

# Muhammad Salman

**Nationality:** Pakistani | [Redacted]

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<https://scholar.google.com/citations?user=cH4waLQAAAAJ&hl=en> [Redacted]

**Address:** Via Delle Sette Sale 12B, 00184, Roma, Italy (Work)

## ● WORK EXPERIENCE

15/03/2024 – CURRENT Rome, Italy

**UNIVERSITY TEACHING ASSISTANT** SAPIENZA UNIVERSITY OF ROME

- Conducting Classes of the course Renewables
- Engaging Master students in Lab activities
- Help students for their Master's thesis

01/08/2023 – 16/12/2023 Nottingham, United Kingdom

**RESEARCH ASSOCIATE** POWER ELECTRONICS AND MACHINE CENTER, UNIVERSITY OF NOTTINGHAM

- Analyzed and Implemented model free control using Ultra-local model for the DC-DC converter to control the output voltage and inductor current.
- Developed algorithm for sliding mode observer based sensor disturbance rejection.
- Developed a new technique to diagnose Open circuit fault diagnosis of Interleaved Boost Converter.
- Proposed a novel fault diagnosis method for 2-L Inverter in SynRM.

31/01/2022 – 31/07/2022 Roma, Italy

**UNIVERSITY TEACHING ASSISTANT** SAPIENZA UNIVERSITY OF ROME

- Developed and prepared instructional materials and lab manuals.
- Graded assignments, exams, and lab reports.
- Provided one-on-one tutoring and academic support to students.
- Facilitated group discussions and collaborative projects.
- Assisted in the design and implementation of course curriculum.
- Organized and supervised field trips and industry visits.
- Conducted research to support course development and enhancement.
- Delivered guest lectures on specialized topics within the course
- Coordinated with faculty members to improve teaching strategies and course delivery.

05/10/2018 – 10/10/2019 Nowshera, Pakistan

**UNIVERSITY RESEARCH ASSISTANT** ELECTRICAL AND ELECTRONICS DEPARTMENT, UNIVERSITY OF TECHNOLOGY

- Development in Power System and Power Electronics Domain
- Conduction of laboratories session
- Content writing of research papers

03/07/2018 – 28/07/2020 Peshawar, Pakistan

**PROJECT ENGINEER** U.S. PAKISTAN CENTER FOR ADVANCED STUDIES IN ENERGY, UNIVERSITY OF ENGINEERING AND TECHNOLOGY

- Project Design and Development
- Quality Assurance
- Report Writing

03/05/2017 – 26/06/2018 Peshawar, Pakistan

**RESEARCH ASSOCIATE** U.S. PAKISTAN CENTER FOR ADVANCED STUDIES IN ENERGY, UNIVERSITY OF ENGINEERING AND TECHNOLOGY

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- PCB designing in Proteus and milling it with CNC machine
- Troubleshooting the finished board.
- Documentation of new projects i.e., proposals, monthly reports
- Purchasing and Managing of Semiconductor Devices

20/08/2017 – 09/12/2017 Tempe, United States

**EXCHANGE RESEARCH SCHOLAR ENGINEER** ARIZONA STATE UNIVERSITY, UNITED STATES

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- Modeling of Multi-Level Inverter in PSCAD
- Developed transmission line model and apply different faults to observe the effect of footing resistance to back flash over-voltage
- Conducted research on digital relays

## ● EDUCATION AND TRAINING

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01/11/2020 – CURRENT

**DOCTOR OF PHILOSOPHY (FELLOWSHIP) IN ENGINEERING AND APPLIED SCIENCE FOR ENERGY AND INDUSTRY** Sapienza University of Rome

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**Address** Rome, Italy |

**Thesis** Open Circuit and Current Sensor Fault Diagnosis, Localization and Compensation of DC Converters and AC Drives

18/09/2016 – 09/12/2018 Peshawar, Pakistan

**MASTER OF SCIENCE IN ELECTRICAL ENERGY SYSTEM ENGINEERING** US Pakistan Center for Advanced Studies in Energy, University of Engineering and Technology

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**CGPA:** 3.57 / 4.00

**Thesis Title:** Modeling, Design and Control of Multi Level Inverter Having Low Total Harmonic Distortion

**Short Description:** Designing and Modeling of Multi-Level Inverter by using Bio-inspired Artificial Intelligent Algorithms to decrease the total harmonic distortion and to increase the power quality.

23/09/2012 – 10/08/2016 Peshawar, Pakistan

**BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING** University of Engineering & Technology

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**CGPA:** 3.32 / 4.00

**Final Year Project:** Head Movement Based Robotic Vehicle

**Short Description:** Designing and implementation of a head movement based robotic vehicle for those having physical disabilities and cannot even control the automatic wheel chair, but can only move their heads.

## ● PUBLICATIONS

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### Journals

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1. Dardouri, M., **M. Salman**, S. Khojet El Khil, C. Boccaletti, and K. Jelassi. "A Multiple-Sensor Fault-Tolerant Control of a Single-Phase Pulse-Width Modulated Rectifier Based on MRAS and GPI Observers." *Electronics* 13, no. 3 (2024): 502. <https://doi.org/10.3390/electronics13030502>
2. Sami, Irfan, Shafaat Ullah, Shafqat Ullah, Syed Sabir Hussain Bukhari, Naseer Ahmed, **Muhammad Salman**, and Jong-Suk Ro. "A Non-Integer High-Order Sliding Mode Control of Induction Motor with Machine Learning-Based Speed Observer." *Machines* 11, no. 6 (2023): 584. <https://doi.org/10.3390/machines11060584>
3. **Muhammad Salman**, Inzamam Ul Haq, Tanvir Ahmad, Haider Ali, Aftab Qamar, Abdul Rauf and Abdul Basit, "Minimization of Total Harmonic Distortions of Cascaded H-Bridge Multi-level Inverter by Utilizing Bio-Inspired AI Algorithm", *EURASIP Journal on Wireless Communication and Networking*, 66 (2020); <https://doi.org/10.1186/s13638-020-01686-5>
4. Kamran Alam, Saddam Ali, Abdul Saboor, **Muhammad Salman**, Maoz, Muhammad Humayun, Muhammad Sadiq and Muhammad Arif, "Antireflection, Superhydrophilic Nano-Porous SiO Coating

## Conference Proceedings

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1. **Salman, M.**, Zanchetta, P., El Khil, S., Boccaletti, C., "Open Switch Fault Diagnosis and Localization for Voltage Source Inverters in Synchronous Reluctance Motor Drives" 26th International Conference on Electrical Machines (ICEM 2024), 1-4 September 2024, Torino, Italy. (Accepted)
2. Moayed Almobaied, Hassan S. Al-Nahhal, **Muhammad Salman**, Chiara Boccaletti, "Design of an Efficient Energy Harvesting System for Smart Grid Connection Based on Piezoelectric Technology", 5th International Conference on DC Microgrids (ICDCM 2023), 5-17 November 2023, Auckland, New Zealand.
3. **Muhammad Salman**, Najeeb ullah, Mohammad Zia Javed, Chiara Boccaletti, "Model of 9 level transformerless RV topology Grid-tied inverter for PV applications", 48th Annual Conference of the Industrial Electronic Society, October 17-20, 2022, Brussels, Belgium. [10.1109/IECON49645.2022.9969088](https://doi.org/10.1109/IECON49645.2022.9969088)
4. **Muhammad Salman**, Merium Dardouri, Sejir Khojet El Khil, Chiara Boccaletti, "Open Switch Fault Diagnosis and Current Sensor Tolerant Control of a DC-DC Interleaved Boost Converter using Generalized Proportional Integral Observer, 13th Edition of the IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, August 20-25, 2021, Dallas TX, USA. [10.1109/SDEMPED51010.2021.9605525](https://doi.org/10.1109/SDEMPED51010.2021.9605525)
5. **Muhammad Salman**, Abdul Basit, Muhammad Shoaib Khalid, Aftab Qamar, "Reduction in Total Harmonic Distortion of Cascaded H-Bridge Multilevel Inverter with Equal Phase Method", The 16th IEEE Clemson University Power System Conference on Smart Grid Technologies and Innovation, September 4-7, 2018, Charleston, South California, USA. [10.1109/PSC.2018.8664070](https://doi.org/10.1109/PSC.2018.8664070)

## ● NETWORKS AND MEMBERSHIPS

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### IEEE Institute of Electrical and Electronics Engineers

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### IAS Industrial Application Society

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Member of the meeting department

## ● CONFERENCES AND SEMINARS

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16/05/2022 Sapienza University of Rome

### AAT transformers isolated with natural esters: operational experiences

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11/04/2022 Sapienza University of Rome

### Management Seminar of the National Electricity System

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08/04/2022 Sapienza University of Rome

### Renewable Energy Communities: integration of distributed generation with the electricity grid

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08/03/2022 – 09/03/2022 Sapienza University of Rome

### Optimal Operation and Planning of Energy Hub in GAMS

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15/12/2021 Sapienza University of Rome

### Approaches to address and ensure resilience of future net-zero power systems

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26/10/2021 Sapienza University of Rome

### Low-cost rural electrification with Illiceto Shield Wire Scheme for Micro-Grids and RES Advancement in Developing Countries

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## ● PROJECTS

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12/09/2023 – 16/12/2023

### Mobilit Grant for the Project Entitled, "Performance evaluation of Model Predictive Control applied to synchronous reluctance motor drives under converter and machines faulty conditions" University of Nottingham

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## Won Project Entitled, "Open Switch Fault Diagnosis and Current Sensor Fault Tolerant Control of a DC-DC Interleaved Boost Converter using Generalized Proportional Integral Observer" as Principal Investigator (PI)-Sapienza University of Rome

### HONOURS AND AWARDS

#### Honours and awards

- Awarded Mobility grant to University of Nottingham, UK by Sapienza University of Rome
- Awarded PhD fellowship grant for three years by Sapienza University of Rome
- Awarded a grant for the research project entitled "Open Switch Fault Diagnosis and Current Sensor Fault Tolerant Control of a DC- DC Interleaved Boost Converter using different Control Strategies" by Sapienza University of Rome.
- Awarded a grant as a student tutor for the course of Renewables in Sapienza University of Rome.
- Awarded Laptop from Prime Minister Foundation
- Sponsored by USAID for research training at Arizona State University
- Awarded by USAID scholarship for graduate studies
- Final year project funded by National Grassroot ICT R&D fund
- HEC (Higher Education Commission) need and merit based scholarship for undergraduate studies

### LANGUAGE SKILLS

Mother tongue(s): **PASHTO**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
<b>ENGLISH</b>	C1	C1	C1	C1	B2
<b>ITALIAN</b>	B1	B1	A2	A2	B1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

### PRESENTATIONS

#### Posters

- Design, Modeling And Control Of Modular Multi-Level Inverter by Using Bio- Inspired Artificial Intelligent Algorithm Having Low Total Harmonic Distortion "International Conference on Sustainable Energy Pakistan", USPCAS-E 2019.
- Reduction in total harmonic distortion of cascaded H-Bridge Multilevel inverter with different Switching angle arrangement techniques, "National Conference on Green Energy Technologies", USPCAS-E 2018.

#### Paper Presentations

- Design of an Efficient Energy Harvesting System for Smart Grid Connection Based on Piezoelectric Technology", 5th International Conference on DC Microgrids (ICDCM 2023), 5-17 November 2023, Auckland, New Zealand.
- Model of 9 level transformerless RV topology Grid-tied inverter for PV applications", 48th Annual Conference of the Industrial Electronic Society, October 17-20, 2022, Brussels, Belgium.
- Open Switch Fault Diagnosis and Current Sensor Tolerant Control of a DC-DC Interleaved Boost Converter using Generalized Proportional Integral Observer, 13th Edition of the IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives, August 20-25, 2021, Dallas TX, USA.
- Reduction in Total Harmonic Distortion of Cascaded H-Bridge Multilevel Inverter with Equal Phase Method", The 16th IEEE Clemson University Power System Conference on Smart Grid Technologies and Innovation, September 4-7, 2018, Charleston, South California, USA.

## ● CERTIFICATIONS

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09/11/2017

### **Teaching Volunteer Arizona State University, United States**

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Participated as a teaching volunteer for ASU course SOS 322 on International Development and Sustainability in the role of country expert. I helped students to work on preparing a Human Development Report in the context of a class assignment.

10/08/2017 – 10/12/2017

### **Research Training Arizona State University, United States**

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Completed research training in Power System Lab under the supervision of Prof. George Karady. The research training includes the study about smart grid, power world, PSCAD (power system computer aided design), Mathcad, digital relays and different protection schemes.

## ● SUMMER SCHOOL

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22/05/2023 – 26/05/2023

### **Power Electronics, Electrical Machines, Energy Control and Power Systems**

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## ● REVIEWER

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**SEST22 (Smart Energy and System Technology)**

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**IECON22 (Conference of the Industrial Electronic Society)**

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**ICEM22 (International Conference on Electrical Machines)**

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## ● RECOMMENDATIONS

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**Dr. Chiara Boccaletti** Associate Professor

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Sapienza University of Rome, Italy

**Email** [chiara.boccaletti@uniroma1.it](mailto:chiara.boccaletti@uniroma1.it)

**Dr. Pericle Zanchetta** Professor

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University of Nottingham, United Kingdom

**Dr. Kenneth Mulligan** Professor

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Fulton Schools of Engineering  
Arizona State University