Anamitra Pal

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EDUCATION

PhD, Electrical Engineering (May'14), Virginia Tech, USA. **(CGPA: 4.00/4.00)**

- **Title:** PMU-based applications for improved monitoring and protection of power systems
- **Advisor:** Dr. James S. Thorp (Email: jsthorp@vt.edu)

M.S., Electrical Engineering (Feb'12), Virginia Tech, USA. **(CGPA: 4.00/4.00)**

- **Title:** Coordinated Control of Inter-area Oscillations using SMA and LMI
- **Advisor:** Dr. James S. Thorp (Email: jsthorp@vt.edu)

B. E., Electrical & Electronics Engineering (May'08), Birla Institute of Technology (BIT) Mesra, India. **(CGPA: 8.57/10.00)**

- Awarded **Gold Medal** for achieving highest GPA in Electrical Engineering

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ACADEMIC EXPERIENCE

Associate Professor, School of Electrical, Computer, and Energy Engineering, Arizona State University, Tempe, Arizona. (May' 23 – Present)

Assistant Professor, School of Electrical, Computer, and Energy Engineering, Arizona State University, Tempe, Arizona. (Aug' 16 – May' 23)

Research and Teaching Interests:

- Data analytics using time-synchronized measurements
- Artificial intelligence (AI)-applications in power systems
- Critical infrastructure resilience
- Facilitate increased penetration of renewable energy in the smart grid
- Teach junior-level (Energy Systems and Power Electronics), senior-level (Power System Analysis), and graduate-level (Power Transmission & Distribution, Wide-area measurement system (WAMS)-based Applications in Power Systems) courses

Applied Electrical and Computer Scientist, Network Dynamics and Simulation Science Laboratory (NDSSL), Virginia Bioinformatics Institute (VBI), Virginia Tech. (Jul'14 – Jul' 16)

- Modeled dynamic behavior of power system in response to catastrophic events
- Designed efficient and accurate energy demand model for modern cities based on a synthetic population database

Instructor, Bradley Department of Electrical and Computer Engineering, Virginia Tech. (Jan'14 – May'14)

- Taught Electrical Theory to 120+ students from Non-Electrical Majors

Graduate Research Assistant, Bradley Department of Electrical and Computer Engineering, Virginia Tech. (Jan'11 – May'12, Jan'13 – May'14)

- **Research Area:**
  - PMU-based Applications in Power Systems
- **Research Projects:**
  - Damping Low Frequency Oscillations in the WECC (funded by California Energy Commission's Public Interest Energy Research Program – Jan'11 to Oct'11)
  - Dynamic Power System State Estimator using Synchrophasor Measurements (funded by Lockheed Martin Corporation – Nov'11 to May'12)
  - Synchrophasor Data Conditioning and Validation (funded by Lawrence Berkeley National Laboratory – Jan'13 to May'14)

Graduate Teaching Assistant, Bradley Department of Electrical and Computer Engineering, Virginia Tech. (Aug'10 – Dec'10, Aug'12 – Dec'12)

- Validated experiments and graded students in Open Engineering Lab (Lab-in-a-box)

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INDUSTRIAL EXPERIENCE

Summer Intern, **Electric Power Group, LLC**, Pasadena, California. (May'13 – Aug'13)

- Created model files for PGDA/RTDMS 2012 testing and training
- Performed base-line studies (Analyzed causes of Outliers in two ISOs)

Summer Intern, **Electric Power Group, LLC**, Pasadena, California. (May'12 – Aug'12)

- Computed phasor alarm limits for SCE System
- Performed code-testing for RTDMS 2012 (Modemeter & Oscillation Detection modules)

Manager (Electrical T&D), Tata Steel Ltd., Jamshedpur, India. (Jul'08 – Jun'10)

- Operationalized Transmission Security Management – a software developed by GE
- Performed contingency analysis for 6.8 MTPA Tata Steel Power System

Summer Intern, **Tata Steel Ltd.**, Jamshedpur, India. (May'07 – Jul'07)

- Studied back-up protection of a thermal power plant so as to improve its reliability

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FUNDED PROPOSALS

- As PI/Co-PI (in reverse chronological order):
  - "Data-Driven Reliable and Resilient Operation of Active Transmission and Distribution Systems" (**U.S. Department of Energy – Office of Electricity**); Role: **PI**; Share: 60% of USD 999,999; Duration: TBD.
  - "Detection and Analysis of Sub Synchronous Oscillations in Power Systems with High Penetration of Inverter Based Resources" (**Salt River Project**); Role: **Co-PI**; Share: 50% of USD 70,000; 08/2024 – 07/2024.
  - "DASH-IBR: Dynamic Assessment of System Health for IBR-dominant Power Systems" (**U.S. Department of Energy – Solar Energy Technologies Office (SETO)**); Role: **Co-PI**; Share: 18% of USD 3M; Duration: TBD.
  - "Investigate Feasibility of Residential Fast Charging for SRP Distribution Grid" (**Salt River Project**); Role: **PI**; Share: 50% of USD 70,000; 09/2023 – 08/2024.

- "Identifying Worst-Case Scenarios from a Reliability Planning Perspective in Presence of Utility-Scale Storage" (**Salt River Project**); Role: **PI**; Share: 100% of USD 59,950; 09/2022 – 08/2023.
- "CAREER: Time-Synchronized Estimation in Power Systems: Unique Challenges and Innovative Solutions" (**U.S. National Science Foundation**); Role: **PI**; Share: 100% of USD 500,000; 02/2022 – 01/2027.
- "ASCENT: Sensor-enabled Wildfire Awareness and Risk Management (WARM) for Electric Power Infrastructure" (**U.S. National Science Foundation**); Role: **PI**; Share: 40% initially, later changed to 70%, of USD 1.5M; 09/2021 – 08/2025.
- "Synthetic Scenario Generation Considering Different Correlations" (**Salt River Project**); Role: **PI**; Share: 100% of USD 59,950; 09/2021 – 08/2022.
- "Artificial Intelligence (AI) for Robust Integration of AMI and Synchrophasor Data to Significantly Boost Solar Adoption" (**U.S. Department of Energy – Solar Energy Technologies Office (SETO)**); Role: **Co-PI**; Share: 25% of USD 750,000; 07/2021 – 06/2024.
- "Data-Driven, Real-Time State Estimator Using Machine Learning for Transmission Systems" (**Electric Power Research Institute**); Role: **PI**; Share: 100% of USD 210,000; 10/2020 – 12/2022.
- "Error Characterization of Synchrophasor Data using Rigorous Statistical Testing" (A Research Experiences for Undergraduates (REU) Supplement to HDR I-DIRSE: OAC: Collaborative Research: High-dimensional Spatio-temporal Data Science for a Resilient Power Grid: Towards Real-time Integration of Synchrophasor Data) (**U.S. National Science Foundation**); Role: **Co-PI**; Share: 100% of USD 16,000; 09/2019 – 08/2021.
- "Collaborative Research: High-dimensional Spatio-temporal Data Science for a Resilient Power Grid: Towards Real-time Integration of Synchrophasor Data" (**U.S. National Science Foundation**); Role: **Co-PI**; Share: 20% of USD 1.3M; 09/2019 – 08/2023.
- "Identification of Utility-Scale Renewable Penetration Threshold for SRP in a Dynamic Setting" (**Salt River Project**); Role: **PI**; Share: 100% of USD 57,200; 09/2019 – 08/2020.
- "A Systematic Approach to using Power Systems Signatures for Uniquely Identifying Failing Assets" (**Salt River Project**); Role: **PI**; Share: 100% of USD 57,200; 09/2019 – 08/2020.
- "Sensor Enabled Modeling of Future Distribution Systems with Distributed Energy Resources" (**U.S. Department of Energy – Advanced Research Projects Agency-Energy (ARPA-E)**); Role: **Co-PI**; Share: 18% of USD 3.1M; 08/2019 – 02/2023.
- "Machine Learning Approaches for Real-time Integration of Synchrophasor Data" (**Power Systems Engineering Research Center**); Role: **Co-PI**; Share: USD 50,000 of USD 200,000; 07/2019 – 08/2021.

- "Harnessing the Power of Artificial Intelligence (AI) for Transmission & Distribution Operations" (**Power Systems Engineering Research Center**); Role: **Co-PI**; Share: USD 70,000 of USD 220,000; 07/2019 – 08/2021.
- "Three-phase Line Parameter Estimation for the Bulk Power System of SRP using PMUs" (**Salt River Project**); Role: **PI**; Share: 100% of USD 57,200; 09/2018 – 08/2019.
- "Identifying Unique Power System Signatures for Determining Vulnerability of Critical Power System Assets" (**Salt River Project**); Role: **PI**; Share: 100% of USD 57,200; 09/2018 – 08/2019.
- "Designing a Robust Voltage Support System (VSS) for SRP Transmission System" (**Salt River Project**); Role: **PI**; Share: 100% of USD 57,200; 09/2018 – 08/2019.
- "PMU-based Online Monitoring of Critical Power System Assets" (**Salt River Project**); Role: **PI**; Share: 100% of USD 52,800; 09/2017 – 08/2018.
- "Development of a Precise Line Impedance Estimation Tool for Transmission Lines Using Synchrophasor Measurements" (**Salt River Project**); Role: **PI**; Share: 100% of USD 52,800; 09/2017 – 08/2018.
- "Relevant Transmission Reliability Metrics for SRP System" (**Salt River Project**); Role: **PI**; Share: 100% of USD 52,800; 09/2017 – 08/2018.
- "Synchrophasor-Data Analytics for a More Resilient Electric Power System" (**Power Systems Engineering Research Center**); Role: **PI**; Share: USD 80,000 of USD 220,000; 07/2017 – 08/2019.
- "Coupled Social and Infrastructure Approaches for Enhancing Solar Energy Adoption" (**U.S. Department of Energy**); Role: **PI**; USD 61,982; 01/2017 – 08/2020.

- As Non-PI/Senior Personnel/Other Personnel or Without receiving direct funds:
  - "Multiple Event Recordings for Grid Evaluation (MERGE)" (**Power Systems Engineering Research Center**); Role: Co-**PI**; Share: N/A; 08/2024 – 07/2026.
  - "Detection, Characterization, and Mitigation of Disruptive Events (DECODE) by Combining Machine Learning/Artificial Intelligence on Synchrophasors and Physics-based Analysis" (**Power Systems Engineering Research Center**); Role: Co-**PI**; Share: N/A; 08/2022 – 07/2024.
  - "Center of Excellence for Energy (COE/E) Program" (U.S. Agency for International Development); Role: Senior Personnel; Share: TBD% of USD amount of project; 11/2021-11/2026. Note: Recognition shares will be determined annually by faculty participant involvement.
  - "Transformer Predictive Maintenance" (U.S.-Pakistan Centers for Advanced Studies in Energy (USPCAS-E) Program funded by **U.S. Agency for International Development**); USD 58,677; 07/2018-06/2019.

- Exchange Scholar Program (U.S.-Pakistan Centers for Advanced Studies in Energy (USPCAS-E) Program funded **U.S. Agency for International Development**); USD 67,501; 07/2018-06/2019.
- "SSDIM: Generation of Simulated and Synthetic Data for Interdependent Power and Communication Networks" (**U.S. National Science Foundation**); USD 31,500; 07/2017-10/2018.
- "Research on Adaptive Control Strategy for the Power System Connected with Large-scale Renewable Energy Resource" (**Chinese National Science Foundation**)
- "Synchrophasor Data Conditioning and Validation" (**U.S. Department of Energy**)

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PATENTS

- J. Blain-Christen, A. Pal, R. Essikpe, U. Ogras, and L. Roald "Wildfire monitoring system for real-time risk assessment" (Submitted).
- A. Pal, B. Azimian, and L. Tong "Systems and Methods for Time-Synchronized Topology and State Estimation in Real-Time Unobservable Distribution Systems" (Submitted).
- J. Patterson, and A. Pal, "Time-synchronized micro-CPoW measurement device" U.S. Patent Application 63/243,864, filed September 14, 2021. (Patent Pending).
- A. Pal, and M. Barkakati, "Systems and methods for assessing reliability of electrical power transmission systems," U.S. Patent Application 17/078,863, filed April 29, 2021 (Patent Pending).

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COURSES TAUGHT

- **Face-to-Face:**
  - EEE 598 – Wide Area Measurement System (WAMS)-Based Applications in Power Systems (Arizona State University)
  - EEE 579 – Power Transmission and Distribution (Arizona State University)
  - EEE 471/591 – Power System Analysis (Arizona State University)
  - EEE 360 – Energy Systems and Power Electronics (Arizona State University)
  - ECE 3054 – Electrical Theory (Virginia Tech)
- **Online/Hybrid:**
  - EEE 579 – Power Transmission and Distribution (Arizona State University)
  - EEE 360 – Energy Systems and Power Electronics (Arizona State University)

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PROFESSIONAL TALKS/PRESENTATIONS

- **University of Maryland, Baltimore County (UMBC):** Delivered a seminar titled "Machine Learning-based Voltage Monitoring in Real-time Unobservable Distribution Systems" at UMBC on May 23, 2024.

- **Smart Grid Synchronized Measurements & Analytics (SGSMA) 2024:** Delivered an invited tutorial titled "Time-Synchronized State Estimation in Micro-PMU Unobservable Distribution Systems" at the 2024 IEEE SGSMA Conference on May 20, 2024.
- **Center of Excellence for Energy (Egypt):** Delivered an invited webinar on February 26, 2024, titled "Big Data Analytics for the Electric Power Grid of the 21st Century" to researchers from Ain Shams University, Mansoura University, and Aswan University in Egypt.
- **5th International Conference on Sustainable Energy Technologies (ICSET-23):** Was a Keynote Speaker at the 5th ICSET that took place in Peshawar, Pakistan, on December 14-15, 2023. The talk was titled "Big Data Analytics for the Electric Power Grid of the 21st Century".
- **Salt River Project (SRP):** Delivered an invited webinar on November 8, 2023, titled "Role of Artificial Intelligence (AI) in the Modern Power System" at the Q3 Business Analysis Community of Practice Meeting of SRP.
- **Army Research Lab (ARL):** Gave a talk at the ARL on November 1, 2023. The talk was titled "Application-Inspired Fundamental Problems in Power & Energy Systems".
- **2023 DOE Solar Energy Technologies Office (SETO) Workshop:** Presented a poster at the 2023 SETO workshop on Solar Applications of AI and ML held in Washington DC, from October 31 to November 1, 2023.
- **International Conference on NextGen Solar:** Delivered a recorded webinar titled "Coordinated High-speed Voltage Control in Real-time Unobservable Active Distribution systems". The recording was displayed on October 31, 2023.
- **International Conference on Renewable Energy:** Delivered an invited webinar on October 25, 2023, titled "Coordinated High-speed Voltage Control in Real-time Unobservable Active Distribution systems".
- **The Institute for Operations Research and the Management Sciences (INFORMS) 2023:** Delivered an invited talk on October 16, 2023, titled "Optimal Power System Decision-Making in Presence of Active Wildfires" in the Session on "Wildfire Risk Management for Electric Power Systems".
- **Electric Power Group (EPG) Webinar: Machine Learning for Synchrophasor Applications:** Gave a presentation titled "Machine Learning (ML)-Based Time-Synchronized State Estimation (TSSE) for Real-Time Unobservable Transmission Systems" on August 2, 2023.
- **Advanced Research Projects Agency-Energy (ARPA-E) Energy Innovation Summit:** Co-presented a poster at the ARPA-E Energy Innovation Summit held in Washington DC on March 23-24, 2023.
- **Power Seminar Series at Iowa State University (ISU):** Delivered an invited webinar on November 15, 2022, titled "Time-synchronized State and Topology Estimation in Distribution Grids using Machine Learning" to researchers at ISU.

- **Birla Institute of Technology (BIT) Mesra under the Faculty Webinars program:** Delivered an invited webinar on October 22, 2022, titled "Time-synchronized State Estimation for Transmission and Distribution Grids using Machine Learning". The webinar was organized by the BIT Mesra Alumni Association-North America (BITMAA-NA).
- **North American Synchro-Phasor Initiative (NASPI):** Invited to give a webinar on August 31, 2022, as part of the NASPI webinar series of 2022. The title of my talk was "Machine Learning Based State Estimation for Transmission and Distribution Grids", and I co-presented it with Evangelos Farantatos of EPRI.
- **IEEE Power & Energy Society (PES) General Meeting 2022:** Invited to give talk in the panel session titled "Model validation of RES and other system components through PMU data: Opportunities, challenges, and practical experiences". The title of my talk was "Challenges Encountered During Network Parameter Estimation Using Field PMU Data".
- **Fox 10 News:** Fox 10 News spoke to me on the risk of rolling blackouts in Arizona in Summer 2022. The interview can be accessed through here.
- **North American Synchro-Phasor Initiative (NASPI):** Invited to deliver a talk remotely at the NASPI session titled "Synchrophasor Projects and Edge Computing Solutions" in Oct' 21. The title of my talk was "Time-Synchronized State Estimation at the Grid Edge".
- **IEEE Power & Energy Society (PES) General Meeting 2021:** Invited to give talk in the panel session titled "Asset Management Reliability & Resilience Decisions in Practice". The title of my talk was "Synchrophasor-Based Assessment of Equipment Health".
- **Electric Power Group (EPG), LLC:** Delivered an invited webinar in Feb' 21, titled "Time-Synchronized State Estimation for Incompletely Observed Distribution Systems".
- **Birla Institute of Technology (BIT) Mesra under the Faculty Webinars program:** Delivered an invited webinar on February 13, 2021, titled "Coordinated Wide-Area Control Design for Damping Low Frequency Oscillations". The webinar was organized by the BIT Mesra Alumni Association-North America (BITMAA-NA).
- **ATAL Faculty Development Program of N.I.T. Calicut:** Invited to give a lecture on the "Application of Artificial Intelligence in Power System Operation and Control". My talk was titled "Time-Synchronized State Estimation for Incompletely Observed Distribution Systems" and was delivered remotely on November 9, 2020.
- **Future Energy Forum at the 2nd World Young Scientist Summit:** Invited to give a talk on the theme "Sustainable Power Development amid the World's Energy Transition". My talk was titled "Time-Synchronized State Estimation for Incompletely Observed Distribution Systems" and was delivered remotely on October 17, 2020.
- **IEEE Power & Energy Society (PES) General Meeting 2020:** Invited to give talks in two different panels.

  - In the panel titled "Synchronized Point-on-wave measurements: Technology, Requirements and Applications" sponsored by the PES Working group on Power System Dynamic Measurements, I gave a talk on "A Systematic Approach to Using Power System Signatures for Uniquely Identifying Failing Power Transformers".
  - In the panel titled "Practical Experiences in Grid Reliability and Risk Management" organized by the IEEE Asset Management Working Group, I gave a talk on "Determining Impending Failures of Critical Power System Assets from Synchrophasor Measurements".
- **North American Electric Reliability Corporation (NERC):** Delivered a talk remotely titled "Investigating Roles of Technology-Specific Battery Energy Storage Systems (BESSs) in an Evolving Grid" in Jul' 20.
- **Power Systems Engineering Research Center (PSERC) Webinar:** Invited to give a 1-hour webinar on "Coordinated Wide-Area Polytopic Control Design using Linear Matrix Inequality" on April 21, 2020. [Online]. Available: https://pserc.wisc.edu/webinars.aspx
- **First Solar, Inc:** Delivered a talk titled "Investigating Roles of Technology-Specific Battery Energy Storage Systems (BESSs) in an Evolving Grid" in Oct' 19.
- **Arizona Public Service (APS):** Delivered a talk titled "What can Synchrophasor Technology "Really" Do for Us???" in Aug' 19.
- **International Workshop on Critical Infrastructure Network Security (CINS):** Invited speaker at the 3rd International Workshop on CINS held in conjunction with ACM Sigmetrics on June 28, 2019.
- **North American Synchro-Phasor Initiative (NASPI):** Invited to deliver a talk remotely at the NASPI session titled "Big Data Analytics Platforms Architecture Requirements and Analysis Techniques" in Mar' 19. The title of my talk was "Techniques To Support Next-Generation of Synchrophasor Technology Applications".
- **Power Systems Engineering Research Center (PSERC) Summer Workshop:** Delivered a talk titled "What can Synchrophasor Technology "Really" Do for Us???" in Jul' 18.
- **Electric Power Group (EPG), LLC:** Delivered an invited talk in Sep' 17 titled "WAMS-Based Applications in Power Systems".
- **The Atlantic Magazine:** Approached by The Atlantic Magazine to talk about the future prospects of Puerto Rico's electric grid after Hurricane Maria destroyed its built infrastructure. My comments were published on the September 30, 2017 issue of The Atlantic. [Online]. Available: https://www.theatlantic.com/business/archive/2017/09/puerto-rico-hurricane/541641/?utm_source=feed
- **Global Energy Interconnection Research Institute North America (GEIRI NA):** Delivered an invited talk in Nov' 16 titled "WAMS-Based Applications in Power Systems".

- **Birla Institute of Technology & Science (BITS), Goa, India:** Delivered an invited lecture in Oct' 15 on synchrophasor measurement-based applications for damping power system oscillations.
- **New York ISO (NYISO):** Gave a talk at NYISO in Albany in Dec'14 on phasor measurements and the role they play in modern power systems with a special emphasis on state estimation.
- **International Workshop on Synchrophasor Measurements for Smart Grid:** Delivered an invited lecture remotely (via-Skype) to the students of MVGR College of Engineering in Vizianagaram, India in Nov'14.
- **Dominion Virginia Power (DVP):** Presented the results of my research on the synchrophasor data condition and validation project during a demonstration at the DVP office in Richmond, Virginia in Apr'14.
- **North China Electric Power University (NCEPU):** Invited by NCEPU in Beijing for two weeks in Sep'12 under Chinese Universities' Subject Innovation and Expert Invitation Project sponsored by the Chinese Ministry of Education and State Administration of Foreign Experts Affairs to give talks about my research.
- **University of California, Los Angeles (UCLA):** Visited the Smart Grid Energy Research Center (SMERC) at UCLA in Jul'12 to talk about my work done at EPG as well as research done previously at Virginia Tech.
- **North American Synchro-Phasor Initiative (NASPI):** Presented results of my research done at Virginia Tech on Damping Low Frequency Oscillations at the Work Group meeting of NASPI in Feb'12 in Orlando, Florida.

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STUDENTS CURRENT/GRADUATED/MENTORED

- **Current Students**
  - Behrouz Azimian (Ph.D.)
  - Antos C. Varghese (Ph.D.)
  - Dhaval Dalal (Ph.D.)
  - Satyaprajna Sahoo (Ph.D.)
  - Shiva Moshtagh (Ph.D.)
  - Yadunandan Paudel (Ph.D.)
  - Mohammad Golgol (Ph.D.)
  - Zachary Lythgoe (Ph.D.)
  - Muhfizaturrahmah (Ph.D.)
  - Anushka Sharma (Ph.D.)
  - Marco Iorio (Ph.D.)
  - Nihar Thakkar (M.S.E)
- **Graduated Students**
  - Doctoral
    - Reetam Sen Biswas (Ph.D., 2021) – Lead engineer at GE Vernova Advanced Research Center

        - Pooja Gupta (Ph.D., 2021) – Lead Engineer - Controls Engineering at GE Renewable Energy
    - Masters
        - Muhammad Bilal (M.S., 2022) – Machine Learning Engineer, RedBuffer, in Islamabad, Pakistan
        - Mohammed Alhazmi (M.S., 2021) – Chief AI Specialist, Ministry of Energy, in Riyadh, Saudi Arabia
        - Fakhri Saadedeen (M.S., 2021) – Electrical Engineer II at Palo Verde Nuclear Generating Station, in Glendale, AZ
        - John Patterson (M.S., 2021) – Product and Engineering Manager, Hoolest Performance Technologies, Inc. in Phoenix, AZ
        - Harish Chandrasekaran (M.S., 2020) – Engineer 3 at Quanta Technology, LLC, North Carolina (currently working remotely)
        - Hashem A M H S Albhrani (M.S., 2020) – Business Development Manager, Shajara Sustainability Solutions (3S), in Kuwait
        - Anubhav Nath (M.S., 2019) – Product Manager, NextEra Mobility, in San Francisco, CA
        - Prashanth Kumar Mansani (M.S., 2018) – Senior Power Engineer, ETAP, in Irvine, CA
        - Meghna Barkakati (M.S., 2018) – Senior Power Systems Engineer, Jacobs, in Perth, Australia

- **Mentored Students**
    - Venkata Nagarjuna Anudeep Kandrathi (Engineer at Tesla)
    - Hritik Shah (Power System's Resiliency and Reliability at Eversource Energy)
    - Ahmed N. Sheta (Mansoura University, Egypt)
    - Ahmed Albutayshi (Project Engineer at Saudi Aramco)
    - Yug Patel (Energy Market Analyst at The Energy Authority)
    - Demetra Salls (Associate Electrical Engineer at Northrop Grumman)
    - Nabila Ahmed (National University of Sciences and Technology, Pakistan)
    - Tamojit Chakraborty (Senior Design Engineer HVDC Studies at Siemens Energy, Manchester, U.K.)
    - Rajiv Jha (Indian Institute of Technology (IIT), Delhi, India)
    - Taufan Roekman (Arizona State University, USA)
    - Jairo Ramirez Torres (Arizona State University, USA)
    - Fareeha (University of Engineering & Technology (UET), Peshawar, Pakistan)
    - Shazmina Jamil (University of Engineering & Technology (UET), Peshawar, Pakistan)
    - Atif Naveed Khan (National University of Science & Technology (NUST), Islamabad, Pakistan)
    - Muhammad Nadeem (Vanderbilt University)

- Muhammad Zulqarnain Zeb (National University of Science & Technology (NUST), Islamabad, Pakistan)

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PROFESSIONALS MENTORED

- Dr. Anwarul Sifat (In-person mentoring from Fall 2022–Summer 2023); Currently Assistant Professor, Phillip M. Drayer Department of Electrical Engineering, Lamar University, Beaumont, TX
- Dr. Babak Jafarpisheh (Remote mentoring from Fall 2019–Spring 2021); Currently working in National Grid, UK)
- Dr. Kashif Imran (Visiting Scholar in Spring 2019); Currently Associate Professor, in National University of Science & Technology (NUST), Islamabad, Pakistan

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HONORS AND AWARDS

- Received the **2023 Outstanding Editor Award** for the Journal of Modern Power Systems and Clean Energy.
- Co-author of the **Best Paper Award** at the 2024 IEEE Smart Grid Synchronized Measurements & Analytics (SGSMA) Conference
- Co-author of the **Second Best Paper Award** at the 2024 IEEE Texas Power and Energy Conference
- Contributed to the PES Technical Report "State Estimation for Integrated Energy Systems: Motivations, Advances, and Challenges" that received the **2024 IEEE PES Technical Committee Working Group Recognition Award for Outstanding Technical Report**.
- Received the **2023 Outstanding Reviewer Award** for the IEEE Transactions on Power Systems.
- Promoted to **Associate Professor (with Tenure)** at ASU in 2023.
- **2023 Centennial Professorship Award** (Associated Students of Arizona State University): Received this award of USD 10,000 as recognition for engaged scholarship, leadership, community service, and exemplary student-centered practices at ASU.
- Received the **2022 Outstanding Editor Award** for the Journal of Modern Power Systems and Clean Energy.
- Under my leadership, the Young Professionals (YP) Affinity Group Chapter of the Phoenix Section received the **2021 IEEE Region 6 Outstanding Affinity Group Chapter of the Year Award**
- Co-author of the **Third Best Paper Award** at the 53rd North American Power Symposium (NAPS) in 2021 (my M.S. student was the only other author)
- Elevated to grade of **IEEE Senior Member** in November 2019
- **2019 Outstanding IEEE Young Professional Award** (IEEE Phoenix Section): In recognition "For Outstanding Education and Research Contributions to Critical Infrastructures and Network Security for Electric Power Systems"

- **2018 Young CRITIS Award**: Best young researcher in the field of Critical Infrastructure Protection (CIP)
- Co-author of the **Third Best Paper Award** at the 2017 IEEE Texas Power and Energy Conference (my Ph.D. student was the only other author)
- **Best New Employee of the Year** (Jul'08 – Jun'09), Tata Steel Ltd., Jamshedpur, India
- **Institute Gold Medal**: Awarded for achieving highest CGPA in Electrical Engineering as an undergraduate student
- **Tata Steel Scholar** (Jan'07 – Jun'08): Awarded for consistently getting the highest GPA in Electrical Engineering
- **Sahara Scholarship** (Mar'06): Awarded for maintaining Academic Excellence while continuing to be an active member of the National Cadet Corps (NCC)

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ACCOLADES WON BY MY MENTEES

- **Anushka Sharma** (Ph.D. student): Received the Graduate College Enrichment Fellowship (GCEF) from Arizona State University for 2024-2026
- **Marco Iorio** (Ph.D. Student): Received the Fulton Fellowship for 2024-2025
- **Dhaval Dalal** (Ph.D. student): Received the Graduate College Completion Fellowship for Fall 2024
- **Behrouz Azimian** (Ph.D. Student): Received the ECEE Graduate Student Research Award in the Power Area in Spring 2024
- **Zachary Lythgoe** (Ph.D. student): Second Best Paper Award at the 2024 IEEE Texas Power and Energy Conference
- **Anwarul Islam Sifat** (Post-doc): Received Assistant Professor (Tenure Track) position in the Phillip M. Drayer Department of Electrical Engineering, College of Engineering, Lamar University, Beaumont, TX
- **Shiva Moshtagh** (Ph.D. student): Awarded the 2023-2024 Irv and Ruby Kaufman Fellowship
- **Behrouz Azimian** (Ph.D. student): Received the University Graduate Fellowship for the academic year 2023-2024
- **Shiva Moshtagh** (Ph.D. student): Received the 2023-2024 ASU Iranian American Alumni Academic Scholarship
- **Behrouz Azimian** (Ph.D. student): Awarded the Joseph A. Barkson Fellowship by the Ira A. Fulton Schools of Engineering for the academic year 2022-2023
- **Fakhri Saadedeen** (M.S. Student): Third Best Paper Award at the 53rd North American Power Symposium (NAPS) in 2021
- **Behrouz Azimian** (Ph.D. student): Awarded the Joseph A. Barkson Fellowship by the Ira A. Fulton Schools of Engineering for the academic year 2021-2022
- **Jairo Ramirez Torres** (UG, worked with me on an NSF REU grant): Recipient of the 2021 IEEE PES Scholarship Plus Initiative

- **Behrouz Azimian** (Ph.D. student): Selected by the IEEE Phoenix Section Awards Committee for the Al Gross award for the year 2021
- **Shiva Moshtagh** (Ph.D. student): Awarded the Fulton Fellowship from the Ira A. Fulton Schools of Engineering for the academic year 2021-2022
- **Behrouz Azimian** (Ph.D. student): Received the Engineering Graduate Fellowship from the Ira A. Fulton Schools of Engineering for the Spring 2021 semester
- **Dhaval Dalal** (Ph.D. student): Received the Engineering Graduate Fellowship from the Ira A. Fulton Schools of Engineering for the Spring 2021 semester
- **Behrouz Azimian** (Ph.D. student): Received the digital portfolio award from the ASU Graduate & Professional Student Association for 2021
- **Demetra Salls** (M.S. student): Received the Graduate College Interdisciplinary Enrichment Fellowship (IEF) for 2021-22
- **Pooja Gupta** (Ph.D.): Received the University Graduate Fellowship for Spring 2021
- **Demetra Salls** (M.S. student): PES Scholar for 2020-21 by the IEEE PES Scholarship Plus Initiative
- **Tasha Reynolds** (UG, did her senior design project with me): Her Senior Design Project Topic helped her win the Entrepreneur & Value Creation Competition for Fall 2020
- **Pooja Gupta** (Ph.D.): Selected by the IEEE Phoenix Section Awards Committee for the Al Gross award for the year 2020
- **Reetam Sen Biswas** (Ph.D.): Received the Engineering Graduate Fellowship from the Ira A. Fulton Schools of Engineering for the Spring 2020 semester
- **Behrouz Azimian** (Ph.D. student): Received the Engineering Graduate Fellowship from the Ira A. Fulton Schools of Engineering for the Spring 2020 semester
- **Behrouz Azimian** (Ph.D. student): Received the University Graduate Fellowship for the academic year 2019-2020
- **John Patterson** (M.S.): Received the Gerald T. Heydt Scholarship in Electric Power Engineering for the year 2019
- **Reetam Sen Biswas** (Ph.D.): Selected by the IEEE Phoenix Section Awards Committee for the Atluri award for the year 2018
- **Meghna Barkakati** (M.S.): Selected by the IEEE Phoenix Section Awards Committee for the Dieter Schroder Student Scholarship for the year 2018
- **Reetam Sen Biswas** (Ph.D.): Third Best Paper Award at the 2017 IEEE Texas Power and Energy Conference
- **Ngoni Mugwisi** (UG, did his senior design project with me): Awarded Rhodes Scholarship in 2017

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SOFTWARE SKILLS

- Power System Simulators
    - Siemens-PSS/E
    - Powertech-DSA Tools

  - GE-PSLF
  - MATPOWER
  - Power System Toolbox (PST)
  - Simulink
- Programming Languages
  - C/C++
  - Python
  - EPCL
- MATLAB
- GUROBI

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SYNERGISTIC ACTIVITIES

- Co-chair for the Transactions Paper Session at the 2023 IEEE PES General Meeting held in Orlando, FL, from July 16-20, 2023.
- Co-chair for the Paper Forum sessions titled "Power System Operations" and "Analytical Methods for Power Systems #2" at the IEEE PES General Meeting 2022 held in Denver, CO, from July 17-21, 2022.
- Associate Editor for Journal of Modern Power Systems and Clean Energy (2022-current)
- Student Program Chair for the 52nd North American Power Symposium (NAPS) held virtually in April 2021.
- Session Moderator for the 2021 IEEE Power & Energy Society Innovative Smart Grid Technologies Conference North America
- Associate Editor for IEEE Power Engineering Letters (2021-current)
- Associate Editor for IEEE Transactions on Power Systems (2021-current)
- Organized an Industry Panel Session on the topic of "Emerging Challenges in the Modern Electric Grid" at the 2020 IEEE SmartGridComm held virtually in November 2020.
- Organized a Student-Industry-Faculty Interaction (SIFI) Session at the 2020 IEEE SmartGridComm held virtually in November 2020.
- Faculty Advisor for the ASU student organization, Asha for Education (2020-2021).
- Member of NSF Review Panels (2017, 2020, 2022).
- Guest Editor for the Journal of Modern Power Systems and Clean Energy: Special Section on Application of Artificial Intelligence in Modern Power Systems (2020)
- Member of the New Faculty Advisory Council (NFAC) of Arizona State University (2019-2021)
- Volunteer for the TryEngineering Together program of IEEE (an eMentorship program) to inspire and educate the next generation (grades 3 to 5) of engineers, scientists and technical professionals (2019-current).

- Industry Liaison for the IEEE SmartGridComm 2020 (2020 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)) held virtually in November 2020.
- Co-chair for the Paper Forum session titled "Power System Modeling and Analysis Paper Forum #1" at the IEEE PES General Meeting 2019 held in Atlanta, GA, from August 4-8, 2019.
- Chair of the IEEE Young Professional Affinity Group Chapter of the IEEE Phoenix Section (2019-current).
- Panel member for the session on "Big Data Analytics Platforms Architecture Requirements and Analysis Techniques" at the North American SynchroPhasor Initiative (NASPI) Work Group Meeting on 16 April 2019.
- Session Chair for the session titled "Challenges and solutions to operation of transmission and distribution systems with utility-scale deployment of renewable generation" of the 50th North American Power Symposium (NAPS) held in Fargo, ND, from 9-11 September 2018.
- Technical Program Committee (TPC) member of the ACM SIGMETRICS International Workshop on Critical Infrastructure Network Security (CINS) in 2017, 2018, and 2019.
- TPC member of IEEE SmartGridComm'18 (2018 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)) held in Aalborg, Denmark, on October 29-31, 2018.
- Organizer of "Computing for Ebola Challenge" at Virginia Tech in October 2014.
- Part of a team led by Ms. Bachendri Pal (first Indian woman to climb Mt. Everest) for a "Two Week Adventure/Survival Expedition" in the Himalayas in May-June 2009.
- Member of Tata Steel Rural Development Society (TSRDS) from 2008-10:
    - Visited rural villages located in vicinity of Jamshedpur, India, to help them become self-reliant (Focus was on providing clean drinking water and cheap electricity)
- Active member of the National Cadet Corps (NCC) from 2004-06.

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MISCELLANEOUS

- Reviewer of high-impact journals and conferences:
    - IEEE Transactions on Power Systems
    - IEEE Transactions on Power Delivery
    - IEEE Transactions on Smart Grid
    - IEEE Transactions on Sustainable Energy
    - IEEE Transactions on Energy Markets, Policy, and Regulation
    - IEEE Transactions on Instrumentation & Measurement
    - IEEE Transactions on Industrial Informatics
    - IEEE Transactions on Circuits and Systems
    - IEEE Systems Journal

  - IEEE Access
  - IEEE Power Engineering Letters
  - IET Generation, Transmission, and Distribution
  - IET Renewable Power Generation
  - IET Science, Measurement, and Technology
  - IET Energy Conversion and Economics
  - Journal of Modern Power Systems and Clean Energy (published in IEEE Xplore)
  - International Journal of Electrical Power and Energy Systems (Elsevier)
  - Electric Power Systems Research (Elsevier)
  - Applied Energy (Elsevier)
  - Measurement (Elsevier)
  - Engineering Applications of Artificial Intelligence (Elsevier)
  - Computers & Electrical Engineering (Elsevier)
  - Ain Shams Engineering Journal (Elsevier)
  - Electric Power Components and Systems (Taylor & Francis)
  - Cogent Engineering (Taylor & Francis)
  - International Transactions on Electrical Energy Systems (Wiley)
  - Advanced Theory and Simulations (Wiley)
  - Protection and Control of Modern Power Systems (Springer)
  - Electrical Engineering (Springer)
  - Energies-Open Access Energy Research, Engineering and Policy Journal (MDPI)
  - Sensors-Open Access Journal (MDPI)
  - Sustainability-Open Access Journal (MDPI)
  - Mathematics (MDPI)
  - International Journal of Electrical and Computer Engineering Systems (Faculty of Electrical Engineering, Computer Science and Information Technology, Josip Juraj Strossmayer University of Osijek, Croatia)
  - Mathematical Problems in Engineering (Hindawi)
  - Recent Advances in Electrical & Electronic Engineering (Bentham Science)
  - IEEE Power & Energy Society General Meeting
  - IEEE Power & Energy Society T&D Conference and Exposition
  - IEEE International Conference on Smart Grid Communications (SmartGridComm)
  - IEEE North American Power Symposium (NAPS)
  - International Conference on Intelligent Systems Applications to Power Systems (ISAP)
  - IEEE SusTech
  - Emerging Trends for Smart Grid Automation and Industry (ICETSGAI) (Springer)
- Future Professoriate Certificate (Preparing graduate students to become faculty)

- IEEE Graduate Student Member (2011-2014), IEEE Member (2014-2019), IEEE Senior Member (2019-current)
- Graduate Student Member of Tau Beta Pi (2011-2014), Member (2014 onwards)

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PUBLICATIONS

Journals:

1. A. N. Sheta, B. E. Sedhom, A. Pal, M. S. El-Moursi, and A. E. Eladl, "Stability-constrained settings of directional overcurrent relays with shifted user-defined characteristics in microgrids" accepted in *IEEE Trans. Power Del*.
2. A. C. Varghese, H. Shah, B. Azimian, A. Pal, and E. Farantatos, "Deep neural network-based state estimator for transmission system considering practical implementation challenges" accepted in *J. Modern Power Syst. Clean Energy*.
3. B. Azimian, S. Moshtagh, A. Pal, and S. Ma, "Analytical verification of deep neural network performance for time-synchronized distribution system state estimation," *J. Modern Power Syst. Clean Energy* [Early Access].
4. A. C. Varghese, A. Pal, and G. Dasarathy, "Transmission line parameter estimation under non-Gaussian measurement noise," *IEEE Trans. Power Syst*., vol. 38, no. 4, pp. 3147-3162, Jul. 2023.
5. D. Dalal, M. Bilal, H. Shah, A. I. Sifat, A. Pal, and P. Augustin, "Cross-correlated scenario generation for renewable-rich power systems using implicit generative models," *Energies*, vol. 16, no. 4, pp. 1-20, Feb. 2023.
6. B. Azimian, R. S. Biswas, S. Moshtagh, A. Pal, L. Tong, and G. Dasarathy, "State and topology estimation for unobservable distribution systems using deep neural networks," *IEEE Trans. Instrum. Meas.*, vol. 71, pp. 1-14, Apr. 2022.
7. T. Wang, M. Jin, B. Jafarpisheh, A. Pal, and Z. Wang, "Gain scheduled adaptive control scheme for damping SSOs in PMSG-integrated power system under high wind speed variability," *Elect. Power Compon. Syst*., vol. 49, no. 9-10, pp. 953-966, Apr. 2022.
8. P. Gupta, A. Pal, and V. Vittal, "Coordinated wide-area damping control using deep neural networks and reinforcement learning," *IEEE Trans. Power Syst.*, vol. 37, no. 1, pp. 365-376, Jan. 2022.
9. R. S. Biswas, A. Pal, T. Werho, and V. Vittal, "Mitigation of saturated cut-sets during multiple outages to enhance power system security," *IEEE Trans. Power Syst.*, vol. 36, no. 6, pp. 5734-5745, Nov. 2021.
10. B. Jafarpisheh, and A. Pal, "A robust algorithm for real-time phasor and frequency estimation under diverse system conditions," *Energies*, vol. 14, no. 21, pp. 1-20, Nov. 2021.
11. A. N. Khan, K. Imran, M. Nadeem, A. Pal, A. Khattak, K. Ullah, M. W. Younas, and M. S. Younis, "Ensuring reliable operation of electricity grid by placement of FACTS devices for developing countries," *Energies*, vol. 14, no. 8, pp. 1-21, Apr. 2021.
12. R. S. Biswas, A. Pal, T. Werho, and V. Vittal, "A graph theoretic approach to power system vulnerability identification," *IEEE Trans. Power Syst*., vol. 36, no. 2, pp. 923-935, Mar. 2021.
13. P. Gupta, A. Pal, and V. Vittal, "Coordinated wide-area control of multiple controllers in a power system embedded with HVDC lines," *IEEE Trans. Power Syst*., vol. 36, no. 1, pp. 648-658, Jan. 2021.

14. M. Z. Zeb, K. Imran, A. Khattak, A. K. Janjua, A. Pal, M. Nadeem, J. Zhang, and S. Khan, "Optimal placement of electric vehicle charging stations in the active distribution network," *IEEE Access*, vol. 8. No. 1, pp. 68124-68134, Dec. 2020.
15. K. Imran, J. Zhang, A. Pal, A. Khattak, K. Ullah, and S. M. Baig, "Bilateral negotiations for electricity market by adaptive agent-tracking strategy," *Electric Power Syst. Research*, vol. 186, pp. 1-12, Sep. 2020.
16. M. Padhee, A. Pal, C. Mishra, and K. A. Vance, "A fixed-flexible BESS allocation scheme for transmission networks considering uncertainties," *IEEE Trans. Sustainable Energy*, vol. 11, no. 3, pp. 1883-1897, Jul. 2020.
17. K. Imran, K. Ullah, A. Khattak, J. Zhang, A. Pal, M. N. Rafique, and S. M. Baig, "Matchmaking model for bilateral trading decisions of load serving entity," *Electric Power Syst. Research*, vol. 183, pp. 1-11, Jun. 2020.
18. T. Wang, J. Yang, M. Padhee, A. Pal, J. Bi, and Z. Wang, "Robust coordinated control of sub-synchronous oscillation in wind integrated power system," *IET Renewable Power Gener*., vol. 14, no. 6, pp. 1031-1043, Apr. 2020.
19. M. Padhee, R. S. Biswas, A. Pal, K. Basu, and A. Sen, "Identifying unique power system signatures for determining vulnerability of critical power system assets," *ACM SIGMETRICS Perform. Eval. Rev.*, vol. 47, no. 4, pp. 8-11, Apr. 2020.
20. C. Mishra, R. S. Biswas, A. Pal, and V. A. Centeno, "Critical clearing time sensitivity for inequality constrained systems," *IEEE Trans. Power Syst.*, vol. 35, no. 2, pp. 1572-1583, Mar. 2020.
21. M. Nadeem, K. Imran, A. Khattak, A. Ulasyar, A. Pal, M. Z. Zeb, A. K. Khan, and M. Padhee, "Optimal placement, sizing and coordination of FACTS devices in transmission network using whale optimization algorithm," *Energies*, vol. 13, no. 3, pp. 1-24, Feb. 2020.
22. M. Ghamsari-Yazdel, M. Esmaili, F. Aminifar, P. Gupta, A. Pal, and H. A. Shayanfar, "Incorporation of controlled islanding scenarios and complex substations in optimal WAMS design," *IEEE Trans. Power Syst*., vol. 34, no. 5, pp. 3408-3416, Sep. 2019.
23. C. Mishra, A. Pal, J. S. Thorp, and V. A. Centeno, "Transient stability assessment of prone-to-trip renewable generation rich power systems using Lyapunov's direct method," *IEEE Trans. Sustainable Energy*, vol. 10, no. 3, pp. 1523-1533, Jul. 2019.
24. P. Chatterjee, A. Pal, J. S. Thorp, J. De La Ree, and V. A. Centeno, "Error reduction of phasor measurement unit (PMU) data considering practical constraints," *IET Gener., Transm. Distrib*., vol. 12, no. 10, pp. 2332-2339, May 2018.
25. R. Subbiah, A. Pal, E. K. Nordberg, A. Marathe, and M. V. Marathe, "Energy demand model for residential sector: A first principles approach," *IEEE Trans. Sustain. Energy*, vol. 8, no. 3, pp. 1215-1224, Jul. 2017.
26. T. Wang, A. Pal, J. S. Thorp, and Y. Yang, "Use of polytopic convexity in developing an adaptive inter-area oscillation damping scheme," *IEEE Trans. Power Syst.*, vol. 32, no. 4, pp. 2509-2520, Jul. 2017.

27. A. Pal, A. K. S. Vullikanti, and S. S. Ravi, "A PMU placement scheme considering realistic costs and modern trends in relaying," *IEEE Trans. Power Syst.*, vol. 32, no. 1, pp. 552-561, Jan. 2017.
28. A. Pal, C. Mishra, A. K. S. Vullikanti, and S. S. Ravi, "General optimal substation coverage algorithm for phasor measurement unit placement in practical systems," *IET Gener., Transm. Distrib*., vol. 11, no. 2, pp. 347-353, Jan. 2017.
29. A. Pal, G. A. Sanchez-Ayala, J. S. Thorp, and V. A. Centeno, "A community-based partitioning approach for phasor measurement unit placement in large systems," *Elect. Power Compon. Syst*., vol. 44, no. 12, pp. 1317-1329, Jun. 2016.
30. C. Mishra, K. D. Jones, A. Pal, and V. A. Centeno, "Binary particle swarm optimisation-based optimal substation coverage algorithm for phasor measurement unit installations in practical systems," *IET Gener. Transm. Distrib.*, vol. 10, no. 2, pp. 555-562, Feb. 2016.
31. A. Pal, P. Chatterjee, J. S. Thorp, and V. A. Centeno, "Online calibration of voltage transformers using synchrophasor measurements," *IEEE Trans. Power Del.*, vol. 31, no. 1, pp. 370-380, Feb. 2016.
32. T. Wang, A. Pal, J. S. Thorp, Z. Wang, J. Liu, and Y. Yang, "Multi-polytope based adaptive robust damping control in power systems using CART," *IEEE Trans. Power Syst.*, vol. 30, no. 4, pp. 2063-2072, Jul. 2015.
33. K. D. Jones, A. Pal, and J. S. Thorp, "Methodology for performing synchrophasor data conditioning and validation," *IEEE Trans. Power Syst.*, vol. 30, no. 3, pp. 1121-1130, May 2015.
34. F. Gao, J. S. Thorp, S. Gao, A. Pal, and K. A. Vance, "A voltage phasor based fault classification method for phasor measurement unit only state estimator output," *Elect. Power Compon. Syst*., vol. 43, no. 1, pp. 22-31, Jan. 2015.
35. A. Pal, G. A. Sanchez, V. A. Centeno, and J. S. Thorp, "A PMU placement scheme ensuring real-time monitoring of critical buses of the network," *IEEE Trans. Power Del.*, vol. 29, no. 2, pp. 510-517, Apr. 2014.
36. M. Li, A. Pal, A. G. Phadke, and J. S. Thorp, "Transient stability prediction based on apparent impedance trajectory recorded by PMUs," *Int. J. Elect. Power Energy Syst.*, vol. 54, pp. 498-504, Jan. 2014.
37. A. Pal, J. S. Thorp, T. Khan, and S. S. Young, "Classification trees for complex synchrophasor data," *Elect. Power Compon. Syst.*, vol. 41, no. 14, pp. 1381-1396, Sep. 2013.
38. A. Pal, J. S. Thorp, S. S. Veda, and V. A. Centeno, "Applying a robust control technique to damp low frequency oscillations in the WECC," *Int. J. Elect. Power Energy Syst.*, vol. 44, no. 1, pp. 638-645, Jan. 2013.

Conferences:

1. S. Sahoo, and A. Pal, "Cut-set and stability constrained optimal power flow for resilient operation of the electric grid during active wildfire risks" presented at the *IEEE Kansas Power & Energy Conference*, 2024.

2. M. Golgol, and A. Pal, "High-speed voltage control in active distribution systems with smart inverter coordination and DRL" presented at the *IEEE Power & Energy Society General Meeting* (PESGM), 2024.
3. R. Anguluri, and A. Pal, "Localizing single and multiple oscillatory sources: A frequency divider approach" presented at the *IEEE Power & Energy Society General Meeting* (PESGM), 2024.
4. D. Dalal, A. Pal, and R. Ayyanar, "Analyzing cross-phase effects of reactive power intervention on distribution voltage control" presented at the *IEEE Power & Energy Society General Meeting* (PESGM), 2024.
5. A. Sharma, A. C. Varghese, and A. Pal, "Comparative analysis of information theoretic and statistical methods for line parameter estimation" in *Proc. International Conference on Smart Grid Synchronized Measurements and Analytics (SGSMA)*, Washington, DC, USA, pp. 1-6, 21-23 May 2024.
6. M. M. Taif, M. Kezunovic, Y. Paudel, V. Vittal, A. Pal, D. Joshi, Menuka K.C., M. V. Venkatasubramanian, and G. Torresan "Automated detection and classification of critical power system events using ML on PMU data" in *Proc. International Conference on Smart Grid Synchronized Measurements and Analytics (SGSMA)*, Washington, DC, USA, pp. 1-6, 21-23 May 2024.
7. Z. J. Lythgoe, T. F. Long, M. J. Buchholz, A. R. Livernois, K. Kanuteh, D. R. Allee, A. Pal, I. R. Graham, Z. D. Drummond, "Design and validation of a very low-power phasor measurement unit" in *Proc. 2024 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, USA, pp. 1-6, 12-13 Feb. 2024.
8. S. Moshtagh, A. I. Sifat, B. Azimian, and A. Pal, "Time-synchronized state estimation using graph neural networks in presence of topology changes" in *Proc. IEEE 55th North American Power Symposium (NAPS)*, Asheville, NC, pp. 1-6, 15-17 Oct. 2023.
9. S. Sahoo, A. I. Sifat, and A. Pal, "Data-driven flow and injection estimation in PMU-unobservable transmission systems" in *Proc. IEEE Power Eng. Soc. General Meeting*, Orlando, FL, pp. 1-5, 16-20 Jul. 2023.
10. B. Azimian, A. Pal, B. Abu-Jaradeh, L. Chen, and P. Markham, "PMU-timescale topology identification of sub-station node-breaker models using deep learning" in *Proc. IEEE Power Eng. Soc. General Meeting*, Orlando, FL, pp. 1-5, 16-20 Jul. 2023.
11. D. Dalal, A. Pal, and P. Augustin, "Representative scenarios to capture renewable generation stochasticity and cross-correlations," in *Proc. IEEE Power Eng. Soc. General Meeting*, Denver, CO, pp. 1-5, 17-21 Jul. 2022.
12. A. Sen, S. Roy, K. Basu, S. Adeniye, S. Choudhuri, and A. Pal, "Optimal cost network design for bounded delay data transfer from PMU to control center," in *Proc. IEEE Global Communications Conference (GLOBECOM)*, Madrid, Spain, pp. 1-6, 7-11 December 2021.
13. F. Saadedeen, and A. Pal, "GPS spoofing attacks on phasor measurement units: practical feasibility and countermeasures," in *Proc. IEEE North American Power Symposium (NAPS)*, College Station, TX, pp. 1-6, 14-16 Nov. 2021.

14. B. Azimian, R. S. Biswas, A. Pal, and L. Tong, "Time synchronized distribution system state estimation for incompletely observed systems using deep learning and realistic measurement noise," in *Proc. IEEE Power Eng. Soc. General Meeting*, Washington DC, pp. 1-5, 26-29 Jul. 2021.
15. J. Patterson, and A. Pal, "An inductively powered line-mounted time-synchronized micro point-on-wave recorder," in *Proc. IEEE Power Eng. Soc. General Meeting*, Washington DC, pp. 1-5, 26-29 Jul. 2021.
16. D. Salls, J. Ramirez, A. Varghese, J. Patterson, and A. Pal, "Statistical characterization of random errors present in synchrophasor measurements," in *Proc. IEEE Power Eng. Soc. General Meeting*, Washington DC, pp. 1-5, 26-29 Jul. 2021.
17. H. Albhrani, R. S. Biswas, and A. Pal, "Identification of utility-scale renewable energy penetration threshold in a dynamic setting," in *Proc. IEEE North American Power Symposium (NAPS)*, Tempe, AZ, pp. 1-6, 11-13 Apr. 2021.
18. R. S. Biswas, B. Azimian, and A. Pal, "A micro-PMU placement scheme for distribution systems considering practical constraints," in *Proc. IEEE Power Eng. Soc. General Meeting*, Montreal, Canada, pp. 1-5, 2-6 Aug. 2020.
19. R. S. Biswas, A. Pal, T. Werho, and V. Vittal, "Fast identification of saturated cut-sets using graph search techniques," in *Proc. IEEE Power Eng. Soc. General Meeting*, Montreal, Canada, pp. 1-5, 2-6 Aug. 2020.
20. C. Wang, C. Mishra, R. S. Biswas, A. Pal, and V. A. Centeno, "Adaptive LVRT settings adjustment for enhancing voltage security of renewable-rich electric grids," in *Proc. IEEE Power Eng. Soc. General Meeting*, Montreal, Canada, pp. 1-5, 2-6 Aug. 2020.
21. S. Roy, H. Chandrasekaran, A. Pal, and A. Sen, "A new model to analyze power and communication system intra-and-inter dependencies," in *Proc. IEEE Conf. Technol. Sustainability (SusTech)*, Santa Ana, CA, pp. 1-8, 23-25 Apr. 2020.
22. Z. Chu, A. Pinceti, R. S. Biswas, O. Kosut, A Pal, and L. Sankar, "Can predictive filters detect gradually ramping false data injection attacks against PMUs?" in *Proc. IEEE International Conf. Communications, Control, and Computing Technol. Smart Grids (SmartGridComm)*, Beijing, China, pp. 1-6, 21-23 Oct. 2019.
23. M. Barkakati, R. S. Biswas, and A. Pal, "A PMU based islanding detection scheme immune to additive instrumentation channel errors," in *Proc. IEEE North American Power Symposium (NAPS)*, Wichita, KS, pp. 1-6, 13-15 Oct. 2019.
24. A. Nath, R. S. Biswas, and A. Pal, "Application of machine learning for online dynamic security assessment in presence of system variability and additive instrumentation errors," in *Proc. IEEE North American Power Symposium (NAPS)*, Wichita, KS, pp. 1-6, 13-15 Oct. 2019.
25. M. Barkakati, and A. Pal, "A comprehensive data driven outage analysis for assessing reliability of the bulk power system," in *Proc. IEEE Power Eng. Soc. General Meeting*, Atlanta, GA, pp. 1-5, 4-8 Aug. 2019.

26. C. Mishra, A. Pal, and V. A. Centeno, "Critical clearing time sensitivity for inequality constrained systems," in *Proc. IEEE Power Eng. Soc. General Meeting*, Atlanta, GA, pp. 1-5, 4-8 Aug. 2019.
27. P. Gupta, A. Pal, C. Mishra, and T. Wang, "Design of a coordinated wide area damping controller by employing partial state feedback," in *Proc. IEEE Power Eng. Soc. General Meeting*, Atlanta, GA, pp. 1-5, 4-8 Aug. 2019.
28. R. Meyur, A. Vullikanti, M. V. Marathe, A. Pal, M. Youssef, and V. Centeno, "Cascading effects of targeted attacks on the power grid," in *Proc. Int. Workshop Complex Networks and their Applications*, Cambridge, UK, pp. 1-13, 2 Dec. 2018.
29. T. Wang, J. Yang, J. Liu, P. Gupta, A. Pal, and J. Deng, "SDAE-based probabilistic stability analysis of wind integrated power systems," in *Proc. 2nd IEEE Conf. Energy Internet and Energy System Integration (EI2)*, Beijing, China, pp. 1-6, 20-22 Oct. 2018.
30. K. Basu, M. Padhee, S. Roy, A. Pal, A. Sen, M. Rhodes, and B. Keel, "Health monitoring of critical power system equipments using identifying codes," in *Proc. 13th Int. Conf. Critical Information Infrastructures Security (CRITIS)*, Kaunas, Lithuania, pp. 1-12, 24-26 Sep. 2018.
31. M. Padhee, and A. Pal, "Effect of solar PV penetration on residential energy consumption pattern," in *Proc. IEEE North American Power Symposium (NAPS)*, Fargo, ND, pp. 1-6, 9-11 Sep. 2018.
32. P. Mansani, A. Pal, M. Rhodes, and B. Keel, "Estimation of transmission line sequence impedances using real PMU data" in *Proc. IEEE North American Power Symposium (NAPS)*, Fargo, ND, pp. 1-6, 9-11 Sep. 2018.
33. V. Chakati, M. Pore, A. Banerjee, A. Pal, and S. K. S. Gupta, "Impact of false data detection on cloud hosted linear state estimator performance," in *Proc. IEEE Power Eng. Soc. General Meeting*, Portland, OR, pp. 1-5, 5-10 Aug. 2018.
34. C. Mishra, J. S. Thorp, V. A. Centeno, and A. Pal, "Transient stability assessment of cascade tripping of renewable sources using SOS," in *Proc. IEEE Power Eng. Soc. General Meeting*, Portland, OR, pp. 1-5, 5-10 Aug. 2018.
35. C. Mishra, J. S. Thorp, V. A. Centeno, and A. Pal, "Estimating relevant portion of stability region using Lyapunov approach and sum of squares," in *Proc. IEEE Power Eng. Soc. General Meeting*, Portland, OR, pp. 1-5, 5-10 Aug. 2018.
36. A. Pal, P. Rangudu, S. S. Ravi, and A. K. Vullikanti, "Using activity patterns to place electric vehicle charging stations in urban regions," in *Proc. IEEE Workshop Parallel Distributed Processing Computational Social Systems (IPDPS)*, Vancouver, BC, Canada, pp. 1143-1152, 21-25 May 2018.
37. M. Padhee, J. Banerjee, K. Basu, S. Roy, A. Pal, and A. Sen, "A new model to analyze power system dependencies," in *Proc. IEEE Texas Power Energy Conf. (TPEC)*, College Station, TX, pp. 1-6, 8-9 Feb. 2018.
38. M. Padhee, A. Pal, and K. A. Vance, "Analyzing effects of seasonal variations in wind generation and load on voltage profiles," in *Proc. IEEE North American Power Symposium (NAPS)*, Morgantown, WV, pp. 1-6, 17-19 Sep. 2017.

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