JONATHAN M. SNODGRASS

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RESEARCH AREAS

- Active topics: Electric Power Systems Planning and Optimization, Transmission and distribution system co-simulation, Electric vehicle integration, Grid Resilience, GMD and EMP analysis and mitigation, Electric transmission network planning, Optimal power flow, Integration of renewable energy resources, Smart Grids
- Research Interests: Protective Relaying, Energy Markets, Microgrids

EDUCATION

University of Wisconsin, Madison, Wisconsin — December 2018, December 2021

- Master of Science and PhD in Electrical Engineering with a minor in optimization
- Dissertation: Tractable Algorithms for Constructing Electric Power Network Models
- Advisors: Dr. Christopher DeMarco & Dr. Bernard Lesieutre
- Coursework emphasis: power systems, power electronics, optimization, automatic control systems

Texas A&M University, College Station, Texas — August 2016

- Master of Science in Electrical Engineering, power systems emphasis
- Thesis: Analysis of lightning arrester overloading in future distribution systems with distributed generation
- Advisor: Dr. Le Xie
- Coursework emphasis: Power systems, electric machines, linear control systems

Texas A&M University, College Station, Texas — May 2012

- Bachelor of Science in Electrical Engineering, electrical power and controls specialties, Magna Cum Laude
- Coursework emphasis: Power systems, electric machines, power electronics, linear controls systems, signal processing

RESEARCH

Senior Research Engineer, Texas A&M University, College Station, Texas — June 2022 - Present
Postdoctoral Researcher, Texas A&M University, College Station, Texas — September 2021 - June 2022

PI (Principal Investigator) of Research Projects:

- A Utility-Scale Plan for Accelerating the Deployment of Multi-Family EV Charging Infrastructure, TAMU portion $150,000, $2M project total, DOE VTO — 10/2023 - 09/2025
- Transmission Study on Heavy Duty Truck Electrification for Northern California, ElectroTempo, TAMU Portion $40,000 — 06/2024 - 06/2025
- Scalable Truck Charging Demand Simulation for Cost-Optimized Infrastructure Planning, TAMU portion $97,200, $320,000 project total, DOE VTO — 10/2021 - 12/2024

- Study of the Impact of Geomagnetic Disturbance (GMD) Events on the Entergy System Associated with NERC TPL-007.1, Entergy, TAMU Portion $37,000 01/2023 - 12/2023

Co-PI of Research Projects:

- Research, Development, and Demonstration of a Natural Hazard and Large Language Model Enhanced Electric Grid Planning Tool, DOE CESER TAMU Portion $2,500,000 12/2025 - 12/2028
- Electric Grid Resilience, National Institute of Standards and Technology (NIST), TAMU portion $1,500,000 07/2024 - 09/2026
- Proposal lead of Texas A&M and Prairie View A&M Regional Grid Consortium, DOE Grid Deployment Office (GDO), TAMUS Portion $600,000 09/2024 - 11/2025
- Enhanced Geomagnetic Disturbance Modeling, DOE CESER, TAMU portion $1,000,000 02/2022 - 09/2025
- HEMP Transmission Consequence Model, DOE CESER TAMU Portion $600,000 10/2021 - 09/2025

Researcher on Projects:

- ARPA-E GO (Grid Optimization) Competition Challenge 3, TAMU Portion $550,000 01/2022 - 10/2024
- PSERC S-102G: Second Stage in the Feasibility Assessment of the Synchronous Operations of the North American Eastern and Western Interconnections, TAMU portion $100,000 12/2022 - 05/2024
- PSERC S-99: Incorporating Climate Impacts into Electricity System Planning Models, TAMU portion $64,000 08/2022 - 09/2023
- PSERC S-91: Generating Value from Detailed, Realistic Synthetic Electric Grids, TAMU portion $32,000 09/2021 - 08/2022

Graduate Research Assistant, University of Wisconsin-Madison Fall 2016 - Summer 2021

Researcher on Projects:

- PSERC S-91: Generating Value from Detailed, Realistic Synthetic Electric Grids, UW-Madison portion $32,000 9/2020 - 08/2021
- ARPA-E GO (Grid Optimization) Competition Challenge 2 08/2020 - 08/2021
- ARPA-E PERFORM (Performance-based Energy Resource Feedback, Optimization, and Risk Management), UW-Madison Portion $200,000 09/2019 - 08/2021
- ARPA-E GO (Grid Optimization) Competition Challenge 1, UW-Madison portion $165,000.00 11/2018 - 12/2019
- Lead PhD student for EPIGRIDS (Electric Power Infrastructure and Grid Representations in Interoperable Data Sets), ARPA-E GRID DATA (Generating Realistic Information for the Development of Distribution and Transmission Algorithms), UW-Madison Portion $1,801,587 09/2016 - 02/2020

Undergraduate Research Projects Supervised:

Economic Analysis of Energy Storage, Spring 2020

- Andrew Bryce and Matthew Vervelde analyzed variations in LMP data to determine an algorithm for optimal placement of energy storage in transmission and distribution systems

United States power system analysis and modeling, 2017 - 2018

- Tyler Whitmore, Andrew Bryce and Michael Zupan created sets of transmission line parameters and statistics from limited publicly available data that were used to create realistic synthetic power system models

Underground transmission line modeling Spring 2019

- Tyler Whitmore and Zach Wesson extended the synthetic power system models to include underground transmission lines

Substation configuration and modeling Spring 2019

- Co-supervised Zach Wesson's senior design project to create a substation modeling algorithm and list of criteria to convert synthetic bus-branch models to more detailed node-breaker models

Graduate Research Assistant (unpaid), Texas A&M University, College Station, Texas 9/2015 – 5/2016

- Examined the impact of line-to-ground faults on transmission line protective equipment on the high side of delta-wye transformers
- Conducted research on successful islanding of distribution networks with distributed generation
- Calculated the economic and reliability impacts of load shedding for successful islanding

PUBLICATIONS

† indicates publications from projects led as PI, ‡ indicates publications from projects co-led as co-PI,
* indicates students directly supervised

Journal Publications

[J3] S. Taylor, A. Rangarajan, N. Rhodes, J. Snodgrass, B. C. Lesieutre and L. A. Roald, "California Test System (CATS): A Geographically Accurate Test System Based on the California Grid," in *IEEE Transactions on Energy Markets, Policy and Regulation*, vol. 2, no. 1, pp. 107-118, March 2024,

‡ [J2] P. Dehghanian, A. Zhang, R. Fatima, J. Snodgrass, A. B. Birchfield, K. R. Davis, T. J. Overbye, "An Integrated Assessment of a G3 GMD Event on Large-Scale Power Grids: From Magnetometer Data to Geomagnetically Induced Current Analysis," in *IEEE Transactions on Industry Applications*, vol. 60, no. 1, pp. 1634-1644, Jan. 2024.

[J1] J. Snodgrass and L. Xie, "Overvoltage analysis and protection of lightning arresters in distribution systems with distributed generation," *International Journal of Electrical Power & Energy Systems*, vol. 123, p. 106209, 2020.

Conference Publications

[C27] F. Safdarian, J. Cook, K. Zhgun, T.J. Overbye, J. Snodgrass, "Power Flow Modeling of the Impacts of Weather and Other Resiliency Hazards with a Focus on Transmission Planning," 58th Hawaii International Conference on System Sciences, Waikoloa, HI, January 2025.

†[C26] L. Haylow*, D. Wallison, J. Snodgrass, T.J. Overbye, "Undergraduate Research on Big Data Analysis: Towards Large-Scale Electric Vehicle Integration Studies," 2024 North American Power Symposium (NAPS), El Paso, TX, Oct. 2024.

[C25] J.S. Cook, F. Safdarian, J. Snodgrass, and T.J. Overbye, "Large-Scale Weather Correlations for a Possible Interconnection of North American Power Grids," 2024 North American Power Symposium (NAPS), El Paso, TX, Oct. 2024.

‡[C24] N. LoGuidice, J. Snodgrass, T. J. Overbye, "Estimating the Electric Field from Geomagnetically Induced Currents," Kansas Power and Energy Conference 2024, April 2024.

[C23] F. Safdarian, S. Kunkolienkar, J. Snodgrass, A. Birchfield, T. Overbye, "Creating a Portfolio of Large-Scale, High-Quality Synthetic Grids: A Case Study," Kansas Power and Energy Conference 2024, April 2024.

[C22] F. Safdarian, M. Stevens, J. Snodgrass, T. J. Overbye, "Detailed Hourly Weather Measurements for Power System Applications", 2024 IEEE Texas Power and Energy Conference (TPEC), College Station, TX, Feb. 2024.

[C21] S. Kunkolienkar, F. Safdarian, J. Snodgrass, A. Birchfield, T. Overbye, "A Description of the Texas A&M University Electric Grid Test Case Repository for Power System Studies", 2024 IEEE Texas Power and Energy Conference (TPEC), College Station, TX, Feb. 2024.

[C20] J.S. Cook, F. Safdarian, J. Snodgrass, and T.J. Overbye, "Using Power Flow Application Capabilities to Visualize and Analyze US Energy Information Administration Generation Data", 2024 IEEE Texas Power and Energy Conference (TPEC), College Station, TX, Feb. 2024.

[C19] M. Stevens, T. J. Overbye, J. Snodgrass, A. B. Birchfield, "Generating Electric Field Test Patterns for Electric Grid Resiliency Studies", 2023 North American Power Symposium, October 2023.

[C18] E. Ekeruche*, S. Kunkolienkar, J. Snodgrass, T.J. Overbye, "Undergraduate Research on Improving Power Grid Planning Models", 2023 North American Power Symposium, Asheville, NC, October 2023.

[C17] J. L. Wert, T. Chen*, F. Safdarian, J. Snodgrass, and T. J. Overbye, "Calculation and Validation of Weather-Informed Renewable Generator Capacities in the Identification of Renewable Resource Droughts," IEEE PowerTech 2023, Belgrade, Serbia, June 2023.

[C16] S. Kunkolienkar, F. Safdarian, J. Snodgrass, T. J. Overbye, "Quantification of Area Sparsity in Large-Scale Electric Grids," Kansas Power and Energy Conference 2023, April 2023.

[C15] S. Kunkolienkar, F. Safdarian, J. Snodgrass, T. J. Overbye, "Creating Active and Reactive Power Reserve Zones for Large-Scale Electric Grids," Kansas Power and Energy Conference 2023, April 2023.

[C14] F. Safdarian, J. Penaranda, S. Kang, J. Snodgrass, A. Birchfield, T. J. Overbye, "Improving Load Time Series of Electric Power Systems based on the Temperatures," Kansas Power and Energy Conference 2023, April 2023.

‡[C13] J. Griffin*, B. Kruse*, M.S. Bitar, J. Snodgrass, K. Davis, and T.J. Overbye, "Properties of Geomagnetic Disturbances and How they Might Effect Power Systems: An Analysis of Past Geomagnetic Disturbances," IEEE Texas Power and Energy Conference at College Station, TX, February 2023.

‡[C12] S.E. Hurt*, J. Snodgrass, T.J Overbye, “Undergraduate Research on Adding Relay Models and Generator Capability Curves to Synthetic Electric Grids,” IEEE Texas Power and Energy Conference at College Station, TX, February 2023.

‡[C11] A. Zhang, P. Dehghanian, M. Stevens, J. Snodgrass, and T. J. Overbye, “Synthetic Geomagnetic Field Data Creation for Geomagnetic Disturbance Studies using Time-series Generative Adversarial Networks,” IEEE Texas Power and Energy Conference at College Station, TX, February 2023.

[C10] T. J. Overbye, F. Safdarian, W. Trinh, Z. Mao, J. Snodgrass, and J. Yeo, “An Approach for the Direct Inclusion of Weather Information in the Power Flow,” Proc. 56th Hawaii International Conference on System Sciences (HICSS), January 2023.

[C9] J. Yeo, W. Trinh, S. Hurt, J.Wert, J. Snodgrass, and T. J. Overbye, “Selectively Modeling Generator Capability Curves Based on Critical Generator Parameter Rankings,” 14th IEEE PES Asia-Pacific Power and Energy Engineering Conference, Melbourne, Australia, November 2022.

[C8] F. Safdarian, J. Snodgrass, J. Yeo, A. Birchfield, C. Coffrin, C. Demarco, S. Elbert, B. Eldridge, T, Elgindy, S. Greene, N. Guo, J. Holzer, B. Lesieutre, H. Mittelmann, R. O’Neill, T. J. Overbye, B. Palmintier, P. Van Henternryck, A. Veeramany, T. WK Mak, and J. Wert, “Grid Optimization Competition on Synthetic and Industrial Power Systems,” North American Power Symposium, Salt Lake City, UT, October 2022.

‡[C7] J. Wert, P. Dehghanian, J. Snodgrass, and T.J. Overbye, “The Effects of Correctly Modeling Generator Step-Up Transformer Status in Geomagnetic Disturbance Studies,” North American Power Symposium, Salt Lake City, UT, October 2022

[C6] T. J. Overbye, J. Snodgrass, A. Birchfield, and M. Stevens, “Towards Developing Implementable High Altitude Electromagnetic Pulse E3 Mitigation Strategies for Large-Scale Electric Grids,” IEEE. Texas Power and Energy Conference (TPEC), February 2022.

[C5] J. Snodgrass, S. Kunkolienkar, U. Habiba, Y. Liu, M. Stevens, F. Safdarian, T. Overbye, and R. Korab, “Case Study of Enhancing the MATPOWER Polish Electric Grid,” IEEE Texas Power and Energy Conference, College Station, TX, February 2022.

‡[C4] J. L. Wert, P. Dehghanian, A. Zhang, M. Stevens, R. Guthrie, J. Snodgrass, K. S. Shetye, T. J. Overbye, K. R. Davis, and J. Gannon, “Analysis of Magnetometer Data from a Strong G3 Geomagnetic Disturbance,” in the 2022 IEEE Texas Power and Energy Conference (TPEC), College Station, TX, February 2022.

[C3] S. Babaeinejadsarookolaee, J. Snodgrass, S. Acharya, S. Greene, B. Lesieutre, and C. DeMarco, "Comparison of Real and Synthetic Network Models of the Western United States with Respect to New Realism Measures," in 2021 IEEE Power and Energy Conference at Illinois (PECI), Mar. 2021.

[C2] C. Coffrin, A. Birchfield, J. Snodgrass, T.J. Overbye, C.L. DeMarco, B. Lesieutre, , et al., “The power grid library for benchmarking ac optimal power flow algorithms,” *arXiv preprint arXiv:1908.02788*, Aug. 2019.

[C1] A. A. Almehizia and J. Snodgrass, "Investigation of V2G Economical viability," in 2018 IEEE Texas Power and Energy Conference (TPEC), 2018, pp. 1-6.

TEACHING

Instructor of Record

Texas A&M University

- ECEN 214: Electrical Circuit Theory, Course enrollment: 90 — Spring 2022

University of Wisconsin-Madison

- ECE 355: Electromechanical Energy Conversion, University of Wisconsin-Madison — Summer 2019

DELTA Institute, University of Wisconsin-Madison — Fall 2017 - Spring 2021

- Conducted a teaching-as-research project as part of a semester-long internship project
- Completed 4 pedagogy courses on teaching in science and engineering inquiry-based learning, research mentoring, and internationally diverse teaching

INDUSTRY EXPERIENCE

Graduate Summer Intern, Oncor Electric Delivery, Fort Worth, Texas — May 2015 - August 2015

- Researched and documented Oncor's compliance with NERC PRC 005-2 standard for testing power line carrier communication channels
- Completed a transmission level (345kV) generator interconnect study for a proposed wind generating facility
- Conducted a distribution level (15kV) distributed generation interconnect study for a proposed photovoltaic generating facility

Electrical Engineer II, Zachry Engineering, Amarillo, Texas — July 2012 - July 2014

- Performed design work on three natural gas combustion turbine power plants - simple cycle Xcel Jones Station 4 and combined cycle Calpine Channel and Deer Park Energy Centers
- Designed electrical schematics for key electrical equipment including generator and switchyard breakers, 480V and 4160V switchgear, generator step-up transformers, and a 5600 HP gas compressor
- Created time-current curves and developed relay settings for 480V switchgear
- Revised electrical one-line and protective relaying and metering one-line drawings
- Conducted a plant grounding study to meet IEEE 80 requirements for safe step and touch potentials
- Completed load flow and short circuit studies to provide data for relay settings and equipment ratings
- Managed electrical cable databases and supervised cable routing for all 3 plants

Summer Internships, Cisco Systems, Austin, Texas — Summer 2009 - Summer 2011

- Created customer-facing bug tracking reports as a problem management engineer — 2011
- Conducted a physical and logical inventory and performed data center management as a junior system administrator — 2010
- Updated process documentation and managed data entry as a project coordinator — 2009

AWARDS

- Texas A&M Engineering Staff Excellence Award, Texas A&M University — 2025

- Best poster finalist, IEEE Energy and Policy Forum, Washington DC 2025
- Gerald Holdridge TA Teaching Excellence Award, University of Wisconsin-Madison 2021
- Grainger Graduate Student Fellowship, University of Wisconsin-Madison 2020
- Best Poster Award, Power Conference at Illinois (PECI) 2019
- ARAP-E Energy Innovation Summit Student Program Scholarship 2019
- Powell Industries Fellowship, Texas A&M University 2015
- Summa Cum Laude Honors, Texas A&M University 2012
- National Merit Scholar, Texas A&M University 2008

LEADERSHIP, SERVICE

Academic Service: University of Wisconsin, Madison

- Graduate student representative on the ECE department PhD grad committee 2019 - 2020
- ECE Graduate Student Association: Secretary (2017-2019), Public Relations Officer (2019-2020) 2017 - 2021
- Power System Research Group: Graduate Student Office Manager 2017 - 2021
- Coordinated graduate student feedback for the faculty candidate search committee 2019 - 2021

Supervising and Mentoring

Texas A&M University

Full time Research Engineers supervised:

- Eric Keller 2024 - Present
- Hayat Mbayed 2022 - 2023

Master's Student Workers Supervised (Research): 2024 - Present

- Hwiyoon Kim
- Selorm Dzakpasu
- Hitarth Chopra

Undergraduate Students Supervised: 2022 - Present

- Nathan Philipello
- Eduardo Carstensen
- Abdoulaye Diop
- William Yun
- Jonathan Ruiz
- Harshkumar Patel
- Nikola Slavchev
- Jaehyeok Kwon
- Rachel Kurian
- Jeweliana Mendez
- Lyric Haylow
- Brian Lee
- Talha Ibrahim

- Emran Ahmed
- Jacqueline Aguilera
- Stephen Hurt
- Juntao (Thomas) Chen
- Juliana Day
- Alexandra (Alex) Gonce
- Jack Griffin
- Blake Kruse

Served as a mentor to many of Professor Tom Overbye's graduate students

University of Wisconsin Madison Fall 2016 - Summer 2021

Undergraduate Students Supervised: Fall 2017 - Spring 2020

- Andrew Bryce
- Anna Iwanski
- Caleb Kuske
- Jordan Nunez
- Matthew Vervelde
- Jacob Yatso
- Michael Zupan
- Peer-mentored graduate students Sogol Babaeinejad, Antara Khadria, Noah Rhodes, Sofia Taylor Fall 2016 - Summer 2021

Professional

- IEEE PES General Meeting, Local Organizing Committee Member 2024 - 2025
- IEEE Power and Energy Society, Power System Optimization Task Force, Secretary 2024 - Present
- One Day Academy, Austin Tx: Advisory Board Member 2017 - Present
- IEEE Region 5, Panhandle section: IEEE Young Professionals Chair 2012 - 2014
- Amarillo Toastmasters International: Secretary (2012-2013): VP of Public Relations (2014) 2012 - 2014
- NCFCA (National Christian Forensics and Communication Association) speech and debate league: Alumnus judge 2008 - 2010

Academic Paper Reviewer

- IEEE Systems Journal 2024 - Present
- IEEE Transactions on Power Systems 2022 - Present
- American Geophysical Union (AGU) Space Weather Journal 2022 - Present
- Texas Power and Energy Conference 2022 - Present
- Elsevier Electric Power Systems Research Journal 2019 - Present
- Power System Computational Conference 2019 - Present
- Elsevier International Journal of Electrical Power and Energy Systems 2019
- IEEE Power and Energy Society General Meeting 2018

Community

- City Church, Young Professionals Program Leader 2017 - 2020
- Awana Clubs International: High School Program Director 2014 - 2016
- The Navigators: Amarillo College Campus Director 2013 - 2014
- The Navigators: West Texas A&M University Associate Staff 2012 - 2014
- Awana clubs international: Junior High program director 2009 - 2012
- Impact Ministries: Volunteer counselor at camps for incoming A&M freshmen 2011

CONTINUING EDUCATION

Electrical Engineering

- GE EMS 015C: AEMS Source: Building a Generation Model 2023
- GE EMS 114W: Network Modeling in Source 2023
- GE EMS 112W: SCADA Modeling with Source 2022
- GE EMS 111W: Power System Modeling in Source 2022
- GE GRID102E and EMS103E, Habitat Databases v5.10 2021
- Steady State Power System Security Analysis, PowerWorld Corporation 2018
- OPAL-RT LAB, Real-time digital simulator and hardware-in-the-loop training 2015
- SEL PROT 401, Protecting Power System for Engineers 2014
- SES CDEGS, Power system grounding and electromagnetic interference training 2013
- NFPA 70: NEC 2014, Overview and review of the 2014 National Electrical Code 2013
- SKM Power Tools 101 & 102, Low flow, load flow, short circuit, and arc flash training 2012
- SEL PROT 405, Industrial Power System Protection 2012

Teaching and Pedagogy

- DELTA Institute, University of Wisconsin-Madison 2017 - 2021
- UW-Madison I-LEAP: Instructor Learning Environment and Pedagogics, 2-day workshop 2019
- Texas A&M University Academy for Future Faculty 2014 - 2016
- ENGR 681: Professional Seminar for Future Faculty 2015
- Texas A&M Teaching Assistant Institute 2014

Leadership and Project Management

- Global Leadership Summit 2013, 2014, 2016, 2018, 2025
- Project Management for Graduate Students training course 2018

ADDITIONAL SKILLS

Computer System Administration

- Manage the software and hardware for computer research labs
- Perform the specification, ordering, and coordinating installation and set-up of new computers for the lab
- Coordinate with department IT personnel to manage remote desktop users, shared storage resources, and updates and maintenance on lab computers

Project Management

- Organized and directed both individual undergraduate meetings and team group meetings
- Directed a 4-person electrical engineering senior design team as an undergraduate at Texas A&M

Computer Software

- Advanced: MATLAB, PowerWorld Simulator
- Intermediate: SKM Power Tools, CDEGS, AutoCAD, Python
- Basic Knowledge: PSS/E, Linux, Julia, PowerModels

PROFESSIONAL MEMBERSHIPS AND LICENSES

- IEEE Power and Energy Society, Member 2018 - Present
- IEEE Eta Kappa Nu Honor Society, Member 2010 - Present
- Engineer in Training, Texas 2012 - Present
- Toastmasters International, Member, CC, CL 2012 - 2015
- Phi Kappa Phi, Member 2011 - 2014
- Phi Theta Kappa, Member 2006 - 2011

ACADEMIC AND PROFESSIONAL REFERENCES

References are available upon request