

John W. Simpson-Porco

1 Personal Data

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Citizenship: Canadian

2 Education

Sep'10–Oct'15 **Ph.D. in Mechanical Engineering**
University of California, Santa Barbara, CA, USA

Sept'06–May'10 **B.Sc. in Engineering Physics**
Queen's University, Kingston, ON, Canada

3 Employment History

3.1 Academic Appointments

April '16– **Assistant Professor**
Department of Electrical and Computer Engineering
University of Waterloo, Waterloo, ON, Canada

Fall '15 **Visiting Scientist**
Automatic Control Laboratory
Swiss Federal Institute of Technology (ETH) Zürich, Switzerland

4 Research Interests

My research interests are in the area of automatic control, and in its application for the analysis and design of modern energy systems.

5 Honours and Awards

2020	Best Task Force Award (for “Microgrid Stability Definitions, Analysis, and Examples”, PES-TR-66)	IEEE PES Power System Dynamic Performance Committee
2019	Distinguished Performance Award (institutional award)	Faculty of Engineering, University of Waterloo
2019	Engineering Research Excellence Award (decision pending) (institutional award)	Faculty of Engineering, University of Waterloo
2016	CCDC Best Thesis Award (institutional award)	Center for Control, Dynamical Systems, and Computation
2015	CCDC Student of the Month (institutional award)	Center for Control, Dynamical Systems, and Computation
2014	Peter J. Frenkel Foundation Fellowship (one of two campus-wide awards per academic year)	Institute for Energy Efficiency
2014	Automatica Paper Prize (best paper prize, awarded once every three years)	International Federation of Automatic Control
2013	CCDC Fellowship (institutional scholarship)	Center for Control, Dynamical Systems, and Computation
2011-2014	NSERC Fellowship (the most prestigious Canadian fellowship)	Natural Sciences and Engineering Research Council of Canada
2010	CCDC Fellowship (institutional award)	Center for Control, Dynamical Systems, and Computation
2010	NSERC Fellowship (the most prestigious Canadian fellowship)	Natural Sciences and Engineering Research Council of Canada
2010	Engineering Physics Design Award (best senior thesis)	Department of Physics, Queen’s University
2010	CAP Prize Examination Award (institutional award)	Department of Physics, Queen’s University
2010	NSERC Summer Fellowship (national award)	Natural Sciences and Engineering Research Council of Canada
2009	Kern Partners Ltd. Scholarship (institutional award)	Faculty of Applied Science, Queen’s University
2009	NSERC Summer Fellowship (national award)	Natural Sciences and Engineering Research Council of Canada
2008	James H. Rattray Scholarship (institutional award)	Faculty of Applied Science, Queen’s University
2006	Queen’s University Excellence Scholarship (institutional award)	Faculty of Applied Science, Queen’s University

6 Supervision

6.1 Graduate Student Supervision

CURRENT GRADUATE STUDENTS

- W20– Ruiqi Li (PhD, co-sup. with S. Smith), “Data-Driven Control and Optimization”
F19– Ilyas Farhat (PhD), “Feedback-Based Optimization for Large-Scale Systems”
F19– Enrique González (PhD, co-sup. with M. Kazerani), “Control of Hybrid AC/DC Microgrids”
F18– Etinosa Ekomwenrenren (PhD), “Next Generation Grid Monitoring and Control”

PREVIOUS GRADUATE STUDENTS

- F17–W19 Liam S. P. Lawrence (MAsc), “The Optimal Steady-State Control Problem”
Last known position: PhD Student, Medical Physics, University of Toronto
F16–W17 Yousef Sawires (MAsc)
Last known position: System Test Specialist, Synaptive Medical, Toronto, ON, Canada

PREVIOUS VISITING GRADUATE STUDENTS

- F18 Jacqueline Llanos, “Congestion control in microgrids”
Last known position: PhD Candidate, University of Chile
S17 Jacqueline Llanos, “Congestion control in microgrids”
Last known position: PhD Candidate, University of Chile
F17 Nainar Karthikeyan, “Predictive control in active distribution networks”
Last known position: PhD Candidate, Aalborg University
F17 Juan Sebastian Gomez Quintero, “Distributed predictive control in microgrids”
Last known position: PhD Candidate, University of Chile

6.2 Undergraduate Student Supervision

PREVIOUS UNDERGRADUATE STUDENTS

- S19 Audrey Avianto, “Fast feedback-based methods for training deep neural networks”
Last known position: BSc Student, University of Waterloo
F17 Nicholas Olson, “Frequency regulation with battery energy storage”
Last known position: PhD Student, ECE, UT Austin

6.3 Postdoctoral Fellow Supervision

CURRENT POSTDOCTORAL FELLOWS

- S19– Zhiyuan Tang “Next Generation Grid Monitoring and Control”
Last known position: Postdoctoral Fellow, University of Waterloo

PREVIOUS POSTDOCTORAL FELLOWS

- S18–S19 Mauricio Restrepo Restrepo (co-supervised with C. Cañizares) “EMS Implementation at the Canadian Renewable Energy Lab”
Last known position: Assistant Professor, Department of Electrical Engineering, Universidad del Norte in Barranquilla, Colombia

F17 – S18

Mostafa Farrokhbabadi (co-supervised with C. Cañizares) “Analysis and Control of Microgrids”
Last known position: Director, Grid Analytics and Technology, BluWave-ai, Ottawa, ON, Canada

7 Teaching

Fall '19 ECE 484-002: Digital Control Applications
Fall '19 ECE 484-001: Digital Control Applications
Spring '18 ECE 780-T10: Multivariable Control Systems II
Fall '18 ECE 484-002: Digital Control Applications
Fall '18 ECE 484-001: Digital Control Applications
Spring '18 ECE 780-T09: Network Systems and Control
Fall '17 ECE 484 Digital Control Applications
Spring '17 ECE 380 Analog Control Systems
Fall '16 ECE 484 Digital Control Applications

8 Research Funding

'18-'23 Ontario Research Fund – Research Excellence (Submitted)
Title: “Making Ontario Buildings Smart”
Role: Waterloo Co-PI w/ C. Cañizares (Ryerson lead J. McArthur)
Funding Level: TBD

'18-'21 Electric Power Research Institute: Grid Operations
Title: “Next Generation Grid Monitoring and Control”
Role: Principal Investigator
Funding Level: \$111,000 per year

'18-'18 NSERC Engage (Partner: Canadian Solar Solutions Inc.)
Title: “Interface and Testing Platform Design for Canadian Renewable Energy Laboratory”
Role: Principal Investigator
Funding Level: \$25,000 for 6 months

'17-'22 NSERC Discovery
Title: “Real-Time Distributed Control for Low-Inertia Power Grids”
Role: Principal Investigator
Funding Level: \$24,000 per year

'17-'18 WISE-Cisco Smart Grid Research Fund
Title: “Frequency Control Strategies for Future Microgrids”
Role: Principal Investigator
Funding Level: \$15,000 for one year

9 Talks, Seminars, and Presentations

Invited Seminars

Feb '20 Center for Control, Dynamical Systems, and Computation, UC Santa Barbara
Title: “Frameworks for Feedback-Based Optimization with Application to Energy Systems”

Feb '20 Department of Electrical and Computer Engineering, UC Riverside

- Title: "Advances in Feedback Control for Grid Modernization"
- Jan '20 Department of Electrical and Computer Engineering, University of Toronto
Title: "Advances in Feedback Control for Grid Modernization"
- Nov '19 Department of Electrical and Computer Engineering, University of Toronto
Title: "Frameworks for Feedback-Based Optimization with Application to Energy Systems"
- Nov '19 Jan C. Willems Center for Systems and Control, Groningen, Netherlands
Title: "A Theory of Solvability for Power Flow Equations"
- May '19 Workshop on Mathematics of Energy Systems, Issac Newton Institute, Cambridge, UK
Title: "Optimal Steady-State Control with Application to Frequency Regulation of Power Grids"
- April '19 Innovative Optimization and Control Methods for Highly Distributed Autonomous Systems Workshop, National Renewable Energy Lab, Golden, CO, USA
Title: "Optimal Steady-State Control and Frequency Regulation of Transmission Systems"
- April '19 Electrical Engineering Department, University of Michigan, Ann Arbor, MI, USA
Title: "Optimal Steady-State Control and Frequency Regulation of Transmission Systems"
- Feb '19 Future Electric Power Systems and the Energy Transition, Champerey, Switzerland
Title: "A Theory of Solvability for Power Flow Equations"
- Jan '19 Automatic Control Lab, ETH Zürich
Title: "The Optimal Steady-State Control Problem"
- Mar '18 Electrical Engineering Department, Universidad de Chile
Title: "A Theory of Solvability for Power Flow Equations"
- April '17 Clarkson Center for Complex Systems Science, Clarkson University
Title: "A Theory of Solvability for Power Flow Equations"
- Mar '17 Electrical Engineering Department, Universidad de Chile
Title: "Lossy DC Power Flow"
- Mar '17 Workshop on Power Electronics and Control Strategies for Energy Storage Systems in Micro-grids and Power Systems, Valparaiso, Chile
Title: "Distributed Control of Inverter-Based Power Grids"
- Jan '17 Center for Control, Dynamical Systems, and Computation, UC Santa Barbara
Title: "A Theory of Solvability for Power Flow Equations"
- Feb '16 Centre for Power and Information, University of Toronto
Title: "Distributed Control of Inverter-Based Power Grids"
- Jan '16 National Renewable Energy Lab, Golden, CO
Title: "Distributed Control of Inverter-Based Power Grids"
- Dec '15 Automatic Control Laboratory, Royal Institute of Technology (KTH) Stockholm
Title: "Distributed Control of Inverter-Based Power Grids"
- Nov '15 Engineering and Technology Institute, University of Groningen
Title: "Voltage Control of Micro and Power Grids"
- Oct '15 Automatic Control Laboratory, Swiss Federal Institute of Technology (ETH) Zürich
Title: "Conditions for Voltage Stability of Power Grids"
- June '15 Department of Electrical and Computer Engineering, University of Waterloo
Title: "Power Grid Stability and Distributed Control"

- May '15 Department of Electrical and Computer Engineering, University of British Columbia
Title: "Power Grid Stability and Distributed Control"
- Mar '15 Department of Electrical Engineering, University of Southern California
Title: "Power Grid Voltage Stability and Distributed Control"
- Mar '15 Advanced Power and Energy Systems, Pacific Northwest National Laboratory
Title: "Distributed Frequency and Voltage Control of Islanded Microgrids"
- Dec '13 Department of Information Engineering, University of Padova
Title: "Droop-Controlled Inverters in Microgrids: Stability, Secondary Control, & Optimization"

Workshop and Conference Presentations

- Nov '19 **(Keynote)** Energy Open, Groningen, Netherlands.
Title: "Feedback Optimization of Uncertain Dynamic Systems with Application to Energy Systems".
- Jun '19 Invited Tutorial Session on Distributed Control & Optimization for Autonomous Power Grids, European Control Conference, Naples, Italy.
Title: "Optimal and Distributed Frequency Control of Transmission Grids".
- Mar '19 Conference on Information Science and Systems, Baltimore, MD, USA
Title: "Optimal Steady-State Control and Frequency Regulation of Transmission Systems"
- Nov '18 INFORMS Annual Meeting, Phoenix, AZ, USA.
Title: "A Theory of Solvability for Power Flow Equations"
- Nov '18 INFORMS Annual Meeting, Phoenix, AZ, USA.
Title: "Optimal Steady-State Control for Frequency Regulation of Power Systems"
- Jun '18 American Control Conference, Milwaukee, WI.
Title: "A Hill-Moylan Lemma for Equilibrium-Independent Dissipativity"
- Dec '16 IEEE Conference on Decision and Control, Las Vegas, NV.
Title: "Quadratic Performance of Primal-Dual Methods for Distributed Optimization"
- Dec '16 IEEE Conference on Decision and Control, Las Vegas, NV.
Title: "Model-Free Wide-Area Monitoring of Power Grids via Cutset Voltages"
- Sept '16 54th Annual Allerton Conference on Communication, Control, and Computing, Monticello, IL.
Title: "Input/Output Analysis of Primal-Dual Gradient Algorithms"
- June '16 **(Keynote)** Workshop on Communications, Computation and Control for Resilient Smart Energy Systems (co-located with ACM e-Energy), Waterloo, ON
Title: "Distributed Control of Inverter-Based Power Grids"
- May '16 7th Biannual Meeting on System and Control Theory, Kingston, ON
Title: "Quadratic Performance of Distributed Optimization Algorithms"
- May '15 SIAM Conference on Applied Dynamical Systems, Salt Lake City, UT
Title: "Voltage Stability of Power Networks and Microgrids"
- Jan '15 LANL Grid Science Winter School and Conference, Santa Fe, NM
Title: "The Transmission Capacity of Power Networks"
- Dec '14 IEEE Conference on Decision and Control, Los Angeles, CA
Title: "Plug-and-play Control and Optimization in Microgrids"

- Dec '13 IEEE Conference on Decision and Control, Los Angeles, CA
Title: "Voltage Stabilization in Microgrids via Quadratic Droop Control"
- Oct '13 IEEE SmartGridComm, Vancouver, BC
Title: "Stability, Power Sharing, & Distributed Secondary Control in Droop-Controlled Microgrids"
- Nov '12 Southern California Control Workshop, San Diego, CA
Title: "Synchronization and Distributed Integral Control in Droop-Controlled Microgrids"
- Sept '12 IFAC Workshop on Distributed Estimation and Control in Networked Systems, Santa Barbara
Title: "Droop Controlled Inverters are Kuramoto Oscillators"
- May '12 LANL Workshop on Optimization and Control for Smart Grids, Santa Fe, NM
Title: "Droop Controlled Inverters are Kuramoto Oscillators"

Publications

Annotation: If the paper was written in collaboration with a graduate student, the student is marked with an asterisk. If the paper was written in collaboration with a post-doctoral fellow, the post-doctoral fellow is marked with a double asterisk.

Journal Articles (Submitted for Publication or in Revision)

- [SubJ4] **J. W. Simpson-Porco**, "Analysis and synthesis of low-gain integral controllers for nonlinear systems with application to feedback-based optimization," *IEEE Transactions on Automatic Control*, 2020.
- [SubJ3] M. Farrokhhabadi**, **J. W. Simpson-Porco**, and C. A. Cañizares, "Optimal design of voltage-frequency controllers for microgrids," *IEEE Transactions on Power Systems*, 2019, Submitted.
- [SubJ2] L. S. P. Lawrence*, **J. W. Simpson-Porco**, and E. Mallada, "Linear-convex optimal steady-state control," *IEEE Transactions on Automatic Control*, 2019, Submitted.
- [SubJ1] M. Restrepo**, C. A. Cañizares, **J. W. Simpson-Porco**, P. Su, and J. Taruc, "Implementation and testing of energy management systems at the CANREL microgrid facility," *Applied Energy*, 2019, Submitted.

Journal Articles (Published or Accepted)

- [J22] J. S. Gómez*, D. Sáez, **J. W. Simpson-Porco**, and R. Cárdenas, "Distributed predictive control for frequency and voltage regulation in microgrids," *IEEE Transactions on Smart Grid*, vol. 11, no. 2, pp. 1319–1329, Mar. 2020. DOI: [10.1109/TSG.2019.2935977](https://doi.org/10.1109/TSG.2019.2935977).
- [J21] Y. Khayat, Q. Shafiee, R. Heydari, T. Dragicevic, M. Naderi, **J. W. Simpson-Porco**, F. Dörfler, M. Fathi, F. Blaabjerg, and H. Bevrani, "On the secondary control architectures of ac microgrids: A survey," *IEEE Transactions on Power Electronics*, vol. 35, no. 6, pp. 6482–6500, Jun. 2020. DOI: [10.1109/TPEL.2019.2951694](https://doi.org/10.1109/TPEL.2019.2951694).
- [J20] N. Karthikeyan*, J. R. Pillai, B. Bak-Jensen, and **J. W. Simpson-Porco**, "Predictive control of flexible resources for demand response in active distribution networks," *IEEE Transactions on Power Systems*, vol. 34, no. 4, pp. 2957–2969, Jul. 2019. DOI: [10.1109/TPWRS.2019.2898425](https://doi.org/10.1109/TPWRS.2019.2898425).

- [J19] J. Llanos^{*}, D. E. Olivares, **J. W. Simpson-Porco**, M. Kazerani, and D. Saez, “A novel distributed control strategy for optimal dispatch of isolated microgrids considering congestion,” *IEEE Transactions on Smart Grid*, vol. 10, no. 6, pp. 6595–6606, Nov. 2019. DOI: [10.1109/TSG.2019.2908128](https://doi.org/10.1109/TSG.2019.2908128).
- [J18] **J. W. Simpson-Porco**, B. K. Poolla^{*}, N. Monshizadeh, and F. Dörfler, “Input-output performance of linear-quadratic saddle-point algorithms with application to distributed resource allocation problems,” *IEEE Transactions on Automatic Control*, Jul. 2019, To appear. DOI: [10.1109/TAC.2019.2927328](https://doi.org/10.1109/TAC.2019.2927328).
- [J17] F. Dörfler, **J. W. Simpson-Porco**, and F. Bullo, “Electrical networks and algebraic graph theory: Models, properties, and applications,” *Proceedings of the IEEE*, vol. 106, pp. 977–1005, 5 May 2018. DOI: [10.1109/JPROC.2018.2821924](https://doi.org/10.1109/JPROC.2018.2821924).
- [J16] **J. W. Simpson-Porco**, “A theory of solvability for lossless power flow equations – Part I: Fixed-point power flow,” *IEEE Transactions on Control of Network Systems*, vol. 5, no. 3, pp. 1361–1372, 2018. DOI: [10.1109/TCNS.2017.2711433](https://doi.org/10.1109/TCNS.2017.2711433).
- [J15] —, “A theory of solvability for lossless power flow equations – Part II: Conditions for radial networks,” *IEEE Transactions on Control of Network Systems*, vol. 5, no. 3, pp. 1373–1385, 2018. DOI: [10.1109/TCNS.2017.2711859](https://doi.org/10.1109/TCNS.2017.2711859).
- [J14] —, “Equilibrium-Independent Dissipativity with Quadratic Supply Rates,” *IEEE Transactions on Automatic Control*, vol. 64, no. 4, pp. 1440–1455, 2018. DOI: [10.1109/TAC.2018.2838664](https://doi.org/10.1109/TAC.2018.2838664).
- [J13] M. Todescato, **J. W. Simpson-Porco**, F. Dörfler, R. Carli, and F. Bullo, “Voltage stress minimization by optimal reactive power control,” *IEEE Transactions on Control of Network Systems*, vol. 5, no. 3, pp. 1467–1478, 2018. DOI: [10.1109/TCNS.2017.2722818](https://doi.org/10.1109/TCNS.2017.2722818).
- [J12] K. Dvijotham, E. Mallada, and **J. W. Simpson-Porco**, “High-voltage solution in radial power networks: Existence, properties and equivalent algorithms,” *IEEE Control Systems Letters*, vol. 1, no. 2, pp. 322–327, 2017. DOI: [10.1109/LCSYS.2017.2717578](https://doi.org/10.1109/LCSYS.2017.2717578).
- [J11] M. Pirani^{*}, E. Hashemi, **J. W. Simpson-Porco**, B. Fidan, and A. Khajepour, “A graph theoretic approach to the robustness of k -nearest neighbor vehicle platoons,” *IEEE Transactions on Intelligent Transportation Systems*, vol. 18, no. 11, pp. 3218–3224, Nov. 2017. DOI: [10.1109/TITS.2017.2671347](https://doi.org/10.1109/TITS.2017.2671347).
- [J10] **J. W. Simpson-Porco**, “Lossy DC Power Flow,” *IEEE Transactions on Power Systems*, vol. 33, no. 3, pp. 2477–2485, 2017. DOI: [10.1109/TPWRS.2017.2749042](https://doi.org/10.1109/TPWRS.2017.2749042).
- [J9] F. Dörfler, **J. W. Simpson-Porco**, and F. Bullo, “Breaking the hierarchy: Distributed control & economic optimality in microgrids,” *IEEE Transactions on Control of Network Systems*, vol. 3, no. 3, pp. 241–253, 2016. DOI: [10.1109/TCNS.2015.2459391](https://doi.org/10.1109/TCNS.2015.2459391).
- [J8] **J. W. Simpson-Porco** and F. Bullo, “Distributed monitoring of voltage collapse sensitivity indices,” *IEEE Transactions on Smart Grid*, vol. 7, pp. 1979–1988, 4 Jul. 2016. DOI: [10.1109/TSG.2016.2533319](https://doi.org/10.1109/TSG.2016.2533319).
- [J7] **J. W. Simpson-Porco**, F. Dörfler, and F. Bullo, “Voltage collapse in complex power grids,” *Nature Communications*, vol. 7, no. 10790, 2016. DOI: [10.1038/ncomms10790](https://doi.org/10.1038/ncomms10790).
- [J6] —, “Voltage stabilization in microgrids via quadratic droop control,” *IEEE Transactions on Automatic Control*, vol. 62, no. 3, pp. 1239–1253, 2016. DOI: [10.1109/TAC.2016.2585094](https://doi.org/10.1109/TAC.2016.2585094).

- [J5] —, “On resistive networks of constant power devices,” *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 62, no. 8, pp. 811–815, 2015. DOI: [10.1109/TCSII.2015.2433537](https://doi.org/10.1109/TCSII.2015.2433537).
- [J4] **J. W. Simpson-Porco**, Q. Shafiee, F. Dörfler, J. M. Vasquez, J. M. Guerrero, and F. Bullo, “Secondary frequency and voltage control of islanded microgrids via distributed averaging,” *IEEE Transactions on Industrial Electronics*, vol. 62, no. 11, pp. 7025–7038, 2015. DOI: [10.1109/TIE.2015.2436879](https://doi.org/10.1109/TIE.2015.2436879).
- [J3] **J. W. Simpson-Porco** and F. Bullo, “Contraction theory on Riemannian manifolds,” *Systems & Control Letters*, vol. 65, pp. 74–80, 2014. DOI: [10.1016/j.sysconle.2013.12.016](https://doi.org/10.1016/j.sysconle.2013.12.016).
- [J2] **J. W. Simpson-Porco**, F. Dörfler, and F. Bullo, “Synchronization and power sharing for droop-controlled inverters in islanded microgrids,” *Automatica*, vol. 49, no. 9, pp. 2603–2611, 2013. DOI: [10.1016/j.automatica.2013.05.018](https://doi.org/10.1016/j.automatica.2013.05.018).
- [J1] M. Farrokhabadi^{**}, C. A. Cañizares, **J. W. Simpson-Porco**, E. Nasr, L. Fan, P. A. Mendoza-Araya, R. Tonkoski, U. Tamrakar, N. Hatziargyriou, D. Lagos, R. W. Wies, M. Paolone, M. Liserre, L. Meegahapola, M. Kabalan, A. H. Hajimiragha, D. Peralta, M. Elizondo, K. P. Schneider, F. Tuffner, and J. Reilly, “Microgrid stability definitions, analysis, and examples,” *IEEE Transactions on Power Systems*, vol. 35, no. 1, pp. 13–29, Jan. 2010. DOI: <https://doi.org/10.1109/TPWRS.2019.2925703>.

Refereed Conference Articles (Published or Accepted)

- [C24] T. Zheng^{*}, J. W. Simpson-Porco, and E. Mallada, “Implicit trajectory planning for feedback linearizable systems: A time-varying optimization approach,” in *American Control Conference*, To appear, Denver, CO, USA, Jul. 2020.
- [C23] M. H. Basiri^{*}, J. G. Thistle, **J. W. Simpson-Porco**, and S. Fischmeister, “Kalman filter based secure state estimation and individual attacked sensor detection in cyber-physical systems,” in *American Control Conference*, Philadelphia, PA, USA, Jul. 2019, pp. 3841–3848. DOI: [10.23919/ACC.2019.8814963](https://doi.org/10.23919/ACC.2019.8814963).
- [C22] M. Colombino, **J. W. Simpson-Porco**, and A. Bernstein, “Towards robustness guarantees for feedback-based optimization,” in *IEEE Conf. on Decision and Control*, To appear, Nice, France, Dec. 2019.
- [C21] F. Dörfler, S. Bolognani, **J. W. Simpson-Porco**, and S. Grammatico, “Distributed control and optimization for autonomous power grids,” in *European Control Conference*, Naples, Italy, Jun. 2019, pp. 2436–2453. DOI: [10.23919/ECC.2019.8795974](https://doi.org/10.23919/ECC.2019.8795974).
- [C20] J. Llanos^{*}, J. Gomez, D. Saez, D. Olivares, and **J. W. Simpson-Porco**, “Economic dispatch by secondary distributed control in microgrids,” in *European Conference on Power Electronics and Applications*, Genova, Italy, Sep. 2019. DOI: [10.23919/EPE.2019.8915499](https://doi.org/10.23919/EPE.2019.8915499).
- [C19] B. K. Poolla^{*}, **J. W. Simpson-Porco**, N. Monshizadeh, and F. Dörfler, “Quadratic performance analysis of secondary frequency controllers,” in *IEEE Conf. on Decision and Control*, To appear, Nice, France, Dec. 2019.
- [C18] L. S. P. Lawrence^{*}, Z. E. Nelson, E. Mallada, and **J. W. Simpson-Porco**, “Optimal steady-state control for linear time-invariant systems,” in *IEEE Conf. on Decision and Control*, Miami Beach, FL, USA, Dec. 2018, pp. 3251–3257.

- [C17] M. Pirani^{*}, E. Hashemi, B. Fidan, **J. W. Simpson-Porco**, H. Sandberg, and K. H. Johansson, “Resilient estimation and control on k -nearest neighbor platoons: A network-theoretic approach,” in *IFAC Workshop on Distributed Estimation and Control in Networked Systems*, vol. 51, Groningen, Netherlands, 2018, pp. 22–27. DOI: [10.1016/j.ifacol.2018.12.005](https://doi.org/10.1016/j.ifacol.2018.12.005).
- [C16] **J. W. Simpson-Porco**, “A Hill-Moylan lemma for equilibrium-independent dissipativity,” in *American Control Conference*, Milwaukee, WI, USA, Jun. 2018, pp. 6043–6048. DOI: [10.23919/ACC.2018.8431557](https://doi.org/10.23919/ACC.2018.8431557).
- [C15] M. Pirani^{*}, E. Hashemi, B. Fidan, and **J. W. Simpson-Porco**, “ \mathcal{H}_∞ performance of mechanical and power networks,” in *IFAC World Congress*, vol. 50, Toulouse, France, Jul. 2017, pp. 5196–5201. DOI: [10.1016/j.ifacol.2017.08.453](https://doi.org/10.1016/j.ifacol.2017.08.453).
- [C14] M. Pirani^{*}, **J. W. Simpson-Porco**, and B. Fidan, “System-theoretic performance metrics for low-inertia stability of power networks,” in *IEEE Conf. on Decision and Control*, Melbourne, VIC, Australia, Dec. 2017, pp. 5106–5111. DOI: [10.1109/CDC.2017.8264415](https://doi.org/10.1109/CDC.2017.8264415).
- [C13] C. D. Persis, N. Monshizadeh, and **J. W. Simpson-Porco**, “The cost of dishonesty on optimal distributed frequency control of power networks,” in *IEEE Conf. on Decision and Control*, Las Vegas, NV, USA, Dec. 2016, pp. 7508–7513. DOI: [10.1109/CDC.2016.7799429](https://doi.org/10.1109/CDC.2016.7799429).
- [C12] **J. W. Simpson-Porco**, “Input/output analysis of primal-dual gradient algorithms,” in *Allerton Conf. on Communications, Control and Computing*, Monticello, IL, USA, Sep. 2016, pp. 219–224. DOI: [10.1109/ALLERTON.2016.7852233](https://doi.org/10.1109/ALLERTON.2016.7852233).
- [C11] **J. W. Simpson-Porco** and N. Monshizadeh, “Model-free wide-area monitoring of power grids via cutset voltages,” in *IEEE Conf. on Decision and Control*, Las Vegas, NV, USA, Dec. 2016, pp. 7508–7513. DOI: [10.1109/CDC.2016.7799429](https://doi.org/10.1109/CDC.2016.7799429).
- [C10] **J. W. Simpson-Porco**, B. K. Poolla^{*}, N. Monshizadeh, and F. Dörfler, “Quadratic performance of primal-dual methods with application to secondary frequency control of power systems,” in *IEEE Conf. on Decision and Control*, Las Vegas, NV, USA, Dec. 2016, pp. 1840–1845. DOI: [10.1109/CDC.2016.7798532](https://doi.org/10.1109/CDC.2016.7798532).
- [C9] E. Tegling, M. Andreasson, **J. W. Simpson-Porco**, and H. Sandberg, “Improving performance of droop-controlled microgrids through distributed PI-control,” in *American Control Conference*, Boston, MA, USA, Jul. 2016, pp. 2321–2327. DOI: [10.1109/ACC.2016.7525264](https://doi.org/10.1109/ACC.2016.7525264).
- [C8] **J. W. Simpson-Porco**, F. Dörfler, and F. Bullo, “A solvability condition for reactive power flow,” in *IEEE Conf. on Decision and Control*, Osaka, Japan, Dec. 2015, pp. 2013–2017. DOI: [10.1109/CDC.2015.7402502](https://doi.org/10.1109/CDC.2015.7402502).
- [C7] M. Todescato, **J. W. Simpson-Porco**, F. Dörfler, R. Carli, and F. Bullo, “Optimal voltage support and stress minimization in power networks,” in *IEEE Conf. on Decision and Control*, Osaka, Japan, Dec. 2015, pp. 6921–6926. DOI: [10.1109/CDC.2015.7403310](https://doi.org/10.1109/CDC.2015.7403310).
- [C6] F. Dörfler, **J. W. Simpson-Porco**, and F. Bullo, “Plug-and-play control and optimization in microgrids,” in *IEEE Conf. on Decision and Control*, Los Angeles, CA, USA, Dec. 2014, pp. 211–216. DOI: [10.1109/CDC.2014.7039383](https://doi.org/10.1109/CDC.2014.7039383).
- [C5] B. Gentile, **J. W. Simpson-Porco**, F. Dörfler, S. Zampieri, and F. Bullo, “On reactive power flow and voltage stability in microgrids,” in *American Control Conference*, Portland, OR, USA, Jun. 2014, pp. 759–764. DOI: [10.1109/ACC.2014.6859434](https://doi.org/10.1109/ACC.2014.6859434).

- [C4] H. Bouattour, **J. W. Simpson-Porco**, F. Dörfler, and F. Bullo, “Further results on distributed secondary control in microgrids,” in *IEEE Conf. on Decision and Control*, Florence, Italy, Dec. 2013, pp. 1514–1519. DOI: [10.1109/CDC.2013.6760097](https://doi.org/10.1109/CDC.2013.6760097).
- [C3] **J. W. Simpson-Porco**, F. Dörfler, and F. Bullo, “Voltage stabilization in microgrids via quadratic droop control,” in *IEEE Conf. on Decision and Control*, Florence, Italy, Dec. 2013, pp. 7582–7589. DOI: [10.1109/CDC.2013.6761093](https://doi.org/10.1109/CDC.2013.6761093).
- [C2] **J. W. Simpson-Porco**, F. Dörfler, Q. Shafiee, J. M. Guerrero, and F. Bullo, “Stability, power sharing, & distributed secondary control in droop-controlled microgrids,” in *IEEE Int. Conf. on Smart Grid Communications*, Vancouver, BC, Canada, Oct. 2013, pp. 672–677. DOI: [10.1109/SmartGridComm.2013.6688036](https://doi.org/10.1109/SmartGridComm.2013.6688036).
- [C1] **J. W. Simpson-Porco**, F. Dörfler, and F. Bullo, “Droop-controlled inverters are Kuramoto oscillators,” in *IFAC Workshop on Distributed Estimation and Control in Networked Systems*, Santa Barbara, CA, USA, Sep. 2012, pp. 264–269. DOI: [10.3182/20120914-2-US-4030.00055](https://doi.org/10.3182/20120914-2-US-4030.00055).

Technical Reports / Other

- [TR1] M. Restrepo^{**}, C. A. Cañizares, and **J. W. Simpson-Porco**, “Development of a diesel genset emulator and energy management systems for the canadian renewable energy laboratory,” University of Waterloo, Tech. Rep., Sep. 2019, Private report for Canadian Solar Solutions Inc.
- [TR2] M. Farrokhhabadi^{**}, C. A. Cañizares, **J. W. Simpson-Porco**, E. Nasr, L. Fan, P. A. Mendoza-Araya, R. Tonkoski, U. Tamrakar, N. Hatzigiargyriou, D. Lagos, R. W. Wies, M. Paolone, M. Liserre, L. Meegahapola, M. Kabalan, A. H. Hajimiragha, D. Peralta, M. Elizondo, K. P. Schneider, F. Tuffner, and J. Reilly, “Microgrid stability definitions, analysis, and modeling,” IEEE-PES Task Force on Microgrid Stability Analysis and Modeling, Tech. Rep. PES-TR-66, Apr. 2018.

10 Professional Service

10.1 Society Memberships

- 2010– Institute for Electrical and Electronics Engineers (IEEE)
 Student Member, 2010-2015
 Member, 2015–present
- 2010– Member, IEEE Control Systems Society (CSS)
- 2015– Member, IEEE Power and Energy Society (PES)
- 2011-2015 Graduate Student Member, Society for Industrial and Applied Mathematics (SIAM)

10.2 Editorships:

- 2020– Associate Editor, IEEE Transactions on Smart Grid

10.3 Technical Program Committee Member

- 2018 IEEE Smart Grid Comm, Control and Operation Symposium
- 2017 IEEE Smart Grid Comm, Control and Operation Symposium
- 2016 IEEE GLOBECOMM, Workshop on Cyber-Physical Smart Grid Security and Resilience

10.4 IEEE PES Task Force Participation

- '20-'21 Section Lead, Task Force on Microgrid Stability Analysis and Modeling II
'17-'19 Contributor, Task Force on Microgrid Stability Analysis and Modeling

10.5 Conference Invited Sessions Organized

- 2018 "Real-time optimization in power networks", *INFORMS Annual Meeting*, Phoenix, AZ, USA

10.6 Chair of Conference Sessions

- 2019 "Distributed Control and Optimization for Autonomous Power Grids", *European Control Conference*, Naples, Italy
2018 "Real-time optimization in power networks", *INFORMS Annual Meeting*, Phoenix, AZ, USA
2018 "Algebraic and Geometric Methods", *American Control Conference*, Milwaukee, WI, USA
2016 "Smart Grid IV", *IEEE Conference on Decision and Control*, Las Vegas, NV, USA

10.7 External Grant Reviewer

NSERC Canada Research Chair Program
Swiss National Science Foundation
NSERC Discovery Program

10.8 Technical Reviewer

- Journals IEEE Transactions on Automatic Control ◦ IEEE Transactions on Control Systems Technology ◦ IEEE Transactions on Circuits and Systems ◦ IEEE Emerging and Selected Topics in Circuits and Systems ◦ Automatica ◦ IEEE Transactions on Power Systems ◦ IEEE Transactions on Smart Grid ◦ IEEE Transactions on Power Electronics ◦ IEEE Transactions on Sustainable Energy ◦ Nature Communications ◦ New Journal of Physics
- Conferences IEEE Conference on Decision and Control ◦ American Control Conference ◦ IFAC Workshop on Distributed Estimation and Control in Networked Systems ◦ IFAC Symposium on Robust Control Design ◦ IFAC Workshop on Lagrangian and Hamiltonian Methods for Non Linear Control ◦ IEEE Multiconference on Systems and Control ◦ IEEE Smart Grid Comm

11 University Service

11.1 PhD Defence Committee Member

- 2019 Juan C. Machado, Electrical Engineering, LSS-Supelec Paris
2019 Bala Kameshwar Poolla, IFA, Swiss Federal Institute of Technology (ETH) Zürich
2016 Ebrahim Moradi Shahrivar, ECE, University of Waterloo

11.2 PhD Comprehensive Exam Committee Member

- 2019 Mohamed Al Lawati (ECE, Supervisor: D. Wang), University of Waterloo
2019 Reza Hajiloo (MME, Supervisor: A. Khajepour), University of Waterloo
2019 Baheej Alghamdi (ECE, Supervisor: C. Canizares), University of Waterloo

2018 Enrique Vera (ECE, Supervisor: C. Canizares), University of Waterloo
 2018 Baheej Alghamdi (ECE, Supervisor: C. Canizares), University of Waterloo
 2017 Ivan Calero (ECE, Supervisor: C. Canizares), University of Waterloo
 2017 Ahmad Bilal Asghar (ECE, Supervisor: S. Smith), University of Waterloo
 2017 Nur Zengin (SYDE, Supervisor: B. Fidan), University of Waterloo

11.3 PhD Comprehensive Exam Chair

2019 Carlos Ceja Espinosa (ECE, Supervisor: C. Canizares), University of Waterloo
 2019 Sreehari Ramachandra Prabhu (CIVE, Supervisor: M. Pandey), University of Waterloo
 2019 Javad Zare (ECE, Supervisor: S. Pirooz Azad), University of Waterloo
 2018 Hyunjae Lee (ECE, Supervisor: Y. Yoon), University of Waterloo
 2018 Dario Andres Peralta Moarry (ECE, Supervisor: C. Canizares), University of Waterloo
 2018 Alexander Botros (ECE, Supervisor: S. Smith), University of Waterloo
 2017 Sofia Noela Guzman (ECE, Supervisor: C. Canizares), University of Waterloo
 2017 Mohamad Shahab (ECE, Supervisor: D. E. Miller), University of Waterloo
 2016 Adrian Wong (MME, Supervisor: A. Khajepour), University of Waterloo

11.4 MASC Thesis Reader

2018 Joel Simard (ECE, Supervisor: D. E. Miller and C. Nielsen), University of Waterloo
 2017 Dario Peralta (ECE, Supervisor: C. Canizares), University of Waterloo
 2017 Come Carquex (ECE, C. Rosenberg), University of Waterloo

11.5 Other Department and Faculty Service

'19-'21 80's group member, Undergraduate Studies Committee (USC)
 2019 Handwritten letter writer for admitted ECE students
 2019 Beta tester, EngThesis online submission system
 2018 ExpecTAtions Faculty Mentor
 2018 Beta tester, EngThesis online submission system
 2017 Department Advisory Committee on Appointments (DACA) Member, Power Systems
 2017-2019 Engineering Faculty Committee (EFC) Member
 2017 Reviewer for Faculty of Engineering *New Faculty Handbook*
 2017 Capstone Design Project Judge, Electrical and Computer Engineering
 2017- Control systems group secretary
 F2017 Fourth-year MTE class prof