

# MUHAMMAD MANSOOR

## Researcher | Electrical Engineer

📍 8114 Regents Road, Apt. 204, San Diego, CA, 92122

☎ +1 (619) 629-5099

@ mumansoor@ucsd.edu

in mmansoor@malik

🔗 scholar.google.com/citations?user=XF5uuEAAAAAJhl=enoi=sra



## PROFESSIONAL EXPERIENCE

### Asst. Project Scientist

#### University of California San Diego | Center for Energy Research (CER)

📅 Jan 2023 – Present 📍 San Diego, CA, USA

- Development and testing of Model Predictive Control (MPC) based supervisory microgrid controller for optimal operation of multi-energy systems.
- Development and testing of Application Programming Interface (API) for connecting remote intermediate servers with cloud-based optimization engine.
- Performing real-time open-loop and closed-loop operation dispatch control of microgrid sites including the UC San Diego microgrid.

### Postdoctoral Researcher

#### University of California San Diego | Center for Energy Research (CER)

📅 Jul 2022 – Dec 2022 📍 San Diego, CA, USA

- Development and validation of Load Forecasting and PV Forecasting techniques for multi-energy system of microgrids based on different modelling approaches (Time-Series Regression, Fast Fourier Transform and Machine Learning etc.).
- Development and testing of communication protocols (Modbus TCP/IP, and REST/JSON) to connect microgrid devices such as solar PV, battery storage, and diesel generators and also utility Point-of-Common Coupling (PCC) with intermediate servers and cloud-based optimization engine.
- Development and testing of web-based Graphical User Interface (GUI) involving SQLite databases, real-time data acquisition, and dispatch control.

### Off-Campus Research Consultant

#### XENDEE | Engineering Team

📅 Feb 2022 – Nov 2022 📍 San Diego, CA, USA

- Provided off-campus research consulting to XENDEE for 2 Weeks in Feb 2022, 2 Weeks in May 2022, and 2 Weeks in Nov 2022 (total no. of 6 Weeks) on topics of microgrid planning, load and solar PV forecasting, microgrid MPC development, communication protocols, and APIs.

### Visiting Graduate Researcher

#### University of California San Diego | Center for Energy Research (CER)

📅 Jan 2022 – Jun 2022 📍 San Diego, CA, USA

- Modelling and simulation of smart- and microgrids.
- Development of the grid-connected and islanded microgrid optimization models for optimal planning of DER based multi-energy systems (electricity, heating and cooling).
- Data acquisition and performance analysis of data related to the microgrid devices including solar pv, battery storage, and electric vehicles at UC San Diego microgrid site.

## EDUCATION

### Ph.D. Electrical Engineering

#### Technische Universität Wien

📅 2019-2022 📍 Vienna, Austria

🎯 CGPA: 1.00/1.00 (Austrian Grading System)

### M.Sc. Electrical Engineering

#### Politecnico di Milano

📅 2016-2018 📍 Milan, Italy

🎯 CGPA: 107/110 (Italian Grading System)

### Bachelor of Electrical Engineering

#### National University of Sciences & Technology (NUST)

📅 2011-2015 📍 Karachi, Pakistan

🎯 CGPA: 3.96/4.00 (American Grading System)

## PROFESSIONAL SKILLS

Energy System Optimization and Modelling  
Software Development Data Analysis  
Cost and CO<sub>2</sub> Minimization  
Time-Series Forecasting Sensitivity Analysis  
New Business Models  
Designing and Decision Making

## PROGRAMMING

Python C/C++ SQL GAMS VBA  
PHP HTML LaTeX

## SOFTWARE

Git Visual Studio Eclipse  
Web Service Tools  
Cloud-based Database Systems Grafana  
IBM Rational Tools GAMS Studio  
XENDEE DER-CAM MATLAB/Simulink  
DlgSilent SAP AutoCAD

## OPERATING SYSTEMS

Windows OS MAC OS Linux OS  
Raspberry Pi OS

# PROFESSIONAL EXPERIENCE

## Junior Researcher

### Bioenergy and Sustainable Technologies GmbH | Smart- & Microgrids

📅 Mar 2019 – Jan 2022

📍 Wieselburg, Austria

- Development of optimization techniques using Linear Programming (LP) and Mixed-Integer Linear Programming (MILP) through GAMS and Python.
- Designing and implementation of advanced controller strategies and operation planning for multi-energy systems including bioenergy sources, PV, wind, battery storage, hydrogen storage, heat storage, electric vehicles and other distributed energy resources.
- Communication and integration of different Microgrid Lab devices with Energy Management System (EMS) and supervisory controller.

## Software Integration Engineer

### Whirlpool Corporation | Electrical & Electronic Systems (EES)

📅 Jul 2018 – Jan 2019

📍 EMEA Region - Fabriano, Italy

- Worked on Agile/SCRUM projects with test driven development.
- Reviewed software requirements and created test plans and performed integration tests including IoT testing.
- Executed the integration/connection among software, hardware and configuration files.
- Interacted with stakeholders to refine requirements, reviewed test plans and discussed software improvements.

## Junior Electrical Engineer

### OltreBASE SRL | Industrial Automation and Process Control Division

📅 Jul 2017 – Nov 2017

📍 Milan, Italy

- Reviewed the Front-End Engineering Design (FEED) documentation and finalized them according to project detailed engineering design.
- Designed MV/LV switchgears, LV/LV switchgears, AC/DC UPS, Electrical Control System (ECS), HVAC MCC and Distribution Boards according to the project specifications, Shell DEP standards and IEC standards.

## Assistant Manager-Electrical Maintenance

### K-Electric Limited | 560 MW Bin Qasim Power Station-II

📅 Jul 2015 – Sep 2016

📍 Karachi, Pakistan

- Hands-on experience on overall design, operation, maintenance and troubleshooting of 560 MW Combined Cycle Power Plant (3xGas Turbine + 1xSteam Turbine).
- Worked in electrical maintenance and troubleshooting of plant including shutdowns and tripping activities and ensured proper working of plant.
- Managed the preventive maintenance and corrective maintenance activities of gas turbines, steam turbine, Balance of Plant (BOP) equipment according to the OEM's documentation and carried out planned and unplanned outages to restore the plant to its normal working conditions.
- Demonstrated capability to program, commission and troubleshoot GE and ABB protection relays.
- Managed High Voltage (220 kV), Medium Voltage (6.6 kV) and Low Voltage (400 V) switchgears.

# ACHIEVEMENTS

- Recently contributed to a proposal which secured funding of up to \$262,926 for testing MPC at UC San Diego microgrid site.
- Recipient of 2022 Gerfried Zeichen - Preis award (worth €1,500) from TU Wien, Austria for outstanding PhD Thesis of the Year.
- Recipient of a federal National Science Foundation (NSF) grant for my postdoctoral work at UC San Diego.
- Graduated from PhD studies with highest distinction (equivalent to summa cum laude in the USA).
- Completed Alta Scuola Politecnica (ASP) Diploma program in parallel to my Master's degree in Italy, and received ASP Diploma, and an additional Master's degree from Politecnico di Torino, Italy.
- Recipient of the Gold Scholarship (worth €10,000) for my Master's degree program at Politecnico di Milano, Italy.
- Recipient of Chancellor's Silver Medal for securing second position in Bachelor's degree class at NUST, Pakistan.

# LANGUAGES

English



German



Italian



# REFEREES

Jan Kleissl, Ph.D.

Professor | Center for Energy Research (CER)

@ jkleissl@eng.ucsd.edu

✉ University of California San Diego, USA

Michael Stadler, Ph.D.

Chief Technology Officer

@ mstadler@xendee.com

✉ XENDEE, USA

Hans Auer, Ph.D.

Associate Professor | Energy Economics Group (EEG)

@ auer@eeg.tuwien.ac.at

✉ Technische Universität Wien, Austria

# LIST OF SELECTED PUBLICATIONS

---

## Academic Theses

- **Ph.D. Degree Thesis:** Planning and Operation Strategies of Microgrids in Decarbonized Multi-Energy Systems.
  - **Master's Degrees Thesis:** Electrical Load Forecasting using Machine Learning Techniques in view of Demand Response Programs.
  - **Bachelor's Degree Thesis:** Design, Fabrication and Performance Analysis of Cascaded Multi-Level Inverter using Renewable Energy Sources (Wind & Solar).
- 

## Book Chapter

- Barsanti, M., Garbolino, L., Mansoor, M., Realmonte, G., Zeinoun, R., Causone, F., & Fabi, V. (2020). *Innovative user experience design and customer engagement approaches for residential demand response programs*. In Sustainability in Energy and Buildings (pp. 613-627). Springer, Singapore. DOI: [https://doi.org/10.1007/978-981-32-9868-2\\_52](https://doi.org/10.1007/978-981-32-9868-2_52).
- 

## Journal Articles

- Houben, N., Cosic, A., Stadler, M., Mansoor, M., Zellinger, M., Auer, H., Ajanovic, A., & Haas, R. (2023). *Optimal dispatch of a multi-energy system microgrid under uncertainty: A renewable energy community in Austria*. Applied Energy, 337, 120913. DOI: <https://doi.org/10.1016/j.apenergy.2023.120913>.
  - Cosic, A., Stadler, M., Mansoor, M., & Zellinger, M. (2021). *Mixed-integer linear programming based optimization strategies for renewable energy communities*. Energy, 237, 121559. DOI: <https://doi.org/10.1016/j.energy.2021.121559>.
  - Mansoor, M., Stadler, M., Auer, H., & Zellinger, M. (2021). *Advanced optimal planning for microgrid technologies including hydrogen and mobility at a real microgrid testbed*. International Journal of Hydrogen Energy, 46(37), 19285-19302. DOI: <https://doi.org/10.1016/j.ijhydene.2021.03.110>.
  - Mansoor, M., Stadler, M., Zellinger, M., Lichtenegger, K., Auer, H., & Cosic, A. (2021). *Optimal planning of thermal energy systems in a microgrid with seasonal storage and piecewise affine cost functions*. Energy, 215, 119095. DOI: <https://doi.org/10.1016/j.energy.2020.119095>.
  - Mansoor, M., Grimaccia, F., Leva, S., & Mussetta, M. (2021). *Comparison of echo state network and feed-forward neural networks in electrical load forecasting for demand response programs*. Mathematics and Computers in Simulation, 184, 282-293. DOI: <https://doi.org/10.1016/j.matcom.2020.07.011>.
  - Zahid, U., Haq, M. I. U., Zahid, S., Khan, A., Mansoor, M., & Khan, A. A. (2016). *Feasibility Analysis of 100kW Grid Connected PV System: A Case Study at Karachi*. International Journal of Electrical Energy, 4, 165-173. DOI: <https://doi.org/10.18178/ijoe.4.3.165-173>.
- 

## Conference Proceedings

- Mansoor, M., Grimaccia, F., & Mussetta, M. (2020, July). *Echo State Network Performance in Electrical and Industrial Applications*. In 2020 International Joint Conference on Neural Networks (IJCNN) (pp. 1-7). IEEE. DOI: <https://doi.org/10.1109/IJCNN48605.2020.9207069>.
  - Zellinger, M., Stadler, M., Aigenbauer, S., Mansoor, M., Mair, C., Cosic, A., & Liedtke, P. (2020, January). *Optimization based Planning of energy systems*. In Central European Biomass Conference CEBC, Topic: Decarbonisation of the energy system, oral and visual presentation and proceedings.
  - Raja, A. A., Mansoor, M., & Zahid, F. (2018, February). *Optimal sitting of distributed generation based on hosting capacity approach*. In 2018 International Conference on Engineering and Emerging Technologies (ICEET) (pp. 1-5). IEEE. DOI: <https://doi.org/10.1109/ICEET1.2018.8338630>.
- 

# PROFESSIONAL MEMBERSHIPS

---

- Institute of Electrical and Electronics Engineers (IEEE)
  - IEEE Power and Energy Society (IEEE PES)
  - IEEE Young Professionals
-