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Education

- 2019 – 2023 **Doctor of Philosophy (Ph.D.) in Power Systems.**
Department of Electrical Engineering,
Indian Institute of Technology (IIT) Patna, India, 801103.
Thesis title: *Design and Development of Wide Area Damping Controller for Inter-Area Oscillations in Large Power Systems.*
Supervisor: Dr. Sanjoy Kumar Parida, Associate Professor.
- 2016 – 2018 **Master of Technology (M.Tech.) in Power Systems.**
Department of Electrical Engineering,
National Institute of Technology (NIT) Patna, India, 800005.
- 2011 – 2015 **Bachelor of Engineering (B.E.) in Electrical and Electronics Engineering.**
Rajiv Gandhi Proudyogiki Vishwavidyalaya (RGPV) Bhopal, India, 462033.

Experiences

- July 2024 – Pres. **Assistant Professor.**
School of Electrical and Computer Sciences,
Indian Institute of Technology Bhubaneswar, India, 752050.
Working on *Dynamic Stability and State Estimation of Power Systems.*
- March 2024 – July 2024 **Assistant Professor.**
Electrical Engineering Department,
National Institute of Technology Calicut, India, 673601.
Working on *Dynamic Stability and State Estimation of Power Systems.*
- Sep. 2023 – March 2024 **Control System Engineer.**
General Electric (GE) Renewable Energy, Noida, India.
Worked on *Dynamic Performance Study (DPS) for installation of STATCOM REE Tabernas, Spain and Tabuk, Saudi Arabia Projects.*
Prepared PSSe DPS report for REE Tabernas project and delivered three talks on PSSe tutorial: REE Tabernas STATCOM fault studies. Also, delivered a talk on the stabilizer design for power system applications.
- Nov. 2022 – April 2023 **Visiting Researcher.**
Advanced Power and Energy Center, EECS Department,
Khalifa University, Abu Dhabi, United Arab Emirates.
Topic: *Developing Control Strategies for Enhancing the Stability of the Power Systems with High Penetration of Renewable Energy Sources.*
Supervisor: Prof. Mohamed Shawky El Moursi.

Achievements and Recognitions

- 2025 **Prestigious IEEE SeFet-2025 Outstanding Doctoral Thesis Award** from IEEE.
- 2024 **Prestigious IEEE PES Outstanding Doctoral Dissertation Award 2024** from IEEE Power & Energy Society, USA.

Achievements and Recognitions (continued)

- **International Travel Support** from Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India.
- **Express Mode PhD Degree** from Indian Institute of Technology Patna.
- 2023 ■ Prestigious **POSOCO Power System Award (PPSA) now GRID-India Power System Award (GIPSA) 2023** from Grid Controller of India (GRID-INDIA), Ministry of Power, Govt. of India.
- 2018 ■ **Certificate of Excellence Award** during M. Tech from NIT Patna for being branch topper of the Electrical Engineering Department.
- 2015 ■ Received **Bachelor of Engineering Degree with Honours**.

Research Interests

- 2019 – Pres.
- Power System Dynamics, Control, and Stability.
 - Dynamic State Estimation in Power Systems.
 - Inertia Estimation in Power Systems.
 - Power System Frequency Control.
 - Forced Oscillation Localization.
 - Integration and Control of Renewable Energy Sources into Power Systems.
 - AI/ML Applications to these Power System Fields.

Sponsored/Consultancy Projects

1. Adaptive decoupled damping control strategy with frequency regulation in power systems considering high penetration of renewable energy sources, Indian Institute of Technology Bhubaneswar, 2024-2026.
2. Assessment of TPCODL's performance in previous five years, Tata Power Central Odisha Distribution Limited (TPCODL), 2025.

Research Publications

Journals

1. **A. Prakash**, M. S. El-Moursi, S. K. Parida and R. K. Tiwari, "Adaptive Unscented Filtering Based Decoupled Wide-Area Damping Controller for Power Systems," *IEEE Transactions on Power Systems*, Aug 2025, doi: 10.1109/TPWRS.2025.3597787.
2. **A. Prakash**, K. Kumar, and S. K. Parida, "A modal transformation approach to design reduced order functional observer-based WADC for low-frequency oscillations," *IEEE Transactions on Power Systems*, vol. 38, no. 4, pp. 3593-3604, 2023, doi: 10.1109/TPWRS.2022.3196787.
3. **A. Prakash**, M. S. El-Moursi, S. K. Parida and E. F. El-Saadany, "Design of Adaptive Damping Controller with Wide-Area Measurements Considering Unknown Power System Dynamics," *IEEE Transactions on Power Systems*, vol. 39, no. 3, pp. 5150-5162, May 2024, doi: 10.1109/TPWRS.2023.3321674.
4. K. Kumar, **A. Prakash**, and S. K. Parida, "A Novel Multi-Functional Observer Based Distributed WADC for Large Power System Using Modified Decoupled Control Approach," *IEEE Transactions on Power System*, vol. 39, no. 5, pp. 6662-6674, Sept. 2024, doi: 10.1109/TPWRS.2024.3351369.
5. K. Kumar, **A. Prakash**, K. A. Jaafari and S. K. Parida, "A Novel Modal Eigenvalue Realignment-Based Design of Wide-Area Damping Controller for Inter-Area Oscillations in Modern Power System," *IEEE Transactions on Power Systems*, vol. 40, no. 3, pp. 2795-2798, 2025, doi: 10.1109/TPWRS.2025.3532108.

6. **A. Prakash**, R. K. Tiwari, K. Kumar, and S. K. Parida, "Interacting Multiple Model Strategy Based Adaptive Wide-Area Damping Controller Design for Wind Farm Embedded Power System," *IEEE Transactions on Sustainable Energy*, vol. 14, no. 2, pp. 962-973, 2023, doi: 10.1109/TSTE.2022.3231647.
7. **A. Prakash**, P. Singh, K. Kumar, and S. K. Parida, "Design of a reduced-order WADC for wind turbine system integrated power system," *IEEE Transactions on Industry Applications*, vol. 58, no. 3, pp. 3250-3260, 2022, doi: 10.1109/TIA.2022.3159319.
8. **A. Prakash**, K. Kumar, and S. K. Parida, "Energy capacitor system based wide-area damping controller for multiple inter-area modes," *IEEE Transactions on Industry Applications*, vol. 58, no. 2, pp. 1543-1553, 2022, doi: 10.1109/TIA.2022.3140713.
9. **A. Prakash**, M. S. El-Moursi, S. K. Parida, K. Kumar and E. F. El-Saadany, "Damping of Inter-Area Oscillations with Frequency Regulation in Power Systems Considering High Penetration of Renewable Energy Sources," *IEEE Transactions on Industry Applications*, vol. 60, no. 1, pp. 1665-1679, 2024, doi: 10.1109/TIA.2023.3312061.
10. K. Kumar, P. Saini, **A. Prakash**, S. K. Parida, K. Al Jaafari, H. H. Zeineldin, E. F. El-Saadany, "Real-Time Cyber-Physical Co-Simulation for Resilient Wide-Area Damping Control Against FDIAs and Communication Disruptions," *IEEE Transactions on Industry Applications*, doi: 10.1109/TIA.2025.3571363.
11. K. Kumar, **A. Prakash** and S. K. Parida, "Large-Scale Solar PV Converter based Robust Wide-Area Damping Controller for Critical Low Frequency Oscillations in Power Systems," *IEEE Transactions on Industry Applications*, vol. 59, no. 4, pp. 4868-4879, 2023, doi: 10.1109/TIA.2023.3268632.
12. **A. Prakash**, K. Kumar, and S. K. Parida, "PIDF(1+FOD) controller for load frequency control with SSSC and AC-DC tie-line in deregulated environment," *IET Generation, Transmission & Distribution*, vol. 14, no. 14, pp. 2751-2762, 2020, doi: 10.1049/iet-gtd.2019.1418.
13. **A. Prakash**, S. Murali, R. Shankar, and R. Bhushan, "HVDC tie-link modeling for restructured AGC using a novel fractional order cascade controller," *Electric Power Systems Research*, vol. 170, pp. 244-258, 2019, doi: 10.1016/j.epsr.2019.01.021.
14. **A. Prakash**, K. Kumar, and S. K. Parida, "Damping of Inter-Area Oscillations Using TCPS Based Delay Compensated Robust WADC," *Electric Power Components and Systems*, vol. 51, no. 15, pp. 1562-1575, 2023, doi: 10.1080/15325008.2023.2200772.
15. **A. Prakash**, K. Abhinav, P. Rai and S. K. Parida, "Distributed Generation Based WADC for Inter-Area Oscillations Considering Unknown Inputs," *Electric Power Components and Systems*, 2023, doi: 10.1080/15325008.2023.2258503.
16. P. Singh, **A. Prakash**, and S. K. Parida, "Neural Network Based Pattern Recognition for Classification of the Forced and Natural Oscillation," *Electric Power Systems Research*, vol. 224, pp. 109706, 2023, doi: 10.1016/j.epsr.2023.109706.
17. K. Abhinav, P. Rai, **A. Prakash**, and S. K. Parida, "A Data-Driven Online Approach for Detection and Localisation of Forced Oscillation in Wind Turbine Integrated Power System," *Electric Power System Research*, vol. 233, pp. 110512, 2024, doi: 10.1016/j.epsr.2024.110512.
18. P. Sharma, **A. Prakash**, R. Shankar, and S. K. Parida, "A novel hybrid salp swarm differential evolution algorithm based 2DOF tilted-integral-derivative controller for restructured AGC," *Electric Power Components and Systems*, vol. 47, no. 19-20, pp. 1775-1790, 2019, doi: 10.1080/15325008.2020.1731870.

Patent

19. K. Kumar, **A. Prakash**, and S. K. Parida, "A Low-Cost Real-Time Controller Testing and Development Framework for Power System Applications," **Indian Patent** (IN 202431005767, Filed Jan 29, 2024).

Conferences

20. **A. Prakash**, K. Abhinav, P. Rai, and S. K. Parida, "A Sine-Cosine Algorithm Optimized PI-PD Cascade Controller for Load Frequency Control," *2024 IEEE IAS International Conference on Power Electronics Drives and Energy Systems (PEDES)*, 2024, doi: 10.1109/PEDES61459.2024.10961020.
21. **A. Prakash**, K. Abhinav, P. Saini, and S. K. Parida, "Frequency Control of Two Area Thermal Hydro System Using HSSDEA Based PIDF Controller," *2024 IEEE IAS International Conference on Power Electronics Drives and Energy Systems (PEDES)*, 2024, doi: 10.1109/PEDES61459.2024.10961660.
22. **A. Prakash** and S. K. Parida, "Impact of Solar Photovoltaic on LFC of Interconnected Power System using I-PD Controller," *2019 IEEE PES Innovative Smart Grid Technologies Europe (ISGT-Europe)*, 2019, doi: 10.1109/ISGTEurope.2019.8905696.
23. **A. Prakash**, M. S. El-Moursi, S. K. Parida and E. F. El-Saadany, "Design of Wide Area Damping Controller Based on Clustering of Inter-Area Oscillations," in *2023 IEEE PES Conference on Innovative Smart Grid Technologies - Middle East (ISGT Middle East)*, 2023, doi: 10.1109/ISGTMiddleEast56437.2023.10078566.
24. **A. Prakash**, K. Kumar and S. K. Parida, "Design of Damping Controller Based on the Wide-Area Signal Strength," *2020 21st IEEE National Power Systems Conference (NPSC)*, 2020, doi: 10.1109/NPSC49263.2020.9331866.
25. **A. Prakash** and S. K. Parida, "Combined Frequency and Voltage Stabilization of Thermal-Thermal System with UPFC and RFB," *2020 IEEE 9th Power India International Conference (PIICON)*, 2020, doi: 10.1109/PIICON49524.2020.9113034.
26. **A. Prakash**, P. Singh, K. Kumar and S. K. Parida, "Design of TCSC Based Optimal Wide Area Power System Stabilizer for Low-Frequency Oscillation," *2021 IEEE IAS 4th International Conference on Computing, Power and Communication Technologies (GUCON)*, 2021, doi: 10.1109/GUCON50781.2021.9573982.
27. **A. Prakash** and S. K. Parida, "LFC of Interconnected Power System with TCSC using Salp Swarm Algorithm," *2019 IEEE 8th International Conference on Power Systems*, 2019, doi: 10.1109/ICPS48983.2019.9067729.
28. **A. Prakash** and S. K. Parida, "LQR Based PI Controller for Load Frequency Control with Distributed Generations," *2020 21st IEEE National Power Systems Conference (NPSC)*, 2020, doi: 10.1109/NPSC49263.2020.9331761.
29. **A. Prakash**, K. Kumar and S. K. Parida, "A novel I-PDF controller for LFC with AC/DC Tie-line," *2019 20th IEEE International Conference on Intelligent System Application to Power Systems (ISAP)*, 2019, doi: 10.1109/ISAP48318.2019.9065929.
30. **A. Prakash**, K. Kumar and S. K. Parida, "Design of Wide-Area Damping Controller Based on Modulation of Active Power Demand," *2022 IEEE IAS Global Conference on Emerging Technologies (GlobConET)*, pp. 176-181, 2022, doi: 10.1109/GlobConET53749.2022.9872521.
31. **A. Prakash**, P. Saini and S. K. Parida, "Distributed Generation Based Design of Prescribed Degree Robust Wide Area Damping Controller for Inter-Area Oscillations in Power Systems," *2023 IEEE 3rd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*, 2023, doi: 10.1109/STPEC59253.2023.10431168.
32. K. Kumar, **A. Prakash**, P. Singh and S. K. Parida, "A Novel SVC Based Wide-Area Damping Controller for Inter-Area Oscillation," *2021 IEEE 4th International Conference on Computing, Power and Communication Technologies (GUCON)*, 2021, doi: 10.1109/GUCON50781.2021.9573946.
33. P. Singh, **A. Prakash**, K. Kumar and S. K. Parida, "Comparative Assessment of Spectral Analysis Methods for Characterizing Forced Oscillation," *2021 9th IEEE International Conference on Power Systems (ICPS)*, 2021, doi: 10.1109/ICPS52420.2021.9670399.
34. K. Kumar, **A. Prakash**, S. K. Parida, S. Ghosh and C. Kumar, "Coordinated Tuning of AVR and PSSs for Local and Inter-Area Modes of Oscillation in Eastern Regional Grid of India," *2021 IEEE 2nd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*, 2021, doi: 10.1109/STPEC52385.2021.9718621.

35. K. Kumar, **A. Prakash** and S. K. Parida, "A Novel PID-FOPD Controller for LFC Including IPFC and RFB," *2021 IEEE 6th International Conference for Convergence in Technology (I2CT)*, 2021, doi: 10.1109/I2CT51068.2021.9417977.
36. S. Murali, **A. Prakash** and R. Shankar, "LFC of Multi Area Power System with Electric Vehicle using VPL Optimized Controller," *2019 IEEE International Conference on Power Electronics Applications and Technology in Present Energy Scenario (PETPES)*, 2019, doi: 10.1109/PETPES47060.2019.9003878.
37. P. Singh, **A. Prakash** and S. K. Parida, "Analysis and Detection of Forced Oscillation Using Synchrosqueezed Wavelet Based Ridge Technique," *2022 IEEE IAS Global Conference on Emerging Technologies (GlobConET)*, pp. 417-422, 2022, doi: 10.1109/GlobConET53749.2022.9872167.
38. K. Kumar, **A. Prakash** and S. K. Parida, "Robust Wide-Area Damping Controller for Inter-Area Oscillation with AC/DC Tie-Line," *2022 IEEE IAS Global Conference on Computing, Power and Communication Technologies (GLOBCONPT)*, 2022, doi: 10.1109/GlobConPT57482.2022.9938364.
39. K. Kumar, **A. Prakash** and S. K. Parida, "Wide-Area Damping Controller Design with TCSC Using Active Disturbance Rejection Control," *2023 IEEE IAS Global Conference on Emerging Technologies (GlobConET)*, 2023, doi: 10.1109/GlobConET56651.2023.10150111.
40. P. Saini, **A. Prakash** and S. K. Parida, "Enhanced Short-Term Load Forecasting Using Facebook Prophet and Discrete Wavelet Transform," *2023 IEEE 3rd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*, 2023, doi: 10.1109/STPEC59253.2023.10430521.
41. K. Abhinav, P. Rai, **A. Prakash** and S. K. Parida, "Comparative Assessment of Prony Analysis and Eigensystem Realization Algorithm for Forced Oscillation Detection and Mode Estimation Considering PMU Noise," *2023 IEEE 3rd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*, 2023, doi: 10.1109/STPEC59253.2023.10430933.
42. K. Abhinav, P. Rai, **A. Prakash** and S. K. Parida, "A Data-Driven Forced Oscillation Detection Using Random Forest," *2023 IEEE International Conference in Energy Technologies for Future Grids (ETFG)*, 2023, doi: 10.1109/ETFG55873.2023.10408579.
43. P. Saini, K. Abhinav, **A. Prakash**, and S. K. Parida, "Adaptive Disturbance Onset Detection in Power System with Varying Wind Power Penetration Using Kernel Density Estimator," *2024 22nd IEEE National Power Systems Conference (NPSC)*, 2024, doi: 10.1109/NPSC61626.2024.10986841.
44. K. Abhinav, P. Rai, P. Saini, **A. Prakash**, and S. K. Parida, "Forced Oscillation Source Location using System Oscillating Energy and Eigensystem Realization Algorithm," *2024 22nd IEEE National Power Systems Conference (NPSC)*, 2024, doi: 10.1109/NPSC61626.2024.10987087.
45. K. Kumar, P. Saini, **A. Prakash**, and S. K. Parida, "Detection and Mitigation of False Data Injection Attacks in Wide-Area Damping Controller Using Random Forest Classifier," *2024 IEEE 22nd National Power Systems Conference (NPSC)*, 2024, doi: 10.1109/NPSC61626.2024.10987052.
46. P. Rai, K. Abhinav, P. Saini, **A. Prakash**, and S. K. Parida, "Detection of Wind Turbine Induced Forced Oscillations using Periodogram and DEF Techniques," *2024 IEEE International Conference on Power Electronics Drives and Energy Systems (PEDES)*, 2024, doi: 10.1109/PEDES61459.2024.10960966.
47. K. Khinchi, K. Kumar, K. Abhinav, S. K. Parida, and **A. Prakash**, "A SVC-Based Wide-Area Damping Controller for Inter-Area Oscillation using Fuzzy Logic," *2025 IEEE IAS International Conference on Sustainable Energy and Future Electric transportation (SEFET)*, 2025.
48. S. Mishra, P. Saini, K. Kumar, S. K. Parida, and **A. Prakash**, "Estimation of Time-Varying Power System Inertia Using Gated Recurrent Unit Model," *2025 IEEE IAS International Conference on Sustainable Energy and Future Electric transportation (SEFET)*, 2025.