

# ABDUL BASIT MIRZA

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## EDUCATION

### Doctor of Philosophy (Ph.D.) in Electrical Engineering

January 2020 – August 2024

**Stony Brook University, USA**

**University of Arkansas, USA (Transferred to Stony Brook University)**

**CGPA: 4.00/4.00**

- Advisor: Dr. Fang Luo, Empire Innovation Associate Professor
- Dissertation: Electro-Mechanical-Thermal Co-Design and Side Effect Mitigation for a 75 kVA SiC-Based Intelligent Grid-Interface Bidirectional Converter
- Research Area: System-level design and packaging of high-density and high-power converters; side effects (EMI/EMC, Partial Discharge, and high-frequency interactions) modeling and mitigation and non-invasive health monitoring of power converters.

### Master of Science (M.Sc.) in Electrical Engineering

September 2020 – December 2022

**Stony Brook University, USA**

**CGPA: 4.00/4.00**

- Advisor: Dr. Fang Luo, Empire Innovation Associate Professor
- Thesis: Design and Validation of a Grid-Integrable Medium-Voltage Hybrid DC Circuit Breaker

### Bachelor of Science (B.Sc.) in Electrical Engineering with Honours

October 2014 – September 2018

**University of Engineering and Technology, Lahore, Pakistan**

**CGPA: 3.88/4.00**

- Subjects include: Electromagnetic Theory, Power Electronics, Power Transmission & Distribution, Power System Analysis & Design, Power System Protection and Semiconductor Devices.

## WORK & RESEARCH EXPERIENCE

### Lead Engineer Power Electronics

August 2024 – Present

**Eaton Research Labs**

**Eaton Corporation, Menomonee Falls, WI, USA**

- Technical lead for hardware development and testing of ongoing projects sponsored by government and business units.
- Contribute to government proposal preparation.
- Contribute to the value proposition development for technical projects and programs.
- Assist in identification of leading external partnership and outside technologies.
- Contribute to IP generation through authoring or co-authoring disclosures and patents.
- Mentor junior staff and consult internal business and engineering customers.
- Participate in external open innovation events with universities and research institutions.

### Power Electronics Intern

May 2022 – August 2022

**GE Global Research, Niskayuna, NY, USA**

- **EMI Radiated Susceptibility Testing of SiC Gate Driver for Hybrid Electric Propulsion Aircraft**
  - Studied and analyzed gate driver mis-triggering under high di/dt and dv/dt due to radiated emissions.
  - Reviewed MIL-461 and DO-160 Radiated Susceptibility (RS) test standards to define H and E-fields susceptibility test levels for gate driver.
  - Investigated the effect of metallic shielding in increasing gate driver noise immunity against external H and E-fields.
  - Developed Design of Experiment (DoE) to perform RS testing of gate driver for WBG devices.

- **SiC-based 75 kVA Intelligent Grid-Interface Bidirectional Converter**
  - Led hardware development and testing of a 75 kVA SiC-based DC-DC-AC power converter.
  - Optimized PCB layouts for TO-247 1200 V SiC devices to maximize switching performance.
  - Designed a gapped EE-core based Integrated Magnetic Structure with decoupled Common Mode (CM) and Differential Mode (DM) inductances for a DC-DC interleaved boost converter.
  - Developed a 3-D converter-level packaging layout to achieve high power density (5.5 kW/L).
  - Designed an air-cooled three-faced utilized heat sink for thermal management.
  - Designed a FPGA and DSP based mixed-signal control card with high-speed communication link between DSP and FPGA and external fiber optic link with latency < 30 ns.
  - Coded discrete-time closed-loop control for the power converter in embedded C and Verilog.
  - Investigated switching performance of Two-Level Split-Phase (2L-SP) inverter.
  - Performed conducted EMI modeling of 2L-SP inverter and compared its performance with two-level inverter on a MIL-STD-461 standard-based test bench.
- **EMI Immune Gate Driver Design for High Speed GaN HEMT**
  - Developed EMI noise propagation path model for the gate drive circuitry.
  - Designed an EMC hardened gate driver to suppress mis-triggering due to high CM noise generated by high switching  $dv/dt$  of GaN HEMT.
  - Conducted Double Pulse Tests (DPTs) for a GaN power module without mis-triggering at 400 V/60 A (overshoot <10 %) with 185 V/ns turn-off and 180 V/ns turn-on  $dv/dt$ .
- **Broadband Electro-Magnetic Modeling and Testing for Reliable Power-Electronic-Based Energy Conversion System for Electric Aircrafts**
  - Developed a MIL-STD-461/DO-160G standard EMI test bench for analyzing impact of cable length on conducted EMI in WBG-based cable-connected motor drive systems.
  - Developed a 3.3 kV SiC-based bipolar square waveform generator for Partial Discharge (PD) testing.
  - Developed a 15 kV DC PD testing platform for cryogenic cables.
  - Investigated the influence of PWM output voltage characteristics (rise/fall time, duty cycle and frequency) of SiC-based motor drives on PD in motor winding insulation.
  - Implemented Ultra-High Frequency (UHF)-based Near-Field (H and E-field) PD detection.
- **Integration Methods for High-Density Integrated Electric Drives**
  - Investigated integration of TMR current sensors inside a double-sided cooled SiC power module.
  - Developed a slit-based PCB terminal for high bandwidth current-sensing.

- **Grid-Integrable Medium-Voltage Hybrid DC Circuit Breaker (HCB)**
  - Led design and development of a current injection-based HCB.
  - Designed a novel integrated E-Core magnetic structure with zero magnetic bias in normal operation.

- Sampling and material inspection on-site.
- Managed quality control and safety issues on-site, ensuring compliance with technical designs and drawings.

- Developed a cost model for induction-based Distribution and Power transformers.
- Conducted market research on Solid-State transformers.

- Conducted research on the use of SiC power devices to increase converter's power density and efficiency.
- Designed and developed a SiC-based Two-Input DC-DC Boost Converter, switching at 200 kHz.

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## **TEACHING EXPERIENCE**

### **Teaching Assistant**

#### **Department of Electrical and Computer Engineering**

#### **Stony Brook University, Stony Brook, NY, USA**

- **ESE 451 Power Electronics (Spring 2023, Fall 2023 and Spring 2024)**
  - Co-taught the class with Professor Fang Luo.
  - Developed and organized homework assignments.
  - Conducted sessions on using simulation tools, including LTspice and MATLAB Simulink.
- **ESE 559 EMI in Power Electronics Converters: Generation, Propagation and Mitigation (Spring 2023 and Spring 2024)**
  - Co-taught the class with Professor Fang Luo.
  - Conducted hardware sessions focusing on measurement and quantification of EMI emissions.
- **ESE 366/566 Hardware-Software Co-Design of Embedded Systems (Fall 2022)**
  - Conducted lab sessions for graduate students.
  - Graded homework and exams.
- **ESE 280 Embedded Microcontroller Systems Design I (Fall 2020)**
  - Conducted lab sessions for students.

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## **MENTORING EXPERIENCE**

### **Department of Electrical and Computer Engineering**

August 2021 – August 2024

#### **Stony Brook University, Stony Brook, NY, USA**

- **Graduate Students**
  - Austin Zhou, M.Sc. + Ph.D. Electrical Engineering (Fall 2021 – Summer 2024)
  - Abdul Muneeb, M.Sc. + Ph.D. Electrical Engineering (Fall 2021 – Summer 2024)
  - Masayuki Hijikata, M.Sc. + Ph.D Electrical Engineering (Fall 2022 – Summer 2024)
  - John Kaplun, M.Sc. Electrical Engineering (Fall 2021 – Fall 2022)
- **Undergraduate Students**
  - Ilan Messing, B.Sc. Electrical Engineering (Fall 2023 – Summer 2024)
  - Rachel Leong, B.Sc. Electrical Engineering (Fall 2023 – Summer 2024)
  - Daniel Szewczyk, B.Sc. Electrical Engineering (Fall 2021 – Spring 2022)

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## **HONORS / AWARDS**

- Best EMC Paper Finalist for the first authored paper, presented at IEEE EMC+SIPI 2023.
- Received Armstrong Memorial Research Foundation (AMRF) Award worth \$1000 for outstanding academic performance during graduate study.
- Received the William Portnoy prize paper award for the co-authored paper, presented at 2021 IEEE Energy Conversion Congress and Exposition (ECCE).
- Received Distinguished Travel Award (DTA) from Stony Brook University to attend and present paper at EPE 2022 ECCE Europe.

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## **TRAININGS**

- "Writing and Managing Federal Proposals" provided by Shipley Associates at Stony Brook University.

## PATENTS

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- Co-inventor for the provisional patent application “System and Method for Digital Twin-based Health and Fault Monitoring for Power Electronics Systems” (filed from Stony Brook University)
- Co-inventor for the provisional patent application “Integrated TMR-based Current Sensing Solution for Future High Power Density Power Electronics Systems” (filed from Stony Brook University)

## JOURNAL PUBLICATIONS

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- [J1] Y. Wu, K. Choksi, S. Defaz, **A. B. Mirza** and F. Luo, "Modeling and Optimization of Near-Field Coupling Between Power Loop and Gate Drive in High-Density Bidirectional Converters," in *IEEE Transactions on Electromagnetic Compatibility*. (In Review)
- [J2] **A. B. Mirza**, A. Castiblanco, A. Muneeb and F. Luo, "Impact of PCB Parasitic Capacitance on Switching Transients in Chopper and Half-Bridge Configurations Utilizing TO-247 SiC Devices," in *IEEE Transactions on Industry Applications*. (In Review)
- [J3] **A. B. Mirza**, K. Choksi, S. S. Vala, A. Anwar and F. Luo, "Investigation of Reflected Wave Phenomenon in SiC-based Two-Level Split-Phase Inverter-Fed Motor Drives," in *IEEE Transactions on Power Electronics*.
- [J4] K. Choksi, M. Hijikata, **A. B. Mirza**, A. Zhou, D. Singh and F. Luo, "Multi-Time-Scale Digital Twin for Health and Fault Monitoring of a Boost Converter," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*.
- [J5] M. R. Nielsen, S. Deng, **A. B. Mirza**, B. F. Kjærsgaard, A. B. Jørgensen, H. Zhao, Y. Li, S. M. Nielsen and F. Luo, "High-Power Electronic Applications Enabled by Medium Voltage Silicon-Carbide Technology: An Overview," in *IEEE Transactions on Power Electronics*, vol. 40, no. 1, pp. 987-1011, Jan. 2025.
- [J6] **A. B. Mirza**, S. S. Vala, K. Choksi and F. Luo, "Simplified Analytical Modeling of Reflected Wave Transients in Cable-Connected VSI-Based Motor Drives With Output Reactor," in *IEEE Transactions on Power Electronics*, vol. 39, no. 10, pp. 11986-11990, Oct. 2024.
- [J7] K. Choksi, M. Hijikata, Y. Wu, M. U. Hassan, D. Singh, **A. B. Mirza**, B. Li, X. Wu and F. Luo, "Investigation of Reflected Wave Phenomenon in WBG-Driven Aircraft Power System," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 12, no. 4, pp. 4259-4274, Aug. 2024.
- [J8] Y. Li, M. U. Hassan, **A. B. Mirza**, Y. Xie, S. Deng, S. S. Vala, F. Luo, X. Feng, S. Narumanchi and J. D. Flicker, "State-of-the-Art Medium- and High-Voltage Silicon Carbide Power Modules, Challenges and Mitigation Techniques: A Review," in *IEEE Transactions on Components, Packaging and Manufacturing Technology*.
- [J9] S. S. Vala, **A. B. Mirza** and F. Luo, "An Integrated TMR-based Current Sensing Solution for WBG Power Modules and Converters," in *IEEE Transactions on Components, Packaging and Manufacturing Technology*.
- [J10] **A. B. Mirza et al.**, " Converter-Level Packaging and Optimization for a SiC-based Grid-Interface Converter Using Discrete Devices," in *IEEE Transactions on Components, Packaging and Manufacturing Technology*.
- [J11] S. S. Vala, **A. B. Mirza**, A. I. Emon and F. Luo, "A Review of Partial Discharge in Stator Winding of Rotating Machines Fed by Voltage Source PWM Motor Drives," in *IEEE Transactions on Industry Applications*, vol. 60, no. 3, pp. 3790-3807, May-June 2024
- [J12] Y. Azadeh, K. Choksi, **A. B. Mirza**, X. Zhang, Y. Wu, F. Luo and K. S. Haran, "Cable and Motor Winding Impedance Interactions in Motor Drive Systems and Its Impact on HF Overvoltages," in *IEEE Transactions on Power Electronics*, vol. 39, no. 1, pp. 1244-1253, Jan. 2024.
- [J13] K. Choksi, **A. B. Mirza**, A. Zhou, D. Singh, M. Hijikata and F. Luo, "Self-Evolving Digital Twin-Based Online Health Monitoring of Multiphase Boost Converters," in *IEEE Transactions on Power Electronics*, vol. 38, no. 12, pp. 16100-16117, Dec. 2023.

- [J14] A. I. Emon, Y. Wu, Y. Li, **A. B. Mirza**, S. Deng and F. Luo, "A Double-Sided Cooled Split-Phase SiC Power Module With Fuzz Button Interposer," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 11, no. 5, pp. 4918-4928, Oct. 2023.
- [J15] A. I. Emon, M. U. Hassan, **A. B. Mirza**, B. Narayanasamy and F. Luo, "A Figure of Merit for SiC MOSFET Power Modules to Achieve High-Power-Density Energy Conversion," in *IEEE Transactions on Electron Devices*, vol. 70, no. 7, pp. 3718-3725, July 2023.
- [J16] **A. B. Mirza**, A. I. Emon, S. S. Vala and F. Luo, "An E-Core Based Integrated Coupled Inductor for Interleaved Boost Converter," in *IEEE Transactions on Industry Applications*, vol. 59, no. 4, pp. 4199-4214, July-Aug. 2023.
- [J17] **A. B. Mirza**, Y. Azadeh, H. Peng, Y. Li, J. Kaplun and F. Luo, "Design and Validation of a MVDC Isolated Active Voltage Injection Based HCB," in *IEEE Transactions on Industry Applications*, vol. 59, no. 3, pp. 2842-2855, May-June 2023.
- [J18] A. I. Emon, Mustafeez-ul-Hassan, **A. B. Mirza**, J. Kaplun, S. S. Vala and F. Luo, "A Review of High-Speed GaN Power Modules: State of the Art, Challenges, and Solutions," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 11, no. 3, pp. 2707-2729, June 2023.
- [J19] A. I. Emon, H. Carlton, J. Harris, A. Krone, Mustafeez-ul-Hassan, **A. B. Mirza**, M. Hossain, A. Rashid, Y. Chen, F. Luo, D. Huitink and A. Mantooth "Design and Optimization of Gate Driver Integrated Multichip 3-D GaN Power Module," in *IEEE Transactions on Transportation Electrification*, vol. 8, no. 4, pp. 4391-4407, Dec. 2022.
- [J20] A. I. Emon, Z. Yuan, **A. B. Mirza**, A. Deshpande, M. U. Hassan and F. Luo, "1200 V/650 V/160 A SiC+Si IGBT 3L Hybrid T-Type NPC Power Module With Enhanced EMI Shielding," in *IEEE Transactions on Power Electronics*, vol. 36, no. 12, pp. 13660-13673, Dec. 2021.

## CONFERENCE PROCEEDINGS

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- [C1] A. Muneeb, **A. B. Mirza**, M. U. Hassan, A. Anwar, A. Castiblanco and Fang Luo, "Parasitic Capacitances in High Step Ratio Planar Transformers for Dual Active Bridge Converters: Cause and Effect," *IECON 2024 – 50th Annual Conference of the IEEE Industrial Electronics Society*, Chicago, USA, 2024.
- [C2] A. Anwar, M. U. Hassan, **A. B. Mirza**, A. Muneeb and Fang Luo, "Design and Analysis of Differential Mode Active EMI Filter for WBG Devices-Based PFC Converters," *IECON 2024 – 50th Annual Conference of the IEEE Industrial Electronics Society*, Chicago, USA, 2024.
- [C3] S. S. Vala, **A. B. Mirza** and F. Luo, "A TMR-based Integrated Current Sensing Solution for WBG Power Modules," *2024 IEEE Applied Power Electronics Conference and Exposition (APEC)*, Long Beach, CA, USA, 2024, pp. 2398-2402.
- [C4] Y. Azadeh, **A. B. Mirza** and F. Luo, "Investigation of Cable Length Influence on EMI Spectrum in a WBG-Based Drive System," *2024 IEEE Applied Power Electronics Conference and Exposition (APEC)*, Long Beach, CA, USA, 2024, pp. 133-136.
- [C5] Y. Azadeh, **A. B. Mirza** and F. Luo, "Investigation of Motor Winding Overvoltages in Integrated WBG-Based Motor Drive Systems," *2024 IEEE Applied Power Electronics Conference and Exposition (APEC)*, Long Beach, CA, USA, 2024, pp. 148-152.
- [C6] **A. B. Mirza**, S. S. Vala, G. Bhansali, B. Narayanasamy and F. Luo, "Split Inductor Design Considerations for Split-Phase Three-Phase Inverter," *2023 IEEE Energy Conversion Congress and Exposition (ECCE)*, Nashville, TN, USA, 2023, pp. 1-6.
- [C7] **A. B. Mirza**, Y. Xie, S. S. Vala and F. Luo, "Impact of PCB Parasitic Capacitance on Switching Transients in Split-Phase Inverter Utilizing TO-247 SiC Devices," *2023 IEEE Energy Conversion Congress and Exposition (ECCE)*, Nashville, TN, USA, 2023, pp. 1-6.
- [C8] K. Choksi, S. S. Vala, **A. B. Mirza**, D. Singh and F. Luo, "Comprehensive Evaluation of Partial Discharge in WBG Drives Fed Motor Windings using DBSCAN Feature Extraction," *2023 IEEE Energy Conversion Congress and Exposition (ECCE)*, Nashville, TN, USA, 2023, pp. 1-7.

- [C9] D. Singh, A. Zhou, A. Muneeb, **A. B. Mirza** and F. Luo, "Modeling and Performance Enhancement of Grid Tied Tidal Energy System with Fractional Order Integral Based Incremental Conductance," *2023 IEEE Energy Conversion Congress and Exposition (ECCE)*, Nashville, TN, USA, 2023, pp. 1-7.
- [C10] **A. B. Mirza**, A. Muneeb, S. S. Vala and F. Luo, "Investigation of Common-Mode EMI in Three-Phase Split-Phase Inverter," *2023 IEEE Symposium on Electromagnetic Compatibility & Signal/Power Integrity (EMC+SIPI)*, Grand Rapids, MI, USA, 2023, pp. 522-528.
- [C11] Y. Azadeh, **A. B. Mirza**, K. Choksi, X. Zhang, F. Luo and K. S. Haran, "dV/dt Impact on Turn-to-Turn Overvoltage Distribution in Motor Windings," *2023 IEEE Symposium on Electromagnetic Compatibility & Signal/Power Integrity (EMC+SIPI)*, Grand Rapids, MI, USA, 2023, pp. 579-584.
- [C12] **A. B. Mirza et al.**, "Hardware Design and Implementation of a 75 kVA 3-D Integrated Intelligent Power Stage," *2023 IEEE Applied Power Electronics Conference and Exposition (APEC)*, Orlando, FL, USA, 2023, pp. 977-983.
- [C13] **A. B. Mirza**, X. Xu, A. I. Emon, F. Luo and S. Chen, "A Three-Face Utilized Heat Sink Design for 3-D Integrated 75 kVA Intelligent Power Stage (IPS)," *2022 International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK)*, 2022.
- [C14] X. Xu, **A. B. Mirza**, L. Gao, F. Luo and S. Chen, "Topology Optimization of Heat Sink for 3d Integrated Power Converters," *2022 International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK)*, 2022.
- [C15] Y. Azadeh, M. Ul-Hassan, **A. B. Mirza**, F. Luo, K. M. Radha and M. S. Chinthavali, "Demand Driven Energy Management for PIPO Auxiliary Power Supply Architecture," *2022 IEEE Energy Conversion Congress and Exposition (ECCE)*, Detroit, MI, USA, 2022, pp. 1-6.
- [C16] S. S. Vala, K. Choksi, **A. B. Mirza** and F. Luo, "Exploring Interactions Between Reflected Wave and Partial Discharge in WBG Motor Drives," *2022 IEEE Energy Conversion Congress and Exposition (ECCE)*, Detroit, MI, USA, 2022, pp. 1-5.
- [C17] **A. B. Mirza**, K. Choksi, S. S. Vala, K. M. Radha, M. S. Chinthavali and F. Luo, "Cognitive Insights into Metaheuristic Digital Twin based Health Monitoring of DC-DC Converters," *2022 24th European Conference on Power Electronics and Applications (EPE'22 ECCE Europe)*, Hanover, Germany, 2022, pp. 1-7.
- [C18] R. Paul, A. Faruque, A. Hassan, A. Mantooth, S. S. Vala, **A. B. Mirza** and F. Luo, "A Heterogeneously Integrated Double-Sided Cooling Silicon Carbide Power Module," *2022 20th IEEE Interregional NEWCAS Conference (NEWCAS)*, Quebec City, QC, Canada, 2022, pp. 475-479.
- [C19] S. S. Vala, **A. B. Mirza** and F. Luo, "A Review on Partial Discharge Phenomenon in Rotating Machines Operated Using WBG Motor Drives," *2022 IEEE Transportation Electrification Conference & Expo (ITEC)*, Anaheim, CA, USA, 2022, pp. 523-528.
- [C20] **A. B. Mirza**, A. I. Emon, S. S. Vala and F. Luo, "A Comprehensive Analysis of Current Spikes in a Split-Phase Inverter," *2022 IEEE Applied Power Electronics Conference and Exposition (APEC)*, Houston, TX, USA, 2022, pp. 1580-1585.
- [C21] H. M. Maheri, S. S. Vala, **A. B. Mirza**, E. Babaei and D. Vinnikov, "A Novel Extendable High Gain Step up DC-DC Converter," *2021 IEEE 62nd International Scientific Conference on Power and Electrical Engineering of Riga Technical University (RTUCON)*, Riga, Latvia, 2021, pp. 1-6.
- [C22] A. I. Emon, M. U. Hassan, **A. B. Mirza**, Z. Yuan and F. Luo, "EMI Propagation Path Modeling of 3-Level T-type NPC Power Module with Stacked DBC Enabled EMI Shielding," *2021 IEEE Energy Conversion Congress and Exposition (ECCE)*, Vancouver, BC, Canada, 2021, pp. 5233-5239.
- [C23] **A. B. Mirza**, A. I. Emon, S. S. Vala and F. Luo, "Noise Immune Cascaded Gate Driver Solution for Driving High Speed GaN Power Devices," *2021 IEEE Energy Conversion Congress and Exposition (ECCE)*, Vancouver, BC, Canada, 2021, pp. 5366-537.
- [C24] **A. B. Mirza**, A. I. Emon, S. S. Vala and F. Luo, "An Integrated Magnetic Structure for Bi-Directional Two-Channel Interleaved Boost Converter with Coupled Inductor," *2021 IEEE Energy Conversion Congress and Exposition (ECCE)*, Vancouver, BC, Canada, 2021, pp. 5466-5470.

- [C25] **A. B. Mirza**, Y. Azadeh, H. Peng and F. Luo, "An Isolated Voltage Injection Based Hybrid Circuit Breaker for MVDC Applications," *2021 IEEE Energy Conversion Congress and Exposition (ECCE)*, Vancouver, BC, Canada, 2021, pp. 608-612.
- [C26] A. I. Emon, H. Carlton, J. Harris, A. Krone, Mustafeez-ul-Hassan, **A. B. Mirza**, Z. Yuan, D. Huitink and F. Luo, "A 650V/60A Gate Driver Integrated Wire-bondless Multichip GaN Module," *2021 IEEE 12th International Symposium on Power Electronics for Distributed Generation Systems (PEDG)*, Chicago, IL, USA, 2021, pp. 1-6.
- [C27] A. I. Emon, H. Carlton, J. Harris, A. Krone, **A. B. Mirza**, Mustafeez-ul-Hassan, Z. Yuan, D. Huitink and F. Luo "Design and Optimization of 650V/60A Double-Sided Cooled Multichip GaN Module," *2021 IEEE Applied Power Electronics Conference and Exposition (APEC)*, Phoenix, AZ, USA, 2021, pp. 2313-2317.

## PROFESSIONAL SERVICE

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- **Reviewer**
  - IEEE Transactions on Power Electronics
  - IEEE Journal of Emerging and Selected Topics in Power Electronics
  - IEEE Transactions on Transportation Electrification
  - IEEE Transactions on Components, Packaging and Manufacturing Technology
  - IEEE Transactions on Electromagnetic Compatibility
  - IEEE Transactions on Industry Applications
  - IEEE Transactions on Industrial Electronics
  - IEEE Open Journal of Power Electronics
  - IEEE Applied Power Electronics Conference and Exposition (APEC)
  - IEEE Energy Conversion Congress and Exposition US (ECCE) and Asia (ECCE-Asia)
  - IEEE Transportation Electrification Conference and Exposition (ITEC)
  - IEEE International Symposium on Smart Electronic Systems

## TECHNICAL SKILLS

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**Hardware/Equipment** – Spellman HV power supplies, Tektronix MSO56 and MSO58 Oscilloscopes, Rigol DSA 815 Spectrum Analyzer, Bode-100 and Keysight ENA 5061B Network Analyzer, Com-Power Near Field Probes and LISN, Keysight EXA N9010A Signal Analyzer and EXA N9038A EMI Receiver

**Software** – Altium PCB Designer, ANSYS (Maxwell, Simplorer, Q3D, SIwave and HFSS), ORCAD PSpice, LTSpice, MATLAB Simulink, PLECS, Typhoon HIL, Code Composer Studio, Intel Quartus, Power World Simulator (PWS), LaTeX, LabView

**Functional** – Structural Programming, Object Oriented Programming, Meta-Heuristic Optimization Algorithms (Particle Swarm Optimization and Genetic Algorithm)

**Programming** – C, Embedded C, ARM Assembly, Verilog, MathScript, Python

**Microcontrollers/FPGA** – Texas Instrument C2000 series, Arduino, Intel Cyclone IV FPGAs

**Communication Protocols** – UART, SPI

## PROFESSIONAL SOCIETIES

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|--|----------------|
| • Institute of Electrical and Electronics Engineers (IEEE) | 2015 - Present |
| • IEEE Electromagnetic Compatibility Society               | 2023 - Present |
| • IEEE Industry Applications Society                       | 2023 - Present |
| • IEEE Industrial Electronics Society                      | 2023 - Present |
| • IEEE Power and Energy Society (PES)                      | 2016 - Present |
| • IEEE Power Electronics Society (PELS)                    | 2016 - Present |
| • Pakistan Engineering Council (PEC)                       | 2018 - Present |

