

# Muhammad Salman

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**Address:** Italy (Roma)

## ● WORK EXPERIENCE

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

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

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- 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 an inverter in SynRM drive.

31/01/2022 – 31/07/2022 Roma, Italy

**UNIVERSITY TEACHING ASSISTANT** SAPIENZA UNIVERSITY OF ROME

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

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

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

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

03/07/2018 – 28/07/2019 Peshawar, Pakistan

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

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- Project Design and Development
- Quality Assurance
- Report Writing

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

**EDUCATIONAL RESEARCHER** 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** 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

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. **Supervisor:** Dr Abdul Basit

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.

**Supervisor:** Engr Mujtaba Hassan

## ● LANGUAGE SKILLS

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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

## ● ADDITIONAL INFORMATION

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### PUBLICATIONS

#### Journals

1. 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>
2. **Muhammad Salman**, Inzamam Ul Haq, Tanvir Ahmad, Haider Ali, Affaq 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>
3. **Muhammad Salman**, Abdul Basit, Aemal Ahmad, Zeeshan Saeed Shah, Kamran Alam, "Modeling of Cascaded H-Bridge Multi-level Inverter Having Low Total Harmonic Distortion by using Equal Phase Distribution Method", *International Journal of Engineering Works*, Vol. 6, Issue 03, PP. 84-89, March 2019.
4. Kamran Alam, Saddam Ali, Abdul Saboor, **Muhammad Salman**, Maoz, Muhammad Humayun, Muhammad Sadiq and Muhammad Arif, "Antireflection, Superhydrophilic Nano-Porous SiO Coating

based on Aerosol Impact Spray Deposition Technique for Solar PV Module”, Coatings 2019, 9(8), 497; <https://doi.org/10.3390/coatings9080497>

5. Rizwan kamal, Muhammad younas, Shakeel ahmed and **Muhammad Salman**, “Homer based Techno-Economic Comparison of Solar PV, Micro Hydro and Biomass Renewable Energy System with and without Battery Storage”, International Journal of Engineering Works, Vol. 5, Issue 10, PP. 203-210, October 2018.
6. Usman Rahat, Abdul Basit and **Muhammad Salman**, “Voltage control for DC-DC converters”, International Journal of Engineering Works, Vol. 5, Issue 10, PP. 198-202, October 2018. <https://doi.org/10.20944/preprints201808.0288.v1>

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### Conference Proceedings

1. 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 (Presented).
2. **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)
3. **Muhammad Salman**, Merium Dardouri, Sejr 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)
4. **Muhammad Salman**, Abdul Basit, Muhammad Shoaib Khalid, Affaq 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)

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### NETWORKS AND MEMBERSHIPS

IEEE Institute of Electrical and Electronics Engineers

IAS Industrial Application Society

### CONFERENCES AND SEMINARS

16/05/2022 – Sapienza University of Rome

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

11/04/2022 – Sapienza University of Rome

**Management Seminar of the National Electricity System**

08/04/2022 – Sapienza University of Rome

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

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

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

15/12/2021 – Sapienza University of Rome

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

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**

### RECOMMENDATIONS

**Dr. Chiara Boccaletti** Associate Professor

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Organization: Sapienza University of Rome, Italy

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

**Dr Haider Ali** Assistant Professor/HoD

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Organization: University of Technology, Nowshera, Pakistan

Email [haider.ali@uotnowshera.edu.pk](mailto:haider.ali@uotnowshera.edu.pk)

**Dr. Abdul Basit** Assistant Professor

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Organization: University of Engineering and Technology, Peshawar, Pakistan

Email [abdul.basit@uetpeshawar.edu.pk](mailto:abdul.basit@uetpeshawar.edu.pk)

## PROJECTS

01/09/2022 – 30/10/2023

**Open Switch Fault Diagnosis and Current Sensor Fault Tolerant Control of a DC-DC Interleaved Boost Converter using Generalized Proportional Integral Observer**

12/09/2023 – 16/12/2023

**Performance evaluation of Model Predictive Control applied to synchronous reluctance motor drives under converter and machines faulty conditions**

## 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 Commision) need and merit based scholarship for undergraduate studies

## JOB-RELATED SKILLS

### Job-related skills

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- Highly proficient in applying the course material in analyzing the problem situations.
- Good teamwork skills in group assignments.
- Ability to create innovative solutions.

## PRESENTATIONS

### Posters

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- 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

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- Design of an Effiient 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**

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.

## **REVIEWER**

### **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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## **SUMMER SCHOOL**

22/05/2023 – 26/05/2023

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

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