Alejandro D. Domínguez-García

Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
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Education

MASSACHUSETTS INSTITUTE OF TECHNOLOGY — Cambridge, MA

Ph.D. in Electrical Engineering and Computer Science, June 2007.
Major fields of study: Reliability Theory; Dynamic Systems and Control.

UNIVERSITY OF OVIEDO — Gijón, Spain

Ingeniero Industrial, June 2001 (Class 2001 Valedictorian).
Major fields of study: Electric Power and Energy Systems.

Academic Positions

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN — Urbana, IL

Department of Electrical and Computer Engineering
Professor, August 2018 - Present.
Associate Professor, August 2014 - August 2018.
Assistant Professor, April 2008 - August 2014.

Coordinated Science Laboratory
Professor, August 2018 - Present.
Associate Professor, August 2014 - August 2018.
Assistant Professor, October 2011 - August 2014.

Information Trust Institute
Professor, August 2018 - Present.
Associate Professor, August 2014 - August 2018.
Assistant Professor, October 2008 - August 2014.

UNIVERSITY OF OVIEDO — Gijón, Spain

Department of Electrical Engineering
Assistant Professor, September 2001 - August 2002.

Research Positions

MASSACHUSETTS INSTITUTE OF TECHNOLOGY — Cambridge, MA

Laboratory for Electromagnetic and Electronic Systems; and Space Exploration Group
Postdoctoral Research Associate, June 2007 - March 2008.

Laboratory for Electromagnetic and Electronic Systems
Research Assistant, October 2002 - May 2007.

RICARDO UK — Cambridge, UK

Cambridge Technical Centre
Research Intern, Summer 2005.

ROBERT BOSCH GMBH — Stuttgart, Germany

Corporate Research and Development
Research Intern, Summer 2004.

Awards and Honors

RESEARCH

IEEE Fellow, class of 2023, for contributions to distributed control and uncertainty analysis of electrical energy systems.

List of Best Papers (one out of seven), IEEE Transactions on Power Systems, 2018 – 2020.

Dean's Award for Excellence in Research (Formerly Xerox Award for Faculty Research), College of Engineering, University of Illinois at Urbana-Champaign, 2015.

Second Best Student Paper Award (with X. Jiang), North American Power Symposium, 2014.

Outstanding Young Engineer Award, IEEE Power and Energy Society, 2012.

Best Student Paper Award (with Y. C. Chen and X. Jiang), North American Power Symposium, 2011.

CAREER Award, National Science Foundation, 2010.

Best Student Paper Award, IEEE/AIAA Digital Avionics Systems Conference, 2006.

TEACHING

List of Teachers Ranked as Excellent by Their Students for ECE 573: Power System Control, University of Illinois at Urbana-Champaign, Fall 2022.

List of Teachers Ranked as Excellent by Their Students for ECE 476: Power System Analysis, University of Illinois at Urbana-Champaign, Fall 2020.

List of Teachers Ranked as Excellent by Their Students for ECE 554/ME 544: Dynamic System Reliability, University of Illinois at Urbana-Champaign, Spring 2020.

List of Teachers Ranked as Excellent by Their Students for ECE 554/ME 544: Dynamic System Reliability, University of Illinois at Urbana-Champaign, Spring 2015.

List of Teachers Ranked as Excellent by Their Students for ECE 476: Power System Analysis, University of Illinois at Urbana-Champaign, Fall 2014.

List of Teachers Ranked as Excellent by Their Students for ECE 598 ADG: Dynamic System Reliability, University of Illinois at Urbana-Champaign, Spring 2013.

List of Teachers Ranked as Excellent by Their Students for ECE 476: Power System Analysis, University of Illinois at Urbana-Champaign, Fall 2012.

List of Teachers Ranked as Excellent by Their Students for ECE 598 ADG: Dynamic System Reliability, University of Illinois at Urbana-Champaign, Spring 2011.

List of Teachers Ranked as Excellent by Their Students for ECE 330: Power Circuits and Electromechanics, University of Illinois at Urbana-Champaign, Fall 2008.

OTHER

William L. Everitt Scholar, University of Illinois at Urbana-Champaign, 2017 - Present.

Campus Distinguished Promotion Award, University of Illinois at Urbana-Champaign, 2014.

Participant (by invitation only), US Frontiers of Engineering Symposium, National Academy of Engineering, 2014.

Grainger Associate, Grainger Foundation, August 2011 - Present.

Presidential Fellow, MIT, 2002 - 2003.

Class 2001 Valedictorian Award, Colegio Oficial de Ingenieros Industriales de Asturias, Spain, 2001.

Class 2001 Valedictorian Award, Aceralia Corporación Siderúrgica, Spain, 2001.

Grants and Contracts

FOR RESEARCH

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2023, $50,000 ($8,333 to this Co-PI).

Co-Principal Investigator, Universal Interoperability for Grid-Forming Inverters (UNIFI) Consortium, 2022 - 2027, $25,000,000 ($750,000 to this PI)

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2022, $50,000 ($8,333 to this Co-PI).

Principal Investigator, Scalable Data-Driven Voltage Control of Ultra-Large-Scale Power Networks, Digital Transformation Institute, 2021 - 2023, $146,000 ($60k to this PI)

Co-Principal Investigator, Private cyber-secure data-driven control of distributed energy resources, Digital Transformation Institute, 2021 - 2023, $250,000 ($83k to this PI)

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2021, $50,000 ($8,333 to this Co-PI).

Principal Investigator, Modeling and Coordinating Distributed Energy Resources in Power Systems and Markets, Power Systems Engineering Research Center (PSERC), 2020 - 2022, $220,000 ($70,000 to this PI).

Principal Investigator, A Resilient Distributed Platform for Microgrid Control, Environmental Security Technology Certification Program (DoD), 2020 - 2023, $1,400,000 ($740k to this PI)

Principal Investigator, Distributed Grid Control of Flexible Loads and DERs for Optimized Provision of Synthetic Regulating Reserves: Project Extension, ARPA-E, 2020 - 2021, $500,000 ($225,000 to this PI)

Co-Principal Investigator, A Scalable Control Architecture for 100% PV Penetration with Grid Forming Inverters, Solar Energy Technologies Office (DoE), 2020 - 2023, $4,900,000 ($400k to this Co-PI)

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2020, $50,000 ($8,333 to this Co-PI).

Co-Principal Investigator, Megawatt-scale Power-Electronic-Intergrated Generator with Controlled Dc Output, ARPA-E, 2019 - 2022, $2,056,280 ($350,000 to this Co-PI).

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2019, $50,000 ($8,333 to this Co-PI).

Co-Principal Investigator, NextGrid: Illinois Utility of the Future Study, Illinois Commerce Commission, 2018, $337,162 ($56,193 to this Co-PI).

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2018, $50,000 ($8,333 to this Co-PI).

Principal Investigator, Measurement-Based Estimation of Loss Factors and Application to Optimization Problems in Distribution Networks, University of Tennessee (DOE), 2017 - 2018, $75,000.

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2017, $50,000 ($8,333 to this Co-PI).

Principal Investigator, A Framework for Assessing the Impact of Coordinated Aggregation of Distributed Energy Resources on Bulk Power System Performance – Phase II, Department of Energy (CERTS), 2016 - 2017, $90,000.

Principal Investigator, Distributed Grid Control of Flexible Loads and DERs for Optimized Provision of Synthetic Regulating Reserves, ARPA-E, 2016 - 2019, $680,000 ($340,000 to this PI).

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2016, $50,000 ($6,250 to this Co-PI).

Co-Principal Investigator, Modular and Scalable High Efficiency Power Inverters for Extreme Density Applications, NASA, 2015 - 2017, $330,000 ($110,000 to this Co-PI).

Principal Investigator, A Measurement Based on Optimal Power Flow Approach to Voltage, Siebel Energy Institute, 2015 - 2017, $25,000 ($12,500 to this PI).

Principal Investigator, EAGER-DynamicData: A Scalable Framework for Data-Driven Real-Time Event Detection in Power Systems, NSF/AFOSR, 2015 - 2018, $185,000 ($92,500 to this PI).

Co-Principal Investigator, Automated Reliability Reports Research and Implementation – Phase VI, Department of Energy (CERTS), 2015, $75,000 ($25,000 to this Co-PI).

Principal Investigator, A Framework for Assessing the Impact of Coordinated Aggregation of Distributed Energy Resources on Bulk Power System Performance – Phase I, Department of Energy (CERTS), 2015 - 2016, $80,000.

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2015, $50,000 ($6,250 to this Co-PI).

Co-Principal Investigator, Stochastic Planning, Operations, and Markets Analysis, Department of Energy (CERTS), 2014, $175,000 ($55,000 to this Co-PI).

Co-Principal Investigator, Automated Reliability Reports Research and Implementation – Phase V, Department of Energy (CERTS), 2014, $140,000 ($30,000 to this Co-PI).

Principal Investigator, Measurement-Based Estimation of Power Flow Jacobian: Algorithms and Computational Architectures, University of Tennessee (DOE), 2014 - 2015, $75,000.

Principal Investigator, Sparse Sensing Methods for Model-Free Sensitivity Estimation and Topology Change Detection using Synchro-Phasor Measurements, Power Systems Engineering Research Center (PSERC), 2014 - 2016, $200,000 ($50,000 to this PI).

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2014, $50,000 ($6,250 to this Co-PI).

Co-Principal Investigator, The MidAmerica Regional Microgrid Education and Training Consortium, Department of Energy (EERE Program), 2013 - 2017, $880,000Ê ($146,667 to this PI)

Principal Investigator, Distributed and Resilient Voltage Control of Distributed Energy Resources in the Smart Grid, ABB, 2013 - 2014, $75,000 ($37,500 to this PI).

Co-Principal Investigator, Renewable Integration Through Risk-Limiting Dispatch and Distributed Resource Aggregation, Department of Energy (CERTS), 2013, $175,000 ($50,000 to this Co-PI).

Co-Principal Investigator, Automated Reliability Reports Research and Implementation – Phase IV, Department of Energy (CERTS), 2013, $140,000 ($30,000 to this Co-PI).

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2013, $50,000 ($8,333 to this Co-PI).

Co-Principal Investigator, Stochastic Hybrid Systems: Applications to Complex System Performability Analysis, Initiative for Mathematical Sciences and Engineering, University of Illinois at Urbana-Champaign, 2012 - 2013, $5,000 ($2,500 to this Co-PI).

Co-Principal Investigator, The Application of Robust Optimization and Control in Power Systems, Power Systems Engineering Research Center (PSERC), 2012 - 2014, $110,000 ($35,000 to this Co-PI).

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2012, $50,000 ($10,000 to this Co-PI).

Co-Principal Investigator, Evaluating the Effects of Managing Controllable Demand and Distributed Energy Resources Locally on System Performance and Costs, Department of Energy (CERTS), 2011 - 2012, $190,000 ($50,000 to this Co-PI).

Co-Principal Investigator, Automated Reliability Reports Research and Implementation – Phase III, Department of Energy (CERTS), 2011 - 2012, $240,000 ($40,000 to this Co-PI).

Co-Principal Investigator, Scalable Submodule Power Conversion Methods for Power Density, Efficiency, Performance, and Protection Leaps in Utility-Scale Photovoltaics, ARPA-E, 2011 - 2014, $1,062,494 ($531,247 to this Co-PI).

Co-Principal Investigator, CPS: Collaborative Research: Smart Power Systems of the Future: Foundations for Understanding Volatility and Improving Operational Reliability, NSF, 2011 - 2015, $700,000 ($350,000 to this Co-PI).

Co-Principal Investigator, Probabilistic Simulation Methodology for Evaluating the Impact of Renewable Intermittency on Operation and Planning, Department of Energy (PSERC), 2011 - 2013, $210,000 ($105,000 to this Co-PI).

Principal Investigator, Real-Time PMU-Based Tools for Monitoring Operational Reliability, Department of Energy (PSERC), 2011 - 2013, $210,000 ($105,000 to this PI).

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2011, $50,000 ($10,000 to this Co-PI).

Principal Investigator, Power Inverter for Autonomous Microgrids, University of Wisconsin, 2010 - 2011, $75,110 ($37,555 to this PI).

Co-Principal Investigator, Integration of Storage Devices into Power Systems with Renewable Energy Sources, Power Systems Engineering Research Center (PSERC), 2010 - 2012, $120,000 ($40,000 to this Co-PI).

Co-Principal Investigator, Automated Reliability Reports Research and Implementation – Phase II, Department of Energy (CERTS), 2010 - 2011, $300,000 ($70,000 to this Co-PI).

Principal Investigator, Impacts on Reliability of Coupling Between Power System Cyber and Physical Components, University of Illinois at Urbana-Champaign (TCIPG), 2010 - 2015, $150,000.

Principal Investigator, CAREER: Reliability Engineering for Electrical Energy Systems 2020: Smart Grid Applications and Beyond, NSF, 2010 - 2015, $400,000.

Co-Principal Investigator, Power Affiliates program, University of Illinois at Urbana-Champaign, 2010, $50,000 ($10,000 to this Co-PI).

Principal Investigator, Reliability Prediction of Power Modules for Traction Applications, John Deere, 2009 - 2012, $20,000.

Principal Investigator, Managing Intermittency in Planning and Operations of Power Systems with Deep Penetration of Wind, NSF, 2009 - 2012, $349,766 ($175,000 to this PI).

Co-Principal Investigator, Implications of the Smart Grid Initiative on Distribution Engineering, Power Systems Engineering Research Center (PSERC), 2009 - 2011, $200,000 ($62,000 to this Co-PI).

Co-Principal Investigator, Scalable and Flat Controls for Reliable Power Grid Operation with High Renewable Penetration, Global Climate and Energy Project, Stanford University, 2009 - 2013, $2,700,000 ($120,000 to this Co-PI).

Principal Investigator, Mechanisms for Reliability Operation of Wind Turbines After Grid Disturbances, General Electric, 2009 - 2011, $15,000.

Co-Principal Investigator, Automated Reliability Reports and Implementation – Phase I, Department of Energy (CERTS), 2009 - 2010, $225,000 ($37,500 to this Co-PI).

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2009, $50,000 ($8,333 to this Co-PI).

Principal Investigator, Efficient Algorithms for Reliability Modeling of Fault-Tolerant Systems, Draper Laboratory, 2008 - 2009, $100,000.

Principal Investigator, Dynamic Fault Coverage Modeling and its Applications to System Reliability Analysis, MIT, 2008 - 2009, $20,300.

Co-Principal Investigator, Power Affiliates Program, University of Illinois at Urbana-Champaign, 2008, $50,000 ($8,333 to this Co-PI).

FOR EDUCATION

Principal Investigator, Student Travel Support for the 2012 North American Power Symposium, NSF, 2012 - 2013, $12,000.

Co-Principal Investigator, Curriculum Development for a Power Electronics Module for Ages 10-13, Power Manufacturers Association, 2012, $15,000 ($5000 to this co-PI)

Books

[B1] A. D. Domínguez-García, *Large-Scale System Analysis Under Uncertainty: With Electric Power Applications*, Cambridge University Press, 2022.

Journal Publications

[J65] O. O. Ajala, N. Baeckeland, B. Johnson, S. Dhople, and A. D. Domínguez-García, "Model Reduction and Dynamic Aggregation of Grid-forming Inverter Networks," *IEEE Transactions on Power Systems*, Accepted for Publication.

[J64] M. Zholbaryssov, A. D. Domínguez-García, and C. N. Hadjicostis, "Fast Distributed Coordination of Distributed Energy Resources over Time-Varying Communication Networks," *IEEE Transactions on Automatic Control*, vol. 68, no. 2, pp. 1023 – 1038, February 2023.

[J63] C. N. Hadjicostis, A. D. Domínguez-García, A. Rikos, "Finite-Time Distributed Balancing," *IEEE Transactions on Automatic Control*, vol. 67, no. 12, pp. 6926 – 6933, December 2022.

[J62] O. O. Ajala, M. Lu, B. Johnson, S. Dhople, A. D. Domínguez-García, "Model Reduction for Inverters with Current Limiting and Dispatchable Virtual Oscillator Control," *IEEE Transactions on Energy Conversion*, vol. 37, no. 4, pp. 2250 – 2259, December 2022.

[J61] C. N. Hadjicostis and A. D. Domínguez-García, "Distributed Balancing under Flow Constraints over Arbitrary Communication Topologies," *IEEE Transactions on Automatic Control*, vol. 66, no. 12, pp. 5637 – 5650, December 2021.

[J60] O. O. Ajala, A. D. Domínguez-García, and D. M. Liberzon, "Robust leader-follower synchronization of electric power generators," *Systems & Control Letters*, vol. 152, pp. 13 – 21, June 2021.

[J59] M. Zholbaryssov and A. D. Domínguez-García, "Safe Data-Driven Secondary Control of Distributed Energy Resources," *IEEE Transactions on Power Systems*, vol. 36, no. 6, pp. 5933 – 5943, May 2021.

[J58] O. O. Ajala, A. D. Domínguez-García, P. W. Sauer, and D. M. Liberzon, "A Library of Second-Order Models for Synchronous Machines," *IEEE Transactions on Power Systems*, vol. 35, no. 6, pp. 4870 - 4879, November 2020.

[J57] S. Dhople, Y. C. Chen, A. Al-Digs, and A. D. Domínguez-García, "Reexamining the Distributed Slack Bus," *IEEE Transactions on Power Systems*, vol. 35, no. 6, pp. 4803 - 4814, November 2020.

[J56] S. Nigam, O. Ajala and A. D. Domínguez-García, "A Controller Hardware-in-the-Loop Testbed: Verification and Validation of Microgrid Control Architectures," in IEEE Electrification Magazine, vol. 8, no. 3, pp. 92-100, September 2020.

[J55] C. N. Hadjicostis and A. D. Domínguez-García, "Privacy-Preserving Distributed Averaging via Homomorphically Encrypted Ratio Consensus," *IEEE Transactions on Automatic Control*, vol. 65, no. 9, pp. 3887 - 3894, September 2020.

[J54] H. Xu, A. D. Domínguez-García, P. W. Sauer, and V. V. Veeravalli, "Data-driven Voltage Regulation in Radial Power Distribution Systems," *IEEE Transactions on Power Systems*, vol. 35, no. 3, pp. 2133 - 2143, May 2020.

[J53] H. Xu, A. D. Domínguez-García, and P. W. Sauer, "Optimal Tap Setting of Voltage Regulation Transformers Using Batch Reinforcement Learning," *IEEE Transactions on Power Systems*, vol. 35, no. 3, pp. 1990 - 2001, May 2020. **Best Papers List for papers published between 2018 and 2020.**

[J52] M. Zholbaryssov and A. D. Domínguez-García, "Convex Relaxations of the Network Flow Problem Under Cycle Constraints," *IEEE Transactions on Control of Network Systems*, vol. 7, no. 1, pp. 64 - 73, March 2020.

[J51] H. Xu, A. D. Domínguez-García, and P. W. Sauer, "Data-driven Coordination of Distributed Energy Resources for Active Power Provision," *IEEE Transactions on Power Systems*, vol. 34, no. 4, pp. 3047 - 3058, July 2019.

[**J50**] D. Fooladivanda, A. D. Domínguez-García, and P. W. Sauer, "Utilization of Water Supply Networks for Harvesting Renewable Energy," *IEEE Transactions on Control of Network Systems*, vol. 6, no. 2, pp. 763 - 774, June 2019.

[**J49**] C. N. Hadjicostis, and A. D. Domínguez-García, "Distributed Balancing of Commodity Networks Under Flow Interval Constraints," *IEEE Transactions on Automatic Control*, vol. 64, no. 1, pp. 51 - 65, January 2019.

[**J48**] M. Zholbaryssov, Dariush Fooladivanda, and A. D. Domínguez-García, "Resilient Distributed Optimal Generation Dispatch for Lossy AC Microgrids," Systems & Control Letters, vol. 123, pp. 47 - 54, January 2019.

[**J47**] D. Fooladivanda, M. Zholbaryssov, and A. D. Domínguez-García, "Control of Networked Distributed Energy Resources in Grid-Connected AC Microgrids," *IEEE Transactions on Control of Network Systems*, vol. 5, no. 4, pp. 1875 - 1886, December 2018.

[**J46**] D. Fooladivanda, H. Xu, A. D. Domínguez-García, and S. Bose, "Offer Strategies for Wholesale Energy and Regulation Markets," *IEEE Transactions on Power Systems*, vol. 33, no. 9, pp. 7305 - 7308, November 2018.

[**J45**] C. N. Hadjicostis, A. D. Domínguez-García, and T. Charalambous, "Distributed Averaging and Balancing in Network Systems with Applications to Coordination and Control," *Foundations and Trends in Systems and Control*, vol. 5, no. 2-3, pp 99 - 292.

[**J44**] J. Zhang, and A. D. Domínguez-García, "Evaluation of Demand Response Resource Aggregation System Capacity Under Uncertainty," *IEEE Transactions on Smart Grid*, vol. 9, no. 3, pp. 1859 - 1868, May 2018.

[**J43**] M. Zholbaryssov, and A. D. Domínguez-García, "Distributed Enforcement of Phase-Cohesiveness for Frequency Control of Islanded Inverter-Based Microgrids," *IEEE Transactions on Control of Network Systems*, vol. 5, no. 3, pp. 1 - 11, September 2018.

[**J42**] J. Zhang, and A. D. Domínguez-García, "On the Impact of Measurement Errors on Power System Automatic Generation Control," *IEEE Transactions on Smart Grid*, vol. 9, no. 3, 1859 -1868, May 2018.

[**J41**] S. T. Cady, M. Zholbaryssov, A. D. Domínguez-García, C. N. Hadjicostis, "A Distributed Frequency Regulation Architecture for Islanded Inertia-Less AC Microgrids," *IEEE Transactions on Control Systems Technology*, vol. 25, no. 6, 1961-1977, November 2017.

[**J40**] Y. C. Chen, S. Dhople, A. D. Domínguez-García, and P. W. Sauer, "Generalized Injection Shift Factors," *IEEE Transactions on Smart Grid*, vol. 8, no. 5, 2071-2080, September 2017.

[**J39**] G. Rovatsos, X. Jiang, A. D. Domínguez-García, and V. V. Veeravalli, "Statistical Power System Line Outage Detection Under Transient Dynamics," *IEEE Transactions on Signal Processing*, vol. 65, no. 11, 2787-2797, June 2017.

[**J38**] J. T. Hughes, A. D. Domínguez-García, and K. Poolla, "Identification of Virtual Battery Models for Flexible Loads," *IEEE Transactions on Power Systems*, vol. 31, no. 6, 4660-4669, November 2016.

[**J37**] D. Apostolopoulou, A. D. Domínguez-García, and P. W. Sauer, "Balancing Authority Area Model and its Application to the Design of Adaptive AGC Systems," *IEEE Transactions on Power Systems*, vol. 31, no. 5, 3756-3764, September 2016.

[**J36**] B. Gharesifard, T. Başar, and A. D. Domínguez-García, "Price-Based Coordination of Networked Distributed Energy Resources," *IEEE Transactions on Automatic Control*, vol. 61, no. 10, 2936-2946, October 2016.

[**J35**] Y. C. Chen, J. Wang, A. D. Domínguez-García, and P. W. Sauer, "Measurement-Based Estimation of the Power Flow Jacobian Matrix," *IEEE Transactions on Smart Grid*, vol. 7, no. 5, 2507-2515, September 2016.

[**J34**] K. E. Van Horn, A. D. Domínguez-García, and P. W. Sauer, "Measurement-Based Real-Time Security-Constrained Economic Dispatch," *IEEE Transactions on Power Systems*, vol. 31, no. 5, 3548-3560, September 2016.

[**J33**] B. A. Robbins and A. D. Domínguez-García, "Optimal Reactive Power Dispatch for Voltage Regulation in Unbalanced Distribution Systems," *IEEE Transactions on Power Systems*, vol. 61, no. 4, 2903-2913, July 2016.

[**J32**] D. Apostolopoulou, A. D. Domínguez-García, and P. W. Sauer, "An Assessment of the Impact of Uncertainty on Automatic Generation Control Systems," *IEEE Transactions on Power Systems*, vol. 61, no. 4, 2657-2665, July 2016.

[**J31**] C. N. Hadjicostis, N. H. Vaidya, and A. D. Domínguez-García, "Robust Distributed Average Consensus via Exchange of Running Sums," *IEEE Transactions on Automatic Control*, vol. 31, no. 6, 1492-1507, June 2016.

[**J30**] L. DeVille, S. Dhople, A. D. Domínguez-García, and J. Zhang, "Moment Closure and Finite-Time Blowup for Piecewise Deterministic Markov Processes," *SIAM Journal on Applied Dynamical Systems*, vol. 15, no. 1, pp. 526-556, January 2016.

[**J29**] Y. C. Chen, T. Banerjee, A. D. Domínguez-García, and V. V. Veeravalli, "Quickest Line Outage Detection and Identification," *IEEE Transactions on Power Systems*, vol. 31, no. 1, pp. 749-758, January 2016.

[**J28**] B. A. Robbins, H. Zhu, and A. D. Domínguez-García, "Optimal Tap Setting of Voltage Regulation Transformers in Unbalanced Distribution Systems," *IEEE Transactions on Power Systems*, vol. 31, no. 1, pp. 256-267, January 2016.

[**J27**] S. T. Cady, A. D. Domínguez-García, and C. N. Hadjicostis, "A Distributed Generation Control Architecture for Islanded AC Microgrids," *IEEE Transactions on Control Systems Technology*, vol. 23, no. 5, pp. 1717-1735, September 2015.

[**J26**] A. D. Domínguez-García and C. N. Hadjicostis, "Distributed Resource Coordination in Networked Systems Described by Digraphs," *Systems & Control Letters*, vol. 82, pp. 33-39, August 2015.

[**J25**] Y. C. Chen, A. D. Domínguez-García, and P. W. Sauer, "A Sparse Representation Approach to Online Estimation of Power System Distribution Factors," *IEEE Transactions on Power Systems*, vol. 30, no. 4, pp. 1727-1738, July 2015.

[**J24**] A. Y.S. Lam, B. Zhang, A. D. Domínguez-García, and D. Tse, "An Optimal and Distributed Method for Voltage Regulation in Power Distribution Systems," *IEEE Transactions on Power Systems*, vol. 30, no. 4, pp. 1714-1726, July 2015.

[**J23**] S. Qin, S. T. Cady, A. D. Domínguez-García, and R. Pilawa-Podgurski, "A Distributed Approach to MPPT for PV Sub-Module Differential Power Processing," *IEEE Transactions on Power Electronics*, vol. 30, no. 4, pp. 2024-2040, April 2015.

[**J22**] Y. C. Chen, A. D. Domínguez-García, and P. W. Sauer, "Measurement-Based Estimation of Linear Sensitivity Distribution Factors and Applications," *IEEE Transactions on Power Systems*, vol. 29, no. 3, pp.1372-1382, May 2014.

[**J21**] S. V. Dhople, L. DeVille, and A. D. Domínguez-García, "A Stochastic Hybrid Systems Framework for Analysis of Markov Reward Models," *Journal of Reliability Engineering and System Safety*, vol. 123, pp. 158-170, Mar. 2014.

[**J20**] S. V. Dhople, Y. C. Chen, L. DeVille, and A. D. Domínguez-García, "Analysis of Power System Dynamics Subject to Stochastic Power Injections," *IEEE Transactions on Circuits and Systems—I: Regular Papers*, vol. 60, no. 12, pp. 3341-3353, Dec. 2013.

[**J19**] S. V. Dhople, Y. C. Chen, and A. D. Domínguez-García, "A Set-Theoretic Method for Parametric Uncertainty Analysis in Markov Reliability and Reward Models," *IEEE Transactions on Reliability*, vol. 62, no. 3, pp. 658-669, Sep. 2013.

[**J18**] X. Jiang, J. Zhang, B. Harding, J. Makela, and A. D. Domínguez-García, "Spoofing GPS Receiver Clock Offset of Phasor Measurement Units," *IEEE Transactions on Power Systems*, vol. 28, no. 3, pp. 3253-3262, Aug. 2013.

[**J17**] B. A. Robbins, C. N. Hadjicostis, and A. D. Domínguez-García "A Two-Stage Distributed Architecture for Voltage Control in Power Distribution Systems," *IEEE Transactions on Power Systems*, vol. 28, no. 2, pp. 1470-1482, May 2013.

[**J16**] X. Jiang, Y. C. Chen, and A. D. Domínguez-García, "A Set-Theoretic Framework to Assess the Impact of Variable Generation on the Power Flow," *IEEE Transactions on Power Systems*, vol. 28, no. 2, pp. 855-867, May 2013.

[**J15**] X. Ding, J. Poon, I. Celanovic, and A. D. Domínguez-García, "Fault Detection and Isolation Filters for Three-Phase Power Electronics Systems," *IEEE Transactions on Circuits and Systems—I: Regular Papers*, vol. 60, no. 4, pp. 1038-1051, Apr. 2013.

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Book Chapters

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[**C24**] A. D. Domínguez-García and C. N. Hadjicostis, "Distributed Algorithms for Control of Demand Response and Distributed Energy Resources," in Proc. of the IEEE Control and Decision Conference, Orlando, FL, December 2011. **Invited**

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[**C21**] Y. C. Chen, X. Jiang, and A. D. Domínguez-García, "Impact of Power Generation Uncertainty on Power System Static Performance," in Proc. of the North American Power Symposium, Boston, MA, August 2011. **Best Student Paper Award**.

[**C20**] A. D. Domínguez-García, C. N. Hadjicostis, P. T. Krein, and S. T. Cady, "Small Inverter-Interfaced Distributed Energy Resources for Reactive Power Support," in Proc. of the IEEE Applied Power Electronics Conference and Exposition, Fort Worth, TX, February 2011.

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[**C17**] C. Chen and A. D. Domínguez-García "Assessing the Impact of Wind Variability on Power System Small-Signal Reachability," in Proc. of the Hawaii International Conference on System Sciences, Kuaui, HI, January 2011.

[**C16**] A. D. Domínguez-García and S. Trenn, "Detection to Impulsive Effects in Switched DAEs with Application to Power Electronics Reliability Analysis," in Proc. of the IEEE Control and Decision Conference, Atlanta, GA, December 2010.

[**C15**] A. D. Domínguez-García and C. N. Hadjicostis, "Coordination and Control of Distributed Energy Resources for Provision of Ancillary Services," in Proc. of IEEE International Conference on Smart Grid Communication, Gaithersburg, MD, October 2010.

[**C14**] K. Levin, E. Hope, and A. D. Domínguez-García, "Observer-Based Fault Diagnosis of Power Electronics Systems," in Proc. of the IEEE Energy Conversion Congress and Exposition, Atlanta, GA, September 2010.

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[**C11**] M. Müller and A. D. Domínguez-García, "On Input-to-State Stability Notions for Reachability Analysis of Power Systems," in Proc. of the IEEE International Symposium on Circuits and Systems, Paris, France, June 2010.

[**C10**] A. Bazzi, A. D. Domínguez-García, and P. T. Krein, "A Method for Impact Assessment of Faults on the Performance of Field-Oriented Control Drives: A First Step to Reliability Modeling," in Proc. of the IEEE Applied Power Electronics Conference and Exposition, Palm Springs, CA, February 2010.

[**C9**] S. C. Chang, F. M. Yaul, A. D. Domínguez-García, F. O'Sullivan, D. M. Otten, and J. H. Lang, "Harvesting Energy from Moth Vibrations During Flight," in Proc. of the International Workshop on Micro and Nanotechnologies for Power Generation and Energy Conversion Applications, Washington, DC, December 2009.

[**C8**] E. Hope and and A. D. Domínguez-García, "Design Verification of Power Electronics Systems Subject to Uncertainty," in Proc. of the IEEE Energy Conversion Congress and Exposition, San Jose, CA, September 2009.

[**C7**] S. V. Dhople, A. Davoudi, P. L. Chapman, and A. D. Domínguez-García, "Reliability Assessment of Fault-Tolerant DC-DC Converters for Photovoltaic Applications," in Proc. of the IEEE Energy Conversion Congress and Exposition, San Jose, CA, September 2009.

[**C6**] G. Hanuschak, N. Harrison, E. Crawley, S. Hall, A. D. Domínguez-García, J. West, and N. Dennehy, "A Comparison of Fault-Tolerant GN&C System Architectures Using the Object Process Network (OPN) Modeling Language," in Proc. of the AIAA Guidance, Navigation and Control Conference and Exhibit, Chicago, IL, August 2009.

[**C5**] A. D. Domínguez-García and P. T. Krein, "A Framework for Multi-Level Reliability Evaluation of Electrical Energy Systems," in Proc. of the IEEE Conference on Global Sustainable Energy Infrastructure, Atlanta, GA, November 2008.

[**C4**] A. D. Domínguez-García and P. T. Krein, "Integrating Reliability into the Design of Fault-Tolerant Power Electronic Systems," in Proc. of the IEEE Power Electronics Specialist Conference, Rhodes, Greece, June 2008.

[**C3**] A. D. Domínguez-García, G. Z. Hanuschak, S. R. Hall, and E. F. Crawley, "A Comparison of Guidance, Navigation and Control Architectural Approaches for Robotic and Human-Rated Spacecraft," in Proc. of the AIAA Guidance, Navigation and Control Conference and Exhibit, Hilton Head, SC, August 2007.

[**C2**] A. D. Domínguez-García, J. G. Kassakian, J. E. Schindall, and J. J. Zinchuk, "On the Use of Behavioral Models for the Integrated Performance and Reliability Performance Evaluation of Fault-Tolerant Avionics Systems," in Proc. of the IEEE/AIAA Digital Avionics Systems Conference, Portland, OR, October 2006. **Best Student Paper Award**.

[**C1**] A. D. Domínguez-García, J. G. Kassakian, and J. E. Schindall, "A Backup System for Automotive Steer-by-Wire, Actuated by Selective Braking," in Proc. of the IEEE Power Electronics Specialist Conference, Aachen, Germany, June 2004.

Technical Reports

[**R10**] O. O. Ajala, A. D. Domínguez-García, and P. W. Sauer, *A Hierarchy of Models for Inverter-Based Microgrids,* Coordinated Science Laboratory Technical Report UILU-ENG-17-2201, University of Illinois at Urbana-Champaign, May 2017.

[**R9**] S. T. Cady, A. D. Domínguez-García, C. N. Hadjicostis, *A Distributed Generation Control Architecture for Small-Footprint Power Systems*, Coordinated Science Laboratory Technical Report UILU-ENG-13-2206, University of Illinois at Urbana-Champaign, July 2013.

[**R8**] S. V. Dhople, L. DeVille, and A. D. Domínguez-García, *A stochastic hybrid systems framework for analysis of Markov reward models*, Coordinated Science Laboratory Technical Report UILU-ENG-13-2205, University of Illinois at Urbana-Champaign, June 2013.

[**R7**] Author, *IEEE Vision for Smart Grid Controls: 2030 and Beyond*, IEEE Control Systems Society and IEEE Standards Association, July 2013.

[**R6**] X. Jiang, B. Harding, J. Makela, and A. D. Domínguez-García, *Spoofing GPS Receiver Clock Offset of Phasor Measurement Units*, Coordinated Science Laboratory Technical Report UILU-ENG-12-2205, University of Illinois at Urbana-Champaign, June 2012.

[**R5**] A. D. Domínguez-García, C. N. Hadjicostis, and N. H. Vaidya, *Distributed Algorithms for Consensus and Coordination in the Presence of Packet-Dropping Communication Links, Part I: Statistical Moments Analysis Approach*, Coordinated Science Laboratory Technical Report UILU-ENG-11-2207, University of Illinois at Urbana-Champaign, September 2011.

[**R4**] N. H. Vaidya, C. N. Hadjicostis, and A. D. Dominguez-Garcia, *Distributed Algorithms for Consensus and Coordination in the Presence of Packet-Dropping Communication Links Part II: Coefficients of Ergodicity Analysis Approach*, Coordinated Science Laboratory Technical Report UILU-ENG-11-2208, University of Illinois at Urbana-Champaign, September 2011.

[**R3**] Contributor, *Reliability Considerations from Integration of Smart Grid*, North American Reliability Corporation, December 2010.

[**R2**] Contributor, *Grainger Center for Electric Machinery and Electromechanics Annual Report*, University of Illinois at Urbana-Champaign, 2009, 2010, 2011, 2012, 2013, and 2014.

[**R1**] Contributor, *Power Affiliates Program Annual Report*, University of Illinois at Urbana-Champaign, 2009, 2010, 2011, 2012, 2013, and 2014.

Theses

A. D. Domínguez-García, *An Integrated Methodology for the Performance and Reliability Evalution of Fault-Tolerant Systems*, Ph.D. Thesis, Massachusetts Institute of Technology, Cambridge, MA, June 2007.

A. D. Domínguez-García, *Refurbishment and Improvement of a* 27/5 *kV* - 10 *MVA Power Substation for a Coal Mine*, Ingeniero Industrial Thesis, University of Oviedo, Spain, September 2001.

Other Publications

S. Purandare, S. Qin, S.-V. Dhople, A. D. Domínguez-García, R. Pilawa-Podgurski, and L. L. Goddard, *Harnessing Energy*, L. L. Goddard, Editor.

Invited Talks *Data-Drive Coordination of Distributed Energy Resources*, Smart Grid Seminar, Stanford University, Stanford, CA, March 2022.

Data-driven Coordination of Assets in Power Distribution Systems for Provision of Ancillary Services, Colloquia on Digital Transformation Science, C3.ai Digital Transformation Institute, Webinar, June 2021.

Data-driven Coordination of Assets in Power Distribution Systems for Provision of Ancillary Services, Center for Control, Dynamical Systems, and Computation Seminar Series, University of California, Santa Barbara, Webinar, May 2021.

Data-driven Coordination of Assets in Power Distribution Systems for Provision of Ancillary Services, Power Systems Seminar Series, Iowa State University, Webinar, March 2021.

Data-driven Coordination of Assets in Power Distribution Systems for Provision of Ancillary Services, Center for Information Systems and Engineering, Boston University, Webinar, November 2020.

Data-driven Coordination of Assets in Power Distribution Systems for Provision of Ancillary Services, Workshop on Forging Connections between Machine Learning, Data Science, and Power Systems Research, National Science Foundation, March 2020.

Data-driven Coordination of Assets in Power Distribution Systems for Provision of Ancillary Services, Power Systems Engineering Research Center, Webinar, November 2019.

Data-driven Coordination of Assets in Power Distribution Systems for Provision of Ancillary Services, Keynote Speech at Symposium on Machine Learning, Optimization, and Security for Future Energy Delivery Systems, IEEE GlobalSIP 2019, Ottawa, Canada, November 2019.

Resilient Architectures and Algorithms for Generation Control of Inertialess AC Microgrids, NSF Workshop On Power Electronics-Enabled Operation Of Power Systems, November 2019.

Data-driven Coordination of Distributed Energy Resources, Laboratory for Information & Decision Systems Seminar Series, Massachusetts Institute of Technology, Cambridge, MA, October 2019.

Data-driven Coordination of Assets in Power Distribution Systems for Provision of Ancillary Services, Cymer Center for Control Systems and Dynamics Seminar, Department of Mechanical and Aerospace Engineering, University of California San Diego, La Jolla, May 2019.

Resilient Architectures and Algorithms for Generation Control of Inertialess AC Microgrids, Department of Electrical and Computer Engineering Seminar, University of Cyprus, Nicosia, Cyprus, January 2018.

Resilient Architectures and Algorithms for Generation Control of Inertialess AC Microgrids, Penn Workshop on Network Resilience, University of Pennsylvania, Philadelphia, PA, November 2017.

Resilient Architectures and Algorithms for Generation Control of Inertialess AC Microgrids, Michigan Power and Energy Laboratory Seminar, University of Michigan, Ann Arbor, MI, October 2017.

Distributed Architectures for Control and Coordination of Distributed Energy Resources in Microgrids, Typhoon HIL, Webinar, September 2017.

Assessing the impact of uncertainty on Demand Response Aggregation System, IEEE Power and Energy Society General Meeting, Chicago, IL, July 2017.

Distributed Enforcement of Phase-Cohesiveness for Frequency Control of Islanded Inverter-Based Microgrids, IEEE Power and Energy Society General Meeting, Chicago, IL, July 2017.

Architectures and Algorithms for Distributed Generation Control of Inertia-Less AC Microgrids, Renewable Energy Analysis Laboratory Seminar, University of Washington, Seattle, WA, May 2017.

Architectures and Algorithms for Distributed Generation Control of Inertia-Less AC Microgrids, IEEE Smart Grid, Webinar, February 2017.

Architectures and Algorithms for Distributed Generation Control of Inertia-Less AC Microgrids, Power Systems Engineering Research Center, Webinar, November 2016.

Architectures and Algorithms for Distributed Generation Control of Inertia-Less AC Microgrids, Rigorous Systems Research Group Seminar, California Institute of Technology, Pasadena, CA, October 2016.

Architectures and Algorithms for Distributed Generation Control of Inertia-Less AC Microgrids, Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, MN, May 2016.

Decentralized Control of Distributed Resources for Emerging Applications in Electric Power Systems, Department of Electrical and Computer Engineering, University of Minnesota, Minneapolis, MN, November 2015.

Decentralized Control and Coordination of Distributed Resources and its Application in Emerging Electrical Energy Systems, Department of Electrical and Computer Engineering, University of Cyprus, Nicosia, Cyprus, November 2014.

Decentralized Control and Coordination of Distributed Resources and its Application in Emerging Electrical Energy Systems, Automatic Control Laboratory, ETH, Zurich, Switzerland, November 2014.

Decentralized Control of Distributed Energy Resources and its Application to Microgrid Generation Control, Department of Electrical Engineering and Computer Science, Missouri University of Science and Technology, Rolla, MO, October 2014.

Decentralized Approaches to Control and Coordination of Distributed Resources, Department of Mechanical and Aerospace Engineering, University of California San Diego, La Jolla, CA, May 2014.

Measurement-Based Estimation of Linear Sensitivity Distribution Factors and Applications, Department of Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN, March 2014.

Decentralized Approaches to Control and Coordination of Distributed Energy Resources, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, January 2014.

Distributed Algorithms for Resource Coordination in Networked Systems Described by Directed Graphs, Applied Math Seminar, University of Illinois at Urbana-Champaign, Urbana, IL, November 2013.

Decentralized Approaches to Control and Coordination of Distributed Energy Resources, NSF Workshop on Computing, Control, and Signal Processing Challenges in Future Power Systems, Washington, DC, November 2013.

Decentralized Approaches to Control and Coordination of Distributed Energy Resources, Central Illinois Section IEEE Chapter, Urbana, IL, October 2013.

Decentralized Approaches to Control and Coordination of Distributed Energy Resources, Northeastern University, Boston, MA, August 2013.

Decentralized Approaches to Control and Coordination of Distributed Energy Resources, Google, Mountain View, CA, July 2013.

Decentralized Approaches to Control and Coordination of Distributed Energy Resources, Systems Sciences Seminar, University of Michigan, Ann Arbor, MI, April 2013.

A Price-Based Approach to Control of Networked DERs, Center for Discrete Mathematics and Theoretical Computer Science (DIMACS), Rutgers University, Piscataway, NJ, February 2013.

Decentralized Optimal Coordination of Distributed Energy Resources, Department of Industrial and Enterprise Systems Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, November 2012.

Decentralized Optimal Coordination of Distributed Energy Resources, Symposium on Critical Challenges at the Interface of Mathematics and Engineering, Initiative for Mathematical Sciences and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, September 2012.

Reliability Modeling of Cyber-Physical Electric Power Systems: A System-Theoretic Framework, IEEE Power and Energy Society General Meeting, San Diego, CA, July 2012.

Engineering Reliable Electrical Energy Systems: Smart Grid Applications for 2020 and Beyond, University of Illinois ECE Department Alumni Event, Austin TX, April 2012.

Decentralized Optimal Coordination of Distributed Energy Resources, Energy Systems Seminar, University of Texas at Austin, Austin, TX, April 2012.

Reliability Engineering for Electrical Energy Systems 2020: Smart Grid Applications and Beyond, University of Castilla – La Mancha, Toledo, Spain, December, 2011.

Distributed Algorithms for Control of Demand Response and Distributed Energy Resources, Energy Group Seminar, Stanford University, Stanford, CA, December 2011.

Reliability Engineering for Electrical Energy Systems 2020: Smart Grid Applications and Beyond, Foundations of Information Engineering Seminar, Cornell University, New York, NY, November 2011.

Reliability Engineering for Electrical Energy Systems 2020: Smart Grid Applications and Beyond, Center for Sustainable Energy, Notre Dame University, South Bend, IN, October 2011.

Reliability Engineering for Electrical Energy Systems 2020: Smart Grid Applications and Beyond, Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA, October 2011.

Reliability Engineering for Electrical Energy Systems 2020: Smart Grid Applications and Beyond, Laboratory for Information and Decision Systems, Massachusetts Institute of Technology, Cambridge, MA, August 2011.

Coordination and Control of Distributed Energy Resources for Provision of Ancillary Services, Center for Nonlinear Studies, Los Alamos National Laboratory, NM, June 2011.

Reliability Engineering for Electrical Energy Systems 2020: Smart Grid Applications and Beyond, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, Berkeley, CA, April 2011.

Coordination and Control of Distributed Energy Resources for Provision of Ancillary Services, Center for Information Systems and Engineering, Boston University, Boston, MA, April 2011.

Coordination and Control of Distributed Energy Resources for Provision of Ancillary Services, Department of Electrical and Computer Engineering, Northeastern University, Boston, MA, April 2011.

Coordination and Control of Distributed Energy Resources for Provision of Ancillary Services, Power Systems Seminar, University of Wisconsin – Madison, January 2011.

Coordination and Control of Distributed Energy Resources for Reactive Power Support, TRUST Security Seminar, University of California, Berkeley, Berkeley, CA, November 2010.

Coordination and Control of Distributed Energy Resources for Reactive Power Support, Power Systems Control and Automation Laboratory, Georgia Tech., Atlanta, GA, September 2010.

Reliability Engineering: From Aerospace and Automotive Applications to Electric Power Systems, School of Engineering, University of Oviedo, Spain, May 2010.

Impact of Wind Variability on Power System Small-Signal Reachability, Electric Power and Energy Systems Seminar, Iowa State University, Ames, IA, April 2010.

Impact of Wind Variability on Power System Small-Signal Reachability, Department of Electrical and Computer Engineering, University of Iowa, Iowa City, IA, April 2010.

Reliability Engineering for Next Generation Electrical Energy Systems, Electric Power Systems Seminar, Arizona State University, Tempe, AZ, October 2009.

Reliability Engineering for Next Generation Electrical Energy Systems, Central Illinois Section IEEE Chapter, Urbana, IL, September 2009.

Advanced Methods for Reliability Evaluation and Design Validation, Hamilton Sundstrand, Rockford, IL, January 2009.

Design for Reliability of Energy Processing Systems, Rock Valley Section IEEE Chapter, Rockford, IL, January 2009.

Integrating Reliability into the Design of Energy Processing Systems, Department of Electrical and Computer Engineering, Northeastern University, Boston, MA, January 2009.

Design for Reliability of Energy Processing Systems, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, October 2008.

Integrating Reliability into the Design of Fault-Tolerant Power Electronics Systems, Laboratory for Electromagnetic and Electronic Systems, Massachusetts Institute of Technology, Cambridge, MA, July 2008.

New Frontiers in the Analysis, Design and Optimization of Ultra-Reliable Electronic Systems, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, May 2007.

A Comparison of Conceptually Different Approaches to Achieve Fault-Tolerance in Steer-by-Wire Systems, MIT/Industry Consortium on Advance Automotive Electrical/Electronic Components and Systems, Seattle, WA, April 2007.

An Integrated Methodology for the Performance and Reliability Evaluation of Fault-Tolerant Systems, Mechanical Engineering Department, Oregon State University, Corvallis, OR, October 2006.

Modeling for Reliability of Electrical Power Net Architectures for X-by-Wire Systems, MIT/Industry Consortium on Advance Automotive Electrical/Electronic Components and Systems, Barcelona, Spain, October 2004.

Use of Differentiated Backup Mechanisms to Improve X-by-Wire Reliability, MIT/Industry Consortium on Advance Automotive Electrical/Electronic Components and Systems, San Diego, CA, April 2004.

A Study of Fault-Tolerant approaches to X-by-Wire systems, MIT/Industry Consortium on Advanced Automotive Electrical/Electronic Components and Systems, Tokyo, Japan, October 2003.

Invited Workshops

Analytic Research Foundations for the Next Generation Electric Grid, National Research Council, Beckman Center, February 2015.

Energy Infrastructure: Designing for Stability and Resilience, Center for Discrete Mathematics and Computer Science, Rutgers University, February 2013.

Computational Needs for the Next Generation Electric Grid, Department of Energy, Cornell University, April 2011.

Energy and Power Educational Programs Development, NSF/Electrical and Computer Engineering Department Heads Association, October 2010.

New Research Directions for Future Cyber-Physical Energy Systems, NSF, June 2009.

Service

PROFESSIONAL ORGANIZATIONS

Fellow, IEEE, January 2022 - Present.

Senior Member, IEEE, November 2019 - December 2022.

Site Director, Power Systems Engineering Research Center, January 2017 - Present.

Member, Board of Directors, Energy Education Council, July 2017 - August 2020.

Chair, University Education Subcommittee, Power and Energy Education Committee, IEEE Power and Energy Society, July 2013 - July 2015.

Vice-chair, University Education Subcommittee, Power and Energy Education Committee, IEEE Power and Energy Society, July 2012 - July 2013.

Secretary, University Education Subcommittee, Power and Energy Education Committee, IEEE Power and Energy Society, July 2011 - July 2012.

Chair, Reliability Engineering of Cyber-Physical Electrical Energy Systems Task Force, Reliability, Risk and Probability Applications Subcommittee, IEEE Power and Energy Society; July 2010 - July 2014.

Chair, Distinguished Lecturer Program Committee, IEEE Power Electronics Society, March 2011 - December 2012.

Member, IEEE Control Systems Society, January 2012 - Present.

Member, IEEE Communications Society, Member, January 2011 - December 2011.

Member, IEEE Reliability Society, Member, January 2008 - December 2012.

Member, Reliability, Risk and Probability Applications Subcommittee, IEEE Power and Energy Society, July 2008 - Present.

Member, IEEE Power and Energy Society, January 2008 - Present.

Member, IEEE Power Electronics Society, January 2008 - Present.

Member, IEEE, October 2002 - November 2019.

EDITORSHIPS

Editor, IEEE Transactions on Power Systems, January 2020 - Present.

Editor, IEEE Power Engineering Letters, January 2020 - Present.

Associate Editor, IEEE Transactions on Control of Network Systems, July 2018 - June 2021.

Editor, IEEE Transactions on Power Systems, July 2011 - December 2018.

Editor, IEEE Power Engineering Letters, June 2012 - December 2017.

Guest Editor, IEEE Journal on Selected Areas in Communications, Series on Smart Grid Communications, 2014.

Guest Editor, Guest Editor, IEEE Transactions on Energy Conversion, Special Issue on Advanced Distributed Control of Energy Conversion Devices and Systems, 2014.

Guest Editor, IEEE Transactions on Power Electronics, Special Issue on Robust Design and Reliability in Power Electronics, 2014.

CONFERENCE ORGANIZATION

Co-Chair, Allerton Conference on Communication, Control, and Computing, October 2019.

Session Organizer, "Electric Power Systems," Allerton Conference on Communication, Control, and Computing, October 2019.

Session Organizer, "Control and Optimization of Electric Power Systems," Allerton Conference on Communication, Control, and Computing, October 2018.

Technical Program Committee Member, "Control and Operation of Responsive Grids" IEEE International Conference on Smart Grid Communications, October 2017.

Session Organizer, "Mathematical Challenges in Electric Power System," Allerton Conference on Communication, Control, and Computing, October 2017.

Webinar Organizer, Power Systems Engineering Research Center, January 2017 - Present.

Session Organizer, "Control and Optimization in Energy Systems," Allerton Conference on Communication, Control, and Computing, October 2015.

Session Organizer, "Control and Optimization in Electrical Energy Systems: Smart Grid Applications and Beyond," Allerton Conference on Communication, Control, and Computing, October 2014.

Symposium Co-Chair, "Support for Storage, Renewable Resources and Micro-grids," IEEE International Conference on Smart Grid Communications, October 2013.

Session Organizer, "Control and Optimization Problems in Electrical Energy Systems," Allerton Conference on Communication, Control, and Computing, October 2013.

General Chair, North American Power Symposium, September 2012.

Session Organizer, "Pricing and Control in Power Systems and Markets," Allerton Conference on Communication, Control, and Computing, October 2012.

Session Organizer, "Emerging Paradigms for Control and Optimization in Power Grids," Allerton Conference on Communication, Control, and Computing, October 2011.

Symposium Co-Chair, "Architectures and Models for the Smart Grid," IEEE International Conference on Smart Grid Communications, October 2011.

Session Organizer, "Engineering Reliable and Trustworthy Cyber-Physical Electric Power Systems," Allerton Conference on Communication, Control, and Computing, October 2010.

Panel Organizer, "Engineering Reliable Cyber-Physical Electrical Energy Systems," IEEE Power and Energy Society General Meeting, July 2010.

JOURNAL REVIEWS

IEEE Transactions on Control of Network Systems.

IEEE Transactions on Power Systems.

IEEE Transactions on Power Electronics.

IEEE Transactions on Energy Conversion.

IEEE Transactions on Automatic Control.

IEEE Transactions on Smart Grid.

IEEE Transactions on Control Systems Technology.

IEEE Transactions on Circuits and Systems.

Electric Power Systems Research.

PROPOSAL REVIEW AND PANELS

ARPA-E, 2018 - Present.

National Science Foundation, 2009 - Present.

Department of Energy, 2013 - Present.

UNIVERSITY COMMITTEES

Member, Campus Budget Oversight Committee, November 2022 - Present

Member, Ad Hoc Committee on Faculty Development and Mentoring, August 2020 - June 2021.

Member, Promotion and Tenure Committee, Department of Electrical and Computer Engineering, August 2020 - Present.

Chair, Scholarships, Student Awards, and Honors Committee, Department of Electrical and Computer Engineering, August 2018 - August 2022.

Chair, Professor Rank, Advisory Committee Department of Electrical and Computer Engineering, August 2020 - August 2022.

Member, Taskforce on training for P&T committees at all levels to address issues of diversity and equity in the promotion process, 2020 - 2021

Chair, Power and Energy Systems Area Committee, Department of Electrical and Computer Engineering, August 2017 - Present.

Member, Colloquium Committee, Department of Electrical and Computer Engineering, August 2017 - Present.

Member, Smart Grid Managing Director Search Committee, Information Trust Institute, 2017.

Member (elected), Associate Professor Rank, Advisory Committee Department of Electrical and Computer Engineering, August 2017 - August 2018.

Member, Energy and Sustainability Engineering Council, College of Engineering, 2017 - Present.

Member, Coordinator of Undergraduate Research Search Committee, College of Engineering, 2013 - 2014.

Member, ECE Department Head Search Committee, Department of Electrical and Computer Engineering, 2013 - 2014. Member, Coordinator of Undergraduate Research Search Committee, College of Engineering, 2013 - 2014.

Member (elected), Assistant Professor Rank, Advisory Committee Department of Electrical and Computer Engineering, August 2013 - August 2014.

Chair, Graduate Recruitment Committee, Department of Electrical and Computer Engineering, September 2013 - August 2015.

Member, Graduate Recruitment Committee, Department of Electrical and Computer Engineering, September 2011 - Present.

Member, Curriculum Committee, Department of Electrical and Computer Engineering, September 2010 - Present.

Member, Fellowships Committee, Department of Electrical and Computer Engineering, September 2010 - August 2011.

Member, Scholarships, Student Awards, and Honors Committee, Department of Electrical and Computer Engineering, September 2008 - August 2010.

Member, Graduate Committee, Department of Electrical and Computer Engineering, September 2008 - August 2010.

Advising

Ph.D. THESES

Eric Silk, TBD.

Temitope Amuda, TBD.

T.G. Roberts, TBD.

Siddhartha Nigam, Verification and Validation of Microgrid Control Architectures on a Controller Hardware in the Loop Testbed, August 2022.

Madi Zholbaryssov, *Optimal and resilient management of distributed energy resources*, University of Illinois at Urbana-Champaign, December 2019.

Hanchen Xu, *Data-Driven Coordination of Assets in Power Distribution Systems for Ancillary Service Provision*, August 2019.

Olaoluwapo O. Ajala, *A Hierarchy of Microgrid Models with Some Applications*, University of Illinois at Urbana-Champaign, December 2018.

Xichen Jiang, *Real-Time Power System Topology Change Detection and Identification*, University of Illinois at Urbana-Champaign, August 2016.

Jiangmeng Zhang, *A Unified Framework for Impact Evaluation of Cyber-Physical Events on Power Systems*, University of Illinois at Urbana-Champaign, August 2016.

Justin Hughes, *A Framework for Enabling the Utilization of Flexible Loads to Provide Frequency Regulation*, University of Illinois at Urbana-Champaign, May 2016.

Stanton Cady, *Architectures and Algorithms for Distributed Generation Control of Microgrids*, University of Illinois at Urbana-Champaign, May 2016.

Kai Van Horn, *Real-Time Power System Operational Reliability Tools*, University of Illinois at Urbana-Champaign, December 2015.

Brett Robbins, *Architectures and Algorithms for Voltage Control in Power Distribution Systems*, University of Illinois at Urbana-Champaign, May 2015.

Christine Chen, *Measurement-Based Tools for Power System Monitoring and Operations*, University of Illinois at Urbana-Champaign, December 2014.

Sairaj Dhople, *Renewable Electric Power Systems Energy Yield and Performance Evaluation*, University of Illinois at Urbana-Champaign, December 2012.

M.S. THESES

T.G. Roberts, *Secondary Voltage and Frequency Control for Dispatchable Virtual Cscillator Controlled Inverters*, University of Illinois at Urbana-Champaign, May 2022.

Isaac Lawanson, *Reliability analysis of a power electronic integrated generator for wind energy conversion systems*, University of Illinois at Urbana-Champaign, May 2022.

Samuel C. Utomi, *Hardware-in-the-loop platform for the coordination of distributed energy resources to provide frequency regulation services*, University of Illinois at Urbana-Champaign, May 2018.

Madi Zholbaryssov, *Fault Detection and Isolation in Switched Linear Systems and Applications*, University of Illinois at Urbana-Champaign, May 2014.

Justin Hughes, *Type-C Wind Turbine Model Order Reduction and Parameter Identification*, University of Illinois at Urbana-Champaign, December 2012.

Jiangmeng Zhang, *On the Application of PMU Measurements to Power System Stability Analysis*, University of Illinois at Urbana-Champaign, December 2012.

Stanton Cady, *Robust Implementation of Algorithms for Distributed Generation Control of Small-Footprint Power Systems*, University of Illinois at Urbana-Champaign, December 2012.

Xiangyu Ding, *Observer-Based Fault Detection Filters for Three-Phase Inverters and STATCOMs*, University of Illinois at Urbana-Champaign, May 2012.

Xichen Jiang, *Spoofing GPS Receiver Clock Offset of Phasor Measurement Units*, University of Illinois at Urbana-Champaign, May 2012.

Kieran Levin, *Observer-Based Fault Detection in DC-DC Power Converters*, University of Illinois at Urbana-Champaign, May 2012.

Jarod Delhotal, *Observer-Based Fault Detection and Isolation for Motor Drive Inverters*, University of Illinois at Urbana-Champaign, December 2011.

Brett Robbins, *Distributed Algorithms for Voltage Control in Electrical Networks*, University of Illinois at Urbana-Champaign, May 2011.

Christine Chen, *Assessing Renewable Resource Penetration on Power System Small-Signal Reachability*, University of Illinois at Urbana-Champaign, May 2011.

Sebastian Smater, *A Framework for Assessing the Reliability of Wind Energy Conversion Systems*, University of Illinois at Urbana-Champaign, December 2009.

Frank Lam, *A tool for Reliability Analysis of Electrical Power Systems*, University of Illinois at Urbana-Champaign, December 2009.

Eric Hope, *Design Verification of Power Electronics Systems Subject to Bounded Uncertain Inputs*, University of Illinois at Urbana-Champaign, December 2009.

SENIOR THESES

Minerva Carballo Palacio, *Steady-State Analysis of Power Networks Based on Droop-Controlled Inverters*, University of Illinois at Urbana-Champaign, May 2022.

Javier Gutierrez Catalan, *Implementation of a Real-Time Microgrid Model for Controller Hardware-in-the-Loop Testing of Microgrid Controls*, University of Illinois at Urbana-Champaign, May 2022.

Gines Martinez Rivera, *Implementation of Microgrid Distributed Control Architectures on an Industrial-Grade Control Hardware Platform*, University of Illinois at Urbana-Champaign, May 2022.

Patricia Samper Lario, *Feasible Flow Algorithm for Frequency Control for Islanded AC Microgrids*, University of Illinois at Urbana-Champaign, June 2020.

Alejandro Mayoral Iglesias, *Implementation of a Controller Hardware-in-the-Loop Testbed for Distributed Coordination and Control Architectures*, University of Illinois at Urbana-Champaign, June 2020.

Diego Begara Bretón, *Implementation of Voltage Regulation Control Scheme in Distributed Computing Platform*, University of Illinois at Urbana-Champaign, June 2020.

Sara Linares Calero, *Reliability Analysis of Power-Electronic Grid Interface Topologies for Wind Energy Conversion Systems*, University of Illinois at Urbana-Champaign, June 2020.

Roy Bell, *A Global Maximum Power Point Tracking Method for PV Module Integrated Converters*, University of Illinois at Urbana-Champaign, December 2011.

Justin Hughes, *Predictive Model for Estimating Wind Farm Power Output*, University of Illinois at Urbana-Champaign, December 2010.

Xiangyu Ding, *Simulation Tool for Analyzing Reliability of Electrical Energy System*, University of Illinois at Urbana-Champaign, May 2010.

Xichen Jiang, *Experimental Verification of Ellipsoidal Bounding Techniques for Power Electronic Systems Subject to Uncertain Inputs*, University of Illinois at Urbana-Champaign, May 2010.

POSTDOCTORAL RESEARCH ASSOCIATES

Madi Zholbaryssov, June 2019 - May 2021.

Olaoluwapo O. Ajala, March 2019 - August 2020.

Dariush Fooladivanda, March 2016 - May 2018.

Teaching

UNIVERSITY FORMAL CURRICULUM

ECE 554/ME 544: Dynamic System Reliability, University of Illinois at Urbana-Champaign, Spring 2015.

ECE 476: Power System Analysis, University of Illinois at Urbana-Champaign, Fall 2014.

ECE 313: Probability with Engineering Applications, University of Illinois at Urbana-Champaign, Spring 2014.

ECE 476: Power System Analysis, University of Illinois at Urbana-Champaign, Fall 2013.

ECE 598 ADG: Dynamic System Reliability, University of Illinois at Urbana-Champaign, Spring 2013 (included in the University of Illinois List of Teachers Ranked As Excellent).

ECE 476: Power System Analysis, University of Illinois at Urbana-Champaign, Fall 2012 (included in the University of Illinois List of Teachers Ranked As Excellent).

ECE 333: Green Electric Energy, University of Illinois at Urbana-Champaign, Spring 2012.

ECE 333: Green Electric Energy, University of Illinois at Urbana-Champaign, Fall 2012.

ECE 333: Green Electric Energy, University of Illinois at Urbana-Champaign, Spring 2011.

ECE 598 ADG: Dynamic System Reliability, University of Illinois at Urbana-Champaign, Spring 2011 (included in the University of Illinois List of Teachers Ranked As Excellent).

ECE 476: Power System Analysis, University of Illinois at Urbana-Champaign, Fall 2010.

ECE 333: Green Electric Energy, University of Illinois at Urbana-Champaign, Spring 2010.

ECE 476: Power System Analysis, University of Illinois at Urbana-Champaign, Fall 2009.

ECE 598 ADG: Dynamic System Reliability, University of Illinois at Urbana-Champaign, Spring 2009.

ECE 330: Power Circuits and Electromechanics, University of Illinois at Urbana-Champaign, Fall 2008 (included in the University of Illinois List of Teachers Ranked As Excellent).

Electric Circuit Theory, University of Oviedo, Spring 2002.

SHORT COURSES

Guest Lecturer, Sustainable Energy, University of Illinois Laboratory High School, Course Director: S. Denos, 2015, and 2017.

Coordinator and Instructor, Power and Energy Module, Cena y Ciencias Program: An NSF-sponsored scientific outreach program for the students in the English-Spanish language program at Urbana's Dr. Preston L. Williams and Leal Schools, Program Coordinators: R. Diaz, F. Menanteau, R. J. Whitaker, S. M. Wald, 2017.

Coordinator and Instructor, Girls Learning Electrical Engineering: A Summer Camp for Female High-School Students, University of Illinois at Urbana-Champaign, Camp Coordinator: L. L. Goddard, 2010, 2011, 2012, 2013, and 2014.

Instructor, Illini Summer Academies: A Summer Camp for High-School Students, University of Illinois at Urbana-Champaign, Camp Coordinator: L. L. Goddard, 2012, 2013, and 2014.

COURSE DEVELOPMENT

ECE 554/ME 544 (formerly ECE 598 ADG): Dynamic System Reliability, Electrical and Computer Engineering Department and Mechanical Science and Engineering Department, University of Illinois at Urbana-Champaign.

Doctoral Committees

A. Chattopadhyay, TBD, Advisor: A. Witmer.

A. Madavan, *Risk-Sensitive Optimization for Power Systems*, August 2022, Advisor: S. Bose.

M. Ndrio, *Design And Analysis of Competitive Electricity Markets*, June 2021, Advisor: S. Bose.

G. Rovatsos, *Dynamic Anomaly Detection in Sensor Networks*, Advisor: V. Veeravalli.

A. Stilwell, *Beyond PWM: Active Balancing, Start-Up and ZVS for Multi-Level Converters with Applications in Renewable Energy Systems*, August 2019, Advisor: R. Pilawa-Podgurski.

E. Candan, *Improving Data Center Power Delivery Efficiency with Differential Power Processing and Multi-Level Power Converters*, June 2019, Advisor: R. Pilawa-Podgurski.

M. Liu, *Decentralized Optimization Approach for Power Distribution Network and Microgrid Controls*, May 2018, Advisor: H. Zhu.

K. E. Reinhard, *Power System Dynamic Modeling and Synchrophasor Measurements*, May 2017, Advisor: P. W. Sauer.

T. Hutchins, Ph.D., *Modeling, Simulation, and Mitigation of the Impacts of the Late Time (E3) High-Altitude Electromagnetic Pulse on Power Systems*, December 2015, Advisor: T. J. Overbye.

R. Bhana, Ph.D., *Methods to Ensure the Adequate Primary Frequency Response of Low Inertia Power Systems*, May 2015, Advisor: T. J. Overbye.

D. Apostolopoulou, Ph.D., *Enhanced Automatic Generation Control with Uncertainty*, December 2014, Advisor: P. W. Sauer.

T. Banarjee, Ph.D. *Data-Efficient Quickest Change Detection*, August 2014, Advisor: V. V. Veeravalli.

K. A. Kim, Ph.D., *Hot Spot Detection and Protection Methods for Photovoltaic Systems*, August 2014, Advisor: P. T. Krein.

S. A. Kim, Ph.D., *Power System Analysis Criteria-Based Computational Efficiency Enhancement for Power Flow and Transient Stability*, August 2014, Advisor: T. J. Overbye

R. Chen, Ph.D., *Model-Based Fault Detection and Diagnosis of Selective Catalytic Reduction Systems for Diesel Engines*, August 2014, Advisor: X. Wang

V. T. Buyukdegirmenci, *A Framework for Dynamic Characterization and Short-term Thermal Capability Assessment of Electric Machines and Inverters in Motor Drives*, May 2014, Advisor: P. T. Krein.

Y. Degeilh, *Stochastic Simulation of Power Systems with Integrated Renewable and Utility-Scale Storage Resources*, May 2014, Advisor: G. Gross.

A. S. Kowli, *Reinforcement Learning Techniques for Controlling Resources in Power Networks*, University of Illinois at Urbana-Champaign, May 2013. Advisor: S. P. Meyn.

B. B. Johnson, *Control, Analysis, and Design of Distributed Inverter Systems*, University of Illinois at Urbana-Champaign, May 2013. Advisor: P. T. Krein.

N. Jain, *Thermodynamics-Based Optimization and Control of Integrated Energy Systems*, University of Illinois at Urbana-Champaign, May 2013. Advisor: A G. Alleyne.

S. Dutta, *Data Mining and Graph Theory Focused Solutions to Smart Grid Challenges*, University of Illinois at Urbana-Champaign, December 2012. Advisor: T. J. Overbye.

M. A. Negrete-Pincetic, *Intelligence by Design in an Entropic Power Grid*, University of Illinois at Urbana-Champaign, December 2012. Advisor: S. P. Meyn.

A. T. Becker, *Ensemble Control of Robotic Systems*, University of Illinois at Urbana-Champaign, August 2012. Advisor: T. W. Bretl.

Y. Kuai, *Comprehensive Optimization and Practical Design of Power Electronic Systems Under Multiple Competing Performance Demands*, University of Illinois at Urbana-Champaign, August 2012. Advisor: P. L. Chapman.

P. S. Shenoy, *Improving Performance, Efficiency, and Reliability of DC-DC Conversion Systems by Differential Power Processing*, University of Illinois at Urbana-Champaign, August 2012. Advisor: P. T. Krein.
A. K. Tanwani, *Invertibility and Observability of Switched Systems with Inputs and Outputs*, University of Illinois at Urbana-Champaign, December 2011. Advisor: D. M. Liberzon.

K. M. Rogers, *Data-Enhanced Applications for Power Systems Analysis*, University of Illinois at Urbana-Champaign, December 2011. Advisor: T. J. Overbye.

H. A. Pulgar Painemal, *Wind Farm Model for Power System Stability Analysis*, University of Illinois at Urbana-Champaign, December 2010. Advisor: P. W. Sauer.

A. A. Aquino-Lugo, *Distributed and Decentralized Control of the Power Grid*, University of Illinois at Urbana-Champaign, December 2010. Advisor: T. J. Overbye.

A. M. Bazzi, *Designing Better Induction Motor Drive Systems from Efficiency, Reliability, and Power Electronics Perspectives*, University of Illinois at Urbana-Champaign, December 2010. Advisor: P. T. Krein.

C. M. Davis, *Multiple Event Contingency Screening*, University of Illinois at Urbana-Champaign, May 2009. Advisor: T. J. Overbye.

B. C. Rackowski, *Identification of Critical Lines for Power System Operational Reliability Assessment*, University of Illinois at Urbana-Champaign, December 2008. Advisor: P. W. Sauer.

J. E. Tate, *Event Detection and Visualization Based on Phasor Measurement Units for Improved Situational Awareness*, University of Illinois at Urbana-Champaign, August 2008. Advisor: T. J. Overbye.