Mohammed Ali Khan
Assistant Professor
Institute of Mechanical and Electrical Engineering
Centre for Industrial Electronics
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Qualifications

Power Electronics , Ph.D., Power Management of Single-Phase Grid-Connected Inverter, Jamia Millia Islamia
Award Date: 26. Mar 2021

Power System, Masters of Technology, Energy Efficient Building Inculcating Solar and Grid Integration, Amity University
Apr 2014 → Aug 2014
Award Date: 1. Apr 2016

Electrical and Electronics Engineering , Bachelor of Technology, Assisting System for Visually Impaired, Karunya Institute of Technology and Sciences Coimbatore Tamil Nadu
Jul 2009 → Apr 2013
Award Date: 26. Apr 2013

Reliability of Power Electronics Converters, Guest Ph.D., Resiliency and reliability of a renewable-based power electronics-based power system, Aalborg University
Oct 2020 → Dec 2020

Teaching portfolio

Teaching Philosophy:

The overall aim of my teaching in the context of Project-based Learning (PBL) is to develop students into independent, critical thinkers and problem-solvers who can apply foundational knowledge to explore, question, and create within real world engineering contexts. Beyond imparting technical skills in FPGA and digital design, I strive to cultivate a research mindset that integrates hypothesis testing, iterative design, and engagement with current tools and trends. This approach prepares students to act confidently and responsibly in complex, uncertain environments, much like practicing researchers. I implement PBL in my course by embedding inquiry, experimentation, and reflection into both theoretical lessons and lab work, with a clear future-oriented focus. Students design and test digital systems using Vivado, mirroring real-world research and development workflows. I emphasize the vital role FPGAs play in emerging technologies, especially AI and high-performance data processing. Assignments and projects encourage critical thinking and adaptability, equipping students to contribute to rapidly evolving fields where FPGAs enable intelligent and efficient systems. Practicing PBL makes strong sense in this context because it aligns with key learning outcomes that prioritize problem solving and adaptability, such skills are essential for mastering dynamic technologies like AI-integrated FPGA design. Rather than rote memorization, students actively engage with concepts and tools. This approach also aligns with the university's focus on applied, student-centered learning. To further improve PBL, expanding access to FPGA hardware, current research papers, and industry case studies would deepen inquiry and relevance. Additionally, involving research active faculty as mentors can strengthen the connection between teaching and real-world innovation.

Teaching Approach:

1. Direct Engagement with the Instructor: Direct engagement with me allows students to clarify coding concepts, resolve issues in HDL syntax or logic, and strengthen their understanding of FPGA workflows. I encourage students to approach me during labs and discussions so misconceptions can be corrected immediately, ensuring a strong foundation in both theory and coding practice.
2. Self-Reflection and Personal Inquiry: Through individual coding assignments and self-assessment tasks, students reflect on their progress in writing, simulating, and debugging HDL designs. This process promotes critical evaluation of their solutions, encouraging them to identify errors, test alternatives, and develop independent coding skills essential for real-world FPGA applications.
3. Peer Collaboration and Shared Insights: Collaborative lab work and coding exercises enable students to share approaches for implementing circuits such as adders, counters, or memory blocks. By learning from peers' strategies and reviewing one another's code, students strengthen their understanding of digital design while enhancing teamwork and problem-solving skills.
4. Collective Classroom Dialogue: I foster collective dialogue through group code reviews, project presentations, and problem-solving sessions. Students present their HDL solutions, discuss simulation outcomes, and provide constructive feedback. This shared dialogue builds confidence, reinforces best practices, and nurtures a collaborative learning culture.

Teaching Format:

I primarily use face-to-face teaching combined with lab-based coding sessions. This allows me to address students' coding challenges in real time, observe their debugging process, and guide them through the iterative design cycle. Hands-on lab interaction ensures an active and collaborative environment.

Comprehensive Teaching Framework:

My teaching emphasizes practical coding and inquiry-based learning. Structured questioning links theoretical concepts with practical HDL implementation, while guided lab exercises and group projects encourage experimentation. Regular formative assessments, including coding assignments, simulations, and mini projects, provide timely feedback and highlight areas for improvement. This framework helps students refine not only their technical coding skills but also their ability to analyze, adapt, and innovate.

Teaching Material:

I develop clear and structured teaching materials, including coding templates, simulation files, step-by-step lab manuals, and digital resources aligned with course outcomes. Materials are frequently updated to reflect student feedback, advances in FPGA technology, and pedagogical best practices, ensuring they remain effective and relevant.

Employment

Assistant Professor
Institute of Mechanical and Electrical Engineering

1. Feb 2025 → 31. Jan 2028

Assistant Professor
Centre for Industrial Electronics

Sønderborg
1. Feb 2025 → 31. Jan 2028

Executive Committee (Communication Lead)
CIGRE Denmark Next Generation Network (NGN)
Denmark
1. Nov 2024 → present

Postdoctoral Researcher
University of Technology, Brno
Brno , Czech Republic
1. Dec 2021 → 31. Jan 2023

Guest Faculty
Jamia Millia Islamia
New Delhi, India
1. Aug 2017 → 15. Jan 2020

Research outputs

Multiphysics modeling of electrolyzers under dynamic converter operation
Khan, M. A., Nielsen, M. R., Golsorkhi, M. S., Ebel, T. & Munk-Nielsen, S., 17. Sept 2025, In: International Journal of Hydrogen Energy. 176, 12 p., 151478.

Optimal Power Converter Design with ML-Based Component Selection
Khan, M. A., Maheshwari, R., Paasch, K. M. & Ebel, T., Sept 2025, *2025 Energy Conversion Congress & Expo Europe (ECCE Europe).* IEEE, 6 p.

Fault Localization and Severity Estimation in Power Systems
Khan, M. A., Bayati, N. & Ebel, T., May 2025, *2025 IEEE Energy Conversion Congress & Exposition Asia (ECCE-Asia).* IEEE, 6 p.

Intelligent Inductor characterization for Power Converters
Khan, M. A., Maheshwari, R., Paasch, K. M. & Ebel, T., 2025, *11th IEEE International Conference on Power Electronics Drives and Energy Systems (PEDES).* IEEE, 6 p. (Proceedings - International Conference on Power Electronics, Drives, and Energy Systems for Industrial Growth, PEDES).

Modeling the Operational Dynamics of Alkaline Electrolyzer
Khan, M. A., Golsorkhi, M. S. & Ebel, T., Nov 2024, *2024 IEEE Design Methodologies Conference (DMC).* IEEE, 6 p.

Optimizing Resilience with Digital Twin in Three-Phase Grid-Connected Systems
Khan, M. A., Kurukuru, V. S. B., Bayati, N. & Ebel, T., 2024, *2024 IEEE Power and Energy Society General Meeting, PESGM 2024.* IEEE Computer Society, 5 p. (Proceedings - IEEE Power & Energy Society General Meeting).

Techno-economic analysis and predictive operation of a power-to-hydrogen for renewable microgrids
Khan, M. A., Bayati, N. & Ebel, T., 15. Dec 2023, In: Energy Conversion and Management. 298, 13 p., 117762.

Digital Twin Paradigm for Fault Ride Through in Grid-Integrated Distributed Generation
Khan, M. A., Kurukuru, V. S. B., Bayati, N. & Ebel, T., Oct 2023, *2023 8th IEEE Workshop on the Electronic Grid (eGRID).* IEEE, 8 p. (IEEE Workshop on the Electronic Grid (eGRID)).

Optimizing the performance of single-phase photovoltaic inverter using wavelet-fuzzy controller
Khan, M. A., Haque, A., Kurukuru, V. S. B. & Blaabjerg, F., Mar 2023, In: e-Prime - Advances in Electrical Engineering, Electronics and Energy. 3, 12 p., 100093.

Overview and impact of faults in grid-connected photovoltaic systems
Khan, M. A., 25. Nov 2022, *Fault Analysis and its Impact on Grid-connected Photovoltaic Systems Performance*. Haque, A. & Mekhilef, S. (eds.). Wiley, p. 1-42

Online Learning-based Islanding Detection Scheme for Grid-Connected Systems
Khan, M. A., Kurukuru, V. S. B. & Singh, R., 17. Oct 2022, *2022 24th European Conference on Power Electronics and Applications (EPE'22 ECCE Europe).* IEEE, 10 p.

Power Flow Management With Q-Learning for a Grid Integrated Photovoltaic and Energy Storage System
Khan, M. A., Haque, A. & Kurukuru, V. S. B., Oct 2022, In: IEEE Journal of Emerging and Selected Topics in Power Electronics. 10, 5, p. 5762-5772 11 p.

Intelligent Transition Control Approach for Different Operating Modes of Photovoltaic Inverter
Khan, M. A., Haque, A. & Kurukuru, V. S. B., Mar 2022, In: IEEE Transactions on Industry Applications. 58, 2, p. 2332-2340

Islanding detection techniques for grid-connected photovoltaic systems: a review
Khan, M. A., Haque, A., Kurukuru, V. S. B. & Saad, M., Feb 2022, In: Renewable and Sustainable Energy Reviews. 154, 21 p., 111854.

Islanding classification and low-voltage ride through for grid connected transformerless inverter
Khan, M. A., Kurukuru, V. S. B. & Haque, A., 2022, *Intelligent Circuits and Systems.* Singh, R. & Gehlot, A. (eds.). 1 ed. CRC Press, p. 27-33

Monitoring of Synchronization Failure for Power Electronics Converters
Khan, M. A. & Drapela, J., 2022, *2022 6th International Conference on System Reliability and Safety (ICSRS).* IEEE, p. 26-31

Dynamic Voltage Support for Low Voltage Ride Through Operation in Single-Phase Grid-Connected Photovoltaic Systems
Khan, M. A., Haque, A. & Kurukuru, V. S. B., Oct 2021, In: IEEE Transactions on Power Electronics. 36, 10, p. 12102-12111

Intelligent Transition Control between Grid-Connected and Standalone Modes of Three-Phase Grid-Integrated Distributed Generation Systems
Khan, M. A., Haque, A., Blaabjerg, F., Kurukuru, V. S. B. & Wang, H., Jul 2021, In: Energies. 14, 13, 21 p., 3979.

Islanding Classification Mechanism for Grid-Connected Photovoltaic Systems
Khan, M. A., Kurukuru, V. S. B., Haque, A. & Mekhilef, S., Apr 2021, In: IEEE Journal of Emerging and Selected Topics in Power Electronics. 9, 2, p. 1966-1975

Control strategy for grid-connected solar inverter for IEC standards
Khan, M. A. & Sangwongwanich, A., 1. Jan 2021, *Reliability of power electronics converters for solar photovoltaic applications.* Haque, A., Blaabjerg, F., Wang, H., Yang, Y. & Jaffery, Z. A. (eds.). Stevenage Herts, United Kingdo: Institution of Engineering and Technology, p. 141-188

From Physics to Data Oriented Cyber Attack Profile Emulation in Grid Connected PV Systems
Khan, M. A., Kurukuru, V. S. B., Sahoo, S. & Blaabjerg, F., 2021, *2021 IEEE 22nd Workshop on Control and Modelling of Power Electronics, COMPEL 2021.* IEEE, 8 p.

Power Management of Single Phase Grid Connected Inverter
Khan, M. A., 2021, Jamia Milia Islamia University. 175 p.

Single phase transformerless photovoltaic inverter for grid connected systems - an overview
Khan, M. A., Haque, A., Kurukuru, V. S. B. & Mekhilef, S., 2021, In: International Journal of Power Electronics. 13, 4, p. 434-480

Standalone operation of distributed generation systems with improved harmonic elimination scheme
Khan, M. A., Haque, A., Kurukuru, V. S. B., Wang, H. & Blaabjerg, F., 2021, In: IEEE Journal of Emerging and Selected Topics in Power Electronics. 9, 6, p. 6924-6934

Intelligent control of a novel transformerless inverter topology for photovoltaic applications
Khan, M. A., Haque, A. & Kurukuru, V. S. B., 1. Jun 2020, In: Electrical Engineering. 102, 2, p. 627-641

A present and future state-of-the-art development for energy- efficient buildings using PV systems
Khan, M. A., Mishra, S. & Haque, A., 2. Jan 2020, In: Intelligent Buildings International. 12, 1, p. 44-63

Performance assessment of stand-alone transformerless inverters
Khan, M. A., Haque, A. & Kurukuru, V. S. B., Jan 2020, In: International Transactions on Electrical Energy Systems. 30, 1 , e12156.

Advanced Control Strategy With Voltage Sag Classification for Single-Phase Grid-Connected Photovoltaic System
Khan, M. A., Haque, A. & Kurukuru, V. S. B., 2020, In: IEEE Journal of Emerging and Selected Topics in Industrial Electronics. 3, 2, p. 258 - 269

Reliability analysis of a solar inverter during reactive power injection
Khan, M. A., Haque, A. & Kurukuru, V. S. B., 2020, *9th IEEE International Conference on Power Electronics, Drives and Energy Systems, PEDES 2020.* IEEE, 6 p.

Droop based Low voltage ride through implementation for grid integrated photovoltaic system
Khan, M. A., Haque, A. & Bharath Kurukuru, V. S., Nov 2019, *2019 International Conference on Power Electronics, Control and Automation, ICPECA 2019 - Proceedings.* IEEE, 8975467

Machine Learning Based Islanding Detection for Grid Connected Photovoltaic System
Khan, M. A., Haque, A. & Bharath Kurukuru, V. S., Nov 2019, *2019 International Conference on Power Electronics, Control and Automation, ICPECA 2019 - Proceedings.* IEEE, 8975614

Enhancement of Fault ride through strategy for single-phase grid-connected photovoltaic systems
Khan, M. A., Haque, A. & Bharath Kurukuru, V. S., Sept 2019, *2019 IEEE Industry Applications Society Annual Meeting, IAS 2019.* IEEE, 8911895

An efficient islanding classification technique for single phase grid connected photovoltaic system
Khan, M. A., Haque, A. & Bharath Kurukuru, V. S., 15. May 2019, *2019 International Conference on Computer and Information Sciences, ICCIS 2019.* IEEE, 8716438

Control and stability analysis of H5 transformerless inverter topology
Khan, M. A., Haque, A. & Bharath Kurukuru, V. S., 26. Mar 2019, *2018 International Conference on Computing, Power and Communication Technologies, GUCON 2018.* IEEE, p. 310-315 8674915

Voltage-Balancing Control for Stand-Alone H5 Transformerless Inverters
Khan, M. A., Haque, A. & Kurukuru, V. S. B., 2019, *Applications of Computing, Automation and Wireless Systems in Electrical Engineering.* Tomar, A., Sood, Y. R. & Mishra, S. (eds.). p. 663-675 (Lecture Notes in Electrical Engineering, Vol. 553).

Simulation of lumped parameter building model for observing dynamics of energy efficient buildings
Khan, M. A., Mishra, S. & Kurukuru, V. S. B., 2. Oct 2018, *Proceedings - 2nd International Conference on Intelligent Circuits and Systems, ICICS 2018.* p. 378-381 8479603

Hybrid voltage control for stand alone transformerless inverter
Khan, M. A., Haque, A. & Kurukuru, V. S. B., Oct 2018, *2018 2nd IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2018.* p. 552-557 8897341

Grid connected energy efficient building with roof top SPV
Khan, M. A., Mishra, S. & Harish, V. S. K. V., 11. May 2018, *2017 Recent Developments in Control, Automation and Power Engineering, RDCAPE 2017.* p. 120-124

Intelligent control of fixed capacitor - thyristor controlled reactor for power quality improvement
Khan, M. A., Kurukuru, V. S. B., Mishra, S. & Singh, A. K., 28. Jun 2016, *7th IEEE India International Conference on Power Electronics, IICPE 2016.* 8079342

Intelligent pitch angle control for wind-doubly fed induction generator system
Khan, M. A., Kurukuru, V. S. B., Singh, R., Gupta, A. & Dehury, S. S., 28. Jun 2016, *2016 7th India International Conference on Power Electronics (IICPE).* 8079334

Activities

Renewables Reimagined with Intelligence
Khan, M. A. (Keynote speaker)
19. Sept 2025

ECCE Europe 2025
Khan, M. A. (Program chair)
2. Sept 2025

Lecturer Training Programme
Khan, M. A. (Participant)
Aug 2025 → Feb 2026

Pushing Boundaries in Power Conversion for Renewable Energy Systems
Bharath Kurukuru, V. S. (Speaker) & Khan, M. A. (Speaker)

31. Mar 2025

AI-Driven Optimization of Semiconductor Selection for Enhanced Reliability in Power Electronics Converters
Khan, M. A. (Speaker)
30. Jan 2025

AI for Power Electronics Applications
Khan, M. A. (Speaker)
9. Sept 2024

AI for Power System Security
Khan, M. A. (Speaker)
Aug 2024

Intelligent Energy Management
Khan, M. A. (Speaker)
Jun 2024

From AI to GenAI: Exploring Latest Innovation
Khan, M. A. (Speaker)
25. Mar 2024 → 26. Mar 2024

Discover Electronics (Journal)
Khan, M. A. (Peer reviewer)
2024

6th International Conference on System Reliability and Safety (ICSRS 2022) (Event)
Khan, M. A. (Member)
23. Nov 2022 → 25. Nov 2022

Artificial Intelligence Application in Power Electronic based Power Systems
Khan, M. A. (Speaker)
Feb 2022

2019 International Conference on Power Electronics, Control and Automation, ICPECA 2019 - Proceedings (Event)
Khan, M. A. (Member)
16. Nov 2019 → 17. Nov 2019

IEEE Access (Journal)
Khan, M. A. (Peer reviewer)
2018 → …

IEEE Journal of Emerging and Selected Topics in Power Electronics (Journal)
Khan, M. A. (Peer reviewer)
2018 → …

IEEE Transactions on Industrial Electronics (Journal)
Khan, M. A. (Peer reviewer)
2018 → …

IEEE Transactions on Industry Applications (Journal)
Khan, M. A. (Peer reviewer)
2018 → …

IEEE Transactions on Power Electronics (Journal)
Khan, M. A. (Peer reviewer)
2018 → …

IEEE (External organisation)
Khan, M. A. (Member)
2017 → …

Prizes

Best Project Award
Khan, M. A. (Recipient), 2013

Excellent Oral Presentation Winner
Khan, M. A. (Recipient), 25. Nov 2022

Otto Mønsteds Fond - Conference Participation Abroad
Khan, M. A. (Recipient), 24. Oct 2023

Otto Mønsteds Fond - Conference Participation Abroad
Khan, M. A. (Recipient), 2024

World's Top 2 % Scientists in Energy
Khan, M. A. (Recipient), 16. Sept 2024

World's Top 2 % Scientists in Energy
Khan, M. A. (Recipient), 17. Sept 2025

World's Top 2 % Scientists in Energy
Khan, M. A. (Recipient), 4. Oct 2023

Press/Media

Artificial intelligence and machine learning for power electronics
Khan, M. A.
09/11/2021
1 Media contribution

Solar inverter fault detection techniques at a glance
Khan, M. A.
14/04/2022
1 Media contribution

Projects

A Dynamic Energy Platform for Converter Validation across Fault Scenarios and Operational Lifecycles
Khan, M. A. (PI)
Thomas B. Thriges Fond
01/03/2026 → 31/08/2026

ComElCo: Competitive Electrolyzer Converters
Golsorkhi Esfahani, M. S. (In charge of work packages), Khan, M. A. (Project participant) & Ebel, T. (Organisational project manager)

01/06/2022 → 31/01/2025

Erhvervsfyrtårn Syd: Grøn Energi og Sektorkobling
Bayati, N. (In charge of work packages), Khan, M. A. (Project participant) & Ebel, T. (Organisational project manager)
01/08/2022 → 31/08/2023

IEA Wind Task 61 on VRE-Hydrogen Integration
Bayati, N. (Project participant), Ebel, T. (Project participant) & Khan, M. A. (Project participant)
01/07/2025 → 15/12/2028

PowerGridOptimiser
Shaker, H. R. (Co-PI), Bayati, N. (Project participant), Mirshekali, H. (Project participant), Shadi, M. R. (Project participant) & Khan, M. A. (Project participant)
01/04/2024 → 31/03/2027

Scalable Energy Platform for Green Energy Integration and Power System Control
Khan, M. A. (PI)
Fabrikant Mads Clausens Fond
01/07/2025 → 30/09/2025

Teaching and supervision

AI-Based PLC Programming Assistant for the Danfoss iC7

Popa, A.-A. & Khan, M. A.
01/09/2025 → 01/01/2026

Analytical Mechanics

Ebel, T., Greenbank, W. & Khan, M. A.
06/09/2023 → 23/11/2023

Analyzing and processing for a selected power system using MATLAB AI tools

Khan, M. A.
25/08/2025 → 26/09/2025

Automated Parameter Validation Framework for Actuators at Linak

Khan, M. A.
01/09/2025 → 01/01/2026

Autonomous Aerial Mapping and SLAM: A Drone-Based Approach for 3D Environmental Reconstruction

Chaudhuri, S. & Khan, M. A.
01/02/2025 → 18/06/2025

Design of Flexible Software Test Systems for Frequency Converters

Khan, M. A.
01/09/2025 → 01/01/2026

Development of an Embedded Data Acquisition System for Dual-Actuator Endurance Testing of Electric Linear Actuators

Khan, M. A. & Mahapatra, R. K.
01/09/2025 → 01/01/2026

Digital Design and Signal Processing

Christensen, I. & Khan, M. A.
01/02/2024 → 31/05/2024

Digital Design and Signal Processing

Khan, M. A.
01/02/2025 → …

Electronics Semester Project 4 (B. Eng)

Khan, M. A. & Bayati, N.
03/02/2025 → 31/05/2025

Electronics Semester Project 4 (B.Sc)

Khan, M. A. & Bayati, N.
03/02/2025 → 31/05/2025

Energy Management Scheme for Optimizing Multiple Smart Homes Equipped with Electric Vehicles

Bayati, N. & Khan, M. A.
01/09/2023 → 31/01/2024

Intelligent Design Approaches for an Isolated AC-DC Power Converter for Electrolyser application

Maheshwari, R. & Khan, M. A.
02/09/2024 → 31/07/2025

Mechatronics Semester Project 3 (B.Eng)

Paasch, K. M. & Khan, M. A.
01/09/2025 → …

Mechatronics Semester Project 3 (B.Sc)

Paasch, K. M. & Khan, M. A.
01/09/2025 → …

P2X Water Electrolysis System: Optimized Cell to Power Converter

Maheshwari, R., Khan, M. A. & Ebel, T.
13/01/2025 → 15/01/2025

Stereo-vision using ESP32 boards

Chaudhuri, S. & Khan, M. A.
01/08/2024 → 16/01/2025