

BIO-DATA

Dr. Sonal (Ph.D)
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1. Name and affiliation: Dr. Sonal, Assistant Professor, Department of Electrical and Electronics Engineering, Birla Institute of Technology, Mesra, Deoghar Campus, Deoghar - 814142, Jharkhand, India
2. Gender(M/F/T): F
3. Academic Qualification:

Dr. Sonal holds a Ph.D. in Power Systems from Birla Institute of Technology (BIT) Mesra, Ranchi, following her Master of Engineering (M.E.) in the same specialization from the same institute. She is currently serving as an Assistant Professor in the Department of Electrical and Electronics Engineering at BIT Mesra, Off-Campus. Her Ph.D thesis title was “Situational Awareness Based Resilience and Operational Reliability Estimation of Distribution System”. Prior to her academic tenure, she was associated for 3 years with Tata based project on the Canadian Imperial Bank of Commerce, with a focus on quality assurance. She secured 90.0% in Ph.D (EEE, Power System), 89.1% in M.E, 81.9% in B.Tech, 83.0% in AISSCE, and 93.0% in AISSE. Her core research areas include resilient distribution networks, integration of renewable energy sources, AI-driven optimization of solar PV systems, and advanced smart grid technologies. She has contributed to approximately eight national and international patents across jurisdictions including the UK, Australia, and Germany. Her scholarly work has appeared in globally renowned journals, notably in the *Nature* group and Elsevier’s *Reliability Engineering & System Safety* (Impact Factor 11). Her research has been widely recognized for its technical depth and applied significance, earning her numerous accolades, including First Prize for Oral Presentation at the Research Scholar Colloquium, BIT Mesra (2022) and multiple Best Paper Awards. She was also extended an offer for the position of Project Research Engineer at IIT Bombay, and holds distinguished academic honors such as the CBSE Certificate of Merit (0.1% certificate in Class XII).

4. Professional Recognition/ Award/Prize/Certificate, Fellowship received by the applicant.

Dr. Sonal is a Senior Members of Indian National Academy of Engineering (INAE), which is India’s distinguished community of engineering professionals. Senior Members of INAE receive a certificate, subsidized/free participation in seminars, symposia, training, and access to newsletters and policy papers. They gain mentoring and career guidance from eminent Fellows along with eligibility for awards and recognitions. Members have opportunities for industry–academia collaboration, entrepreneurship support, and participation in hackathons, competitions, and panel discussions. They can also organize seminars/courses under the INAE banner, serve on expert committees, and guide younger members. These privileges strengthen professional growth, peer networking, and future consideration for Fellowship.

S.No	Name of Award	Awarding Agency	Year
1	Co-Coordinator (AICTE ATAL Online FDP)	<i>“Innovative Trends in Data Science and Electric Mobility: IPR Opportunities and Challenges”</i> , 8–13 Dec 2025	2025
2	Resource Person for the organized Exposure Visit Program for Principals in collaboration with the Central Board of Secondary Education (CBSE)	<i>“Exposure Visit Program for Principals of CBSE Affiliated Schools”</i> , conducted on 29–30 January 2026 at BIT Mesra, Off-Campus Deoghar,	2026
3	Certificate of Appreciation for serving as Faculty Advisor	National Entrepreneurship Challenge 2025 for Team <u>NEC2516260</u> , conducted by e-cell IIT Bombay	2025
4	1. Innovation Ambassador (Advanced Level) 2. Innovation Ambassador (Foundation Level)	1. MoE Innovation Cell & AICTE, 2024–25; 30-hour certified training in innovation mentoring and startup ecosystem development. 2. MoE Innovation Cell & AICTE, 2024–25; 30-hour certified training in innovation promotion, IPR awareness, and entrepreneurship	2025

5	Senior Member (INAE)	Indian National Academy of Engineering	2019
6	Women Researcher Award	<i>Hybrid Data-Driven Resilience Assessment and Enhancement of Distribution System for Cyclone Susceptible Zone</i> ", 2nd International Award Ceremony & Conference for Women Researchers, Pondicherry, India	2025
7	Best Paper Award	BIT Mesra	2019
8	1 st Prize, Research Scholar Colloquium	BIT Mesra	2022
9	Certificate of Merit (CBSE: 0.1%), AISSCE	CBSE, New Delhi	2010
10	Project Research Engineer	IIT Bombay	2019
11	Session Chair	National Seminar on "Green Energy, Environment and Technology" (NSGEET 2025) , organized by the Department of Electrical Engineering, NITTTR Kolkata, in collaboration with Star Cement Limited, Shillong, 16th–17th January 2025, Guwahati Extension Centre, NITTTR Kolkata, India.	2025

5. Publications (*List of papers published in **SCI Journals**, in year wise descending order*).

S.no.	Author(s)	Title	Name of Journal	Impact Factor	Volume, Page	Year
1	Sonal, D. Ghosh	A Data-Driven Agrivoltaic Approach for Adaptive Irrigation and Reduced Grid Dependence	<i>Energy for Sustainable Development (Elsevier)</i>	4.9	92, 101939	Jan, 2026
2	S.Sahu, Sonal, D. Ghosh, D.K.Mohanta, S.Dutta	Operation Reliability and Non-Deterministic Resilience Estimation of Active Distribution Network Incorporating Effect of Real-Time Dynamic Hosting Capacity	<i>Sustainable Energy, Grids and Networks (Elsevier)</i>	5.4	40, 101541	Dec, 2024
3	Sonal, D.Ghosh	Impact of Situational Awareness Attributes for Resilience Assessment of Active Distribution Networks Using Hybrid Dynamic Bayesian Multi Criteria Decision-making Approach	<i>Reliability Engineering & System Safety (Elsevier)</i>	11	228, 108772	2022
4	Sonal, D.Ghosh	Hybrid Data-driven Resilience Assessment and Enhancement of Distribution System for Cyclone Susceptible Zones	<i>Scientific Reports (Nature)</i>	4.8	12, 9492	2022
5	Sonal, D.Ghosh	Novel Trends in Resilience Assessment of a Distribution System using Synchrophasor Application: A Literature Review	<i>International Transaction on Electrical Energy Systems (Wiley)</i>	2.0	31, e12934	2021

6. Details of patents.

The details of **Patents** are as mentioned below:

[P01] [Appl. No. 202231065637] [Grant No. 553458] (Country: India) "Method for Assessment of Hosting Capacity and Voltage Stability for Renewable Energy Integrated EV Charging Station", Assignees: D. Ghosh, S.K. Sahu, Sonal.

[P02] [Appl. No. 446163001] (Country: India) "Design for Renewable Energy Integrated System Components", Assignees: D. Ghosh, Divyangini Gyani, T. Ghose, Sonal, S. Bhattacharjee, and T. Das.

[P03] [Appl. No. 202531049140] (Country: India) "A System for Managing A Software Development Lifecycle (SDLC), and Method Thereof", Assignees: Sonal, Debomita Ghosh.

[P04] [Appl. No. 451646-001] (Country: India) "Design for a Solar Photovoltaic Wind Energy System", Assignees: Niranjana Kumar, Sonal, Avani Kumar, Ayush Kumar Agarwal, Jayendra Kumar.

[P05] [Grant No. 202023105081] (Country: Germany) "System to Analyze Impact of Situational Awareness Attributes for Resilience Assessment of Active Distribution Networks", Assignees: Sonal, D. Ghosh.

[P06] [Grant No. 6323437] (Country: UK) "Solar Wireless Electric Vehicle Charging System", Assignees: Sonal, Nitish Kumar, Uttam Kumar, Aman Kumar.

[P07] [Grant No. 6329035] (Country: UK) "Smart Charger for Electric Vehicles", Assignees: Nitish Kumar, Uttam Kumar, Aman Kumar, Sonal, Priyanka Srivastava, Durgesh Kumar.

[P08] [Grant No. 202022103951] (Country: Germany) "A System for the Promotion and Management of Renewable Energies", Assignees: D. Ghosh, S.K. Sahu, Sonal.

[P09] [Grant No. 2642195] (Country: UK) "Drone", Nov 4, 2025, Assignees: Sonal, K. Jha, A. Anand, R. Kumar, K. Priya, A. Shaurya, S. Kumar, H. Priyambada, A. Kashyap.

7. Books/Reports/Chapters/General articles etc.

Book:

- i. M. Namdev, V. Sandeep Baste, **Sonal**, N. Dineshbabu, "*Internet of Things (IoT) and Its Application*", Scientific Publishing House, ISBN: 978-93-6674-489-6, 2024.

Book Chapters:

- ii. **Sonal**, Debomita Ghosh, Dushmanta Kumar Mohanta, "*Resilience Trapezoid based Operational Reliability of Distribution System*", Advances in Smart Grid Automation and Industry 4.0. Lecture Notes in Electrical Engineering, vol 693, pp 639- 647, Springer, Singapore. Editors: Reddy, M.J.B., Mohanta, D.K., Kumar, D., Ghosh, D. (eds). April 2021. DOI: https://doi.org/10.1007/978-981-15-7675-1_64
- iii. **Sonal**, Debomita Ghosh, "*Fuzzy Logic based Planning and Operation of a Resilient Microgrid*", Applications of Fuzzy Logic in Planning and Operation of Smart Grids, pp 23- 65, Editor: Rahmani-Andebili, Springer, May 2021. DOI: https://doi.org/10.1007/978-3-030-64627-1_2
- iv. Shruti Prajapati, **Sonal**, Sourav Kumar Sahu, Debomita Ghosh, "*Network Reconfiguration based Outage Management for Reliability Enhancement of Microgrid: A Hardware in Loop Approach*" Internet of Energy – A Pragmatic Approach to Sustainable Development, Apple Academic Press, exclusive co-publishing with CRC Press, a Taylor & Francis Group, 1st Edition, Editors: Sheila Mahapatra, Mohan Krishna S., B. Chandra Sekhar, Saurav Raj, 2023. DOI: <https://doi.org/10.1201/9781003399827>
- v. Swarali Pujari, **Sonal**, Sourav Kr. Sahu, Debomita Ghosh, Debasmita Mondal, "*Enabling Network Protection Using Switching based Availability Analysis of IEC 61850*" In: Panda, G., Alhelou, H.H., Thakur, R. (eds) Sustainable Energy and Technological Advancements. ISSETA 2023. Advances in Sustainability Science and Technology. Springer, 2023. DOI: https://doi.org/10.1007/978-981-99-4175-9_49

International Conference:

- i. Sonal, Sourav Sahu, Debomita Ghosh, Dushmanta Kumar Mohanta, "Reliability Analysis of a Distribution Network in Two State Weather Condition" *International Conference on Computer, Electrical &*

Communication Engineering, Jan. 18-19, 2019, Kolkata, India, IEEE. DOI: [10.1109/ICCECE44727.2019.9001871](https://doi.org/10.1109/ICCECE44727.2019.9001871)

- ii. **Sonal**, Debomita Ghosh, “Impact of Distributed Generation on the Reliability Allocation of Distribution System : A mesh-Grid Approach”, *International conference on Emerging Frontiers in electrical and electronic Technologies*, Jul. 10-11, 2020, Patna, India, IEEE DOI: [10.1109/ICEFEET49149.2020.9187019](https://doi.org/10.1109/ICEFEET49149.2020.9187019)
- iii. **Sonal**, Debomita Ghosh, “Resilience Assessment of Microgrid Using Complex Network Theory”, *1st International Conference on Power Electronics and Energy (ICPEE)*, 2-3 January, 2021, Bhuwaneshwar, India, IEEE. DOI: [10.1109/ICPEE50452.2021.9358577](https://doi.org/10.1109/ICPEE50452.2021.9358577)
- iv. Divyangini Gyani, **Sonal**, Sourav Kumar Sahu, Debomita Ghosh, Pankaj Mishra and Deep Shekhar Acharya, “Data-Driven Apprehension of Cyber and Physical Anomalies in Distribution System”, *2nd International Symposium on Sustainable Energy, Signal Processing and Cyber Security (ISSSC)*, December 15-17, 2022, Odisha, India, IEEE DOI: [10.1109/iSSSC56467.2022.10051628](https://doi.org/10.1109/iSSSC56467.2022.10051628)
- v. **Sonal**, Debomita Ghosh, “Resilience Analysis of Mesh-Grid Integrated Distribution Network using Bayes’ Theorem” , *5th International Conference on Power, Control & Embedded Systems (ICPCES)*, Prayagraj, India, January 06 – 08, 2023, Allahabad, India, IEEE. DOI: [10.1109/ICPCES57104.2023.10076022](https://doi.org/10.1109/ICPCES57104.2023.10076022)
- vi. Swarali Pujari, Divyangini Gyani, **Sonal**, Sourav Kumar Sahu, Debomita Ghosh, “ A Controller Hardware-in-the-Loop based Approach for Testing Distribution System Protection”, *International Conference on Emerging Frontiers in Electrical and Electronics Technologies, (ICEFEET)*, December 21-22, 2023, Patna, India, IEEE.
- vii. Divyangini Gyani, Debomita Ghosh, **Sonal**, and T. Ghose, “Enhancing Soil Moisture Forecasting with Ensemble Learning: An Approach Towards Sustainable Agriculture” International Conference on Intelligent Computing and Sustainable Innovation in Technology, (IC-SIT-2024), November 21-23, 2024, Odisha, India, IEEE. DOI: [10.1109/IC-SIT63503.2024.10862487](https://doi.org/10.1109/IC-SIT63503.2024.10862487).
- viii. Divyangini Gyani, Debomita Ghosh, **Sonal**, and T. Ghose, “IoT-Enabled Monitoring and Forecasting for Adaptive Irrigation System using CatBoost Algorithm”, International Conference on Electrical, Electronics, and Computing Technologies (ICEECT-2024), August 29-31, 2024, Noida, India, IEEE. DOI: [10.1109/ICEECT61758.2024.10738976](https://doi.org/10.1109/ICEECT61758.2024.10738976).
- ix. Swarali, **Sonal**, Sourav Kumar Sahu, Debomita Ghosh, Debasmita Mondal, “Enabling Network Protection Using Switching-Based Availability Analysis of IEC 61850”, International Symposium on Sustainable Energy and Technological Advancements, Springer, Feb 24-25, NIT Meghalaya, India. DOI: [10.1007/978-981-99-4175-9_49](https://doi.org/10.1007/978-981-99-4175-9_49).
- x. **Sonal**, Aman Anand, Ankan Sarkar, Kumar Ayush, “AI-Driven Optimization of Photovoltaic Efficiency in Urban Buildings by Assessing the Impact of Soiling and Shading”, 1st International Conference on Energy, Environment, and Green Technology (ICEEGT 2025), Apr 3-4, NITTTR Kolkata, India. [Presented]
- xi. Ankan Sarkar, Aman Anand, Kumar Ayush, **Sonal** “Data-Driven Short-Term Solar Power Prediction Using Artificial Neural Networks”, 1st International Conference on Energy, Environment, and Green Technology (ICEEGT 2025), Apr 3-4, NITTTR Kolkata, India. [Presented]
- xii. **Sonal**, Nilesh Kumar Rajalwal, D. Ghosh, “AI-Enhanced Framework for Predicting Shading and Soiling Impacts in Photovoltaic Systems”, IEEE North-East India Internal Energy Conversion Conference and Exhibition (NE-IECCE 2025), July 4-6, NIT Silchar, Assam, India.
- xiii. Nilesh Kumar Rajalwal, **Sonal**, D. Ghosh, “Machine Learning-Baed Backup Protection for Wind Farm Integrated Transmission System”, IEEE North-East India Internal Energy Conversion Conference and Exhibition (NE-IECCE 2025), July 4-6, NIT Silchar, Assam, India.
- xiv. Gyan Prakash Kashyap, Arti Rani, Manisha Prasad Singh, **Sonal**, Anant Milan Khalkho, “Assessment of Seasonal Variability for Resilience and Reliability Analysis of Grid Integrated Photovoltaic Systems for Energy Management”, IEEE North-East India Internal Energy Conversion Conference and Exhibition (NE-IECCE 2025), July 4-6, NIT Silchar, Assam, India.

- xiv. Yash Vardhan, **Sonal**, Aman Anand, Keshav Kha, “AI Enhanced Smart Collar for Military Working Dogs with Deep Learning Based ECG Classification and Real-Time Health Monitoring”, IEEE 1st International Conference on Smart Innovations in Systems, Infrastructure, Mechanical, Power, AI and Computing Technologies (SISIMPACT), Nov 28-29, 2025, SisTec RATIBAD, India.

National Conference:

- i. Sonal, Rajesh Kumar, Nishant Rishav, “Sustainable Open Cast Mining: AI Applications for Environmental Impact Mitigation and Resource Conservation”, 6th International Conference on Opencast Mining Technology & Sustainability (ICOMS-2023), Northern Coalfields Ltd., Singrauli, India, Dec 22-23, 2023.
- ii. Sonal, Rajesh Kumar, Nishant Rishav, “Utilizing AI for Mitigating Environmental Impact and Conserving Resources”, National Conference on Green Mining Initiatives Indian Mineral Industry Perspective (GMI-IMP 2024), Nagpur, India, Jan 13-14, 2024.

8. Projects Sanctioned

“Technical feasibility analysis of dust and soiling impact on generation efficiency of floating photovoltaic system in opencast mining operations” – Govt. of Jharkhand (JCSTI) INR **₹3, 20,000** (PI) [Ongoing]

9. Reviewer Details

S.no	Name	Reviewer	National/International
1	International Conference on Energy, Environment, and Green Technology (ICEEGT 2025), organized by the Department of Electrical Engineering, NITTTR Kolkata, India, held from 3rd-4th April, 2025	Certificate of Appreciation for serving as a Reviewer	International
2	Scientific Reports (Nature)	Reviewer of the journal Scientific Reports (Nature)	International

10. Project Experience Summary

Project	CIBC (Canadian Imperial Bank of Commerce)
Role	Systems Engineer
Technical Skills	- TCS Master-craft ALM 2.0 - Selenium IDE 2.8.0 - HP Unified Functional Testing 11.5
Tools	- HP Load Runner 12.0 - Eclipse-Galileo - Parasoft SOA 9.0 (Trained)
Technologies	- C Language - Basics of: Core Java, HTML, JavaScript, SQL

Sonal

Dr. Sonal
11.02.2026