

JOYDEEP MITRA: CURRICULUM VITAE

APPOINTMENTS

Present Appointments: MSU Foundation Distinguished Professor, Michigan State University;
Distinguished Visiting Scientist, Sandia National Laboratories (honorary appointment).

SUMMARY VITAE

Education: Ph.D., Texas A&M University, College Station;
B.Tech., Indian Institute of Technology, Kharagpur.

Experience: 26 years academic, 5 years industry and consulting.

Major Awards and Honors:

IEEE Power & Energy Society Douglas Staszkesky Distribution Automation Award, 2025;
MSU Foundation Distinguished Professor, 2021;
PMAPS Merit Award 2020 (from International Society for Probabilistic Methods Applied to Power Systems);
IEEE Power & Energy Society Roy Billinton Power System Reliability Award, 2019;
Fellow, IEEE, for contributions to the development of power system reliability methods, 2019;
NSF CAREER Award, 2002.

Technical Publications and Patents: 300+

Publications: 4 books, 10 book chapters, 69 journal articles, 200 conference articles, 17 technical reports;
Patents: 3 issued.

Research and Education Grants: 21 research and education grants and contracts, totaling over \$7.3M.

Education, Training and Mentoring:

22 different Electrical Engineering courses, including laboratory courses;
31 Short Courses, Tutorials, and Workshops in U.S. and abroad, majority offering lifelong learning/
professional development credits;
Student Advising and Mentoring: 6 Post-docs, 12 Ph.D. and 17 M.S. (thesis option); 5 Doctoral and 1 Post-
doctoral alumni in academia, of whom 2 have received the NSF CAREER Award.

Leadership and Synergistic Activities:

Member, Editorial Board, IEEE Press (2024–present);
IEEE-PES Distinguished Lecturer (2020–present);
Chair, IEEE-PES Fellow Evaluation Committee (2022–23);
Chair, IEEE-PES Outstanding Young Engineer Award Committee (2021–24);
Chair, IEEE-PES Technical Co-sponsoring Steering Committee (2014–18);
Chair, IEEE-PES Analytic Methods for Power Systems Committee (2015–16);
Chair, IEEE-PES Research Subcommittee (2015–17);
Chair, IEEE-PES Reliability, Risk and Probability Applications Subcommittee (2009–11);
Chair, IEEE-PES Student Meetings Subcommittee (2005–07);
Associate Editor, IEEE Transactions on Industry Applications (2019–24);
Associate Editor, IEEE Transactions on Power Systems and Power Engineering Letters (2016–21);
Associate Editor, International Transactions on Electrical Energy Systems (2017–19);
Associate Editor, IEEE Transactions on Smart Grid and Power Engineering Letters (2010–15);
Associate Editor, Journal of Renewable Energy (2012–17);
Associate Director, Electric Utility Management Program, New Mexico State University (2003–08);
Other: Organized and Chaired two Conferences; Technical Committee Program Chair at three major IEEE-
PES Conferences; Delivered 100 invited talks, including 16 keynote and 25 panel presentations.

Extramural Outreach:

Testified before Public Utilities Commission of Ohio regarding grid modernization in Ohio;
Provided advice to Federal Bureau of Investigation on matters concerning electric power grid security;
Given interviews to Washington Post, Baltimore Sun, Houston Chronicle, and several local news agencies.

DETAILED VITAE

POSITION AND CONTACT INFORMATION

Present Appointments: MSU Foundation Distinguished Professor, Michigan State University;
Distinguished Visiting Scientist, Sandia National Laboratories (honorary appointment).

Address and Contact Information:

Michigan State University
Electrical & Computer Engineering
428 South Shaw Lane, Room 2120 EB
East Lansing, MI 48824-1226

Phone: (517) 353-8528
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Email: mitraj@msu.edu
Web: <http://www.egr.msu.edu/~mitraj>

AREA OF INTEREST

Electric Power and Energy Systems

Present Research Focus

- energy assurance • infrastructure resilience • smart grid architecture • microgrid architecture
- power grid reliability and reliability-based planning • power grid security, stability and control

Broad Area

- reliability analysis • distributed energy resources and microgrids • resource and network planning
- industry deregulation • energy market modeling, simulation and analysis • energy risk management
- power flow analysis and optimization • stability analysis • power system control • state estimation

EDUCATION

Doctor of Philosophy, Electrical Engineering

[Texas A&M University](#), College Station, TX 77843

Bachelor of Technology (Honors), Electrical Engineering

[Indian Institute of Technology](#), Kharagpur 721302, India

ACADEMIC EXPERIENCE

Appointments

[Michigan State University](#), East Lansing, MI 48824

August 2008 to present

Professor, [Department of Electrical & Computer Engineering](#)

Director, Energy Reliability & Security (ERiSe) Laboratory

Senior Faculty Associate, [Institute of Public Utilities](#)

[Sandia National Laboratories](#), Albuquerque, NM 87123

January 2024 to present; honorary appointment, concurrent with appointment at MSU

Distinguished Visiting Scientist

[New Mexico State University](#), Las Cruces, NM 88003

August 2003 to August 2008

Associate Professor, [Klipsch School of Electrical & Computer Engineering](#)

Associate Director, [Electric Utility Management Program](#)

[North Dakota State University](#), Fargo, ND 58105

August 2000 to August 2003

Assistant Professor, [Department of Electrical & Computer Engineering](#)

INDUSTRY EXPERIENCE

May 1997 to July 2000

Senior Consulting Engineer

[LCG Consulting](#), 4962 El Camino Real, Suite 112, Los Altos, CA 94022

- Nature of work: Performed proprietary research and developed models and algorithms for generation production and energy market simulation and analysis. Worked on the development of *UPLAN-NPM*, an integrated utility planning and market simulation tool, and *GeneratorX*, an expansion planning tool.
- R&D and Coding: Incorporated numerous features and improvements in *UPLAN-NPM*, including: energy market risk management model that optimizes energy and derivative portfolios; an uncertainty module which enables UPLAN-NPM to simulate random variations in several market and environmental variables; capability to assess wheeling charges; improved models for unit commitment and dispatch, including loss compensation when using the optional linearized model; data verification/identification of suspicious data in generation, transmission and load databases; response surface model for rapid estimation of electricity prices.

July 1989 to August 1991

Electrical Engineer

[The Tata Iron & Steel Company](#), Jamshedpur 831001, India

- Nature of work: Installation, on-site testing, and commissioning of new electrical equipment in the plant, such as cables, overhead lines, isolators, circuit breakers, relays, metering instruments, inverters, converters, motors, starters (DOL and star-delta), and controllers (both relay logic controllers and programmable logic controllers).
- Major Project: Directed complete electric installation on an Electric Overhead Traction Crane. Installation work included mounting, interconnection, on-site modification and testing, and commissioning of all equipment—two hoist motors, four traction motors, control panels, resistance panels, controller units in operator's cabin, as well as burden weight sensors and instrumentation equipment.

HONORS & AWARDS

Honors

- Distinguished Visiting Scientist, Sandia National Laboratories, 2024.
- MSU Foundation Distinguished Professor (Michigan State University Foundation), 2021.
- Fellow, IEEE, for contributions to the development of power system reliability methods, 2019.
- IEEE-PES Distinguished Lecturer (2019–present).
- Senior Member, IEEE, 2002.
- Fellow of the Faculty Institute of Excellence in Learning (North Dakota State University), 2002.

Awards

Individual Awards

- IEEE Power & Energy Society (PES) Technical Council Distinguished Service Award, for outstanding leadership and service to the society, committee and subcommittee levels, and technical contributions in power system reliability methods, 2026.
- IEEE-PES Douglas Staszkesky Distribution Automation Award, for contributions to reliability, protection, and control of microgrids and active distribution systems, 2025.
- PMAPS Merit Award, for contributions to the development and application of probability methods applied to power systems, 2020
(from the International Society for Probabilistic Methods Applied to Power Systems).
- IEEE-PES Roy Billinton Power System Reliability Award, for contributions to research, education and leadership in power system reliability methods, 2019.

- IEEE-PES Technical Committee Distinguished Service Award, for service to the Power System Analysis, Computing and Economics (PSACE) Committee, 2012.
- The **NSF Career Award**, 2002.
- The 1994–95 Outstanding Assistant Lecturer Award (Department of Electrical Engineering, Texas A&M University), April 1995.
- The **Jagadis Bose National Science Talent Search Scholarship** (India), July 1985 to June 1989.

Prize Paper Awards

- IEEE-IAS Best Paper Award, March 2023, for conference article [41].
- IEEE-PES Technical Committee Prize Paper Award, August 2019, for journal article [42].
- IEEE-PES Technical Committee Prize Paper Award, July 2016, for journal article [54].

Student Awards

- Supervisor of First prize winner in Student Poster Contest at the IEEE Power Systems Conference & Exposition 2006, Atlanta, GA, October 2006.

Working Group Awards

- IEEE-PES Technical Committee Working Group Recognition Award (as member of the IEEE Standard 762-2023 Working Group), in July 2024.
- IEEE-PES Technical Committee Working Group Recognition Award (as **Chair** of the Electric Delivery System Reliability Tutorial Working Group), in June 2007.
- IEEE-PES Technical Committee Working Group Recognition Award (as member of the IEEE Standard 762-2006 Working Group), in August 2005.
- IEEE-PES Technical Committee Working Group Recognition Award (as member of the Power Engineering Education Committee's Student Meeting Subcommittee), in August 2003.

LEADERSHIP AND SYNERGISTIC ACTIVITIES

Board Memberships

- **Member**, Editorial Board, IEEE Press (2024–present).
- **Member**, International Technical Advisory Committee, International Society for Probabilistic Methods Applied to Power Systems (PMAPS) Conference (2024–present).
- **Member**, Advisory Board for [ASSIST-IoT](#), a research consortium of 15 partners in 7 countries in the European Union (2021–24).
- **Member**, Board of Directors of the Intelligent System Applications to Power Systems (ISAP) Conference (2017–present).

Professional Society Leadership and Service

Member, [International Council on Large Electric Systems \(CIGRE\)](#)

Member, [American Association for the Advancement of Science \(AAAS\)](#)

Fellow, [Institute of Electrical and Electronics Engineers \(IEEE\)](#)

- *Member*, [IEEE Power and Energy Society](#); IEEE-PES Committee affiliations:
 - *Chair*, PES Outstanding Young Engineer Award Committee (2021–24; *Member*, 2016–24).
 - *Chair*, IEEE-PES Fellow Evaluation Committee (2022–23; *Vice-Chair*, 2021; *Member*, 2020).
 - *Chair*, PES Technical Co-sponsoring Steering Committee (*Chair*, 2014–18; *Member*, 2010–18).
 - *Member* and *Past Chair*, Analytic Methods for Power Systems (AMPS) Committee (*Past Chair*, 2017–18; *Chair*, 2015–16; *Vice-Chair*, 2013–14; *Secretary*, 2011–12).
 - *Chair*, AMPS Awards Working Group (2019–20);
 - *Chair*, Reliability, Risk, and Probability Applications (RRPA) Subcommittee (2008–11; *Vice-Chair*, 2006–08; *Secretary*, 2002–06);
 - *Member*, Intelligent Systems Subcommittee (2007–present);

- *Chair*, ISSC Task Force on Intelligent Control of Microgrids (2008–12);
- *Member*, IEEE Std 762 Working Group (2016–present; 2002–06); *Secretary*, Std 762 reaffirmation WG (2011);
- *Member*, IEEE Std 859 reaffirmation WG (2007).
- *Member*, IEEE-PES Conference Advisory Committee (2025–present).
- *Member*, IEEE-PES Power Systems Education Committee (PEEC).
 - *Chair*, Research Subcommittee (2015–17; *Vice-Chair*, 2013–15; *Secretary*, 2011–13);
 - *Chair*, Student Meetings Subcommittee (2005–07; *Vice-Chair*, 2003–05; *Secretary*, 2001–03);
 - *Member*, Lifelong Learning Subcommittee, 2000–03.
- *Secretary*, PES Technical Council Operations & Procedures Committee (2012–14).
- *Member*, PES Technical Council Awards Committee (2019–20).
- *Member*, [IEEE Industry Applications Society](#).
- *Member*, [IEEE Standards Association](#).
- *Member and Fellows Coordinator*, Awards & Recognition Committee, IEEE Southeast Michigan Section, 2025–present.

Editorial and Review

- Member, Editorial Board, IEEE Press (2024–present).
- Associate Editor:
 - IEEE Transactions on Industry Applications (2019–24);
 - IEEE Transactions on Power Systems and Power Engineering Letters (2016–21);
 - IEEE Transactions on Smart Grid and Power Engineering Letters (2010–15);
 - International Transactions on Electrical Energy Systems (2017–19);
 - Journal of Renewable Energy (2012–2017).
- Panel Review for the National Science Foundation (16 panels between 2001 and 2025).
- Site Visit for the National Science Foundation (2013).
- Proposal Review for the US Department of Energy and ARPA-E (2019, 2015, 2010, 2009).
- Project Peer Review for the US Department of Energy (2021, 2017).
- Review of proposals submitted to the Los Alamos National Laboratory (2012), South Africa National Research Foundation (2012, 2011), NIREC (2010), MD-DERP (2010) and ND-EPSCoR (2002).
- Review of manuscripts submitted for publication in:
 - IEEE Transactions on: Power Systems; Power Delivery; Energy Conversion; Smart Grid; Sustainable Energy; Power Electronics;
 - IET Journals: Generation Transmission and Distribution; Renewable Power Generation;
 - International Journal of Electrical Power and Energy Systems;
 - International Transactions on Electrical Energy Systems;
 - Electric Power Systems Research;
 - Journal of Renewable Energy;
 - IEEE Power Engineering Society Conferences; IEEE International Symposium on Circuits and Systems; Other IEEE-sponsored and technically co-sponsored conferences.
- Books, book chapters and book proposals for publishers.
- External reviewer for doctoral students in international universities.

Technology Leadership

1. Discussion Lead: “Metrics: Reliability, Resilience, Energy and Market Efficiency” breakout session moderator at NSF Workshop on Grid at the Edge, Online, March 23–24, 2021.
2. Participant: NSF Workshop on Near-Term Research Needs for the Physical and Cyber Infrastructure that Supports the Future Grid, Washington, DC, May 4–5, 2015.

3. Discussion Lead: “Integration of Renewables, Markets” breakout session moderator at NSF National Workshop on Energy Cyber-Physical Systems, Washington, DC, Dec 16–17, 2013.
4. Participant: DOE Workshop on Advanced Grid Modeling, Knoxville, TN, Feb 5–6, 2013.
5. Discussion Lead: “Smart Grids” breakout session facilitator at Great Lakes Alliance for Sustainable Energy Research (GLASER) Workshop III, Chicago, IL, Feb 18, 2010.
6. Participant: NSF-NIST National Workshop on Research Directions for Future Cyber-Physical Energy Systems, Baltimore, MD, June 3–4, 2009.
7. Discussion Lead: “Smart Grids” breakout session facilitator at GLASER Workshop II, Chicago, IL, May 26, 2009.
8. Participant: NSF Workshop on the Future Power Engineering Workforce, Washington, DC, Nov 29–30, 2007.
9. Participant: Workshop on Power System Security, sponsored by Indian Ministry of Power, Kharagpur, India, Jan 13–14, 2006.
10. Participant: NSF-EPRI Workshop on Understanding and Preventing Cascading Failures, Denver, CO, Oct 27–28, 2005.
11. Participant: DOE Workshop on National Electric Delivery Technologies Roadmap, Washington, DC, July 8–9, 2003.
12. Participant: NSF/EPRI/DOE Workshop on Future Research Directions for Complex Interactive Electric Networks, Washington, DC, Nov 16–17, 2000.

Short Courses, Workshops and Tutorials

1. Short Course: *Grid School Part I*, March 18–20, 2025. *Grid School Part II*, April 8–10, 2025. East Lansing, MI. Team-taught, with multiple co-instructors. Mitra instructed for 5:20 hours out of a total of 28 hours of instruction. Conducted by the Institute of Public Utilities, Michigan State University.
2. Short Course: *Grid School Part I*, East Lansing, MI, June 10–12, 2024. 12 hours of instruction. Team-taught, with 2 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
3. Short Course: *Grid School Part I*, East Lansing, MI, June 27–29, 2023. 12 hours of instruction. Team-taught, with 3 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
4. Short Course: *Grid School Part I*, East Lansing, MI, March 1–3, 2022. 12 hours of instruction. Team-taught, with 2 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
5. Tutorial: *Grid Resilience in the Presence of Renewable Generation*, at the International Conference on Power Systems—2021, Kharagpur, India, December 16, 2021. 2 hours of instruction.
6. Short Course: *Grid School Part I*, East Lansing, MI, March 9–11, 2021. 12 hours of instruction. Team-taught, with 4 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
7. Short Course: *Grid School*, East Lansing, MI, May 4–5, 2020. 12 hours of instruction. Team-taught, with 4 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
8. Short Course: *Vermont Grid Training Program*, at Efficiency Vermont, Burlington, VT, March 2–3, 2020. 12 hours of instruction. Co-instructors: Janice Beecher and Kenneth Rose.
9. Short Course: *Grid School*, East Lansing, MI, May 4–6, 2019. 18 hours of instruction. Team-taught, with 6 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
10. Short Course: *Grid School*, East Lansing, MI, April 9–12, 2018. 24 hours of instruction. Team-taught, with 10 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
11. Short Course: *Grid School*, East Lansing, MI, March 27–30, 2017. 24 hours of instruction. Team-taught, with 11 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
12. Short Course: *Grid School*, Charleston, SC, March 7–10, 2016. 24 hours of instruction. Team-taught, with 6 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
13. Short Course: *Grid School*, Chicago, IL, March 9–12, 2015. 24 hours of instruction. Team-taught, with 7 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.

14. Workshop: *CHP Training Workshop*, Baton Rouge, LA, June 25, 2014. 6.5 hours of instruction. Team-taught, with 5 co-instructors. Conducted by the Louisiana State University Center for Energy Studies for the Louisiana Public Service Commission.
15. Short Course: *Grid School*, Charleston, SC, March 3–6, 2014. 24 hours of instruction. Team-taught, with 9 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
16. Short Course: *Power System Fundamentals*, East Lansing, MI, August 9, 2013. 6 hours of instruction. Organized by the Institute of Public Utilities, Michigan State University, for the Michigan Public Service Commission.
17. Short Course: *Grid School*, Charleston, SC, March 4–7, 2013. 24 hours of instruction. Team-taught, with 8 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
18. Short Course: *Grid School*, Charleston, SC, March 5–8, 2012. 21 hours of instruction. Team-taught, with 6 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
19. Workshop: *Building an Education and Research Program on Power & Energy Systems*, Madanapalle, AP, India, June 27–July 1, 2011. 30 hours of instruction. Organized by the Indo-US Collaboration for Engineering Education (IUCEE).
20. Short Course: *Grid School*, Charleston, SC, March 7–11, 2011. 27 hours of instruction. Team-taught, with 10 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
21. Short Course: *Hawaii PUC Grid School*, at the Hawaii Public Utilities Commission, Honolulu, HI, December 13–15, 2010. 18 hours of instruction. Co-Instructors: Kenneth Rose, Thomas Veselka and Guenter Conzelmann (Argonne National Laboratory).
22. Short Course: *Louisiana Grid Training Program*, at the Center for Energy Studies, Louisiana State University, Baton Rouge, LA, October 21–22, 2010. 12 hours of instruction. Co-Instructor: K. Rose.
23. Short course: *North Carolina Grid Training Program*, at the North Carolina Utilities Commission, Raleigh, NC, May 11–12, 2010. 12 hours of instruction. Co-Instructor: Kenneth Rose.
24. Short Course: *Grid School*, Richmond, VA, March 8–12, 2010. 27 hours of instruction. Team-taught, with 10 co-instructors. Conducted by the Institute of Public Utilities, Michigan State University.
25. Tutorial: *Reliability of Sustainable Energy Systems*, at the International Conference on Power Systems—2009, Kharagpur, India, December 27, 2009.
26. Short course: *Electric Power System Reliability Evaluation*, at the Indian Institute of Technology, Kharagpur, January 9–12, 2006. 16 hours of instruction. Co-Instructor: C. Singh (Texas A&M University).
27. Short course: *Life Extension of Substations*, at New Mexico State University, Las Cruces, August 10–11, 2006. 12 hours of instruction. Co-Instructor: Gene Wolf (Public Service Company of New Mexico).
28. Short course: *Fundamentals of Electric Power System Analysis*, at New Mexico State University, Las Cruces, August 13–15, 2007. 18 hours of instruction. Co-Instructors: H. A. Smolleck and S. J. Ranade (New Mexico State University).
29. Short course: *Fundamentals of Electric Power System Analysis*, at New Mexico State University, Las Cruces, August 7–9, 2006. 18 hours of instruction. Co-Instructors: H. A. Smolleck and S. J. Ranade (New Mexico State University).
30. Tutorial: *Electric Delivery System Reliability Evaluation*, at the IEEE-PES Annual General Meeting—2006, Montreal, Quebec, on June 21, 2006. 7 hours of instruction. One of seven instructors.
31. Tutorial: *Electric Delivery System Reliability Evaluation*, at the IEEE-PES Annual General Meeting—2005, San Francisco, CA, on June 12, 2005. 7 hours of instruction. One of seven instructors.

Invited Talks

Conference Keynote Talks

1. *Grid-Scale Storage for Energy Assurance: Needs and Opportunities*. Keynote talk at the *IEEE Power & Energy Society International Meeting*, Hong Kong, China, January 20, 2026.

2. *Energy Storage to Support Renewable Generation*. Keynote talk at the *7th International Conference on Electrical Engineering and Green Energy (CEEGE)*, Los Angeles, CA, June 29, 2024.
3. *Energy Storage to Support Renewable Generation*. Keynote talk at the *IEEE International Conference on Power Electronics, Smart Grid and Renewable Energy (PESGRE)*, Trivandrum, India, Jan 5, 2022.
4. *Energy Storage to Support Renewable Generation*. Keynote talk at the *13th International Conference on Electrical and Electronics Engineering (ELECO)*, Bursa, Turkey, Nov 26, 2021.
5. *Energy Assurance with Renewable Generation*. Keynote talk at the *4th International Conference on Smart Energy Systems and Technologies*, Vaasa, Finland, Sep 7, 2021.
6. *Reliability Impact of Low-Inertia Generation*. Keynote talk at the *2020 National Power System Conference*, Gandhinagar, India, Dec 19, 2020.
7. *Reliability Impact of Low-Inertia Generation*. Keynote talk at the *2020 Student Conference on Engineering & Systems*, Prayagraj, India, July 10, 2020.
8. *Energy Assurance with Renewable Generation*. Keynote talk at the *2019 International Conference on Computing, Power and Communication Technologies*, New Delhi, India, Sep 27, 2019.
9. *Energy Assurance with Renewable Generation*. Keynote talk at the *IEEE PowerAfrica Conference*, Cape Town, South Africa, June 28, 2018.
10. *Reliability-Based Storage Sizing for Mitigation of Variability of Renewable Generation*. Keynote talk at the *Electrical Energy Storage Applications and Technologies Conference*, San Diego, CA, Oct 11, 2017.
11. *Emerging Technological Opportunities in Smart Grids*. Keynote talk at the *International Conference on Intelligent Control, Power and Instrumentation*, Kolkata, India, Oct 22, 2016.
12. *Energy Assurance with Renewable Generation*. Keynote talk at the *International Forum on "The Belt and Road" Energy Internet*, Chengdu, China, May 28, 2016.
13. *Energy Assurance with Renewable Generation*. Keynote talk at the *12th IEEE India International Conference (INDICON)*, New Delhi, India, Dec 19, 2015.
14. *Reliable Delivery of Renewable Energy*. Keynote talk at the *International Conference and Utility Exhibition on Green Energy for Sustainable Development*, Pattaya City, Thailand, Mar 21, 2014.
15. *Energy Assurance in an Age of Variable Generation*. Keynote talk at the *45th Annual Frontiers of Power Conference*, Stillwater, OK, Oct 30, 2012.
16. *Secure Power Systems Through Autonomous Microgrids*. Keynote talk at the *5th WSEAS International Conference on Circuits, Systems, Electronics, Control & Signal Processing*, Dallas, TX, Nov 1, 2006.

Conference Panel and Invited Talks

17. *Energy Storage to Assist Data Centers in Improving their Grid Impact*. Panel presentation at the *IEEE-PES Annual General Meeting*, Montreal, QC, July 22, 2026.
18. *Emerging Needs and Opportunities for Long Duration Energy Storage*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Chicago, IL, May 6, 2026.
19. *Energy Storage System Integration in the Transmission System*. Panel presentation at the *IEEE PowerTech 2025 Conference*, Kiel, Germany, July 3, 2025.
20. *Increasing Renewable Integration: Challenges and Viable Strategies*. Invited talk at the *Symposium on Renewable Generation and Integration Aspects for Sustainable Energy Mission*, organized by Calcutta University, Kolkata, India, Oct 26, 2024.
21. *Sizing Energy Storage for Grid Reliability Applications*. Panel presentation at the *IEEE-PES Annual General Meeting*, Orlando, FL, July 18, 2023.
22. *Energy Storage to Support Renewable Generation*. Invited talk at the *11th IEEE PES Generation, Transmission and Distribution Conference & Exposition*, Virtual 2022 – Latin America, La Paz, Bolivia, Oct 20, 2022.

23. *Modeling Energy Storage for Improving Power System Performance in Presence of Renewable Energy*. Panel presentation at the *IEEE Green Technologies Conference*, Virtual Conference, Apr 7, 2021. Co-presenter: A. Bera.
24. *Architecture for a Self-Sufficient Microgrid*. Panel presentation at the *IEEE-PES Annual General Meeting*, Montreal, QC, Aug 4, 2020.
25. *Reliability Impact of Low-Inertia Generation*. Panel presentation at the *IEEE Sustainable Power & Energy Conference*, Beijing, China, Nov 23, 2019.
26. *Resilience Evaluation of Future Power Grids*. Panel presentation at the *IEEE-PES Annual General Meeting*, Atlanta, GA, Aug 7, 2019. Co-presenter: M. Benidris.
27. *An Introduction to Distribution Automation*. Panel presentation at the *PowerForward Ohio Phase 2 Conference*, Public Utilities of Ohio (PUCO), Columbus, OH, July 26, 2017.
28. *Homotopy-based Method for Rapid Screening of Dynamic Contingencies*. Panel presentation at the *IEEE-PES Annual General Meeting*, Boston, MA, July 21, 2016. Co-presenter: M. Benidris.
29. *Real-Time Remedial Action Screening Using Direct Stability Analysis Methods*. Panel presentation at the *IEEE-PES Annual General Meeting*, Washington, DC, July 31, 2014. Co-presenter: M. Benidris.
30. *Engineering of Storage for Mitigation of Variability*. Panel presentation at the *IEEE-PES Annual General Meeting*, Washington, DC, July 31, 2014.
31. *Reliability-Based Storage Sizing for Island-Capable Microgrids*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Chicago, IL, Apr 17, 2014.
32. *Distributed Analytics for Steady State Operation of Autonomous Microgrids*. Panel presentation at the *IEEE-PES Annual General Meeting*, San Diego, CA, July 25, 2012.
33. *Intelligent Methods for Smart Microgrids*. Panel presentation at the *IEEE-PES Annual General Meeting*, Detroit, MI, July 26, 2011.
34. *System Analytics for Smart Microgrids*. Panel presentation at the *IEEE-PES Annual General Meeting*, Minneapolis, MN, July 29, 2010.
35. *Planning for a Sustainable Transmission and Distribution System*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, New Orleans, LA, Apr 22, 2010.
36. *The National Science Foundation and Its Quest for Tomorrow's Academic Leaders*. Panel presentation at the *Power System Conference and Exposition*, Seattle, WA, Mar 17, 2009.
37. *The National Science Foundation and Its Quest for Tomorrow's Academic Leaders*. Panel presentation at the *IEEE-PES Annual General Meeting*, Pittsburgh, PA, July 24, 2008.
38. *Application of Computational Intelligence in Optimal Expansion of Distribution Systems*. Panel presentation at the *IEEE-PES Annual General Meeting*, Pittsburgh, PA, July 23, 2008.
39. *Microgrid Evolution: New Paradigms Drive New Architectures*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Chicago, IL, Apr 24, 2008.
40. *Toward Understanding Catastrophic Failure Modes in Power Systems*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Dallas, TX, May 22, 2006.
41. *A Self-Supporting Microgrid Achievable with Today's Technology*. Panel presentation at the *IEEE-PES Transmission and Distribution Conference and Exposition*, Dallas, TX, May 22, 2006.

Lecture Series and Other Invited Talks

42. *Grid-Scale Storage for Energy Assurance: Emerging Challenges and Opportunities*. Invited talk (*IEEE Distinguished Lecture*) at IEEE-CSS Kharagpur Chapter, Jan 27, 2026.
43. *Energy Storage to Support Renewable Generation*. Invited talk (*IEEE Distinguished Lecture*) at IEEE Boise Section, Boise, ID, Nov 15, 2024.
44. *Impacts of BESS Failures and Ageing on System Reliability*. Invited talk presented to IEEE Standard 762 Working Group, May 30, 2024. Co-presenter: A. Bera.

45. *Energy Storage to Support Renewable Generation*. Invited talk (*Science & Society Distinguished Public Talks*) at University of New Mexico, Albuquerque, NM, Mar 8, 2023.
46. *Energy Storage to Support Renewable Generation*. Invited talk (*Energy Storage Technology and Systems Department Distinguished Lecture Series*) at Sandia National Laboratories, Albuquerque, NM, Mar 8, 2023.
47. *Use of Energy Storage for Reliability Improvement of Renewable Generation*. Invited talk (*IEEE Distinguished Lecture*) at IEEE-PES-PELS Delhi Chapter, Feb 9, 2023.
48. *Energy Storage to Support Renewable Generation*. Invited talk (*ICC Distinguished Lecturer Series*) at the Institute of Computing and Cybersystems, Michigan Technological University, Houghton, MI, Oct 24, 2022.
49. *Energy Storage to Support Grid Resilience in the Presence of Renewable Generation*. Invited talk (*IEEE Distinguished Lecture*) at IEEE Orlando Section, Aug 25, 2022. Two-hour talk, PDHs awarded.
50. *Use of Energy Storage for Reliability Improvement of Renewable Generation*. Invited talk (*IEEE Distinguished Lecture*) at IEEE-PES UK-Ireland Chapter, May 5, 2022.
51. *Energy Assurance with Renewable Generation*. Invited talk (*IEEE Distinguished Lecture*) at IEEE-PES Tennessee (Chattanooga) Chapter, Aug 19, 2021.
52. *Use of Energy Storage for Reliability Improvement of Renewable Generation*. Invited talk (*IEEE Distinguished Lecture*) at IEEE-PES Pune Section (India), July 16, 2021.
53. *Energy Assurance with Renewable Generation*. Invited talk (*IEEE Distinguished Lecture*) at IEEE-PES Turkey Chapter, June 18, 2021.
54. *Design of Modern Microgrids: Architecture, Control and Protection*. Invited talk (*Sprint Lecture Series*) at Department of Electrical and Computer Engineering, Florida State University, Tallahassee, FL, Nov 16, 2012.
55. *Long-term Planning of Generation, Transmission and Distribution Assets*. Invited talk (*Smart Grid Lecture Series*) at Los Alamos National Laboratory, Los Alamos, NM, Nov 16, 2009.
56. *Stewardship of Energy Innovation and Education*. Invited talk at the National Science Foundation, Washington, DC, Oct 7, 2009.
57. *Preventing Catastrophic Failures in Power Systems*. Invited talk at the *Workshop on Power System Security*, sponsored by the Ministry of Power, India. Kharagpur, Jan 13–14, 2006.
58. *Reliability of Electric Power Systems*. Invited talk at the Electrical Power Department, Tata Iron & Steel Company, Jamshedpur, India, Aug 22, 1995.

University Seminars and Colloquia

International

59. Energy Research Institute, Nanyang Technological University, Singapore, Mar 5, 2026.
60. Department of Electrical & Electronics Engineering, Nanyang Technological University, Singapore, Mar 3, 2026.
61. School of Engineering and Design, Technische Universität München, Munich, Germany, Apr 29, 2025.
62. Institute of Energy and Automation Technology, Technische Universität Berlin, Berlin, Germany, Apr 25, 2025.
63. Department of Electrical Engineering, Indian Institute of Technology, Kharagpur, Feb 2, 2023.
64. Department of Electrical Engineering, Tsinghua University, Beijing, China, Nov 23, 2019.
65. School of Electrical Engineering, Chongqing University, Chongqing, China, Nov 22, 2019.
66. Department of Electrical Engineering, Indian Institute of Technology, Kharagpur, Oct 1, 2019.
67. Department of Electrical Engineering, Madan Mohan Malaviya University of Technology, Gorakhpur, India, Sep 26, 2019.

68. Department of Electrical Engineering, Indian Institute of Technology, Madras, Sep 26, 2018.
69. School of Electrical Engineering and Information, Sichuan University, Chengdu, China, May 30, 2016.
70. Institute of Energy and Automation Technology, Technische Universität Berlin, Berlin, Germany, Aug 15, 2014.
71. School of Environment, Resources and Development (SERD), Asian Institute of Technology, Bangkok, Thailand, June 18, 2010.
72. Department of Electrical & Electronic Engineering, Imperial College, London, UK, July 10, 2008.
73. Department of Electrical Engineering, Indian Institute of Technology, Kharagpur, Jan 15, 2008.
74. Department of Electrical Engineering, Indian Institute of Technology, Kanpur, Jan 10, 2008.
75. Department of Electrical Engineering, Indian Institute of Technology, Bombay, Jan 13, 2006.
76. Department of Electrical Engineering, University of Manitoba, Winnipeg, Oct 10, 2002.
77. Department of Electrical Engineering, Indian Institute of Technology, Kharagpur, Aug 23, 1995.

Domestic

78. School of EECS, Louisiana State University, Baton Rouge, LA, Feb 4, 2020.
79. Department of ECE, Iowa State University, Ames, IA, Jan 21, 2020.
80. Department of EBME, University of Nevada–Reno, Reno, NV, Apr 8, 2019.
81. Department of ECE, Purdue University, West Lafayette, IN, Feb 28, 2019.
82. Department of EECS, University of Michigan, Ann Arbor, MI, Feb 21, 2019.
83. Department of ECE, University of Florida, Gainesville, FL, Oct 25, 2018.
84. Department of ECE, Texas A&M University, College Station, TX, Sep 21, 2017.
85. Department of ECE, Virginia Tech, Blacksburg, VA, Feb 27, 2015.
86. Department of ECE, University of Illinois–Chicago, Chicago, IL, Apr 18, 2014.
87. Department of ECE, Wayne State University, Detroit, MI, Nov 13, 2013.
88. Department of ECE, University of Illinois–Chicago, Chicago, IL, Apr 2, 2013.
89. Department of ECEE, Arizona State University, Tempe, AZ, Jan 25, 2013.
90. Department of ECE, Florida International University, Miami, FL, Apr 16, 2012.
91. Department of CSE, Michigan State University, East Lansing, MI, Nov 4, 2011.
92. School of ECE, Georgia Institute of Technology, Atlanta, GA, May 23, 2008.
93. Department of ECE, Missouri University of Science & Technology, Rolla, MO, Mar 22, 2007.
94. Department of ECE, North Carolina State University, Raleigh, NC, Mar 19, 2007.

Local Forums

95. *Microgrids for Critical Infrastructures and Community Resilience*. Invited talk at *Michigan Energy Innovation Business Council Public Convening*, Grand Rapids, MI, May 22, 2024.
96. *Role of Grid-scale Storage in Michigan*. Invited talk at the *Michigan Forum on Economic Regulatory Policy*, East Lansing, MI, Feb 23, 2018.
97. *Understanding Electric Resource Adequacy*. Invited talk at the *Michigan Forum on Economic Regulatory Policy*, East Lansing, MI, Jan 30, 2015.
98. *Electric Energy Resource Outlook*. Invited talk at the *Michigan Forum on Economic Regulatory Policy*, East Lansing, MI, Feb 2, 2010.
99. *Economics and Impact of Distributed Generation*. Invited talk at the Red River Valley Section of the IEEE, Oct 2002. (Local while at NDSU)
100. *How Does Electricity Deregulation Affect Us?* Invited talk at the Rough Rider Kiwanis (Fargo Chapter of the Kiwanis International), Nov 2000. (Local while at NDSU)

Events Organized

1. Organized and co-Chaired (with L. K. Goel) the *Roy Billinton Memorial Panel* (to honor Roy Billinton, who passed away on December 23, 2025) at the IEEE-PES Annual General Meeting, Montreal, QC, on July 21, 2026.
2. Member, Technical Program Committee, IEEE Innovative Smart Grid Technologies, North America (ISGT NA), Washington, DC, Feb 19–22, 2024.
3. Organized and co-Chaired (with A. Bera) a panel on *Addressing Grid Reliability and Resilience through Energy Storage* at the IEEE-PES Annual General Meeting, Orlando, FL, on July 18, 2023.
4. Member, Technical Program Committee, IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm), Singapore, Oct 25–28, 2022.
5. Organized and co-Chaired (with J. Liu) a panel on *Resilience Metrics and Modeling in Operation and Planning* at the IEEE-PES Annual General Meeting, Montreal, QC, on August 4, 2020.
6. Organized and co-Chaired (with M. Benidris) a panel on *Resilience Metrics and Evaluation Methods for Power Systems* at the IEEE-PES Annual General Meeting, Atlanta, GA, on August 7, 2019.
7. Organized and Chaired the *William Tinney Memorial Panel* (to honor William Tinney, who passed away on April 14, 2019) at the IEEE-PES Annual General Meeting, Atlanta, GA, on August 5, 2019.
8. Member, Technical Program Committee, 19th International Conference on Intelligent Systems Applications to Power, San Antonio, TX, Sep 17–21, 2017.
9. Organized and co-Chaired (with H. Chiang) a panel on *Application of Direct Methods in Stability Enhancement of Smart Grids* at the IEEE-PES Annual General Meeting—2016, Boston, MA, on July 21, 2016.
10. Technical Committee Program Chair for the Power System Analysis, Computing and Economics Committee at the IEEE-PES Transmission and Distribution Conference & Exposition, Dallas, TX, May 2–5, 2016.
11. Technical Committee Program Chair for the Power System Analysis, Computing and Economics Committee at the IEEE-PES Power System Conference & Exposition, Phoenix, AZ, Mar 20–23, 2011.
12. Technical Committee Program Chair for the Power System Analysis, Computing and Economics Committee at the IEEE-PES Annual General Meeting, Calgary, Alberta, July 26–30, 2009.
13. Organized and co-Chaired (with S. Suryanarayanan) a panel on *Enabling Technologies for the Customer-driven Microgrid* at the IEEE-PES Annual General Meeting—2009, Calgary, AB, on July 28, 2009.
14. Organized and Chaired the 39th Annual *North American Power Symposium*, Las Cruces, NM, September 30 to Oct 2, 2007.
15. Organized and Chaired a panel on *Power System Hardening Through Microgrids* at the IEEE-PES Annual General Meeting—2007, Tampa, FL, on June 27, 2007.
16. Organized and Chaired the IEEE Tutorial on *Electric Delivery System Reliability Evaluation* at the IEEE-PES Annual General Meeting—2006, Montreal, Quebec, on June 21, 2006.
17. Organized and Chaired the IEEE Tutorial on *Reliability of Electric Delivery Systems* at the IEEE-PES Transmission and Distribution Conference & Exposition—2006, Dallas, TX, on May 21, 2006.
18. Organized and Chaired the IEEE Tutorial on *Electric Delivery System Reliability Evaluation* at the IEEE-PES Annual General Meeting—2005, San Francisco, CA, on June 12, 2005.
19. Organized Student Programs at several IEEE-PES Conferences (2002–2008).
20. Organized the Distributed & Renewable Energy Symposium (DRES 2003) at New Mexico State University on Dec 4, 2003.

Conference Sessions Chaired

Chaired technical paper sessions and forums at the following conferences:

1. IEEE Sustainable Power & Energy Conference, Beijing, China, Nov 2019.

2. International Conference on Computing, Power and Communication Technologies, New Delhi, India, Sep 2019.
3. IEEE PowerAfrica 2018, Cape Town, South Africa, June 2018.
4. 14th International Conference on Probabilistic Methods Applied to Power Systems (PMAPS), Beijing, China, Oct 2016.
5. 12th IEEE India International Conference (INDICON), New Delhi, India, Dec 2015.
6. 13th PMAPS, Durham, UK, July 2014.
7. International Conference and Utility Exhibition on Green Energy for Sustainable Development, Pattaya City, Thailand, Mar 2014.
8. 44th North American Power Symposium (NAPS), Champaign, IL, Sep 2012.
9. 3rd International Conference on Power Systems (ICPS), Kharagpur, India, Dec 2009.
10. IEEE-PES General Meeting, Calgary, AB, July 2009.
11. 2nd ICPS, Bangalore, India, Dec 2007.
12. 5th WSEAS International Conference on Circuits, Systems, Electronics, Control & Signal Processing, Dallas, TX, Nov 2006.
13. 38th NAPS, Carbondale, IL, Sep 2006.
14. 37th NAPS, Ames, IA, October 2005.
15. 36th NAPS, Moscow, ID, Aug 2004.
16. IEEE-PES General Meeting, Denver, June 2004.
17. IEEE-PES Summer Meeting, Chicago, July 2002.

INSTITUTIONAL ACTIVITIES AND SERVICE

Mentoring and Student Advising

Currently Advising:

1. Chandan Chaudhary (Ph.D., expected to graduate in 2028).

Post-doctoral Associates:

1. Dr. Aysun Koksall (Post-doc, 2018–19, now Asst. Prof. at Beykent University, Istanbul, Turkey);
2. Dr. Nga Nguyen (Post-doc, 2017–18, now Asst. Prof. at University of Wyoming, Laramie, WY);
3. Dr. Mohammed Ben-Idris (Post-doc, 2015–16, now Assoc. Prof. at Mich. St. Univ., E. Lansing, MI);
4. Dr. Salem El-Saiah (Post-doc, Fall 2015, now Asst. Prof. at Alvernia University, Reading, PA);
5. Dr. Niannian Cai (Post-doc, Fall 2014, now with Google, Mountain View, CA);
6. Dr. Xufeng Xu (Post-doc, 2009–11, now with Electric Reliability Council of Texas, Austin, TX).

Doctoral Alumni:

1. Saad Alzahrani (Aug 2025; now Assistant Professor at King Khaled University, Saudi Arabia);
2. Atri Bera (Aug 2021; now with Sandia National Laboratories, Albuquerque, NM);
3. Saleh Al-Masabi (May 2019; now Asst. Professor at Najran University, Najran, Saudi Arabia);
4. Yuting Tian (Dec 2018; now with China Electric Power Research Institute, Chengdu, China);
5. Nga Nguyen (Aug 2017; now Asst. Professor at University of Wyoming, Laramie, WY);
6. Samer Sulaeman (May 2017);
7. Salem El-Saiah (Aug 2015; now Asst. Professor at Alvernia University, Reading, PA);
8. Mohammed Ben-Idris (Dec 2014; now Assoc. Prof. at Michigan State Univ., East Lansing, MI);
9. Niannian Cai (Aug 2014, now with Google, Mountain View, CA);
10. Mallikarjuna Vallem (Aug 2009, CEO of BrickWise Real Estate, Bellevue, WA);
11. Shashi Patra (May 2007, now with GE Grid Solutions, Redmond, WA).

Master's Alumni (thesis option; non-thesis advisees not listed):

1. Josue Sanchez (May 2025);
2. Saad Al-Zahrani (May 2021);
3. Fares Al-Harbi (May 2018);
4. Valdama Johnson (Dec 2016);
5. Khaleel Khadedah (Aug 2015);
6. Elicia Sashington (Dec 2014);
7. Yuting Tian (Aug 2014);
8. Mohamed Esreraig (May 2012);
9. Sirisha Tanneeru (Dec 2008);
10. Ramakanth Tondupally (Dec 2008);
11. Heidi Shray (Dec 2007);
12. Aleen Mohammed (Dec 2007);
13. Yashwant Patil (Dec 2006);
14. Ramesh Earla (Aug 2005);
15. Narender Aeron (May 2004);
16. Julian Feng (Aug 2003);
17. Ryan Retzlaff (May 2003).

Courses Taught

At Michigan State University:

1. Power System Reliability (ECE 824);
2. Power System Stability and Control (ECE 823);
3. Operation of Modern Electric Grids (ECE 802);
4. Power System Analysis (ECE 423);
5. Power System Laboratory (ECE 420);
6. Energy Conversion and Power Electronics (ECE 320);
7. Electronic Circuits (ECE 302).

At New Mexico State University:

8. Power Systems I (EE 332);
9. Power Systems II (EE 432/542);
10. Power Systems III (EE 493/543);
11. Power System Reliability and Risk Assessment (EE 535);
12. Power System Relaying (EE 534);
13. Energy Economics (EE 490/590); one of four faculty in team-taught course.

At North Dakota State University:

14. Power System Protection (ECE 731);
15. Power Distribution (ECE 733);
16. Machines and Controls Lab (ECE 402);
17. Power Systems Design (ECE 433/633);
18. Energy Conversion (ECE 331);
19. Electrical Engineering II (ECE 303);
20. Electrical Engineering Lab I (ECE 306).

At Texas A&M University (as Assistant Lecturer, during Doctoral program):

21. Electromechanical Energy Conversion (ELEN 338);
22. Electric Circuit Theory and Instrumentation (ELEN 306).

Committee Service

At Michigan State University:

1. Faculty Senator, Michigan State University, 2026–present;
2. Faculty Adviser, IEEE Student Branch MSU, 2025–present;
3. Chair, Undergraduate Studies Committee, ECE Department, 2022–25 (Member, 2018–25);
4. Member, Engineering College Advisory Council, 2024–26;
5. Chair, Faculty Search Committee, ECE Department, 2022–23;
6. Member, ABET Committee, ECE Department, 2013–19;
7. Area Chair, *Power, Control and Robotics Group*, ECE Department, 2016–18;
8. Member, Graduate Studies Committee, ECE Department, 2015–18;
9. Coordinator for Department Seminars, ECE Department, 2010–12;
10. Member, Graduate Admissions, Recruiting & Financial Aid Committee, ECE Department, 2008–11.

At New Mexico State University:

11. Chair, Ph.D. Qualifying Examination Coordination Committee, ECE Department, 2006–07;
12. Member, Graduate Studies Committee, ECE Department, 2005–08;
13. Member, Technology Committee, ECE Department, 2006–08;
14. Member, Faculty Search Committee, ECE Department, 2006–07;
15. Member, Associate Dean (Academic) Search Committee, College of Engineering, 2005.

At North Dakota State University:

16. Coordinator for Graduate Seminars, ECE Department, 2002–03;
17. Member, Graduate Committee, ECE Department, 2001–03;
18. Member, Curriculum Committee, ECE Department, 2000–01.

Faculty Affiliate, [Environmental Science and Policy Program](#), Michigan State University, (2016–present).

Senior Faculty Associate, [Institute of Public Utilities](#), Michigan State University, (2009–present).

Member, [Center for Stochastic Modeling](#), New Mexico State University (2004–08).

RESEARCH AND EDUCATION GRANTS

Research Grants and Contracts

1. PI, “Reliability Foundations for Operating Strategies for Long Duration Storage,” U.S. Department of Energy/Sandia National Laboratories, \$224,000; 2024–27.
2. Co-PI (with M. Benidris, S. Biswas, and C. Cetin), “MRI: Acquisition of an Interactive and Multi-functional Real-time Simulator for Smart Power and Energy Systems,” National Science Foundation, \$762,500, 2024–26.
3. PI, “Probabilistic Frameworks for Resource Planning and Microgrid Design Applications,” U.S. Department of Energy/Sandia National Laboratories, \$70,000; 2023.
4. PI, “Models for Evaluation and Optimization of Grid-Scale Energy Storage,” U.S. Department of Energy/Sandia National Laboratories, \$260,000; 2018–21.
5. PI (with M. Thomas), “Application of Utility-Scale Battery Storage in Power Distribution System,” Consumers Energy Corporation, \$346,000; 2016–19.
6. PI, “Impacts of Power Flow Control in Distribution Systems,” Michigan Economic Development Corporation, \$40,000; 2017.
7. PI, “A Lyapunov Function Based Remedial Action Screening Tool Using Real-Time Data,” U.S. Department of Energy, \$1,875,000; 2012–15.
8. PI (with M. Thomas), “Impact of Increased Renewable Generation Resources Across the MISO Zone 7 Footprint,” Consumers Energy Corporation, \$142,000; 2014–15.

9. Co-PI (with F. Z. Peng), "Transformer-less Unified Power Flow Controller for Wind and Solar Power Transmission," ARPA-E, \$2,520,000; 2012–15.
10. PI, "Optimal Fuel-Switching in CoGen Plant to Meet Environmental and Operational Constraints," MSU Office of Campus Sustainability, \$30,000; 2010–11.
11. Co-PI (with S. J. Ranade, S. Suryanarayanan, P. Ribeiro), "A Holistic Approach to Customer-driven Microgrids," National Science Foundation Grant ECCS-0702208, \$450,000; 2007–10 (extended at no cost to 2011).
12. PI, NSF Career Grant ECS-0134598, \$375,000; 2002–07 (extended at no cost to 2008).
13. PI, SURP Grant, Sandia National Laboratories, \$40,000; 2006–07.
14. PI, Sandia-University Research Program (SURP) Grant, Sandia National Laboratories, \$40,000; 2005–06.
15. PI (with Don L. Stuehm), "Advanced Transformer Modeling for Transients Simulation," Bonneville Power Administration, \$60,000; 2002–03.
16. PI (with Don L. Stuehm), "A Real Time Price Signal Driven Demand Management System," Otter Tail Power Company, \$60,000; 2001–03.
17. PI (with Don L. Stuehm), "Dynamic Modeling of Large Induction Motors for Stability and Load Flow Studies," Otter Tail Power Company, \$15,000; 2001–02.
18. Co-PI (with Don L. Stuehm), "Dynamic Ratings of Transmission Lines, Transformers, Traps and Current Transformers," Otter Tail Power Company, \$15,000; 2001–02.

Education and Outreach Grants

19. PI, Development of Educational Material on Energy Storage, U.S. Department of Energy/Sandia National Laboratories, \$30,000; 2022.
20. PI, "A Nationwide Consortium of Universities to Revitalize Electric Power," subcontract from University of Minnesota (U.S. Department of Energy grant), \$4,000; 2010–13.
21. PI (with S. Ranade), "Student Support for 2007 North American Power Symposium," NSF, \$10,000; 2007.

PATENTS

1. "Linear Optimal Power Flow System and Method," U.S. Patent No. 10,296,988, issued May 21, 2019.
2. "Tool Employing Homotopy-Based Approaches in Finding the Controlling Unstable Equilibrium Point in the Electric Power Grid," with N. Cai and M. Benidris. U.S. Patent No. 10,097,000, issued Oct 9, 2018.
3. "Standby Generator Integration System," with J. A. Jorgenson, D. L. Stuehm and T. Shaner. U.S. Patent No. 7,180,210, issued Feb 20, 2007.

TECHNICAL PUBLICATIONS

Ph.D. Dissertation

"Models for Reliability Evaluation of Multi-Area and Composite Systems," published by *ProQuest Information and Learning*, Ann Arbor, MI; 1997.

Books

- [1] IEEE Std. 762 Working Group, "IEEE Std. 762-2023: IEEE Standard Definitions for Use in Reporting Electric Generating Unit Reliability, Availability and Productivity." IEEE, Piscataway, NJ: 2023. (Working Group Member and Co-author.)
- [2] "Electric Power Grid Reliability Evaluation: Models and Methods," with C. Singh and P. Jirutitijaroen, Wiley-IEEE Press, Hoboken, NJ: 2019. ISBN: 9781119486275.
- [3] IEEE Std. 762 Working Group, "IEEE Std. 762-2006: IEEE Standard Definitions for Use in Reporting Electric Generating Unit Reliability, Availability and Productivity." IEEE, Piscataway, NJ: 2006. (Working Group Member and Co-author.)
- [4] "IEEE Tutorial on Electric Delivery System Reliability Evaluation." IEEE, Piscataway, NJ: 2005. Publication number 05TP175. (Editor: J. Mitra.)

Book Chapters

- [1] "From Cyber Attacks to Resilient Operations: Safeguarding the Modern Power Grid," with C. Chaudhary and M. Benidris, in *Cybersecurity and Resilience of Modern Power Systems* (Editors: M. Shadmand, S. Bayhan and H. Abu-Rub), Wiley-IEEE Press, Hoboken, NJ; 2026.
- [2] "Pumped Hydroelectric Storage," with A. Bera, B. Gunawan, A. G. Benson, R. H. Byrne, B. R. Chalamala and V. Tidwell, in *U.S. DOE Energy Storage Handbook*, Sandia National Laboratories, Albuquerque, NM; Aug 2024. (download link: https://www.sandia.gov/app/uploads/sites/163/2024/08/ESHB_Ch9_PHS_Bera.pdf)
- [3] "Reliability and Mean Life Assessment of Solar Panels," with R. Agrawal, J. Ogale, N. Nguyen and R. K. Saket, in *Reliability Analysis of Modern Power Systems* (Editors: R. K. Saket and P. Sanjeevkumar), pp 353–380, Wiley, New York, NY; July 2024.
- [4] "Emergency Power Supply for Load Point Reliability," with C. Singh, in *Wiley Encyclopedia of Electrical and Electronics Engineering*. Wiley, New York, NY; Aug 2017.
- [5] "Dynamic Contingency Analysis and Remedial Action Tools for Secure Electric Cyber-Physical Systems," with M. Benidris and N. Nguyen, in *Cyber-Physical-Social Systems and Constructs in Electric Power Engineering* (Editors: S. Suryanarayanan, R. Roche and T. Hansen), IET, London, UK; 2016.
- [6] "Reliability Evaluation in Transmission Systems," with C. Singh, in *Smart Grid Handbook* (Editors: C.-C. Liu, S. McArthur and S.-J. Lee), Wiley, New York, NY; 2016.
- [7] "Applications of Particle Swarm Optimization in Composite Power System Reliability Evaluation," with M. Benidris and S. A. Elsaiah, in *Handbook of Research on Swarm Intelligence in Engineering* (Editors: S. Bhattacharyya and P. Dutta), pp 573–610, IGI Global, Hershey, PA; 2015.
- [8] "Reliability-Constrained Optimal Distribution System Reconfiguration," with S. A. Elsaiah and M. Benidris, in *Computational Intelligence Applications in Modeling and Control* (Editors: A. T. Azar and S. Vaidyanathan), pp 265–289, Springer International Publishing, Switzerland; 2015.
- [9] "Monte Carlo Simulation and Intelligent Search Methods," with C. Singh, in *IEEE Tutorial on Electric Delivery System Reliability Evaluation* (Editor: J. Mitra), pp 23–38. IEEE, Piscataway, NJ; 2005.
- [10] "Emergency Power Supply," with C. Singh, in *Wiley Encyclopedia of Electrical and Electronics Engineering* (Editor: J. G. Webster), vol 7, pp 61–67. Wiley, New York, NY; 1999.

Refereed Journal Articles

- [1] "Spatially Correlated Load Dynamics in AI Data-Center-Dominated Grids," with C. Chaudhary, A. Abdelkader, and M. Benidris, *IEEE Transactions on Power Systems*, Early access, DOI: 10.1109/TPWRS.2026.3729445.
- [2] "Sequence-Decoupled Multi-Current Control of a Four-Leg EV Charger for Unbalanced Three-Phase Four-Wire Systems," with K. Sinjari, A. Janabi, S. Alzahrani, M. Ben-Idris and N. Nguyen, *IEEE Access*, art. 3725222: 1–17; 2026.
- [3] "A Bayesian Hierarchical Model for Power System Resilience Assessment," with C. Chaudhary, Y. Pei and M. Benidris, *International Journal of Electrical Power and Energy Systems*, 177: art. 111829: 1–11; 2026.
- [4] "Enhancing Distribution System Reliability via Volt/VAr Regulation and Stability-Constrained Adaptive Inverter Control," with H. Hosseinpour and M. Benidris, *IEEE Transactions on Power Systems*, 41(1): 337–353; Jan 2026.
- [5] "Day-Ahead Demand Response Scheduling to Improve Voltage Stability with Consumer Preference Considerations," with A. Abdelkader, A. Alzahrani, A. Abdelkader and M. Benidris, *IEEE Transactions on Industry Applications*, 62(1): 71–80; Jan/Feb 2026.
- [6] "Probabilistic Sizing of Energy Storage Systems for Reliability and Frequency Security in Wind-Rich Power Grids," with D. Pandit, A. Bera, R. K. Saket and N. Nguyen, *IEEE Transactions on Industry Applications*, 60(3): 4608–4621; May/Jun 2024.

- [7] "Learning Model Combining Convolutional Deep Neural Network with a Self-Attention Mechanism for AC Optimal Power Flow," with Q. Tran and N. Nguyen, *Electric Power System Research*, 231: art. 110327: 1–14; Jun 2024.
- [8] "Multi-Agent and State Observer-Based Technique for Microgrid Protection," with S. Alzahrani and K. Sinjari, *IEEE Transactions on Industry Applications*, 60(2): 2697–2705; Mar/Apr 2024.
- [9] "Quantification of Storage Required for Preserving Frequency Security in Wind-Integrated Systems," with A. Bera, N. Nguyen and B. Chalamala, *IET Renewable Power Generation*, 17(9): 2366–2378; July 2023.
- [10] "Grid Scale Virtual Energy Storage to Advance Renewable Energy Penetration," with N. Nguyen, *IEEE Transactions on Industry Applications*, 58(6): 7952–7965; Nov/Dec 2022.
- [11] "Analytical Assessment of Time-Varying Reliability and Penetration Limit of PV-Integrated Systems," with D. Pandit, N. Nguyen and S. Elsaiah, *IEEE Transactions on Industry Applications*, 58(6): 6886–6898; Nov/Dec 2022.
- [12] "An Advanced Control and Protection Integration Scheme for Microgrids," with S. Alzahrani and K. Sinjari, *Sustainable Energy, Grids and Networks*, 32: art. 100940: 1–8; Dec 2022.
- [13] "Hybrid Data-Model Predictive Control for Enabling Participation of Renewables in Regulating Reserves Service," with J. N. Forestieri and M. Farasat, *IEEE Transactions on Industrial Electronics*, 69(11): 11262–11271; Nov 2022.
- [14] "Sizing of Energy Storage for Grid Inertial Support in Presence of Renewable Energy," with A. Bera, B. Chalamala and R. H. Byrne, *IEEE Transactions on Power Systems*, 37(5): 3769–3778; Sep 2022.
- [15] "Advanced Extended-term Simulation Approach with Flexible Quasisteady-state and Dynamic Semi-analytical Simulation Engines," with R. Yao, D. Zhao, A. P. Sakis Meliopoulos, C. Singh and F. Qiu, *iEnergy*, 1(1): 124–132; Mar 2022.
- [16] "Utility-Scale Shared Energy Storage: Business models for utility-scale shared energy storage systems and customer participation," with M. Benidris, M. Brown, M. Egan and Z. Huang, *IEEE Electrification Magazine*, 9(4): 47–54; Dec 2021.
- [17] "Frequency Response in the Presence of Renewable Generation: Challenges and Opportunities," with N. Nguyen, D. Pandit and R. Quigley, *IEEE Open Access Journal of Power and Energy*, 8: 543–556; 2021.
- [18] "Distributed Energy Resources based Microgrid: Review of Architecture, Control, and Reliability," with A. Muhtadi, D. Pandit and N. Nguyen, *IEEE Transactions on Industry Applications*, 57(3): 2223–2235; May/June 2021.
- [19] "Maximizing the Investment Returns of a Grid-connected Battery considering Degradation Cost," with A. Bera, S. Almasabi, Y. Tian, R. H. Byrne, B. Chalamala and T. A. Nguyen, *IET Generation, Transmission and Distribution*, 14(21): 4711–4718; Nov 2020.
- [20] "Use of Performance Indices for Contingency Screening for Rapid Assessment of Dynamic Security Region," with T. A. Simões and C. L. T. Borges, *IET Generation, Transmission and Distribution*, 14(18): 3896–3904; Sep 2020.
- [21] "PV Hosting Capacity of LV Distribution Networks using Smart Inverters and Storage Systems: A Practical Margin," with J. F. B. Sousa and C. L. T. Borges, *IET Renewable Power Generation*, 14(8): 1332–1339; June 2020.
- [22] "A Homotopy-based Method for Robust Computation of Controlling Unstable Equilibrium Points," with M. Benidris, *IEEE Transactions on Power Systems*, 35(2): 1422–1431; Mar 2020.
- [23] "Reduction of Three-Phase Transformer Inrush Currents Using Controlled Switching," with X. Xu and M. Benidris, *IEEE Transactions on Industry Applications*, 56(1): 890–897; Jan/Feb 2020.
- [24] "Optimal Power Flow Incorporating Frequency Security Constraint," with N. Nguyen, S. Almasabi and A. Bera, *IEEE Transactions on Industry Applications*, 55(6): 6508–6516; Nov/Dec 2019.

- [25] "A Fault-Tolerance Based Approach to Optimal PMU Placement," with S. Almasabi, *IEEE Transactions on Smart Grid*, 10(6): 6070–6079; Nov 2019.
- [26] "Impact of Correlation Between Wind Speed and Turbine Availability on Wind Farm Reliability," with N. Nguyen and S. Almasabi, *IEEE Transactions on Industry Applications*, 55(3): 2392–2400; May/June 2019.
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- [28] "Multi-Stage Optimal PMU Placement Considering Substation Infrastructure," with S. Almasabi, *IEEE Transactions on Industry Applications*, 54(6): 6519–6528; Nov/Dec 2018.
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- [2] "A Hierarchical Semi-Markov Load Model for AI Data Centers Coupling Job Scheduling with Bulk-Synchronous-Parallel Power Dynamics," with C. Chaudhary, A. Bera, C. Newlun and M. Benidris, to be presented at the CIGRE UNSC *Grid of the Future Symposium*, Richmond, VA, Oct 26–29, 2026.
- [3] "Protection-Constrained Allocation of BESS Converter Ratings for Data-Center Ride-Through and Frequency Support," with Y. Pei, C. Chaudhary, A. Tiwari and M. Benidris, to be presented at *IEEE Industrial Electronics Conference*, Doha, Qatar, Oct 18–21, 2026.
- [4] "A Pre-Dispatch Resonance Safety Criterion for AI Training Clusters," with C. Chaudhary, A. Tiwari, Y. Pei and M. Benidris to be presented at the 58th Annual *North American Power Symposium*, Houghton, MI, Oct 11–13, 2026.
- [5] "Storage as a Transmission Asset (SATA) for Large-Load Congestion Relief," with A. Tiwari, C. Chaudhary, Y. Pei and M. Benidris, to be presented at the 58th Annual *North American Power Symposium*, Houghton, MI, Oct 11–13, 2026.
- [6] "Detection of Synchronized AI Data Center Load Episodes Using SCADA Telemetry," with C. Chaudhary, A. Tiwari, Y. Pei and M. Benidris, to be presented at the 61st *IEEE-IAS Annual Meeting*, Vancouver, BC, Oct 4–8, 2026.
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