

Adam B. Birchfield

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Education

Texas A&M University College Station, TX
Ph.D., Electrical Engineering, Energy and Power Area Dec. 2018

University of Illinois at Urbana-Champaign Urbana, IL
M.S., Electrical and Computer Engineering, Energy and Power Area Dec. 2016

Auburn University Auburn, AL
B.E.E., Electrical Engineering, Summa Cum Laude, Honors Scholar Dec. 2014

Experience

Texas A&M University College Station, TX
Assistant Professor, Electrical and Computer Engineering Nov. 2020—present
Graduate Research Assistant, ECEN Dec. 2016—Dec. 2018

Electric Power Research Institute Charlotte, NC
Engineer/Scientist, Transmission Operations and Planning, Electromagnetic Threats Group Sept. 2019—Nov. 2020

Birchfield Consulting LLC College Station, TX
Independent Research Consultant, contracting to Texas A&M University Dec. 2018—Sept. 2019

University of Illinois at Urbana-Champaign Graduate Research Assistant, Electrical and Computer Engineering	Urbana, IL Aug. 2015—Dec. 2016
Electric Power Research Institute Contract Engineer, Power System Studies Research Group	Knoxville, TN Feb. 2015—Aug. 2015
Alabama Power Company Engineering Summer Intern, APC Transformer and Electrical Shops	Calera, AL May 2014—Aug. 2014
Technische Universität Kaiserslautern Research Intern, German Academic Exchange Service (DAAD) RISE Program	Kaiserslautern, Germany May 2013—Aug. 2013
Itron, Inc. Student Intern, Research and Development	West Union, SC May 2012—Aug. 2012

Teaching

Texas A&M University

- *ECEN 616 Electromagnetic Transients in Power Systems*, Spring 2025, Fall 2022
- *ECEN 460 Power Systems Operation and Control*, Spring 2024, Spring 2023, Spring 2021
- *ICPE 615 Smart Grid Fundamentals*, intensive course, Dec 2024, Dec 2023, Dec 2022
- Industry Short Course on *Electric Grid Dynamics and Stability*, Apr. 9-11, 2024
- Industry Short Course on *Electric Grid Impacts of Geomagnetic Disturbances*, Nov 1-2, 2023
- *ECEN 615 Methods of Large-Scale Electric Grid Analysis*, Fall 2023, Fall 2021
- *ECEN 214 Electrical Circuit Theory*, Spring 2022
- Short Course on *Power System Analysis*, for Southwest Power Pool, Oct-Nov 2021
- Short course on *Automating PowerWorld with Python*, Nov. 19-22, 2019

- Graduate Teaching Fellow: *ECEN 460 Power Systems Operation and Control*, Fall 2018 [J8]
- Guest Lecturer, “Synthetic power grids,” in *ECEN 615 Methods of Electric Power System Analysis*, Fall 2018
- Fellow of the Academy for Future Faculty, Center for the Integration of Research, Teaching, and Learning (CIRTL), Apr. 2018
- Teaching Assistant, Guest Lecturer, *ECEN 460 Power Systems Operation and Control*, Fall 2017

Books

- [B1] J. D. Glover, T. J. Overbye, A. B. Birchfield, and M. S. Sarma, *Power System Analysis and Design*, 7th ed. Boston, MA: Cengage, 2023.

Journal Publications

(Mentored graduate students marked with asterisk *, undergraduate with double asterisk **)

- [J21] R. Hoff, R. Sparks, M. Chester, A. Mustafa, N. Johnson, A. Birchfield, T. McPheasron, R. Li, N. Ahmad, and I. Searles, “Cascading failure propagation and perfect storms in interdependent infrastructures,” *ASCE Open: Multidisciplinary Journal of Civil Engineering*, vol. 3, no. 1, pp. 1-15, Feb. 2025.
- [J20] A. Birchfield and Y. Abu-Khalifa*, “Structural characterisation for the synthesis of large-scale combined electric-gas networks,” *IET Energy Systems Integration*, vol. 6, no. S1, pp. 816-827, Sept. 2024.
- [J19] C. Mateo, F. Postigo, T. Elgindy, A. Birchfield, P. Duenas, B. Palmintier, N. Panossian, T. Gomez, F. de Cuadra, T. Overbye, F. Safdarian, and D. Wallison, “Building and validating a large-scale combined transmission & distribution synthetic electricity system of Texas,” *International Journal of Electrical Power and Energy Systems*, vol. 159, pp. 1-11, Aug. 2024.
- [J18] A. Birchfield, “Geographic coordinate validation and assignment using an edge-constrained layout,” in *Journal of Engineering and Applied Science*, vol. 27, no. 112, pp. 1-20, May 2024.
- [J17] P. Dehghanian, A. Zhang, R. Fatima*, J. Snodgrass, A. B. Birchfield, K. R. Davis, and 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.-Feb. 2024.

- [J16] T. J. Overbye, K. R. Davis, and A. B. Birchfield, "The Electric Grid and Severe Resiliency Events." in *The Bridge: National Academy of Engineering Journal*, vol. 53, no. 2, 2023, pp. 73-79.
- [J15] A. B. Birchfield and T. J. Overbye, "A review on providing realistic electric grid simulations for academia and industry," in *Current Sustainable Renewable Energy Reports*, vol. 10, pp. 154-161, Jun. 2023.
- [J14] Y. Abu-Khalifa* and A. B. Birchfield, "Techniques for creating synthetic combined electric and natural gas transmission grids," in *IEEE Transactions on Industry Applications*, vol. 59, no. 4, pp. 4734-4743, July-Aug. 2023.
- [J13] A. B. Birchfield, "Graph decomposition for constructing blackstart restoration strategies in benchmark cases," *Electric Power Systems Research*, Nov. 2022.
- [J12] H. Li *et al.*, "Building highly detailed synthetic electric grid data sets for combined transmission and distribution systems," in *IEEE Open Access Journal of Power and Energy*, vol. 7, pp. 478-488, Nov. 2020.
- [J11] A. B. Birchfield and T. J. Overbye, "Mosaic Packing to Visualize Large-Scale Electric Grid Data," in *IEEE Open Access Journal of Power and Energy*, vol. 7, pp. 212-221, Jun. 2020.
- [J10] C. Coffrin, et al., "The power grid library for benchmarking ac optimal power flow algorithms," Pre-print available: <https://arxiv.org/pdf/1908.02788.pdf>, Aug. 2019.
- [J9] R. H. Lee, K. S. Shetye, A. B. Birchfield, and T. J. Overbye, "Using detailed ground modeling to evaluate electric grid impacts of late-time high-altitude electromagnetic pulses (E3 HEMP)," *IEEE Transactions on Power Systems*, vol. 34, no. 2, pp. 1549-1557, Mar. 2019.
- [J8] A. B. Birchfield, T. J. Overbye, and K. R. Davis, "Educational applications of large synthetic power grids," *IEEE Transactions on Power Systems*, vol. 34, no. 1, pp. 765-772, Jan. 2019.
- [J7] A. B. Birchfield and T. J. Overbye, "Techniques for drawing geographic one-line diagrams: Substation spacing and line routing," *IEEE Transactions on Power Systems*, vol. 33, no. 6, pp. 7269-7276, Nov. 2018.

- [J6] A. B. Birchfield, T. Xu, and T. J. Overbye, “Power flow convergence and reactive power planning in the creation of large synthetic grids,” *IEEE Transactions on Power Systems*, vol. 33, no. 6, pp. 6667-6674, Nov. 2018.
- [J5] T. Xu, A. B. Birchfield, and T. J. Overbye, “Modeling, tuning, and validating system dynamics in synthetic electric grids,” *IEEE Transactions on Power Systems*, vol. 33, no. 6, pp. 6501-6509, Nov. 2018.
- [J4] J. L. Gannon, A. B. Birchfield, K. S. Shetye, and T. J. Overbye, “A comparison of peak electric fields and GICs in the Pacific Northwest using 1-D and 3-D conductivity models,” *Space Weather Journal*, no. 15, pp. 1535-1547, Nov. 2017.
- [J3] A. B. Birchfield, E. Schweitzer, M. H. Athari, T. Xu, T. J. Overbye, A. Scaglione, and Z. Wang, “A metric-based validation process to assess the realism of synthetic power grids,” *Energies*, vol. 10, no. 1233, pp. 1-14, Aug. 2017.
- [J2] A. B. Birchfield, T. Xu, K. M. Gegner, K. S. Shetye, and T. J. Overbye, “Grid structural characteristics as validation criteria for synthetic networks,” *IEEE Transactions on Power Systems*, vol. 32, no. 4, pp. 3258-3265, Jul. 2017.
- [J1] A. B. Birchfield, K. M. Gegner, T. Xu, K. S. Shetye, and T. J. Overbye, “Statistical considerations in the creation of realistic synthetic power grids for geomagnetic disturbance studies,” *IEEE Transactions on Power Systems*, vol. 32, no. 2, pp. 1502-1510, Mar. 2017.

Conference Publications

(Mentored graduate students marked with asterisk *, undergraduate with double asterisk **)

- [C45] J. Xia** and A. B. Birchfield, “Analyzing power grid structure with triangle centrality metrics,” *2025 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, Feb. 2025, pp. 1-6.
- [C44] L. Lowery* and A. B. Birchfield, “EMT simulation with spectral graph wavelets,” *2025 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, Feb. 2025, pp. 1-6.
- [C43] L. Lowery* and A. B. Birchfield, “Voltage stability interface limits in non-uniform geomagnetic disturbances,” *56th North American Power Symposium (NAPS)*, El Paso, TX, Oct. 2024, pp. 1-6.

- [C42] R. Fatima* and A. B. Birchfield, "Application of synthetic geomagnetic storms on transformer thermal assessment," *2024 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, Feb. 2024, pp. 1-6.
- [C41] S. Kunkolienkar*, F. Safdarian, J. Snodgrass, A. B. Birchfield, and T. J. 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, pp. 1-7.
- [C40] T. J. Overbye, S. Kunkolienkar*, F. Safdarian, and A. B. Birchfield, "On the existence of dominant interarea oscillation modes in the North American Eastern Interconnect stability simulations," *57th Hawaii International Conference on System Sciences (HICSS)*, Honolulu, HI, Jan. 2024, pp. 1-9.
- [C39] R. Fatima* and A. B. Birchfield, "Impact of time-dependent transformer thermal model on assessment of GICs in large power systems," *2023 North American Power Symposium (NAPS)*, Asheville, NC, USA, Oct. 2023, pp. 1-6.
- [C38] J. Baek* and A. B. Birchfield, "A tuning method for exciters and governors in realistic synthetic grids with dynamics," *2023 North American Power Symposium (NAPS)*, Asheville, NC, USA, Oct. 2023, pp. 1-6.
- [C37] J. Penaranda* and A. B. Birchfield, "Energizing cold load: Demand after a full system outage," *2023 North American Power Symposium (NAPS)*, Asheville, NC, USA, Oct. 2023, pp. 1-6.
- [C36] M. Stevens, T. J. Overbye, J. Snodgrass and A. B. Birchfield, "Generating electric field test patterns for electric grid resiliency studies," *2023 North American Power Symposium (NAPS)*, Asheville, NC, USA, Oct. 2023, pp. 1-6.
- [C35] F. Safdarian*, J. Penaranda*, S. Kang, J. Snodgrass, A. Birchfield, and T. J. Overbye, "Improving load time series of electric power systems based on the temperatures," *2023 IEEE Kansas Power and Energy Conference (KPEC)*, Manhattan, KS, Apr. 2023, pp. 1-6.
- [C34] J. W. Xia**, A. B. Birchfield, and J. Snodgrass, "Undergraduate research in transmission tower physical design for synthetic electric

- grid cases,” *2023 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, Feb. 2023, pp. 1-6.
- [C33] O. Oshinkoya*, J. Baek*, J. Kao**, and A. B. Birchfield, “Preliminary analysis of the potential impact of electric vehicle fleets on large power system inertia floor,” *2023 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, Feb. 2023, pp. 1-6.
- [C32] J. Penaranda* and A. B. Birchfield, “Application and parameter sensitivities of a state-space cold load pickup model for a synthetic restoration test case,” *2022 North American Power Symposium (NAPS)*, Salt Lake City, UT, Sept. 2022, pp. 1-6.
- [C31] F. Safdarian *et al.*, “Grid optimization competition on synthetic and industrial power systems,” *2022 North American Power Symposium (NAPS)*, Salt Lake City, UT, Sept. 2022, pp. 1-6
- [C30] A. B. Birchfield, “Inertia adequacy in transient stability models for synthetic electric grids,” *11th Bulk Power Systems Dynamics and Control Symposium (IREP)*, Banff, Canada, Jul. 2022, pp. 1-8.
- [C29] A. B. Birchfield, “Graph decomposition for constructing blackstart restoration strategies in benchmark cases,” *Power Systems Computation Conference (PSCC)*, Porto, Portugal, Jun. 2022. (Same paper as [J13].)
- [C28] F. Safdarian, J. Wert, Y. Liu, A. B. Birchfield, K. S. Shetye, H. Chang, and T. J. Overbye, “Reactive power and voltage control issues associated with large penetration of distributed energy resources in power systems,” *Power and Energy Conference at Illinois (PECI)*, Mar. 2022.
- [C27] Y. A. Abu-Khalifa*, A. B. Birchfield, “Techniques for creating synthetic combined electric and natural gas transmission grids,” *IEEE Texas Power and Energy Conference (TPEC)*, Feb. 2022.
- [C26] T. J. Overbye, J. Snodgrass, A. B. Birchfield, M. Stevens, “Toward developing implementable high altitude electromagnetic pulse E3 mitigation strategies for large-scale electric grids,” *IEEE Texas Power and Energy Conference (TPEC)*, Feb. 2022.
- [C25] G. Bhakta**, A. B. Birchfield, “Applying remedial action schemes using sensitivity analysis for undergraduate research,” *2021 North American Power Symposium*, Nov. 2021.

- [C24] A. B. Birchfield, T. J. Overbye, "Graph crossings in electric transmission grids," *2021 North American Power Symposium (NAPS)*, Nov. 2021.
- [C23] F. Safdarian, A. B. Birchfield, K. Shetye, and T. J. Overbye, "Additional insights in creating large-scale, high-quality synthetic grids: A case study," *IEEE Kansas Power and Energy Conference (KPEC)*, Apr. 2021.
- [C22] T. J. Overbye, J. Wert, K. S. Shetye, F. Safdarian and A. B. Birchfield, "Delaunay Triangulation Based Wide-Area Visualization of Electric Transmission Grids," *2021 IEEE Kansas Power and Energy Conference (KPEC)*, Manhattan, KS, 2021, pp. 1-6.
- [C21] A. B. Birchfield, J. Patil, R. Paredes, L. Dueñas-Osorio, "Preliminary analysis of network fragility and resilience in large electric grids," *2021 IEEE Power and Energy Conference at Illinois (PECI)*, Apr. 2021, pp. 1-6.
- [C20] T. J. Overbye, K. S. Shetye, J. Wert, W. Trinh, A. B. Birchfield, T. Rolstad, J. D. Weber, "Techniques for maintaining situational awareness during large-scale electric grid simulations", *2021 IEEE Power and Energy Conference at Illinois (PECI)*, Apr. 2021, pp. 1-8.
- [C19] T. J. Overbye, J. L. Wert, K. S. Shetye, F. Safdarian, and A. B. Birchfield, "The use of geographic data views to help with wide-area electric grid situational awareness", *2021 IEEE Texas Power and Energy Conference (TPEC)*, Feb. 2021, pp. 1-6
- [C18] K. S. Shetye, T. J. Overbye, A. B. Birchfield, J. D. Weber, and T. L. Rolstad, "Computationally efficient identification of power flow alternative solutions with application to geomagnetic disturbance analysis," *2020 IEEE Texas Power and Energy Conference (TPEC)*, Feb. 2020, pp. 1-6.
- [C17] A. B. Birchfield and T. J. Overbye, "Planning sensitivities for building contingency robustness and graph properties into large synthetic grids," *Hawaii International Conference on System Sciences*, Jan. 2020, pp. 1-8.
- [C16] Y. Zhang, K. S. Shetye, A. B. Birchfield and T. J. Overbye, "Grid impact evaluation of localized geomagnetic field enhancements using sensitivity analysis," *2019 North American Power Symposium (NAPS)*, Wichita, KS, USA, Oct. 2019, pp. 1-6

- [C15] T. J. Overbye, J. Wert, A. B. Birchfield and J. D. Weber, "Wide-Area Electric Grid Visualization Using Pseudo-Geographic Mosaic Displays," *2019 North American Power Symposium (NAPS)*, Wichita, KS, USA, Oct. 2019, pp. 1-6.
- [C14] T. Xu, H. Li, A. B. Birchfield, and T. J. Overbye, "Synthesize phasor measurement unit data using large-scale electric network models," Pre-print available: <https://arxiv.org/pdf/1909.03187.pdf>, Oct. 2019.
- [C13] T. J. Overbye, Z. Mao, A. B. Birchfield, J. D. Weber and M. Davis, "An interactive, stand-alone and multi-user power system simulator for the PMU time frame," *2019 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, USA, Feb. 2019, pp. 1-6.
- [C12] K. S. Shetye, A. B. Birchfield, R. H. Lee, T. J. Overbye and J. L. Gannon, "Impact of 1D vs 3D earth conductivity based electric fields on geomagnetically induced currents," *2018 IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)*, Sarajevo, 2018, pp. 1-6.
- [C11] A. B. Birchfield, H. Li, and T. J. Overbye, "Security considerations in transmission planning for creating large synthetic power grids," *Clemson University Power Systems Conference*, Charleston, South Carolina, Sept. 2018. **Second-place Best Paper Award.**
- [C10] D. Bodenmiller, A. B. Birchfield, and T. J. Overbye, "Using large-scale synthetic systems for undergraduate research in electric grid islanding," *North American Power Symposium (NAPS)*, Fargo, North Dakota, Sept. 2018.
- [C9] E. Schweitzer, T. Xu, A. B. Birchfield, A. Scaglione, T. J. Overbye, R. J. Thomas, Z. Wang, "Towards operational validation: Mapping power system inputs to operating conditions," *Power Systems Computation Conference (PSCC)*, Dublin, Ireland, Jun. 2018.
- [C8] H. Li, A. L. Bornsheuer, T. Xu, A. B. Birchfield, K. S. Shetye, and T. J. Overbye, "Load modeling in synthetic electric grids," *IEEE Texas Power and Energy Conference*, College Station, Texas, Feb. 2018.
- [C7] A. B. Birchfield, T. Xu, K. S. Shetye, and T. J. Overbye, "Building synthetic power transmission networks of many voltage levels, spanning multiple areas," *Hawaii International Conference on System Sciences*, Waikoloa Village, Hawaii, Jan. 2018.

- [C6] T. Xu, A. B. Birchfield, K. S. Shetye, and T. J. Overbye, “Creation of synthetic electric grid models for transient stability studies,” *Bulk Power Systems Dynamics and Control Symposium (IREP)*, Espinho, Portugal, Sept. 2017.
- [C5] A. B. Birchfield, Z. Mao, K. S. Shetye, J. D. Weber, and T. J. Overbye, “Impact of synchronous generator model GENTPJ on system dynamics,” *IEEE Power and Energy Society General Meeting*, Chicago, IL, Jul. 2017.
- [C4] A. B. Birchfield and T. J. Overbye, “Convergence characteristics of the variable projection method for mode extraction,” *IEEE Texas Power and Energy Conference*, College Station, TX, Feb. 2017.
- [C3] T. Xu, A. B. Birchfield, K. M. Gegner, K. S. Shetye, and T. J. Overbye, “Application of large-scale synthetic power system models for energy economic studies,” *Hawaii International Conference on System Sciences*, Jan. 2017.
- [C2] K. M. Gegner, A. B. Birchfield, T. Xu, K. S. Shetye, and T. J. Overbye, “A methodology for the creation of geographically realistic synthetic power flow models,” *IEEE Power and Energy Conference at Illinois*, Champaign, IL, Jan. 2016. **Best Paper Award.**
- [C1] J. Taylor, A. B. Birchfield, “DMS simulation toolkit for the grid of the future,” *CIGRE Grid of the Future Symposium*, Chicago, IL, Oct. 13, 2015.
- [R7] T. J. Overbye, A. B. Birchfield, K. Shetye, F. Safdarian, J. Snodgrass, J. Wert, J. Yeo, *Creation of Synthetic Electric Grids (SPP/MISO) Supporting PERFORM*, TAMU final report to USDOE, ARPA-E, Feb. 21, 2023. <https://www.osti.gov/servlets/purl/1958696>
- [R6] *Updated Late-Time High-Altitude Electromagnetic Pulse (E3 HEMP) Transformer Thermal Assessment*. EPRI, Palo Alto, CA: Feb. 2022. 3002023452. (Technical Report)
- [R5] *Substation Instrument Transformer Testing: E1 High-Altitude Electromagnetic Pulse (HEMP) Response Measurement: Test Procedure and Results*. EPRI, Palo Alto, CA: August 7, 2020. 3002019672. (Technical Report)

*Technical
Reports and
other
Publications*

- [R4] *A Time-Domain Plane Wave Coupling Model: Model Development and Validation*. EPRI, Palo Alto, CA: July 7, 2020. 3002019446. (Technical Report)
- [R3] *E3 High-Altitude Electromagnetic Pulse (HEMP) Assessment of the TEPCO Transformer Fleet: Geomagnetically Induced Current and Transformer Thermal Analysis*. EPRI, Palo Alto, CA: Mar. 25, 2020. 3002018576. (Technical Report)
- [R2] A. B. Birchfield, “The creation, validation, and application of synthetic power grids,” Ph.D. Dissertation, Texas A&M University, Dec. 2018.
- [R1] A. B. Birchfield, “The creation of synthetic power grids: preliminary considerations,” M.S. Thesis, University of Illinois at Urbana-Champaign, Dec. 2016.

Invited Sessions, Presentations, and Outreach Activities

- A. Birchfield, “Electric grid dynamic simulations: open synthetic datasets and stability assessment frameworks,” invited talk at UT-Austin Energy Symposium, Mar. 2025.
- A. Birchfield, “Creating realistic synthetic electric grids to promote open science in power engineering,” invited presentation and panel discussion at the *3rd In-Person Workshop: Foundation Models for the Electric Grid*, Argonne National Lab, Lemont, IL, Feb. 2025.
- A. Birchfield, “Doing great research (with some pointers from Faraday and Maxwell),” dinner keynote speaker at *2024 IEEE Texas Power and Energy Conference*, Feb. 2025.
- A. Birchfield, “Detecting and mitigating hidden failure modes in transitioning electric power grids,” Invited seminar at the University of Utah, Salt Lake City, UT, Apr. 11, 2024.
- A. Birchfield, “Detecting and mitigating hidden failure modes in transitioning electric power grids,” Invited seminar at the University of Texas San Antonio (UTSA), San Antonio, TX, Apr. 5, 2024.
- Interview with Umair Irfan for the article, “The solar eclipse is a critical test for the US power grid,” *Vox Media*, Apr. 5, 2024.
- A. Birchfield, “Our future electric grid – resilience and sustainability,” Invited talk at the *Energy Systems Seminar* at Cornell University, College of Engineering, Ithaca, NY, Mar. 28, 2024.

- Interview with Jeremy Hsu for the article “Storm-proofing 1% of power lines protects entire grid from blackouts,” *New Scientist*, March 12, 2024.
- A. Birchfield, “Our future electric grid – resilience and sustainability,” Invited talk at Rice University, Houston, TX, Feb. 15, 2024.
- A. Birchfield, “Electric Power Grid and Natural Gas Pipeline Network Interdependency and Joint Resilience,” Invited poster presentation at Texas Academies of Medicine, Engineering, Science and Technology (TAMEST) Annual Meeting, as part of the Protégé Program, Feb. 6, 2024.
- Interview with Katie Aupperle, “Focus at Four: Bitcoin mining company profits off Texas Grid,” at KBTX, Bryan, TX, Jan. 8, 2024.
- Interview with Katie Aupperle and Rusty Surette, “Texas A&M assistant professor discusses plan to link ERCOT to other Southeastern grids,” at KBTX, Bryan, TX, Jan. 3, 2024.
- A. B. Birchfield, “Creating and validating dynamic models for synthetic electric grids,” Texas A&M Smart Grid Center Webinar Series, Oct. 18, 2023.
- Interview with Tyler Hopkins, “Grid conditions remain tight as record temperatures continue,” at KBTX, Bryan, TX, Aug. 26, 2023.
- A. B. Birchfield, “The future of large electric grids and synthetic test cases,” Invited talk at UT-Austin, Aug. 24, 2023
- A. B. Birchfield, “Synthetic datasets for energy infrastructure modeling,” PSERC Webinar, Jan. 25, 2023.
- A. B. Birchfield, “Modeling and analysis of interdependent electric power grid and natural gas network,” Texas A&M Smart Grid Center Webinar Series, Sept. 23, 2022.
- A. B. Birchfield, “Auto-layout techniques for displaying large-scale, geographically-embedded power system data,” Texas A&M Smart Grid Center Webinar Series, Jan. 19, 2022.
- A. B. Birchfield, “The design of large synthetic transmission networks and implications for grid fragility and resilience assessment,” Texas A&M ECE Department Seminar, Feb. 5, 2021.
- A. B. Birchfield, “Techniques for designing large transmission networks in synthetic electric grids,” Texas A&M Smart Grid Center Webinar Series, Dec. 10, 2020

- A. B. Birchfield, “Getting the most out of OpenDSS with Python,” *Advanced Modeling for Distribution Planning Workshop*, College Station, TX, Apr. 20, 2017.
- A. B. Birchfield, K. M. Gegner, T. Xu, K. S. Shetye, and T. J. Overbye, “Synthetic power grids,” poster presentation at *2016 IEEE Power and Energy Society General Meeting*, Boston, MA, Jul. 19, 2016.
- “Educational electricity and magnetism medley,” exhibit at University of Illinois Engineering Open House, Mar. 11-12, 2016. First Place Award in Back to School Category.

Awards and Honors

- #1 Best Paper Award from 2020-2023 in *IEEE Open Access Journal of Power and Energy (OAJPE)*, for [J12], 2024.
- Thomas W. Powell '62 and Powell Industries Inc. Fellowship, Texas A&M University Department of Electrical and Computer Engineering, Aug. 21, 2017.
- Grainger Power Engineering Award, University of Illinois at Urbana-Champaign, Dec. 12, 2016.
- Honorable Mention, National Science Foundation Graduate Research Fellowship Program, Mar. 29, 2016.
- Distinguished Research Fellowship, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Aug. 2015 – Dec. 2016
- Summa Cum Laude, Honors Scholar, Auburn University, December 2014

Conference Leadership

- Faculty Advisor, *TPEC 2025*, Feb. 11-12, 2025. Secured NSF Award **2433720** for \$15k to support Student Travel to TPEC.
- Faculty Advisor, *TPEC 2024*, Feb. 12-13, 2024. Secured NSF Award **2341300** for \$15k to support Student Travel to TPEC.
- External International Advisory Committee Member, *PowerTech 2023*, Belgrade, Serbia, June 24-29, 2023
- Faculty Advisor, *TPEC 2023*, Feb 13-14, 2023. Secured NSF Award **2208780** for \$15k to support Student Travel to TPEC.
- Faculty Advisor, *TPEC 2022*, Feb 28-Mar 1, 2022.
- Publications Chair, 53rd North American Power Symposium (NAPS 2021), Nov. 2021
- Committee Member, *TPEC 2019*, Feb. 7-8, 2019

- Committee Member, *TPEC 2018*, Feb. 8-9, 2018
- Chair, *2017 IEEE Texas Power and Energy Conference (TPEC)*, Feb. 9-10, 2017

Reviewing Activities

- Reviewer, *Power System Computation Conference (PSCC) 2024*
- NSF Panel Review, Directorate for Engineering, Mar. 2022
- Reviewer, *IEEE Transactions on Power Systems*
- Reviewer, *IEEE Transactions on Smart Grid*
- Reviewer, *IEEE Open Access Journal of Power and Energy (OAJPE)*
- Reviewer, *American Geophysical Union (AGU) Space Weather Journal*
- Reviewer, *Hawaii International Conference on System Sciences (HICSS)*
- Reviewer, *IEEE Power and Energy Society General Meeting*
- Reviewer, *IEEE Power and Energy Conference at Illinois*
- Reviewer, *IEEE Texas Power and Energy Conference*
- Reviewer, *Clemson University Power Systems Conference*

Certifications and Memberships

- Senior Member, IEEE, Apr. 2024 - present
- Member, IEEE Industry Applications Society, Jan. 2017 – present
- Licensed Engineer-in-training (EIT), State of Texas, Jan. 2015 – present
- Member, IEEE Power and Energy Society, Jan. 2014 – present
- Member, IEEE, Jan. 2013 – present

Doctoral and Masters Committees

Chair and Advisor – PhD

- Bart Szymanowski, **Doctoral Committee Chair**, in progress since Aug. 2024.
- Luke Lowery, **Doctoral Committee Chair**, in progress since Jan. 2024.
- Jong-oh Baek, **Doctoral Committee Chair**, in progress since Aug. 2022.

Chair and Advisor – MS

- Rida Fatima, **Masters Committee Chair**, *Geomagnetic Storm and its Impact on Time-dependent Transformer Thermal Response in Large Power Systems*, Aug. 2023.
- John Penaranda, **Masters Committee Chair**, *Application and Parameter Sensitivities of a State-space Cold Load Pickup Model for a Synthetic Restoration Test Case*, Aug. 2023.
- Oluwatoyin Oshinkoya, **Masters Committee Chair**, *Feasibility Study on the Future Impact of Electric Vehicle Fleets on the Power System Inertia Floor*, May 2023.
- Yousef Abu-Khalifa, **Masters Committee Chair**, *A Methodology for Building and Simulating Synthetic Natural Gas Transmission Grids to Analyze the Inter-dependencies Between Natural Gas and Electric Power Systems*, May 2023.
- Ramyaa Kumar, **Masters Committee Chair**, *Considerations for Real-Time Data Analysis Using Multiple Magnetometer Sources for GIC Studies to Improve the Situational Awareness of an Electric Grid Model*, Aug. 2021.

Member of Committee – PhD

- Pranabesh Bhattacharjee, Doctoral Committee Member, in progress, Advisor: A. Datta.
- Hesam Mazaheri, Doctoral Committee Member, in progress, Advisor: M. Ehsani.
- Sanjana Kunkolienkar, **Doctoral Committee Co-Chair**, in progress, Advisor: T. J. Overbye.
- Akramul Haque, Doctoral Committee Member, in progress, Advisor: K. R. Davis.
- Hernan Santos, Doctoral Committee Member, in progress, Advisor: J. Tao (College of Performance, Visualization, and Fine Arts).
- Kseniia Zhun, Doctoral Committee Member, in progress, Advisor: T. J. Overbye.
- Melvin Stevens, Doctoral Committee Member, in progress, Advisor: T. J. Overbye.
- Seri Kang, Doctoral Committee Member, in progress, Advisor: T. J. Overbye
- Shining Sun, Doctoral Committee Member, in progress, Advisor: K. R. Davis

- Jessica Wert, Doctoral Committee Member, *Extracting Value from Electric Grid Information Towards a Resilient Grid Amidst Decarbonization Efforts*, Aug. 2023, Advisor: T. J. Overbye.
- Pooria Dehghanian, Doctoral Committee Member, *Thermal Assessment of Power Transformers During Geomagnetic Disturbances: Hazard Characterization, Vulnerability Assessment, and Mitigation Solutions*, Aug. 2023, Advisor: T. J. Overbye.
- Wei Trinh, Doctoral Committee Member, *The Efficient Determination of Electric Grid Modes for Large Systems Using the Matrix Pencil Method*, Aug. 2022, Advisor: T. J. Overbye.
- Jayant Patil, Doctoral Committee Member, **Rice University**, *Principled Surrogate Modeling for Quantitative Performance Assessment of Engineered Systems*, May 2022, Advisor: L. Dueñas-Osorio.
- Yijing Liu, Doctoral Committee Member, *Techniques for Improving Dynamic Performance within Large-scale Electric Grids with High Penetration of Renewable Generation*, May 2022, Advisor: T. J. Overbye.

Member of Committee – MS

- Andrew Maehl, Masters Committee Member, in progress, Advisor: K. R. Davis.
- Ilknur Karaduman, Masters Committee Member, in progress, Advisor: P. Enjeti.
- Jordan Cook, Masters Committee Member, *Improving Grid Models by Incorporating Weather Data and Analyzing the Impact on Renewable Generation*, May 2025, Advisor: T. J. Overbye.
- Mary Sue Bitar, Masters Committee Member, *Common Operating Picture Enhancement for Cyber-Physical Data and Under Contingencies*, May 2024, Advisor: K. R. Davis.
- Anna Zhang, Masters Committee Member, *Enhancing Geomagnetic Disturbance Modeling for Power Grids: Investigating the Effects of Spatial Variation and Exploring Advanced Data Techniques*, Aug. 2023, Advisor: T. J. Overbye.
- Jung Kyo Jung, Masters Committee Member, *A Methodology of Utilizing Electric Vehicles to Improve the Reliability and Resiliency of the Power System in Extreme Weather*, May 2023, Advisor: T. J. Overbye.

Undergraduate Students Advised

- Gaurang Bhakta
- Tyler Kent
- Reece Moon
- Alex Soudah
- Christian Carr
- Juan Vargas
- Joshua Kao
- Joshua Xia – Completing Undergraduate Research Scholars Capstone Thesis in Spring 2025.
- Isabella Castro Rondon
- Caleb Wilson
- Glen Tee

Visiting Scholars Hosted

- Gustavo Cerda Villafaña, on sabbatical from University of Guanajuato, Mexico, Aug. 2024 – ongoing

Other Service

- Mentor, First-Generation Engineering Students Mentoring Program, Texas A&M University College of Engineering, Aug. 2021—present
- Mentor for Mariam Elnour in the Texas A&M University Academy for Future Faculty, 2023-2024
- Coordinated TAMU participation in IEEE PES Power and Energy Education Committee (PEEC) 2023 survey to promote EPG, Oct. 2023
- Member, TAMU ECEN Former Students and External Relations Committee, Aug. 2023 – Jul. 2024
- Member, TAMU ECEN Graduate Student Quality Evaluation Committee (GSQE), Aug. 2023 – ongoing
- Member, TAMU ECEN Undergraduate Enrichment and Outreach Committee. Gave presentations at two DI Saturday events for ETAM-ing students. Aug. 2021 – Jul. 2022, Aug. 2024 – ongoing.
- Member, TAMU ECEN Undergraduate Studies Committee (USC), Aug. 2022 – Jul. 2023.

- Member, TAMU ECEN Graduate Studies Committee, Aug. 2021 – Jul. 2023.
- Power systems research laboratory exhibit, Texas A&M University Aggieland Saturday, February 10, 2018.