Subir Majumder   April 7, 1991

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Research Interests	• Electric Power & Energy Systems Modeling, Operations & Planning. • Applied Power System Economics & Game Theory. • Applied Power System Optimization. • Power System Resiliency. • Smart Grid.

Research Experience

September, 2021 - Present, Engineering Scientist, West Virginia University, WV, USA.
Contributed to two projects: US DOE UI-ASSIST and NSF CPS aDaption. Research in distributed optimization, resilient operation of the power distribution system, and development of retail electricity markets with Distributed Energy Resource (DER) systems. Mentoring PhD students for distributed algorithm development with discrete variables and test-bed development for distributed applications. Collaborated for machine learning-based power system operational control algorithm development. Contributed to writing proposals as a researcher or a co-I of PSERC, NSF, and US-DOE projects.

January, 2020 - August, 2021, Post-Doctoral Research Associate, Washington State University, WA, USA.
Research in distributed optimization and resilient operation of the power distribution system with DERs. Mentoring undergraduate students for test-bed development. Collaborated for machine learning-based power system operational control algorithm development. Contributed to writing proposals for external funding.

July, 2019 - December, 2019, Research Associate, Indian Institute of Technology Bombay, Mumbai, India.
Research in power quality economics.

Education

2020, Ph.D., Indian Institute of Technology Bombay (IITB), India and University of Wollongong (UOW), Australia (under a Cotutelle/Joint Agreement).
Dissertation: *Techno-economic analysis of electricity networks with renewable energy sources and storage devices.*
Principal Advisors: Dr. S. A. Khaparde, and Dr. A. P. Agalgaonkar
• *The dissertation has been presented in a panel session at IEEE Power and Energy Society General Meeting, 2019.*
2020, M.Tech. in Energy Systems Engineering (under M.Tech. + Ph.D. Dual Degree programme), Indian Institute of Technology Bombay, India.
2012, B.Tech. in Electrical Engineering, Kalyani Govt. Engineering College, West Bengal University of Technology, India.

Journals

[J1] **S. Majumder**, S. A. Khaparde, A. P. Agalgaonkar, S. V. Kulkarni, A. K. Srivastava, and S. Perera, "Chance-Constrained Pre-Contingency Joint Self-Scheduling of Energy and Reserve in a VPP," accepted in *IEEE Trans. Power Syst.*, Jan. 2023
[J2] **S. Majumder**, N. Patari, A. K. Srivastava, P. Srivastava, and A. M. Annaswamy, "Epistemology of Voltage Control in DER-Rich Power System," *Elec. Pow. Syst. Res.*, Art. No. 108874, 2023.
[J3] **S. Majumder**, "Premium Power Investment Strategy utilizing the Economy of Scale of Custom Power Devices," *Elec. Pow. Syst. Res.*, Art. No. 108743, 2023.
[J4] **S. Majumder**, G. Kandaperumal, S. Pandey, A. K. Srivastava, and C. Koplin, "Pre-Event Two-Stage Proactive Control for Enhanced Resiliency," *IEEE Access*, vol.

10, pp. 83281-83296, 2022.

[J5] A. Vosughi, A. Tamimi, A. B. King, **S. Majumder**, and A. K. Srivastava, "Cyber-physical Vulnerability and Resiliency Analysis for DER Integration: A Review, Challenges and Research Needs," *Renew. Sust. Energ. Rev.,* vol. 168, Art. no. 112794, 2022.

[J6] **S. Majumder**, S. A. Khaparde, A. P. Agalgaonkar, S. V. Kulkarni, and S. Perera, "Voltage Sag Mitigation Cluster Formation employing Graph-Partitioning Theory utilizing Dynamic Voltage Restorers in Radial Distribution Networks," *IEEE Trans. Power Del.*, vol. 37, no. 1, pp. 18-28, Dec. 2020.

[J7] **S. Majumder**, A. P. Agalgaonkar, S. A. Khaparde, S. Perera, S. V. Kulkarni, and P. P. Ciufo, "Allowable Delay Heuristic in Provision of Primary Frequency Reserve in the Future Power System," *IEEE Trans. Power Syst.*, vol. 35, no. 2, pp. 1231-1241, Aug. 2019.

[J8] **S. Majumder**, A. P. Agalgaonkar, S. A. Khaparde, P. P. Ciufo, S. Perera, and S. V. Kulkarni, "Allocation of Common-Pool Resources in an Unmonitored Open System," *IEEE Trans. Power Syst.*, vol. 34, no. 5, pp. 3912-3920, Sept. 2019.

[J9] **S. Majumder**, S. A. Khaparde, A. P. Agalgaonkar, P. P. Ciufo, S. Perera, and S. V. Kulkarni, "DFT-Based Sizing of Battery Storage Devices to Determine Day-Ahead Minimum Variability Injection Dispatch with Renewable Energy Resources," *IEEE Trans. Smart Grid*, vol. 10, no. 1, pp. 626-638, Jan. 2019.

[J10] **S. Majumder**, R. M. Shereef, and S. A. Khaparde, "Two-Stage Algorithm for Efficient Transmission Expansion Planning with Renewable Energy Resources," *IET Renew. Power Gen.,* vol. 11, no. 3, pp. 320-329, Feb. 2017.

[J11] **S. Majumder** and S. A. Khaparde, "Revenue and Ancillary Benefit Maximisation of Multiple Non-collocated Wind Power Producers Considering Uncertainties," *IET Gen. Transm. Distrib.,* vol. 10, no. 3, pp. 789-797, Jul. 2016.

[J12] S. U. Kadir, **S. Majumder**, A. Chhokra, A. Dubey, H. Neema, A. Laszka, and A. K. Srivastava, "Reinforcement Learning based Proactive Control for Transmission Grid Resilience to Wildfire," available: arXiv:2107.05756 (also under first revision in IEEE Trans. Indus. Inform.)

Newsletters & Book Chapter	[N1] **S. Majumder**, and A. K. Srivastava, "Resilience-driven Integration of Distributed Energy Resource (DER): Holistic Value Analysis," in *IEEE Smart Grid Newsletters*, Sept. 2022. [N2] **S. Majumder**, and A. K. Srivastava, "Resilience-Driven Integration of Distributed Energy Resource (DER): Coordinating DER Services for Value," in *IEEE Smart Grid Newsletters*, Nov. 2022. [B1] G. Kandaperumal, **S. Majumder**, and A. K. Srivastava, "Microgrids as a Resilience Resource in the Electric Distribution System," *book chapter* in *Elsevier- Electric Power Systems Resiliency – Modelling, Opportunity and Challenges*, Paperback ISBN: 9780323855365, 1st Ed., July 1, 2022.
Selected Conference Publications	[C1] S. Knudsen, **S. Majumder**, and A. K. Srivastava, "Securely implementing and managing neighborhood solar with storage and peer to peer transactive energy," in *Paris Session – CIGRE*, Aug. 2022. [C2] J. Adan, **S. Majumder**, and A. K. Srivastava, "Distributed Optimization Approaches with Discrete Variables in the Power Distribution Systems," in NAPS, 2022. [C3] P. S. Sarker, N. Patari, B. Ha, **S. Majumder**, and A. K. Srivastava, "Quasi-Static Cyber-Power Co-Simulation Platform for Performance Analysis of Distributed VAR Control during Cyber-Attacks," in MSCPES, May 2022. [C4] P. S. Sarker, **S. Majumder**, M. F. Rafy, and A. K. Srivastava, "Impact Analysis of Cyber-Events on Distributed Voltage Control with Active Power Curtailment,"

accepted for publication in PEDES, 2022.

[C5] **S. Majumder**, S. A. Khaparde, V. Pradhan, A. P. Agalgaonkar, and S. Perera, "Optimal Voltage Sag Mitigation Solution Provision using Customers Approximate Marginal Willingness-to-Pay Function," in IEEE PowerTech, Jun. 2021.

[C6] **S. Majumder**, S. A. Khaparde, A. P. Agalgaonkar, S. V. Kulkarni, S. Perera, and P. P. Ciufo, "Hybrid Storage System Sizing for Minimum Daily Variability Injection," in TENSYMP, Jun. 2019.

[C7] N. V. Vigil, **S. Majumder**, V. Pradhan, Padmini V., and S. A. Khaparde, "Transmission Expansion Planning with Variable Wind Source," in NPSC, Dec. 2014.

Manuscripts Under Review	[R1] **S. Majumder**, A. Vosughi, H. M. Mustafa, T. E. Warner, and A. K. Srivastava, "On the Cyber-Physical Needs of DER-based Voltage Control Algorithms," under second revision in *IEEE Access*. [R2] **S. Majumder**, F. A. Martina, S. Pannala, and A. K. Srivastava, "Real-Time Resiliency Monitoring and Decision Support: A Use Case for Reconfiguration of Networked μ-grids," under review in *MDPI Energies* (Invited Paper).
Reports	[S1] State level smart grids road-map for Maharashtra, India, *Technical Report*.
Doctoral Research	• Sizing and operation of storage devices to mitigate renewable energy variability. • Determining reserve requirement and the allowable delay in a low-inertia system. • Developing efficient policies of procuring voltage sag mitigation devices.
Fellowships and Awards	• Conferred POSOCO Power System Awards (PPSA) under Doctoral category, 2020. • Recommended for the Best Ph.D. Thesis award, IITB, 2020. *One of the selected external examiners stated: "the thesis presents the research carried out by the student in an innovative (way of thinking) manner addressing the problem of low inertia due to renewable energy integration — Application of 'Diverse' Approaches, Conceptually and Mathematically for Problem Solving."* • Recommended for special commendation for an Outstanding Ph.D. Thesis, UOW, 2020. *One of the selected external examiners noted: "the thesis is a solid and addresses a number of topics that have resulted in high quality publications. In addition, he/she highlights the fact the student is able to identify research problems and develop innovative solutions."* • Granted University Postgraduate Award (UPA) and Institute Postgraduate Tuition Award (IPTA) from the University of Wollongong, Australia, 2016-2017. • Granted TA-ship for M.Tech.+Ph.D. program, Govt. of India, 2012-2018. • Awarded full free scholarship from Kalyani Govt. Engineering College, Govt. of West Bengal, India (2008-2012).
Teaching Experience	• Delivered a few lectures in *Smart Grids* course at IITB, Autumn, 2018. • Teaching Assistant, *Energy Management*, IITB, Spring, 2016. • Assisted in conducting the CEP course on *Energy Management* at IITB, 2015. • Head Teaching Assistant, *Introduction to Electrical Systems*, IITB, Autumn, 2014 and 2015. • Teaching Assistant, *Power Systems*, IITB, Spring, 2014 and 2015. • Teaching Assistant, *Fundamentals of Energy Engineering,* IITB, Spring, 2013. • Teaching Lab demonstrator, *Power Electronics and Drives,* UOW, Spring, 2017. • Teaching Lab demonstrator, *Power Engineering 1,* UOW, Autumn, 2017.
Mentoring Experience	• Mentoring one undergraduate student, Feb.-Jun. 2017, UOW Dubai. • Supported in mentoring two undergraduate summer students, May-Aug. 2020, WSU.

	• Supported in mentoring one undergraduate and one postgraduate student, Jan.-Dec. 2021, WSU/WVU. • Mentoring three PhD students, Jan. 2022 - Present, WVU.
Technical Skills	• Proficient in *GAMS* as a mathematical modeling and optimization tool. • Proficient in *Matlab*, with *Simulink* and *MatPower*, and OpenDSS. • Basic use of *PSS/E*, PSCAD, RSCAD, *Python* and C. • Attended DWIH (Geschäftsstelle Deutsche Wissenschafts- und Innovationshäuser) Workshop on 'Grant Writing & Management', Nov. 2019. • Languages: Bengali (proficient), English (proficient), German (basic, received training from DAAD) and Hindi (basic).
Services and Associations	• Member, *IEEE, IEEE Power and Energy Society, IEEE Control Systems Society.* • Member, IEEE WG on Modern & Future Distribution System Planning, IEEE CAMS WG on Computational Challenges & Solutions for Implementing Distributed Optimization, IEEE TF on Operational Tools for Enabling Resiliency, BPSO Subcommittee, PSOPE Committee. • Reviewer, *IEEE Trans. Power Del.*, *IEEE Access*, *IEEE Trans. Sust. Energy*, *IEEE Trans. Power Syst.*, *Energies*, *PESGM 2018*. • Proctor, *IEEE xTreme 2017*, Judge, *14th Annual Summer Undergraduate Research Symposium, WVU, 2022 Spring Undergraduate Research Symposium, WVU, 2022 IEEE PES GM Student Poster Competition*. • Assisted in conducting (also attended) *Master of Electrical Power Engineering* program at UOW, Apr. 2017. • Web Administrator at *IEEE UOW student branch*, 2016-2017. • Co-lead technical sessions group in National Power Electronics Conference (NPEC) held at IIT Bombay, Dec. 2015.
Selected Courses / Workshops Attended	Applied Linear Algebra, Applied Multivariate Statistics in Chemical Engg., Computer-Aided Power System Analysis, Distributed Generation and Microgrids, Energy Systems Modeling and Analysis, Game Theory: I, Games and Information, Microeconomics: When Markets Fail, Numerical Methods and Programming, Optimization and Game Theory: From Basics to the Latest Trends, Restructured Power Systems, Strengthen Your Professional Communication Skills, Creating New Habits with Time Management, Navigating Mentoring for Undergraduate Research Mentors.
Career Objectives	I am an adaptive, enthusiastic, fast-learning, focused, and ambitious researcher, possessing strong analytical and problem-solving skills, looking to significantly contribute to future power grid operations. I am highly passionate about power systems modeling, optimization, and economics, and seeking every opportunity to improve my skillsets so that I am able to contribute to original and novel algorithm development. I can work individually or as a part of a multi-disciplinary, remotely-connected team. I have already collaborated with others in developing test-beds for analyzing distributed algorithm performance (with students at WVU) and developing machine learning approaches for power systems operation (with researchers from the University of Houston and Vanderbilt University). I am also working with Massachusetts Institute of Technology researchers to develop alternative retail electricity markets using various centralized and distributed architectures. I have limited teaching and mentoring experience, and my mentees appreciated my contribution to their research. All these qualities make me believe I can take the next set of challenges for power systems operations while being an all-around researcher.