

AMANDEEP SINGH I. MAKHIJA, Ph.D.

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 Google Scholar: <https://scholar.google.com/citations?user=M-XAFsAAAAAJ&hl=en>

Ph.D. in Electrical Engineering with 10+ years of combined academic and industrial experience in solar photovoltaic systems. Research expertise includes water-mounted solar PV systems, performance degradation assessment, yield modelling, techno-economic analysis, and optimization of PV installations. Currently serving as a Lecturer in Electrical Engineering with the Government of Gujarat.

ACADEMIC EXPERIENCE (9+ Years)

LECTURER IN ELECTRICAL ENGINEERING

Government Polytechnic Colleges under GTU | Gujarat Government (GES Class II Gazetted Officer)

 Government Polytechnic College, Himatnagar, Gujarat | **February 2022 – Present**

 Government Polytechnic College, Kheda, Gujarat | **October 2016 – February 2022**

- Deliver instruction in core Electrical Engineering subjects, including Electrical Machines, Power Systems, Switchgear and Protection, Digital Electronics, AC Circuits, and Renewable Energy.
- Develop course materials, laboratory exercises, and assessment methodologies to enhance student learning outcomes.
- Mentor and supervise diploma engineering students in academic projects and technical activities.
- Conduct research on solar photovoltaic systems, with emphasis on water-mounted solar PV systems, performance analysis, degradation assessment, and techno-economic evaluation.
- Serve as the **Departmental NBA Coordinator** and actively contribute to outcome-based education (OBE) implementation, accreditation documentation, and continuous quality improvement initiatives.
- Hold key responsibilities in departmental and institutional committees, contributing to academic planning, curriculum implementation, examination coordination, student development, and institutional governance.

INDUSTRIAL EXPERIENCE (1+ Year)

DESIGN & ENGINEERING (MET)

Azure Power Pvt. Ltd., New Delhi | **June 2015 – September 2016**

- Solar resource assessment, energy yield estimation, and generation forecasting for utility-scale and rooftop PV projects.
- Rooftop solar PV system design, including AC/DC sizing, equipment selection, and bill of materials preparation.
- Technical evaluation of PV technologies and support for competitive bidding activities.
- Review and validation of electrical designs, system layouts, and engineering drawings. Feasibility assessment and performance modelling for solar PV projects.

Notable Projects: Participated in the design, performance assessment, and engineering validation of solar PV projects, including major projects such as PEDDA (10 MW), DMRC (6.5 MW), JCBL (1 MW), IPGCL (1 MW), Oberoi & Trident Hotels (841 kW), DLF Chandigarh (450 kW), and DLF Gurgaon (334 kW).

EDUCATION

Ph.D. in Electrical Engineering

Gujarat Technological University (GTU), Ahmedabad, India

Research Focus: *Performance Investigation, Parameter Optimization, and Anomaly Quantification of Water-Mounted Solar PV Systems*

Enrolled: 2020 | **Ph.D. Notification Issued:** May 2026

M.Tech. in Energy Systems and Technology (Focused on Solar Energy)

Pandit Deendayal Petroleum University, Gandhinagar, India

CPI: 8.60/10 | **Gold Medalist** | 2013-2015

B.Tech. in Electrical Engineering

Charotar University of Science and Technology (CHARUSAT), India

CPI: 7.04/10 | 2009-2013

RESEARCH HIGHLIGHTS & KEY CONTRIBUTIONS

Solar Resource Modelling

- Developed an empirical anisotropic solar radiation model tailored to Indian climatic conditions using sunshine duration as the primary meteorological input, significantly improving tilted irradiance estimation for solar PV performance prediction.

PV Performance Simulation & Optimization

- Conducted a comprehensive validation of commercial PV simulation tools (PVsyst, SAM, Helioscope, and PV*SOL) for water-mounted solar PV systems using field-monitored data, identifying modelling limitations and improving prediction reliability.
- Developed a unified Response Surface Methodology (RSM)-based optimization framework for canal-top and floating solar PV systems to optimize critical design parameters and enhance energy yield while improving techno-economic performance.

Reliability, Degradation & Diagnostics

- Performed a decade-long in-situ performance and degradation assessment of the world's pilot canal-top solar PV system, providing insights into long-term operational reliability under real environmental conditions.
- Investigated degradation mechanisms and failure modes in operational water-mounted solar PV systems using advanced diagnostic techniques, including infrared thermography, electroluminescence, and ultraviolet fluorescence imaging.

Research Impact

- Established an integrated research framework combining solar resource modelling, simulation validation, design optimization, long-term performance evaluation, and advanced diagnostics to improve the design, reliability, and large-scale deployment of water-mounted solar photovoltaic systems.
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RESEARCH AND SCHOLARLY CONTRIBUTIONS

PUBLICATIONS

- **First author of 8 peer-reviewed international publications** in the fields of solar photovoltaic systems, floating/water-mounted PV systems, solar radiation modelling, performance degradation analysis, and techno-economic assessment.
- Published research in leading **SCI-indexed (WoS/Scopus)** international journals, including *Progress in Energy*, *Renewable Energy*, *Energy Conversion and Management*, *Energy for Sustainable Development*, and *International Journal of Emerging Electric Power Systems*, with additional research presented at IEEE international conferences.
- Research contributions focus on floating and canal-top solar PV systems, PV performance modelling, degradation and reliability assessment, solar resource modelling, and optimization of photovoltaic systems.

Google Scholar Profile (Complete Publication List): <https://scholar.google.com/citations?user=M-XAFsAAAAAJ&hl=en>

PEER REVIEW ACTIVITIES

- Reviewer for **13+ manuscripts** in leading international SCI-indexed journals covering renewable energy, solar photovoltaic systems, and electrical engineering.
- Contributed peer reviews for journals published by **Springer Nature, Elsevier, Wiley, and IOP Publishing**, including *Electrical Engineering*, *Energy Conversion and Management: X*, *Energy Science & Engineering*, *Energy for Sustainable Development*, *Progress in Energy*, *Energy Research Express*, and other international journals.

RESEARCH GRANTS & FUNDING

Principal Investigator, STEM Research Promotion Scheme, Commissionerate of Technical Education, Government of Gujarat (**₹2.0 lakh**), *Accelerated Degradation Testing of Solar PV Technologies for Water Body Installation* (2024).

RESEARCH INTERESTS

- Water-Mounted and Floating Solar PV Systems
 - Performance Degradation, Reliability, and Anomaly Assessment of PV Systems
 - Solar Resource Assessment and Energy Yield Modelling
 - Techno-Economic Analysis of Solar PV Power Plants
 - Optimization of Solar PV System Design and Performance
 - Renewable Energy Integration and Sustainable Energy Systems
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TECHNICAL SKILLS

- **Solar PV Software:** PVsyst, HOMER, SolarGIS Prospect, SAM, PVsol, SketchUp.
 - **Engineering and Simulation:** MATLAB, PSIM, AutoCAD.
 - **Data Analysis:** Origin, Microsoft Excel.
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AWARDS & ACHIEVEMENTS

- **Gold Medalist** in M.Tech. (Energy Systems and Technology – Solar Energy), Pandit Deendayal Petroleum University (2015).

- Recipient of the **Best Paper Award** at the IEEE-STETCOM 2025 International Conference, Pandit Deendayal Energy University.
- Developed an advanced solar tilt and generation simulation framework for project-level CUF estimation and IRR benchmarking, exceeding conventional PVsyst-based approaches. The work received **Runner-Up recognition** and a cash reward in the Innovative Idea category at Azure Power Ltd.

ACADEMIC TRAINING & PROFESSIONAL DEVELOPMENT

Successfully completed **20+ Faculty Development Programmes (FDPs), Short-Term Training Programmes (STTPs), NPTEL certification courses, and workshops** between 2017 and 2026 in the areas of Solar PV Systems, Renewable Energy, Artificial Intelligence, Research Methodology, Engineering Education, Intellectual Property Rights, and Sustainable Development. Several NPTEL certifications were completed, earning **top 1% and Top 5% national rankings**, demonstrating a strong commitment to continuous learning and academic excellence.

Year	Programme / Course	Organizer	Duration & Mode	Achievement
2026	Machine Learning for Engineering and Science Applications	NPTEL – IIT Madras	12 Weeks (Online)	93% (Top 1%)
2026	Artificial Intelligence Applications in Power & Energy	L.D. College of Engineering, Ahmedabad	1 Week (Offline)	Completed
2026	Exploring Research Opportunities and Impactful Research	L.D. College of Engineering, Ahmedabad	1 Week (Offline)	Completed
2025	Education for Sustainable Development	NPTEL – IIT Roorkee	12 Weeks (Online)	100% (Top 1%)
2025	Empowering Educators with AI: Tools and Techniques	DTE & Government Polytechnic, Ahmedabad	1 Week (Offline)	Completed
2025	Empowering Educators through Research and Incubation Excellence and NEP Insights	i-Hub, Ahmedabad	1 Week (Offline)	Completed
2023	Non-Conventional Energy Sources	NPTEL – IIT Madras	12 Weeks (Online)	79% (Top 5%)
2023	Solar PV Installers	GPERI, Mehsana	1 Week (Offline)	Completed
2022	Solar Photovoltaics: Principles, Technologies & Materials	NPTEL – IIT Kanpur	8 Weeks (Online)	92% (Top 1%)
2022	Research Methodology and Data Analytics	NITTTR Bhopal	1 Week (Offline)	Completed
2022	Renewable Sources of Energy	NITTTR Bhopal	1 Week (Offline)	Completed
2021	Solar Photovoltaics: Fundamentals, Technology and Applications	NPTEL – IIT Roorkee	8 Weeks (Online)	84% (Top 1%)
2021	Academic and Research Report Writing	NPTEL – NITTTR Chennai	8 Weeks (Online)	83%
2020	Introduction to Research	NPTEL – IIT Madras	8 Weeks (Online)	83% (Top 5%)
2020	Comprehensive Online Intellectual Property Rights (IPR)	i-Hub, Ahmedabad	12 Weeks (Online)	Completed
2020	Nurturing Innovation and Startup Ecosystem (NISE)	i-Hub, Ahmedabad	8 Weeks (Online)	Completed
2019	Pedagogy and Effective Use of ICT in Engineering Education and Academic Governance	NITTTR Bhopal	1 Week (Offline)	Completed
2019	NBA Accreditation	NITTTR Bhopal	1 Week (Offline)	Completed

2019	Entrepreneurship Development Programme on Solar Energy	Indo German Tool Room	2 Days (Offline)	Completed
2018	Induction Programme (Phase II)	NITTTR Bhopal	2 Weeks (Offline)	Completed
2017	Induction Training Programme (Phase I)	NITTTR Bhopal	2 Weeks (Offline)	Completed

CONFERENCES, TECHNICAL PRESENTATIONS & INVITED LECTURES

- Presented the research paper "*Land-neutral Power: National-scale Assessment and Techno-economic Analysis of Canal-top and Floating Solar PV Systems in India*" at the International Conference on "**Design Identities: Intersections of Art, Architecture, Culture, Religion, Science and Technology & Society**", held from 25–27 February 2026.
- Presented the research paper "*Optimizing Critical Parameters Influencing Floating Solar PV System Performance Using Response Surface Methodology*" at the **2025 International Conference on Sustainable Energy Technologies and Computational Intelligence (SETCOM 2025)**, Pandit Deendayal Energy University, Gandhinagar, India, where the paper received the **Best Paper Award**.
- Presented the research paper "*Optimum Design and Analysis for Ascending Elevated Structure for Solar Photovoltaic Rooftop System*" at the **2020 IEEE International Conference for Innovation in Technology (INOCON 2020)**.

INVITED EXPERT LECTURES

Delivered expert lectures at the **Centre of Continuing Education (CCE), Gujarat Technological University**, and **SCET College of Engineering, Surat** on advanced topics in solar photovoltaic systems. Representative lecture topics:

- AutoCAD, SketchUp, and shadow analysis for solar PV design.
- Rooftop solar PV system design from basic to advanced level.
- Design and simulation of rooftop solar PV systems using industry-standard software.

REFERENCES

Prof. Shabbir S. Bohra

Professor, Department of Electrical Engineering, Gujarat Technological University, Ahmedabad, India

Relationship: Ph.D. Supervisor

Email: shabbir.bohra@scet.ac.in

Prof. Indrajit Mukhopadhyay

Former Head, School of Solar Energy, Pandit Deendayal Energy University, Gandhinagar, India

Relationship: M.Tech. Mentor

Email: Indrajit.M@sse.pdpu.ac.in

Prof. Priti Parikh

Principal, Government Polytechnic, Himatnagar, Gujarat, India

Relationship: Head of Institution

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