396–401. DOI: 10.1109/ALLERTON.2015.7447031

C24. B.R. Vellaboyana, A. Oroojlooyjadid, D. Fooladivanda, J.A. Taylor, and L.V. Snyder. "Optimal scheduling of networked energy storages". In: *Signal and Information Processing (GlobalSIP), IEEE Global Conference on*. Dec. 2015, pp. 982–986. DOI: 10.1109/GlobalSIP.2015.7418344

C25. S. F. Barot and J.A. Taylor. "Load aggregation for demand response using polytopic models and the Minkowski sum". In: *CIGRÉ Canada Conference*. Aug. 2015

C26. S. Sun, J.A. Taylor, M. Dong, and B. Liang. "Distributed Real-Time Phase Balancing for Power Grids with Energy Storage". In: *American Control Conference*. July 2015, pp. 3032–3037. DOI: 10.1109/ACC.2015.7171798

C27. J.A. Taylor and L. Scardovi. "Decentralized control of DC-segmented power systems". In: *Communication, Control, and Computing, 52nd Annual Allerton Conference on*. Invited. Sept. 2014, pp. 1046–1050. DOI: 10.1109/ALLERTON.2014.7028570

C28. J.A. Taylor. "Financial rights and tracing for energy storage". In: *PES General Meeting*. July 2014, pp. 1–5. DOI: 10.1109/PESGM.2014.6938936

C29. J.A. Taylor and J.L. Mathieu. "Index Policies for Demand Response Under Uncertainty". In: *Decision and Control (CDC), IEEE 52nd Annual Conference on*. Invited. Dec. 2013, pp. 6262–6267. DOI: 10.1109/CDC.2013.6760879

C30. A. Nayyar, J.A. Taylor, A. Subramanian, D.S. Callaway, and K. Poolla. "Aggregate flexibility of collections of loads". In: *Decision and Control (CDC), IEEE 52nd Annual Conference on*. Invited. Dec. 2013, pp. 5600–5607. DOI: 10.1109/CDC.2013.6760772

C31. J.A. Taylor, A. Nayyar, D.S. Callaway, and K. Poolla. "Dynamic pricing in consolidated ancillary service markets". In: *European Control Conference*. July 2013, pp. 3032–3037. DOI: 10.23919/ECC.2013.6669505

C32. A. Subramanian, J.A. Taylor, E. Bitar, D. Callaway, K. Poolla, and P. Varaiya. "Optimal power and reserve capacity procurement policies with deferrable loads". In: *Decision and Control (CDC), IEEE 51st Annual Conference on*. Dec. 2012, pp. 450–456. DOI: 10.1109/CDC.2012.6426102

C33. J.A. Taylor, J.L. Mathieu, D.S. Callaway, and K. Poolla. "Price and capacity competition in zero-mean storage and demand response markets". In: *50th Annual Allerton Conference on Communication, Control, and Computing*. Invited. 2012, pp. 1316–1323. DOI: 10.1109/Allerton.2012.6483370

C34. J.A. Taylor, D.S. Callaway, and K. Poolla. "Inventory control of storage in distribution systems". In: *American Control Conference*. June 2012, pp. 2147–2152. DOI: 10.1109/ACC.2012.6315148

C35. J.A. Taylor and F.S. Hover. "Conic relaxations for transmission system planning". In: *North American Power Symposium*. Aug. 2011, pp. 1–4. DOI: 10.1109/NAPS.2011.6024861

C36. J.A. Taylor and F.S. Hover. "Lift-and-project relaxations of AC microgrid distribution system

planning". In: *Grand Challenges in Modeling and Simulation*. June 2011

C37. J.A. Taylor, E. Gilbertson, J. Chalfant, and F.S. Hover. "Linear network design for AC shipboard distribution systems". In: *IEEE Electric Ship Technologies Symposium*. Apr. 2011. DOI: 10.1109/ESTS.2011.5770866

C38. J.A. Taylor and F.S. Hover. "Economical simulation in particle filtering using interpolation". In: *Information and Automation, International Conference on*. June 2009, pp. 1326–1330. DOI: 10.1109/ICINFA.2009.5205122

C39. J.A. Taylor, F.S. Hover, and A. Ouroua. "Uncertainty analysis of large-scale power systems using collocation". In: *Grand Challenges in Modeling and Simulation*. June 2008

C40. J. Langston, J.A. Taylor, F.S. Hover, J. Simpson, M. Steurer, and T. Baldwin. "Uncertainty analysis for a large-scale transient simulation of a notional all-electric ship pulse load charging scenario". In: *Probabilistic Methods Applied to Power Systems*. May 2008

C41. J.A. Taylor and F.S. Hover. "High Dimensional Stochastic Simulation and Electric Ship Models". In: *Electric Ship Technologies Symposium*. May 2007, pp. 402–407. DOI: 10.1109/ESTS.2007.372117

Theses

T1. J.A. Taylor. "Conic optimization of electric power systems". PhD thesis. Massachusetts Institute of Technology, 2011. URL: http://dspace.mit.edu/handle/1721.1/67601

T2. J.A. Taylor. "Uncertainty analysis of power systems using collocation". MA thesis. Massachusetts Institute of Technology, 2008. URL: http://dspace.mit.edu/handle/1721.1/45891

Invited talks

- *Convex optimization of bioprocesses*. Technical University of Denmark. Lyngby, Denmark, Jan. 2024
- *Convex optimization of bioprocesses*. Imperial College London. London, England, June 2023
- *Convex optimization of bioprocesses*. Technical University of Denmark. Lyngby, Denmark, June 2023
- *Convex optimization of bioprocesses*. University of California, Santa Barbara. Santa Barbara, CA, Nov. 2022
- *Convex optimization of bioprocesses*. University of California, San Diego. San Diego, CA, Nov. 2022
- *Convex optimization of bioprocesses*. University of California, Berkeley. Berkeley, CA, Nov. 2022
- *Convex optimization of bioprocesses*. Cornell University. Ithaca, NY, Nov. 2022
- *Convex optimization of bioprocesses*. University of Michigan. Ann Arbor, MI, Oct. 2022
- *Convex optimization of bioprocesses*. École Polytechnic Montréal, GERAD. Montréal, Quebec, Oct. 2022
- *Convex optimization of bioprocesses*. Le Laboratoire d'Informatique, de Robotique et de Microélectronique de Montpellier, Université de Montpellier. Montpellier, France, July 2022
- *Convex optimization of bioprocesses*. Delft University of Technology. Delft, Netherlands, July 2022
- *Power system harmonics: identification and mitigation*. National Institute of Standards and Technology. Gaithersburg, MD, Apr. 2022

- *Convex optimization of bioprocesses.* 10th Scientific Days of the LabEx NUMEV, Université de Montpellier. Montpellier, France, Nov. 2021
- *Convex optimization of bioprocesses.* Departement of Mathematical Engineering, Université catholique de Louvain. Louvain-la-Neuve, Belgium, Sept. 2021
- *Financial storage rights.* MISTEA Seminar, Université de Montpellier. Montpellier, France (virtual), Nov. 2020
- *Decentralized control of DC-segmented power systems.* Conference on Decision and Control, Workshop on the Resilience and Controllability of Large Scale Systems. Nice, France, Dec. 2019
- *Power system harmonics: identification and mitigation.* Machine Learning, Optimization and Security for Future Energy Delivery Systems, GlobalSIP. Ottawa, ON, Nov. 2019
- *Optimal planning and control of direct current lines in power systems.* Technical University of Denmark. Lyngby, Denmark, July 2019
- *Optimal planning and control of direct current lines in power systems.* Center for Operations Research and Econometrics, Université catholique de Louvain. Louvain-la-Neuve, Belgium, June 2019
- *Optimal planning and control of direct current lines in power systems.* McGill University, Informal Systems Seminar. Montréal, Quebec, May 2019
- *Optimal planning and control of direct current lines in power systems.* École Polytechnic Montréal, GERAD. Montréal, Quebec, May 2019
- *Optimal planning and control of direct current lines in power systems.* University of Maryland, College Park. College Park, MD, Feb. 2019
- *Decentralized control of DC-segmented power systems.* 23rd International Symposium on Mathematical Programming. Bordeaux, France, July 2018
- *Financial storage rights.* Ontario Power Generation. Toronto, ON, June 2018
- *Power system harmonics: identification and mitigation.* Smart Grid Seminar, California Institute of Technology. Pasadena, CA, June 2018
- *Online learning for demand response.* Panel on Distributed Control, 9th Annual IEEE Green Technologies Conference. Denver, CO, Mar. 2017
- *Online learning for demand response.* Conference on Information Sciences and Systems, Johns Hopkins University. Baltimore, MD, Mar. 2017
- *Leveraging energy storage and demand response in power system operations.* Waterloo Institute for Sustainable Energy, University of Waterloo. Waterloo, ON, Mar. 2017
- *Power systems without fuel.* Keynote, Symposium on Signal and Information Processing for Smart Grid Infrastructures, GlobalSIP. Washington, DC, Dec. 2016
- *Leveraging energy storage and demand response in power system operations.* Pontificia Universidad Católica de Chile. Santiago, Chile, Oct. 2016
- *Leveraging energy storage and demand response in power system operations.* MAESTRO group, INRIA. Sophia-Antipolis, France, June 2016
- *Representing storage and demand response in power system operations.* Centre for Power and Information Research Showcase, University of Toronto. Toronto, ON, Apr. 2016
- *Representing storage and demand response in power system operations.* Mechanical & Industrial Engineering Colloquium, New Jersey Institute of Technology. Newark, NJ, Feb. 2016
- *Representing storage and demand response in power system operations.* Workshop on frontiers in distributed optimization and control of sustainable power systems, National Renewable Energy Laboratory. Boulder, CO, Jan. 2016
- *Strategic Price Bidding in Electricity Markets with Only Renewables.* INFORMS Annual

Meeting. Philadelphia, PA, Nov. 2015
- *Representing storage and demand response in power system operations.* Control Seminar, University of Michigan. Ann Arbor, MI, Oct. 2015
- *Dispatching Thermal Power Plants under Water Constraints.* 53nd Annual Allerton Conference on Communication, Control, and Computing. Monticello, IL, Oct. 2015
- *Financial storage rights.* Industrial and Systems Engineering Seminar, Lehigh University. Bethlehem, PA, Jan. 2015
- *Financial storage rights.* UC Berkeley. Berkeley, CA, Nov. 2014
- *Financial rights for energy storage.* INFORMS Annual Meeting. San Francisco, CA, Nov. 2014
- *Decentralized control of DC-segmented power systems.* 52nd Annual Allerton Conference on Communication, Control, and Computing. Monticello, IL, Oct. 2014
- *Financial storage rights.* Purdue University. West Lafayette, IN, Sept. 2014
- *Load-based power system regulation: algorithms and incentives.* Center for Nonlinear Studies, Los Alamos National Lab. Los Alamos, NM, Apr. 2014
- *Load-based power system regulation: algorithms and incentives.* Informal Systems Seminar, McGill University. Montréal, Quebec, Mar. 2014
- *Leveraging aggregations of flexible loads.* Pillai Institute of Information Technology, Engineering, Media Studies & Research. Navi Mumbai, India, Dec. 2013
- *Load-based power system regulation: algorithms and incentives.* Electric Energy Systems Group, Electrical and Computer Engineering, Carnegie Mellon University. Pittsburgh, PA, Oct. 2013
- *Learning algorithms for demand response.* UC Berkeley. Berkeley, CA, Oct. 2013
- *Restless Bandit Index Policies for Demand Response.* INFORMS Annual Meeting. Minneapolis, MN, Oct. 2013
- *Load-based power system regulation: algorithms and incentives.* Information, Systems, and Networks Seminar, Electrical Engineering Department, Cornell University. Ithaca, NY, Sept. 2013
- *Load-based power system regulation: algorithms and incentives.* Mechanical Engineering Department, Columbia University. New York, NY, Sept. 2013

Service

Editorial roles

- *Journal of Optimization Theory and Applications.* Associate Editor. 2021 - present
- *IEEE Transactions on Control of Network Systems.* Associate Editor. 2021 - present
- *IEEE Canada Conference Editorial Board.* 2016 - 2018
- *Journal of Modern Power Systems and Clean Energy.* Associate Editor for Special Issue on Ultra-high Levels of Variable Renewable Energy. 2017

Conference organization

- *IEEE Conference on Decision and Control.* Advanced Strategies to Control Distributed Energy Resources. 2021
- *IEEE Conference on Decision and Control.* Machine Learning for Control of Power Systems. 2021
- *Canadian Operational Research Society Conference (CORS).* Energy, Natural Resources, and the Environment Cluster Co-Chair. 2021

- *IEEE Global Conference on Signal and Information Processing (GlobalSIP).* Symposium on Machine Learning, Optimization, and Security for Future Energy Delivery Systems, Symposium Co-organizer. 2019
- *IEEE Conference on Decision and Control.* Learning in Power Systems, Session Organizer. 2018
- *IEEE Conference on Control Technology and Application.* Distributed Energy Resources, Session Organizer. 2018
- *IEEE Conference on Control Technology and Application.* Control applications for renewable integration, Session Organizer. 2017
- *INFORMS Annual Meeting.* Optimization in converter-based power systems, Session Organizer. 2016

Program committees

- *IEEE Electric Power and Energy Conference (EPEC).* 2017
- *IEEE Global Conference on Signal and Information Processing (GlobalSIP).* Symposium on Signal and Information Processing for Smart Grid Infrastructures. 2016
- *Workshop on System and Control Perspectives for Smart City.* 2015
- *IEEE Global Conference on Signal and Information Processing (GlobalSIP).* Symposium on Signal and Information Processing for Optimizing Future Energy Systems. 2015
- *IEEE International Conference on Smart Grid Communications (SmartGridComm).* Architectures, Control and Operation for Smart Grids and Microgrids Symposium. 2015
- *CIGRÉ Canada Conference on Power Systems.* Trends in Power System Planning and Operating for Evolving Grid. 2014
- *IEEE International Conference on Smart Grid Communications (SmartGridComm).* Architectures, Control, and Operation for Smart Grids, Microgrids and Distributed Resources Symposium. 2014
- *IEEE International Conference on Smart Grid Communications (SmartGridComm).* Symposium on Demand Side Management, Demand Response, and Dynamic Pricing. 2013

External thesis examiner

- Enrica Raheli. Supervisors: Jalal Kazempour. *Physics-Aware Operation of Power-to-X and Natural Gas Systems.* Technical University of Denmark. 2024
- Abdel Rahman Ahmad Amin Aldik. Supervisor: Bala Venkatesh. *Convex Relaxation of Line-Wise Power Systems Model for Optimal Planning and Operations.* Toronto Metropolitan University. 2022
- Andrea Tosatto. Supervisors: Spyros Chatzivasileiadis, Pierre Pinson, Tilman Weckesser. *Optimization and Market Integration of Multi-Area AC/HVDC Grids.* Technical University of Denmark. 2021
- Navdeep Dhaliwal. Supervisor: François Bouffard. *Generation expansion planning with renewable energy.* McGill University. 2020
- Christian Bingane. Supervisor: Miguel Anjos. *Application de l'optimisation conique au problème d'écoulement de puissance optimal.* École Polytechnic Montréal. 2019
- Raheel Zafar. Supervisor: Jayashri Ravishankar. *Multi-timescale Volt/VAR Optimization with Battery Energy Storage using Convex Relaxations in Smart Distribution Grids.* University of New South Wales. 2019

Community engagement and outreach

- (Virtual) booth organizer, *Science Rendezvous*, University of Toronto. May, 2021
- Organizer, *Sustainable Energy Symposium*, University of Toronto. January, 2020
- Panel moderator, *Power Infrastructure in Africa*, Accelerating Africa. October, 2018
- Panelist, *Network cost allocation: who should pay for green network infrastructure?* PES General Meeting, Latin American Working Group. 2017.
- Speaker, *Game theory in renewable only electricity markets*, Technical University of Denmark, Center for Electric Power and Energy, Summer School, 2017.
- Speaker, *Financial Transmission and Storage Rights*, IEEE Smart Grid Webinar. April, 2017
- Panelist, *The Future of Energy Symposium*, Oakville Chamber of Commerce. June, 2015

Grant reviewer/panelist

- NSERC Electrical and Computer Engineering Evaluation Group (EG 1510), 2022-2025
- NSF, ARPA-E, CHIST-ERA.

Journal reviewer

IEEE Transactions on {Automatic Control, Control of Network Systems, Energy Conversion, Power Electronics, Power Systems, Sustainable Energy}; IEEE Journal on Selected Areas in Communications; IEEE Control Systems Letters; Automatica; Systems & Control Letters; Operations Research; Optimization and Engineering; Sustainable Energy, Grids and Networks; IET Generation, Transmission & Distribution; International Journal of Electrical Power & Energy Systems; Energy Economics.

Internal service

- Faculty Search Committee, Mechanical & Industrial Engineering, 2021 - 2022, 2022 - 2023
- Director, Institute for Sustainable Energy, 2018 - 2022
- Associate Director, Institute for Sustainable Energy, 2015 - 2018
- ECE Computer User Committee, 2021 - present
- ECE Awards Committee, 2021 - present
- ECE Workload Committee, 2019
- Faculty Search Committee, ECE Energy Systems Group, 2017 - 2018, 2018 - 2019
- Faculty Search Committee, ECE Systems Control Group, 2017 - 2018, 2018 - 2019
- Graduate Coordinator, Energy Systems Group, 2014 - 2020

Teaching

University of Toronto, Department of Electrical and Computer Engineering
Instructor

- Probability and Statistics (ECE286), Winter 2022
- Signals and Systems (ECE216), Winter 2013 - 2016, 2018 - 2020
- Energy Systems and Distributed Generation (ECE413), Winter 2014 - 2016
- Circuit Analysis (ECE212), Fall 2016
- Power System Operations and Economics (ECE1094), Winter 2015, Fall 2015 - 2016, 2018 - 2020

Supervision

Graduate students

1. Jesse Macht, MASc, 2021 - present. *Co-advised with F. Azhari.*
2. Johnson Tang, MASc, 2021 - present.
3. Youssef Al Falah, PhD, 2020 - present. *Co-advised with J. Simpson-Porco.*
4. Shuyao Tan, PhD, 2019 - present. *Co-advised with E. Passeport.*
5. Richard Perryman, PhD, 2017 - present.
6. Siyu Chen, MASc, 2017 - 2019.
7. Alok Deshpande, MASc, 2017 - 2019.
8. Zhongbin Huang, MASc, 2016 - 2018. *Co-advised with B. Liang.*
9. Abu Alam, MEng, 2016.
10. Yanhua Tian, MASc, 2015 - 2017.
11. Antoine Lesage-Landry, PhD, 2015 - 2019.
12. Andrija Stupar, PhD, 2015 - 2017. *Co-advised with A. Prodic.*
13. Bharath R. Vellaboyana, MASc, 2014 - 2016.
14. Suhail F. Barot, PhD, 2013 - 2017.

Postdoctoral fellows

1. Mohammad Pirani, 2019 - 2021.
2. Dariush Fooladivanda, 2015 - 2016.
3. Sahar PiroozAzad, 2013 - 2014.

Visiting students

1. Jure Konjevod, 2019, PhD student at University of Zagreb.
2. Andrea Tosatto, 2017, Masters student at Grenoble Institute of Technology.
3. Lesia Marie-Jeanne Mariane Mitridati, 2017, PhD student at Technical University of Denmark.
4. Mirna Grzaňić, 2016, PhD student at University of Zagreb.
5. Rodrigo Henriquez, 2016, Masters student at Pontificia Universidad Católica de Chile.
6. Ahmad Taha, 2014, PhD student at Purdue University.

Funding

Note: Items are displayed as [year(s); my role as applicant; source; amount (total, annual); purpose (operating or equipment)], followed by the project title.

1. 2013; PI; ECE; $100,000; operating.
   Startup funds.
2. 2013; PI; Connaught new researcher award; total: $10,000, annual: $10,000; Operating.
   Project: Coordinated control of distributed energy resources.
3. 2014-2020; PI; NSERC Discovery; total: $150,000, annual: $30,000; Operating.
   Project: Control and economics of power systems with renewables.
4. 2013; PI; Canada Foundation for Innovation Leaders Opportunity Fund & Ontario Research Fund match; total: $187,378, annual: $187,378; Equipment.
   Project: Real-time digital simulation of large, renewable powered distribution systems with energy storage.

5. 2014-2016; PI; HydroOne Networks; total: $120,000, annual: $60,000 ($52,173 after 15% overhead); Operating.
   Project: Flexible utilization of storage in distribution systems with renewables.
6. 2015-2017; PI; NSERC Collaborative Research and Development (Industry partner: HydroOne Networks); total: $104,346, annual: $52,173; Operating.
   Project: Optimal utilization of energy storage in distribution systems.
7. 2017; PI; NSERC Engage (Industry partner: Hydro-Quebec Research Institute); total: $25,000, annual: $25,000; Operating.
   Project: Using online learning to manage uncertainty in load-shifting with water heaters.
8. 2017; PI; Ontario Ministry of Research, Innovation and Science Early Researcher Award; total: $140,000 ($100,00 after overhead), annual: $20,000; Operating.
   Project: Learning to Leverage Flexible Electric Loads.
9. 2018-2020; Co-PI (with P. Lehn, S. Hum, and J. Salmon); NSERC Collaborative Research and Development (Industry partner: Havelaar Canada); total (my portion): $60,000, annual: $30,000; Operating.
   Project: High efficiency electric vehicle drivetrains with integrated fast-charging and dual storage media.
10. 2018; Co-PI (with E. Passeport); CECSeed; total (my portion): $30,000, annual: $15,000; Operating.
    Project: Estimating chemical partition coefficients with low-rank matrix completion.
11. 2019; PI; NSERC Engage (Industry partner: Ontario Power Generation); total: $25,000, annual: $25,000; Operating.
    Project: Providing multiple services on multiple time scales with energy storage.
12. 2019-2022; PI; Percy Edward Hart Professorship (FASE at UofT); total: $225,000, annual: $75,000; Operating.
13. 2020-2026; PI; NSERC Discovery; total: $234,000, annual: $39,000; Operating.
    Project: Control and optimization of electric power systems.
14. 2020; Co-PI (with F. Azhari); CARTE Seed; total (my portion): $60,000, annual: $30,000; Operating.
    Project: Imitation and Reinforcement Learning for Gait Training of Lower-Limb Prosthesis Users.
15. 2022; Co-PI (with B. Karney); WaterSeed; total (my portion): $30,000, annual: $15,000; Operating.
    Project: Nonlinear control of water distribution networks.
16. 2022; Co-PI (with F. Azhari, J. Campbell, C. MacKay); The War Amps; total (shared): $169,805; Operating.
    Project: GAITGNOSIS: A Mobile Gait Lab for Lower-Limb Prosthesis Users.

Consulting

- Opus One Solutions (now part of GE)
- Tapestry group at X - The Moonshot Factory