C. Lindsay Anderson
Biological and Environmental Engineering
Cornell University,
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EMPLOYMENT

Professor & Department Chair Jan 2023 - current
Associate Professor (with tenure) Jul 2017 – Dec 2022
Assistant Professor Jul 2012 – Jun 2017
Biological and Environmental Engineering Department,
Cornell University, Ithaca NY
Graduate Field Memberships: Applied Mathematics, Civil and Environmental Engineering, Electrical and Computer Engineering, Regional Science, Systems Engineering
Interim Director Nov 2020 – Apr 2023
Cornell Energy Systems Institute
House Professor Dean Jul 2021- current
William T. Keeton House, Cornell West Campus
Kathy Dwyer Marble and Curt Marble Faculty Director Jul 2018 – Jun 2021
Cornell Atkinson Center for Sustainability
Associate Director
Cornell Energy Systems Institute Nov 2019 – Oct 2020
Senior Research Associate, Adjunct Assistant Professor Jul 2006-Jun 2012
Biological and Environmental Engineering Department,
Cornell University, Ithaca NY
Assistant Professor Jul 2004-Jul 2006
Civil and Environmental Engineering,
Western University, London, ON Canada

EDUCATION

University of Guelph (Canada)	Environmental Engineering	B.Sc.(Eng)	1994
University of Guelph (Canada)	Environmental Engineering	M.Sc.	1998
Western University (Canada)	Applied Mathematics	Ph.D.	2004

AWARDS

- **Energy Systems Integration Group (ESIG) Award of Excellence** for Contributions to Energy Systems Optimization (2021)
- **IEEE Senior Member** (since 2019)
- **College of Engineering Award for Research Excellence**. Cornell University (2016)
- **NSF CAREER Award:** Advanced Methods for Optimal Integration of Responsive Demand and Variable Generation in Power Systems and Markets. NSF (2015)
- **Norman R. Scott Sesquicentennial Faculty Fellowship** in Energy Systems Engineering, Cornell University (2012)
- **Mr. and Mrs. Richard F. Tucker '50 College of Engineering Excellence in Teaching Award**, Cornell University, College of Engineering (2010)

- **NSERC University Faculty Award**, Faculty of Engineering, Western University (2004)
- **Cecil Graham Doctoral Dissertation Award**: Applied Mathematics dissertation of the year awarded by the Canadian Applied and Industrial Mathematics Society (2004)
- **Natural Science and Engineering Research Council (NSERC) Industrial Postgraduate Scholarship** Sponsored by Ontario Power Generation (2000)

EDITORIAL AND REVIEW ACTIVITIES

Leadership and Editorial Boards
Senior Editor, Oxford Open Energy (https://academic.oup.com/ooenergy)
Member, Editorial Board of IEEE Power and Energy Magazine (https://www.ieee-pes.org/about-the-power-and-energy-magazine)
Member, Editorial Board of IEEE Carbon Neutrality Newsletter (http://www.ieee-cn.org)
Member, Editorial Board, Energies (https://www.mdpi.com/journal/energies)
Member, Ithaca Green New Deal Steering Committee
Member, Board of Trustees of the Paleontological Research Institution

Manuscript Reviewer: Applied Energy, Canadian Applied Math Quarterly, Decision Support Systems, Energies, Energy Conversion and Management, Energy Policy, Electric Power Systems Research, Hawaii International Conference on System Sciences, The Energy Journal, IEEE Transactions on Industrial Informatics, IEEE Transactions on Power Systems, IEEE Transactions on Sustainable Energy, IEEE Transactions on Smart Grid, IEEE Transactions on Control Systems Technology, Interfaces, International Journal of Electrical Power and Energy Systems, Journal of Industrial and Management Optimization, Journal of Mathematics in Management, Operations Research, Renewable Energy, Sustainability, Transactions of the ASABE, Wind Energy

Grant Reviewer: Fields Institute for Mathematical Sciences Grant Program, Ontario Centre for Energy Research, Power Systems Engineering Research Center (PSERC), Biomass Research and Development Initiative (BRDI) USDA. Post-Award Site Reviewer (Dec 2011, Dec 2012), National Science Foundation, National Science and Engineering Research Council (*NSERC) Canada Industrial Research Chair Program, On-Site Reviewer* (January 2016), Canada Research Chairs Program, NSERC Discovery Grant Reviewer, US Department of Energy, ARPA-E

Conference & Program Organizational Responsibilities:

- Track Co-Chair, Electric Energy Systems, Hawaii International Conference on System Sciences (2019, 2020, 2021, 2022,2023)
- Chair, Cornell Sustainability Hackathon, sponsored by Cornell Atkinson Center for Sustainability and Cornell Energy Systems Institute. October 16-18, 2020.
- Session Chair (Co-Simulation and Multi-Modeling Techniques) at Spring Technical Workshop of the Energy Systems Integration Group, Spring 2021
- Session Chair (Energy Systems Integration Planning: Optimization and Modeling Techniques) at Spring Technical Workshop of the Energy Systems Integration Group, April 2020 (online)
- Chair "Distributed and Renewable Resources" Mini-Track, HICSS 2019, Maui, HI.

- Chair "Distributed and Renewable Resources" Mini-Track, HICSS 2018, Kona, HI.
- Session Chair "Integrating Distributed and Renewable Resources" HICSS 2016 Kauai, HI
- "Management of Stochastic Resources, Demand, and Energy Efficiency." INFORMS Annual Meeting, Nashville TN, November 2016
- "Stochastic Applications in Renewable Energy Integration" INFORMS Annual Meeting, Philadelphia PA, November 2015
- "OR Applications in Energy and Routing", CORS/INFORMS Joint International Meeting, Montreal QB Canada, June 2014
- "Modeling in Energy Markets and Systems" INFORMS Annual Mtg. Minneapolis MN, October 2013
- Canadian Operations Research Society Annual Conference 2007 (Conference Co-Chair)

PAPERS AND PUBLICATIONS (Students and Postdoctoral denoted*)

Refereed Journal Articles

1. *Doering, K., Anderson, C. L., & Steinschneider, S. (2022). Evaluating the intensity, duration and frequency of flexible energy resources needed in a zero-emission, hydropower reliant power system. Oxford Open Energy, 1, oiad003.
2. https://doi.org/10.1093/ooenergy/oiad003

3. *Alegre-Bravo, A., & Anderson, C.L. (2023). Exploring the influence of multidimensional variables on access to electricity in rural areas of the Global South. Applied Energy, 333, 120509. https://doi.org/https://doi.org/10.1016/j.apenergy.2022.120509

4. *Liu, M. V., *Yuan, B., Wang, Z., *Sward, J. A., Zhang, K. M., & Anderson, C. L. (2022). An open source representation for the nys electric grid to support power grid and market transition studies. IEEE Transactions on Power Systems. https://doi.org/10.1109/TPWRS.2022.3200887

5. *Morillo, J. L., *Zephyr, L., Pérez, J. F., Cadena, A., & Anderson, C. L. (2022). Distribution-free chance-constrained load balance model for the operation planning of hydrothermal power systems coupled with multiple renewable energy sources. International Journal of Electrical Power & Energy Systems, 142, 108319. https://doi.org/10.1016/j.ijepes.2022.108319

6. *Nagpal, S. V., *Nair, G. G., Parise, F., & Anderson, C. L. (2022). Designing Robust Networks of Coupled Phase-Oscillators with Applications to the High Voltage Electric Grid. IEEE Transactions on Control of Network Systems. https://doi.org/10.1109/TCNS.2022.3214778

7. Kassem, N., *Galantino, C. R., Tester, J. W., Anderson, C. L., & Moore, M. C. (2021). Moving toward a framework for electricity and heat equivalence in energy systems analysis. IScience, 24(10), 103123. https://doi.org/10.1016/j.isci.2021.103123

8. *Doering, K., *Sendelbach, L., Steinschneider, S., & Anderson, C. L. (2021). The effects of wind generation and other market determinants on price spikes. Applied Energy, 300, 117316. https://doi.org/10.1016/j.apenergy.2021.117316

9. *Guo, G., *Zephyr, L., *Morillo, J., *Wang, Z., & Anderson, C. L. (2021). Chance Constrained Unit Commitment Approximation under Stochastic Wind Energy. Computers & Operations Research, 105398. https://doi.org/10.1016/j.cor.2021.105398

10. *Wang, Z., & Anderson, C. L. (2021). A Progressive Period Optimal Power Flow for Systems with High Penetration of Variable Renewable Energy Sources. Energies, 14(10), 2815. https://doi.org/10.3390/en14102815

11. *Nagpal, S. V., *Liu, M. V., & Anderson, C. L. (2021). A comparison of deterministic refinement techniques for wind farm layout optimization. Renewable Energy, 168, 581-592. https://doi.org/10.1016/j.renene.2020.12.043

12. *Liu, J., Zéphyr, L., & Anderson, C. L. (2020). Optimal Operation of Microgrids with Load-Differentiated Demand Response and Renewable Resources. Journal of Energy Engineering, 146(4 (*Awarded Editors' Choice*) https://doi.org/10.1061/(ASCE)EY.1943-7897.0000670

13. *Galantino, C. R., Beyers, S., Anderson, C. L., & Tester, J. W. (2020). Optimizing Cornell's future geothermal district heating performance through systems engineering and simulation. Energy and Buildings, 110529. https://doi.org/10.1016/j.enbuild.2020.110529

14. *Morillo, J. L., *Zéphyr, L., Pérez, J. F., Anderson, C. L., & Cadena, Á. (2020). Risk-averse stochastic dual dynamic programming approach for the operation of a hydro-dominated power system in the presence of wind uncertainty. International Journal of Electrical Power & Energy Systems, https://doi.org/10.1016/j.ijepes.2019.105469

15. *Gupta, A., *Liu, M., Gold, D., Reed, P. and Anderson, C.L., (2020) Exploring a Direct Policy Search Framework for Multiobjective Optimization of a Microgrid Energy Management System. In Proceedings of the 53rd Hawaii International Conference on System Sciences. http://hdl.handle.net/10125/64124

16. Orths, A., Anderson, C.L, Brown, T., Mulhern, J., Pudjianto, D., Ernst, B., O'Malley, M., McCalley, J. & Strbac G. (2019) Flexibility From Energy Systems Integration: Supporting Synergies Among Sectors. IEEE Power and Energy Magazine. Oct 2019. https://doi.org/10.1109/MPE.2019.2931054

17. *Zurmuhl, D.P., *Lukawski, M.Z., Aguirre, G.A., Law, W.R., Schnaars, G.P., Beckers, K.F., Anderson, C.L. and Tester, J.W. (2019) Hybrid geothermal heat pumps for cooling telecommunications data centers. Energy and Buildings, 188, pp.120-128. https://doi.org/10.1016/j.enbuild.2019.01.042

18. *Gupta, A., & Anderson, L. (2018). Statistical Bus Ranking for Flexible Robust Unit Commitment. IEEE Transactions on Power Systems. https://doi.org/10.1109/TPWRS.2018.2864131

19. *Zéphyr, L., & Anderson, C Lindsay (2018). Stochastic dynamic programming approach to managing power system uncertainty with distributed storage. Computational Management Science, 15, 87–110. http://doi.org/10.1007/s10287-017-0297-2

20. *Cheng, L., & Anderson, C.L. Too Conservative to Hedge? How Much Does a Corn Biorefinery lose? (2017) International Journal of Production Economics. https://doi.org/10.1016/j.ijpe.2017.08.023

21. *Tupper, L. L., Matteson, D. S., & Anderson, C. L. (2017). Band Depth Clustering for Nonstationary Time Series and Wind Speed Behavior. Technometrics. https://doi.org/10.1080/00401706.2017.1345700

22. *Cheng, L., Martínez, M. G., & Anderson, C. L. (2016). Long term planning and hedging for a lignocellulosic biorefinery in a carbon constrained world. *Energy Conversion and Management*, *126*, 463-472. http://dx.doi.org/10.1016/j.enconman.2016.08.017

23. *Cheng, L., & Anderson, C. L. (2016). Financial sustainability for a lignocellulosic biorefinery under carbon constraints and price downside risk. *Applied Energy*, 177, 98–107. http://doi.org/10.1016/j.apenergy.2016.05.089

24. *Srivastava, M., Anderson, C. L., & Freed, J. H. (2016) A New Wavelet Denoising Method for Selecting Decomposition Levels and Noise Thresholds. IEEE Access. http://dx.doi.org/10.1109/ACCESS.2016.2587581

25. Cardell, J. B., & Anderson, C. L. (2015). Targeting existing power plants: EPA emission reduction with wind and demand response. *Energy Policy*, *80*, 11–23. http://dx.doi.org/10.1016/j.enpol.2015.01.021

26. Cardell, J. B., & Anderson, C. L. (2014). A Flexible Dispatch Margin for Wind Integration. *IEEE Transactions on Power Systems*, 1–10. http://dx.doi.org/10.1109/TPWRS.2014.2337662

27. Anderson, C. L., *Burke, N., Davison, M. (2014). Optimal Management of Wind Energy with Storage: Structural Implications for Policy and Market Design. *Journal of Energy Engineering*, B4014002. http://dx.doi.org/10.1061/(ASCE)EY.1943-7897.0000177

28. Anderson, C. L., & Cardell, J. B. (2014). A Decision Framework for Optimal Pairing of Wind and Demand Response Resources. *Systems Journal, IEEE*, (99), 1–8. http://dx.doi.org/10.1109/JSYST.2014.2326898

29. *Murage, M. W., & Anderson, C. L. (2013). Contribution of pumped hydro storage to integration of wind power in Kenya. *Renewable Energy*, 63, 698–707. http://dx.doi.org/10.1016/j.renene.2013.10.026

30. Murillo-Sanchez, C. E., Zimmerman, R. D., Anderson, C. L., & Thomas, R. J. (2013). A stochastic, contingency-based security-constrained optimal power flow for the procurement of energy and distributed reserve. Decision Support Systems, 56, 1–12. http://dx.doi.org/10.1016/j.dss.2013.04.006

31. C. Murillo-Sanchez, R. Zimmerman, C.L. Anderson, & R.J. Thomas (2013). Secure Planning and Operations of Systems with Stochastic Sources, Energy Storage and Active Demand, 1–9. IEEE Transactions on Smart Grid. 4(4) 2220:2229. http://dx.doi.org/10.1109/TSG.2013.2281001

32. *Liu, X., O'Carroll, D.M., Anderson, C.L. (2009) "Mobility of Multiwalled Carbon Nanotubes in Porous Media", *Environ. Sci. Technol.*, 2009, 43 (21), pp 8153–8158.

33. Anderson, C.L., Davison, M. (2009). The Application of Cash-Flow-at-Risk to Risk Management in a Deregulated Electricity Market. Invited Paper. Special Issue of Human and Ecological Risk Assessment. 15(2): 253-269.

34. Anderson, C.L., Davison, M. (2008) A Hybrid System-Econometric Model for Electricity Spot Prices: Considering Spike Sensitivity to Forced Outage Distributions. IEEE Transactions on Power Systems. 23(3):927-937

35. Anderson, C.L., Davison, M. (2005) An Aggregate Weibull Method for Modelling Short-term Generating Capacity. IEEE Transactions on Power Systems. 20(4):1783-1789.

36. Davison, M., Anderson, C.L., Marcus, B., Anderson, K. (2002) Development of A Hybrid Model for Electricity Spot Prices. IEEE Transactions on Power Systems. 17(2):257-264. http://dx.doi.org/10.1109/TPWRS.2002.1007890

Peer-Reviewed Papers in Conference Proceedings

1. Liu, M., Doering, K., Gupta, A., & Anderson, C. L. (2023). A Spatiotemporal Analysis of New York State Grid Transition under the CLCPA Energy Strategy. In Proceedings of the 56th Annual Hawaii International Conference on System Sciences. https://hdl.handle.net/10125/102944

2. *Liu, M., Reed, P., & Anderson, C. L. (2021) Stochastic Synthetic Data Generation for Electric Net Load and Its Application. In Proceedings of the Hawaii International Conference on System Sciences. http://hdl.handle.net/10125/70998

3. *Gupta, A., *Liu, M. & Anderson, C.L. Exploring a Direct Policy Search Framework for Multiobjective Optimization for Microgrid Energy Management Systems (2020)

Proceedings of the 53rd Hawaii International Conference on System Sciences. (9 pages).

4. *Lukawski, M., Tester, J., Moore, M., Krol, P., and Anderson, C.L. (2019) Demand Response for Reducing Coincident Peak Loads in Data Centers. Proceedings of the 52nd Hawaii International Conference on System Sciences. (8 pages).

5. Cardell, J.B., Zephyr, L., & Anderson, C.L. (2017) A Vision for Co-optimized T&D System Interaction with Renewables and Demand Response. Proceedings of the 50th Hawaii International Conference on System Sciences. (8 pages).

6. *Liu, J., Martínez, M.G., & Anderson, C.L. (2016) Quantifying The Impact Of Microgrid Location And Behavior On Transmission Network Congestion. Proceedings of the 2016 Winter Simulation Conference (7 pages)

7. *M. Murage, M. G. Martínez & C. L. Anderson. (2016) A Stochastic Approach to the Optimal Management of a Kenyan Wind Farm Coupled With Storage. Proceedings of the IEEE PowerAfrica Conference, July 2016 Livingstone, Zambia.

8. *Liu, J., Martínez, M.G., Li, B., Mathieu, J. & Anderson, C.L. (2016) A Comparison of Robust and Probabilistic Reliability for Systems with Renewables and Responsive Demand. Proceedings of the 49th Hawaii International Conference on System Sciences. (8 pages)

9. Cardell, J.B., and Anderson, C.L. Flexible Wind Dispatch, System Reliability and EPA's Clean Power Plan. (2016) Proceedings of the 49th Hawaii International Conference on System Sciences. (10 pages)
http://dx.doi.org/10.1109/HICSS.2016.301

10. Martínez, M.G., *Liu, J., *Li, B., Mathieu, J. & Anderson, C.L. (2015) Enabling renewable resource integration: The balance between robustness and flexibility. Proceedings of the 53rd Annual Allerton Conference on Communications, Computing and Control. (7 pages).

11. Martínez, M. G., & Anderson C. L. (2015). A Risk-averse Optimization Model for Unit Commitment Problems, Proceedings of the 48th Hawaii International Conference on System Sciences (9 pages) http://dx.doi.org/10.1109/HICSS.2015.31

12. Martínez, M. G. & Anderson, C. L. (2014) Toward a Scalable Chance-Constrained formulation for unit commitment to manage high penetration of variable generation. Proceedings of the 52nd Annual Allerton Conference on Communications, Computing and Control. (8 pages).

13. *Murage, M., Cardell, J. B., Lukuyu, J., & Anderson, C. L. (2014). The Impact of Variable Market Price on Optimal Control of Wind-Hydro Storage System in Kenya (pp. 2417–2425). Proceedings of the 47th Hawaii International Conference on System Sciences (HICSS). http://dx.doi.org/10.1109/HICSS.2014.303

14. C. L. Anderson and J. Cardell (2013) "Wind Power Uncertainty and Power System Performance," *Engineering* Special Issue on Integration of Renewables. pp. 41-51. http://dx.doi.org/10.4236/eng.2013.510A007.

15. C. L. Anderson and J. B. Cardell (2013) The Influence of Demand Resource Response Time in Balancing Wind and Load. Proceedings of the 46th Hawaii International Conference on System Sciences (HICSS).

16. *Lamadrid, A. J., Mount, T., Zimmerman, R., Murillo-Sanchez, C. E., & Anderson, C. L. (2012). Alternate mechanisms for integrating renewable sources of energy into electricity markets. *IEEE Power and Energy Society General Meeting*. June 2012, San Diego CA

17. *M. Roytman, U.V. Shanbag, J.B. Cardell, L. Anderson (2012). Packaging Energy and Reserves Bids through Risk Penalties for Enhanced Reliability in Co-optimized Markets. Proceedings of the 45th Hawaii International Conference on System Sciences (HICSS).

18. J.B. Cardell, L. Anderson (2012). The Impact of Wind Energy on Generator Dispatch Profiles and Carbon Dioxide Production. Proceedings of the 45th Hawaii International Conference on System Sciences (HICSS).

19. J.B. Cardell, C. L. Anderson, (2010) Analysis of the System Costs of Wind Variability Through Monte Carlo Simulation. Proceedings of the 43rd Hawaii International Conference on System Sciences (HICSS).

20. J.B Cardell and C. L. Anderson, (2009) "Estimating the System Costs of Wind Power Forecast Uncertainty", IEEE, Proceedings of the Transmission and Distribution Society General Meeting, 2009. pp. 1-4.

21. C.L. Anderson and J.B. Cardell (2009). Analysis of Wind Penetration and Network Reliability Through Monte Carlo Simulation. Proceedings of the Winter Simulation Conference 2009.

22. C.L. Anderson and J. B. Cardell (2008). Reducing Wind Power Variability in Day Ahead Electricity Markets. Proceedings of the 41st Annual Hawaii International Conference on System Sciences (CD-ROM), Computer Society Press, (7 pages).

Scientific Reports

1. T.D. Mount, C. L. Anderson, R. Zimmerman, J.B. Cardell. (2012) Coupling Wind Generation with Controllable Load and Storage: A Time-Series Application of the SuperOPF: Final Project Report. PSERC Project M-22, PSERC Publication 12-28. November 2012.

2. Jewell, W. T., Twomey, J., Overcash, M., Cardell, J., & Anderson, C. L. (2012). *Future Grid: The Environment* (Report No. 12-04) (pp. 1–43). Power Systems Engineering Research Center.

3. M. Davison, L. Anderson and M. Thompson, (2002) Options on Electrical Power: A Third Report. Submitted to Director of Risk Management, Ontario Power Generation. Technical Report. 91 pages.

4. M. Davison, L. Anderson and M. Thompson, (2001) Options on Electrical Power: A Second Report. Submitted to Director of Risk Management, Ontario Power Generation. Technical Report. 105 pages.

5. M. Davison, L. Anderson and B. Marcus, (2000) Options on Electrical Power: An Interim Report. Submitted to Director of Risk Management, Ontario Power Generation. Technical Report. 119 pages.

CONFERENCE AND SEMINAR PRESENTATIONS

Invited Presentations

Anderson, C.L., Liu (with M.V. Liu, E. Kabir, S. Steinschneider, V. Srikrishnan) *Electric Energy System Decarbonization Strategies and Resiliency*. Resilient Electricity Consortium of North America (RECONS) 2022 Symposium (College Station TX, November 2022)

Anderson, C.L. (with S. Nagpal and F. Parise) *Enhancing Robustness in Electric Grids via a General Effective Resistance Measure*. INFORMS Energy, Natural Resources, and the Environment (ENRE) Online Scientific Series. January 27, 2022.

Anderson, C.L. *Optimal Coordination of High and Low Voltage Systems to Leverage Distributed Energy Resources*. IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids. November 13, 2020.

Anderson, C.L. *Toward a Sustainable Energy Future: Integration of Renewable Resources, Consumers and Communities*. Jones Seminar, Thayer School of Engineering, Dartmouth College, November 2019

Anderson, C.L. *How do we get there from here? The benefits and challenges of a sustainable energy future*. Earth Talks Seminar Series. Penn State University, October 2019.

Anderson, C.L. *Research Needs for Co-optimization of Multi-level Integrated Electricity Systems*. Closing Plenary Panel. Utilities Variable Integration Group Spring Technical Meeting. March 13-15, 2018. Tuscon, AZ.

Aravinthan, V., Anderson, C.L., Cardell, J.B., and Jewell, W. (2017) *Investigating Optimal Model Coordination for Integrated Transmission and Distribution Systems*. Power Engineering Research Center (PSERC) Industrial Advisory Board Meeting, Phoenix AZ. December 3, 2017.

Anderson, C.L. *Incorporating Wind and Distributed Storage into Stochastic Economic Dispatch Solutions*. Power Engineering Research Center (PSERC) Webinar. November 21, 2017.

Anderson, C.L. *Management of Risk and Uncertainty through Optimized Co-operation of Transmission Systems and Microgrids with Responsive Loads. U.S.* Department of Energy Peer Review Meeting. Washington DC, June 2017.

Anderson, C.L. *Development of a Sustainable Future: Integrating Renewable Resources, Consumers and Communities.* Simon Fraser University, Vancouver, Canada. May 2017.

Anderson, C.L. *Sustainable Energy through Renewables and Demand Side Management.* Cornell Energy Seminar. Cornell University, December 2, 2016

Anderson, C.L. *System Impacts of Wind Power*. Guest Lecture, MAE 4020 (Wind Energy). October 2016, 2018.

Anderson, C.L *The EPA's Clean Power Plan: A Case Study of System Impact and Efficacy.* Clean Energy Institute Seminar Series, University of Washington. Seattle Washington, April 2016

Anderson, C.L. *Renewable Energy Prospects: Benefits and Challenges for the Future*. Bethe Ansatz, Cornell University, March 2016

Anderson C. L. *An Empirical Analysis of the Efficacy of EPA's Clean Power Plan for Emission Reduction in the Power Sector.* City and Regional Planning Seminar Series. December 2015

Anderson, C. L. *Integrating Uncertain Renewables in Power Systems: Leveraging Flexibility in Operational Models.* Scientific Computing and Numerics (SCAN) Seminar Series. Jointly organized by the Department of Mathematics and the Department of Computer Science, Cornell University. October 2015.

Martínez, M.G., Liu, J., Li, B., Mathieu, J. & Anderson, C.L. *Enabling renewable resource integration: The balance between robustness and flexibility*. Proceedings of the 53rd Annual Allerton Conference on Communications, Computing and Control.

Anderson C. L. *Meeting the Mandate and Reality of Renewable Grid Integration* (Panelist) School of Public Policy, University of Calgary. Calgary, Canada. September 2015.

Anderson C. L. *Targeting Existing Power Plants: EPA Emission Reduction with Wind and Demand Response.* Energy Seminar, Department of Chemical and Biomolecular Engineering, Cornell University, March 2015.

Anderson C. L. *Optimization and Simulation with Applications to Power Systems*. Electrical and Computer Engineering Graduate Field, Invited Presentation. Cornell University, Ithaca NY. October 2014

Martinez, G. & Anderson, C. L. *Toward a Scalable Chance-Constrained formulation for unit commitment to manage high penetration of variable generation*. The 52nd Annual Allerton Conference on Communications, Computing and Control. Champaign, Illinois. September 2014

C. L. Anderson R*enewable Energy Integration: Impacts and Strategies. Invited Presentation*, Arizona State University Power Systems Graduate Seminar. October 2013. Tempe, Arizona.

L. P. Walker & C. L. Anderson *Ruminations on Renewable Energy*. Cornell Now! Alumni Event, San Francisco CA. March 2013
http://ezramagazine.cornell.edu/Update/March13/EU.SanFran.campaign.html

C. L. Anderson *Revisiting the SABBIC Vision: How do we Begin to Optimize Sustainable Biobased Industries. Invited Presentation*, The Science and Engineering Challenges to the Development of Sustainable Biobased Industries Seminar Series. October 2012.

C. L. Anderson *Wind Power Integration: Exploring Impacts and Alternatives*. Invited Speaker: CEE 6020, Environmental Engineering Seminar. Cornell University, September 2012.

J.B. Cardell, *C. L. Anderson *Managing Wind Variability through a Combination of Self-Reserves and Responsive Demand*. Invited Presentation, Lawrence Berkeley National Laboratory, September 2012

L. Anderson & J.B. Cardell *Improving Wind Integration Outcomes with Responsive Demand*. Invited Presentation UC Berkeley-Lawrence Berkeley National Lab Demand Response Integration Group. Berkeley CA, April 2012

*L. Anderson & R. Zimmerman. *Wind Output Forecasts and Scenario Analysis for Stochastic Multi-period Optimum Power Flow*. Power Systems Engineering Research Center, Webinar. November 2011.

*M. Davison, L. Anderson & N. Kirby. *Energy Storage: A problem at the intersection of Finance and Optimization*. 3C Conference, The Fields Institute for Mathematical Sciences, Toronto Canada. October 2011.

*L. Anderson. *The Systems Approach: A Wind Energy Example*. The Northeast Bioenergy and BioProducts Education Program. June 2011.

Anderson, C. L. *Integrating Wind Generation into Electric Power Systems*. Energy Seminar, Department of Chemical and Biomolecular Engineering, Cornell University. September 2010.

Other Presentations

Anderson, C.L., Sankar, L., Pal, A. (2020) Co-optimization of Transmission and Distribution Systems for Storage Sizing and Siting Under Uncertainty. Presentation at PSERC Summer Workshop. (Virtual) July 2020.

Cardell, J.B., Zephyr, L., & Anderson, C.L. (2017) A Vision for Co-optimized T&D System Interaction with Renewables and Demand Response. 50th Hawaii International Conference on System Sciences. Waikoloa HI, January 2017

*Liu, J., Martínez, M.G., & Anderson, C.L. (2016) Quantifying The Impact Of Microgrid Location And Behavior On Transmission Network Congestion. Proceedings of the 2016 Winter Simulation Conference, Washington DC, December 2016

Murage, M.. and Anderson, C.L. Analysis of a Wind-Hydro Storage System in Kenya. INFORMS Annual Meeting, Nashville TN. November 2016

*Zéphyr, L., Anderson. C.L. (2016) Optimizing The Interplay Between The Micro And Macro Grids: From Challenges To Perspectives. INFORMS Annual Meeting, Nashville TN. November 2016

*M. Murage, M. G. Martínez & C. L. Anderson. A Stochastic Approach to the Optimal Management of a Kenyan Wind Farm Coupled With Storage. IEEE Power Africa Conference, July 2016. Livingstone, Zambia.

C. L. Anderson. Advanced Stochastic Solutions for Management of Uncertainty: Incorporating Storage and Scenario Generation CERTS-DOE Reliability and Markets Annual Review, Alexandria, Virginia. June 2016.

Martínez, M.G., and Anderson, C. L. A Stochastic Model to Determine Probabilistic Reserves in Unit Commitment Problems. INFORMS Annual Meeting, Philadelphia, PA. November 2015

C. L. Anderson (2015) Investigation of Advanced Stochastic Unit Commitment Solution for Optimal Management of Uncertainty. CERTS-DOE Reliability and Markets Annual Review, Cornell University. August 2015

Martínez, M.G., and Anderson, C. L. (2015) A Chance Constrained Model for Unit Commitment under Uncertainty. Hawaii International Conference on System Sciences. January 2015. Kauai, HI.

L. Cheng, C.L. Anderson (2014) Financial Risk Management of a Lignocellulosic Biorefinery: A Stochastic Programming Approach. INFORMS Annual Meeting, San Francisco, CA. November 2014

M.G. Martínez, C. L. Anderson (2014) Approximate Formulations for Chance Constrained Problems. INFORMS Annual Meeting, San Francisco, CA. November 2014

M. Murage, M.G. Martínez, C. L. Anderson (2014) Two-Stage Stochastic Model for Optimal Operation of Combined Wind-Pumped Storage System in Kenya. INFORMS Annual Meeting, San Francisco, CA. November 2014

Martinez, G., Tupper, L. & Anderson, C. L. (2014) Development of Advanced Stochastic Unit Commitment Formulation for Management of Uncertainty. CERTS-DOE Reliability and Markets Annual Review, Cornell University. August 2014

M.G. Martinez, M. Murage and C. L. Anderson, (2014) A Two-Stage Stochastic Model for Optimal Wind Power Commitment. IIE Annual Conference. Montreal, Canada. May 31- June 3rd 2014

L. Cheng, C. L. Anderson (2014) A Two-stage Stochastic Optimization Framework of Lignocelluosic Biorefinery. Presented at joint ASABE-CSBE Conference. Montreal Canada. July 12-15, 2014.

M.W. Murage & C. L. Anderson (2013) Analysis of the Combined Use of Pumped Hydro Storage with a Kenyan Wind Farm. INFORMS Annual Meeting, Minneapolis MN. October 2013.

C. L. Anderson (2013) Investigation of Advanced Stochastic Unit Commitment Solution for Optimal Management of Uncertainty. CERTS-DOE Reliability and Markets Review. Cornell University. August 2013

*K. Kang, U. V. Shanbhag, J.B. Cardell, C.L. Anderson (2012) Packaging Energy and Reserves Bids through Risk Penalties for Enhanced Reliability in Co-optimized Markets. INFORMS Annual Meeting, Phoenix AZ. October 2012.

*M. W. Murage, C. L. Anderson (2012) Optimal Integration Of Wind Power With Pumped Hydro Storage: Case Study Of Kenya. INFORMS Annual Meeting, Phoenix AZ. October 2012.

R. Zimmerman, C.Murillo-Sánchez, C. L. Anderson, R.J. Thomas, A. Gupta, D. Muñoz-Álvarez (2012). Tools for Multi-period Stochastic Optimization with Evolving Information. CERTS-DOE Reliability and Markets Review. Cornell University, August 2012

*C.L. Anderson, H. Atiyeh, S. Capreda, D. Keshwani (2012) Systems Methodologies for a Sustainable Bio-Based Economy. The Science and Engineering for a Biobased Industry and Economy Annual Symposium. Washington DC, August 2012

*L. Anderson & J. B. Cardell (2011) Optimal Balancing of Wind Resources with Responsive Demand on a Network. INFORMS Annual Meeting, Charlotte, NC. November 2011

M. B. Eisenberg, L. P. Walker, C. L. Anderson, (2011) Assessing The Impact Of Uncertainty On Ethanol Production Outcomes. Poster Presentation: The Science and Engineering for a Biobased Industry and Economy Annual Symposium. August 2011. Stillwater, Oklahoma.

*J. Cardell & C. L. Anderson. Power System Performance with 30% Wind Penetration. Seventh Annual Carnegie Mellon Conference on the Electricity Industry: Emerging Phenomena in Changing Electric Energy Systems. March 2011.

Grants Awarded

<u>Awarded</u>

Title: *INFEWS/T1: Agricultural-to-Energy Land Use Transitions: A FEW System Modeling Framework*. INFEWS NSF/USDA. ($2.4M) coPIs: C.Y. Lawell, C.L. Anderson, A. Ortiz-Bobea, S. Steinschneider, MT Walter. Dates: 07/2019-06/2022

Title: *Planning Grant for NSF Engineering Research Center for Sustainable Energy Smart Solutions (SuESS)* PI: C. L. Anderson, Co-PIs: E. Cowen, L. Tong, E. Bitar, R. Stedman
($100 000) Dates: 09/2018-08/2019

Title: *Optimal Model Coordination for Integrated Transmission and Distribution Systems*. Power Systems Engineering Research Center(PSERC). CoPIs: V. Aravinthan, C.L. Anderson, J.B. Cardell, W. Jewel. ($220 000) Dates: 07/2018-06/2020

Title: *Achieving sustainable energy through integration of intermittent renewables with algorithm-controlled heat pumps at scale.* Atkinson Center for a Sustainable Future, Academic Venture Fund. PI: C. L. Anderson, Co-PIs: M. Milstein, M. Moore, T. Mount, J. Tester. ($100 000)Dates: 09/2017-08/2019

Title: *Management Of Risk And Uncertainty Through Optimized Co-Operation Of Transmission Systems And Micro Grids With Responsive Loads.* ($360 000)
US Department of Energy/NETL Dates: 10/2016-09/2019
PI: C. L. Anderson, CoPI: J.B. Cardell

Title: CAREER: Advanced Methods for Optimal Integration of Responsive Demand and Variable Generation in Power Systems and Markets. ($500K) NSF-ECCS Dates: 03/2015-03/2020
PI: C.L. Anderson

Title: *The Science and Engineering for a Biobased Industry and Economy* ($64 000) USDA Multistate Research Grant Dates: 10/2013-09/2018 PI: C. L. Anderson

<u>Completed</u>
Title: Benchmarking and integrating chance-constrained stochastic unit commitment solution for optimal management of uncertainty ($90 000)
Department of Energy, CERTS [†] Dates: 04/2014-03/2015
PI: C. L. Anderson

Title: Development of effective and scalable stochastic unit commitment solution for optimal management of uncertainty ($90 000)
Department of Energy, CERTS Dates: 04/2013-03/2014
PI: C. L. Anderson

Title: Investigation of Advanced Stochastic Unit Commitment Solution for Optimal Management of Uncertainty ($75 000)
Department of Energy, CERTS Dates: 04/2013-03/2014
PI: C. L. Anderson

[†] Consortium for Electric Reliability Technology Solutions

Title: A Systems Approach to Assessing the Impact of Uncertainty on Bioenergy Production Outcomes. ($60 000)
USDA Multistate Research Grant Dates: 10/2009-09/2012
PIs: C. L. Anderson L. P. Walker

Title: Multidimensional Market Design Project: Development and Testing of New Tools.
Department of Energy, CERTS ($260 000) Dates: 10/2010-09/2011
PI: R.J. Thomas Co-PIs: C.L. Anderson, C. Murillio-Sanchez, R. Zimmerman

Title: Market & Reliability Issues for Renewable Energy Sources
US Department of Energy, CERTS Dates: 10/2009- 09/2010
PI: R.J. Thomas $300 000
Co-PIs: C.L. Anderson, J. Cardell (Smith), T. Mount (AEM-Cornell), C. Murillio-Sanchez, R. Zimmerman

Title: Plug-in Hybrid Electric Vehicles as Distributed Energy Systems: Linking the Power sector, the Transportation sector and the Environment".
Cornell Center for a Sustainable Future (CCSF) March 2009 – February 2010
PI: M. Zhang (MAE)

Decision Analysis and Risk Management in Infrastructure Systems. National Science and Engineering Research Council
(NSERC) Discovery Grant (Industrial Engineering Section), Dates: 07/2004- 06/2006
PI: C. L. Anderson $ 45 000

CORNELL ACTIVITIES

Courses Taught

BEE 4750 (3 cr. annually fall 2017-2021 enrollment 45)
Environmental Systems Analysis

BEE/CEE 4880/6880 (3 cr. spring 2010-2021, enrollment 10-25)
Modelling and Simulation for Renewable Energy Systems

ECE5870/CHEME5870/MAE5459 (1 cr. Fall 2020, 2021, co-taught)
Energy Seminar I

ECE 5880/CHEME 5880/MAE 5489 BEE 5496 (1 cr. Spring 2021, 2022 co-taught)
Energy Seminar II

SYSEN 8000 (1 cr. Fall 2019-2021)
Systems Doctoral Colloquium

CEE 5050 (3 cr. spring 2019, spring 2020, fall 2020, spring 2021, spring 2022, co-taught)
Interdisciplinary M.Eng Project: Recovery from Hurricane Maria in Puerto Rico, Project Team Advisor

SYSEN 6000 (3cr. fall 2017, enrollment 8)
Module: Decision Making Under Uncertainty (*team taught*)

CHEME 6672 (1 cr. fall 2014, 2016, 2018)
Electric Power Systems: Economics, Operations and Sustainability

BEE1510 (4 cr. fall 2007-15, enrollment 65-75)
Introduction to Computer Programming in Matlab

BEE 6940 (2 cr., spring 2013, enrollment 15)
Applied Optimization in Engineering, Energy and the Environment (Spring 2015)

CHEME 6675 (1 cr., spring 2014, enrollment ~35)
Life Cycle Assessment Module

Professional Development

- Teaching and Learning in the Diverse Classroom, 4 week online course (Cornell Center for Teaching Innovation, June & July 2020)
- Cornell Academic Leadership Series (Nominated by Dean for participation in inaugural program, 2018-19)
- Academic Search Training for Faculty (CU-Advance, September 23, 2013, 2020)
- Flipping the Classroom workshop (January 15-16, 2015)
- Effective Search Practices: It Depends on the Lens (Office of Faculty Development)

Current Undergraduate Advisees ~ 25

Graduate Field Memberships: Biological and Environmental Engineering, Environmental Water Resources Systems (CEE), Electrical and Computer Engineering, Regional Science, Systems Engineering, Applied Math

Other Undergraduate Programs: Advisor for Environmental and Sustainability Sciences Program (CALS), 2015/16 – current.

Current Ph.D. Students

- Alonso Alegre-Bravo, Ph.D. Student, Biological and Environmental Engineering
- Kenji Doering, Ph.D. Candidate, Environmental Engineering, Co-chaired with S. Steinschneider
- Mengwei (Vivienne) Liu, Ph.D Student, Systems Engineering
- Shriya Nagpal, Ph.D Student, Applied Mathematics
- Tayler Fernandez Nunez, Ph.D. Student, Applied Mathematics
- Gerald Ogbanna, Ph.D. Student, Systems Engineering

Ph.D. Students Graduated:

- Amandeep Gupta, Ph.D. in Systems Engineering, 2020
  Thesis: *Exploring Simulation-Based Decision-Making Frameworks for Energy Management in Electrical Networks of The Future*

- Jialin Liu Ph.D. in Electrical and Computer Engineering, 2019
  Thesis: *A Bi-Level Approach To Future Power System Co-Optimization With High Penetration Of Renewable Energy And Responsive Demand*
- Jose Morillo Carillo, Ph.D. in Electrical and Computer Engineering 2018, (Universidad de los Andes, Chair: Angela Cadena)
  Thesis: *Long-term Hydrothermal Planning Model with Renewables Integration*
- Madhur Srivastava Ph.D. in Biomedical Engineering 2018, (with Chair: Jack Freed)
  Thesis: *Improving Signal Resolution And Reducing Experiment Time In Electron Spin Resonance Spectroscopy Via Data Processing Methods*
- Lingfeng Cheng, Ph.D. in Chemical and Biomolecular Engineering, 2017
  Thesis: *Optimal Production Planning And Hedging For Bio-Energy Industry*
- Maureen Murage, Ph.D. in Biological and Environmental Engineering, 2016.
  Thesis: *A Quantitative Assessment Of Wind Power In Kenya: Assessing Impact And Strategies*
- Laura Lindley Tupper, PhD. in Statistics 2016 (with Chair: David Matteson)
  Thesis: *Topics in Classification and Clustering of High-Dimensional Data*
- Natasha (Kirby) Burke, Ph.D. 2012 (Western University, co-advised with M. Davison)
  Thesis: "*A Real Options Evaluation of Energy Projects*"
- Rachel Dunn, Ph.D. 2011 (co-advised, with M. Walter)
  Thesis: "*Perspectives, Problems, And Pesticides: The Discrepancies Between Institutional And Local Environmental Conservation Perspectives In Northern Thailand And The Implications For Natural Resource Management Model Development"*

M.Eng/M.S. Graduates:

- Agustin Alfonso Jose Lazaro Lugo, M.Eng. 2021 (ECE)
  Project: *Resilient Solar Systems for the Corcovada Community in Puerto Rico*
- Aryama Singh, M.Eng. 2020 (Systems Engineering)
  Project: Energy usage analysis and a comparative study of prediction of building energy use
- Evan Halloran, M.Eng. 2020 (BEE)
  Project: *A Comparison of Economic Dispatch Simulations With Differing Stochastic Wind Power Models*
- Anna Brzozowski, M.Eng. 2020 (Systems Engineering)
  Project: *Microgrid Optimization: Promoting Self-Sufficiency in Corcovada, Puerto Rico*
- Makenzie Sheerer, M.Eng. 2020 (BEE)
  Project: *Identifying Spatial Patterns of Co-Occurring Droughts Of Renewable Energy Sources Using Principal Component Analysis*
- Shikhar Prakash, M.Eng. 2019 (BEE)
  Project: *Control strategies for reducing energy cost and emissions in data centers"*
- Alankar Sharma, M. Eng. 2016(BEE)
  Project: *"Machine learning and statistical forecasting of high-resolution load and wind power data using wavelet transformations"*
- Noah Maze, M.Eng, 2014 (BEE)
  Project: "*Developing Wind Turbine Modules for Gridlab-D*"
- Brandon Bass, M.Eng. 2013 (BEE)
  Project: "*Production Cost Model For Long-Term Power Price Correlation Forecasting"*

- Khadeejah Sani, M. Eng 2012 (BEE)
  Project: *"Evaluating the Impact of Energy Savings Technologies in The Statler Hotel"*
- Mariel Eisenberg, M.Eng. 2011 (BEE)
  Project: *"Assessing the Impact of Uncertainty on Biofuel Production Outcomes"*
- Teja Kanuparthy, M.Eng. 2010 (co-advised with N. Scott)
  Project: "*Feasibility of Upgrades to the Ithaca Area Wastewater Treatment Facility to Increase its Biogas Output"*
- Lin Li, M. S. 2006 (Western University)
  M.Sc. Thesis: *"Reservoir Inflow Forecasting by Artificial Neural Networks"*

Postdoctoral Associates:

- Maria Gabriela Martínez 09/2014-08/2015 (Quant. Optimization, JP Morgan)
- Luckny Zephyr, 8/2015-9/2018 (Assistant Prof., Laurentian University Canada, Department of Finance and Operations)
- Ge (Claire) Guo, 6/2018 – 6/2019 (Assistant Prof., University of Baltimore, Dept of Information and Decision Sciences)
- Zongjie (Lisa) Wang, 11/2018 – 12/2020 (Assistant Prof. UConn, ECE)

Alumni Engagement:

- 2019 Speaker: Fred Hicks '62 Memorial Lecture: "A Vision for a Low Carbon (Energy) Future". Long Island, NY January 27, 2019
- Invited Speaker & Panelist: "Talks in 10: Engagement, Sustainability and Global Cornell", combined Trustee-Council Annual Meeting and Homecoming Event. Bailey Hall, Cornell University, October 2014
- Invited Speaker, "Cornell Now 2015 All Alumni Event". San Francisco, California. March 2013

Department and College Committees:

- College of Engineering, Search Committee Co-Chair, Professor and Director Cornell Energy Systems Institute Studies (current)
- College of Engineering, Search Committee Member, Professor and Director for Lab of Plasma Studies (current)
- College of Engineering, Dean Search Committee (09/2019-04/2020)
- Systems Engineering Program Executive Committee (06/2017-current)
- Systems Engineering Ph.D. Program Committee (07/2016 – current)
- Search Committee Professor of Practice in Space Systems (09/2019-03/2020)
- Chair, Complex Systems Engineering (FEW Nexus) Faculty Search Committee (2018/19, 2019/20 Academic year)
- Environmental Engineering Program Committee (09/15-06/18, Committee co-chair with Jery Stedinger since 07/16)
- Member, Bioinstrumentation and Sensors Faculty Search Committee (2015/16 Academic year)
- Biological and Environmental Engineering Department Representative, Faculty Senate (2012-2015)

- Integrated Water Resources and Hydrologic Systems Engineering Faculty Search Committee (2013/14 Academic Year)
- Undergraduate Advisor for ~ 20-25 students annually.

University Community:

- Ivy+ Faculty Advancement Network Leadership Fellow (2022-23)
- House Professor Dean, William Keeton House (08/21-current)
- Sustainable Cornell Council, Carbon Neutral Campus Committee (since 2019)
    - CNC Committee Working group lead, and Faculty Advisor for Central Energy Plant Carbon Emissions Analysis (2020-2021)
    - CNC Committee Working group lead, Green Hydrogen study (2021-current)
- Graduate Professional Development Advisory Council (07/19-current)
- Cornell Sustainability Task Force Steering Committee (09/18-07/2021)
- House Fellow, Hans Bethe House (09/15-09/18)
- Faculty Advisory Board, Atkinson Center for a Sustainable Future (09/15-07/18)
- Faculty Advisor to Cornell Running Club (2013-2019)

Collaborators and Affiliations

- Angela Cadena, Universidad de los Andes, Columbia
- Judith Cardell, Smith College
- Ben Hobbs, Johns Hopkins University
- Ward Jewell, Wichita State University
- David Matteson, Cornell University
- Johanna Mathieu, University of Michigan
- Tim Mount, Cornell University
- Carlos Murillio-Sanchez, Universidad Nacional de Colombia
- Tom Overbye, Texas A&M University
- Uday Shanbhag, Penn State University
- Jefferson Tester, Cornell University
- Robert J. Thomas, Cornell University
- Larry Walker, Cornell University
- Visvakumar Aravinthan, Wichita State University
- Judy Cardell, Smith College
- Ward Jewell, Wichita State University
- Max Zhang, Cornell University
- Ray Zimmerman, Cornell University
- Ph.D. major advisor: Matt Davison, Western University
- M.Sc. major advisor: Lambert Otten, University of Guelph