

Musannif Shah – Curriculum vitae

EDUCATION AND TRAINING

- **Ph.D. researcher in Energy Science and Engineering**

Università degli Studi di Napoli “Parthenope”

LaTEC LAB, Centro Direzionale isola C4, 80143, Napoli, Italy

Duration:	1/11/2020 to present
Thesis:	Biomass-Based Polygeneration for Enhanced Energy, Economic and Environmental Benefits: assessing different solutions for a real building case study
Supervisor:	Prof. Laura Vanoli
Research activities:	<ul style="list-style-type: none">• Development of an energy demand model of a historical building with realistic energy and load curves using the TRNBUILD extension of TRNSYS simulation software.• Energy, economic and environmental analysis of a biomass-based combined cooling, heating, and power (CCHP) system integrated with a case study historical building.• Energy and economic analysis of a lithium-ion batteries-based electric vehicle (EV) charging system integrated with a biomass-based CCHP system.• Modeling, sensitivity analysis, and optimization of hydrogen production and storage system integrated with the biomass-based CCHP system using TRNSYS simulation software.• Feasibility analysis of reverse osmosis (RO) based desalination system integrated with renewable energy system.

- **Master of Science in Thermal Energy Engineering**

National University of Sciences & Technology, Islamabad, Pakistan

U.S.-Pak. Center for Advanced Studies in Energy, USPCASE

Duration:	11/09/2017 – 20/10/2020
Thesis:	Design, Modeling, and Optimization of a Solar Absorption Cooling System for Cold Storage in Pakistan
CGPA:	3.6/4
Supervisor:	Prof. Adeel Javed
Research activities:	<ul style="list-style-type: none">• Development of an energy demand model of a case study cold storage building using the TRNBUILD extension of TRNSYS simulation software• Configuration-based modelling of solar absorption cooling system for a case study cold storage system• Sensitivity analysis and optimization of the system

- **Bachelor of Science in Mechanical Engineering**

University of Engineering and Technology, Peshawar, Pakistan

Department of Mechanical Engineering

Duration:	09/09/2017 – 27/09/2017
Thesis:	Stress Analysis of Underground Oil and Gas Pipelines
CGPA:	3.17/4
Supervisor:	Prof. Zohaib Ali Khan
Research activities:	<ul style="list-style-type: none">• Determine the effect of vehicular load on buried pipelines.• Determine the safe operational depth of oil and gas pipelines under different static and dynamic loading conditions

PROFESSIONAL AND SCIENTIFIC EXPERIENCE

- **Abroad Ph.D. research period**

AGH University of Science and Technology, Krakow, Poland

Faculty of Energy and Fuels

Duration:	13/03/2023 – 31/08/2023
Supervisor:	Prof. Rafal D. Figaj
Activities:	<ul style="list-style-type: none">• In-depth understanding of using TRNSYS simulation software in energy systems modelling.• Dynamic simulations of the CCHP system for Polish case study district heating and cooling networks.• Feasibility analysis of hydrogen production system integrated with renewable energy system.

- **Internee Mechanical Engineer**

Attock Gen Limited, Rawalpindi, Pakistan

Duration:	30/07/2018 – 30/08/2018
Placement:	Mechanical Engineering Department
Activities:	<ul style="list-style-type: none">• Provide ongoing engineering assistance to operations and maintenance.• Provide troubleshooting and technical support during planned and unplanned outages.

- **Internee HVAC Engineer**

Greaves Air-Conditioning Limited, Peshawar, Pakistan

Duration:	30/07/2018 – 30/08/2018
Placement:	Engineering department of State Bank of Pakistan
Activities:	<ul style="list-style-type: none">• Maintain BOM (bill of materials) and manage the team in maintaining coordination between the customers' requirements.• Understand the design, application, controls, and parts of the HVAC systems.

SUMMER SCHOOLS AND WORKSHOPS

Title	Organized by:	Dates
Workshop on “Geothermal District Heating and Cooling”	European Geothermal Energy Council	19-21 September, 2023
Workshop on “Energy and economic analysis of energy systems by means of dynamic simulations”	AGH University of Science and Technology	20-21 September 2022
Workshop on “Evolutionary design with freedom” by Prof. Adrian Bejan	University of Sannio, Italy	12-14 September 2022
Summer School on “Positive Energy Districts: Towards a Holistic Approach to Modelling and Performance Assessment”	International Energy Agency, Energy in Buildings and Construction, Annex 83 and Concordia University, Canada	01-08 July, 2022
Workshop on “Basics of Thermally Driven Heat-Pumps”	University of Sannio, Italy	21-22 June, 2022
Workshop on “Processing and Characterization of Materials”	US-Pakistan Centre for Advanced Studies in Energy, NUST, Pakistan	14-15 January, 2020
Workshop on “Hydro Power”	US-Pakistan Centre for Advanced Studies in Energy, NUST, Pakistan	24-26 September, 2018

SCIENTIFIC RESEARCH PROJECT PARTICIPATION

- Italian Research Program PRIN (Progetti di ricerca di Rilevante Interesse Nazionale) 2017: “BIOmasses Circular Holistic Economy Approach to EneRgy equipments (BIO-CHEAPER)”-Project code: U:GOV PRJ-0207.
- Design and Integration of Solar PV system to Conventional Cold Storage
- Flow Analysis in Drip Irrigations Emitter using ANSYS fluent.

HONORS AND ACHIEVEMENTS

Awards and Achievements	Details
Ph.D. Scholarship	Fully funded PhD scholarship at the University of Naples “Parthenope”, Italy
Graduate Record Examination (GRE)	Score: 312 Quantitative Reasoning: 161 Verbal Reasoning: 151
USAID Merit Scholarship	Fully funded master’s scholarship funded by USAID at the National University of Science and Technology, Pakistan
Best Research Project Award	Awarded at the final year project exhibition held at the University of Engineering and Technology, Peshawar, Pakistan

SKILLS

Software Skills	<ul style="list-style-type: none">• TRNSYS• Aspen Plus• Design Builder• Energy Plus• ANSYS• Abaqus• HAP• MATLAB• LABVIEW• AutoCAD• MS Office
Other Skills	<ul style="list-style-type: none">• Hands-on experience with characterization equipment like optical microscope, SEM, XRD• Good communication and problem-solving skills

LANGUAGES

- Native Language (Pushto)
- National Language (Urdu)

Other Languages	Listening	Reading	Writing	Spoken Interaction	Spoken production
English	C1	C1	B2	C1	B2
Italian	A1	A1	A1	A1	A1
<i>Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user</i>					

SCIENTIFIC PUBLICATIONS

Peer-reviewed Journal publications:

- Di Fraia, Simona, **Musannif Shah***, and Laura Vanoli. 2024. "Biomass Polygeneration Systems Integrated with Buildings: A Review" *Sustainability* 16, no. 4: 1654. <https://doi.org/10.3390/su16041654>
- Di Fraia, Simona, **Musannif Shah***, and Laura Vanoli, 2023. "A biomass-based polygeneration system for a historical building: A techno-economic and environmental analysis" *Energy Conversion and Management*, (vol. 291, no. June, p. 117336). <https://doi.org/10.1016/j.enconman.2023.117336>
- Hamid Ikram, Adeel Javed, Mariam Mehmood, **Musannif Shah**, M. Ali, and Adeel Waqas, 2021. "Techno-economic evaluation of a solar PV integrated refrigeration system for a cold storage facility" *Sustainable Energy Technologies and Assessments* 44 (2021) 101063. <https://doi.org/10.1016/j.seta.2021.101063>

Journal articles under review:

- S. Di Fraia, R. Figaj, **M. Shah***, and L. Vanoli, (2023). Dynamic simulation of a biomass-based polygeneration system: A novel approach for on-site EV charging and hydrogen production, **under process**

Conference Proceedings:

- Franco Cotana, Simona Di Fraia, **Musannif Shah***, Laura Vanoli “A Biomass Based Polygeneration System for Historical Building: An Energy Analysis” in Proceedings of 17th Conference on Sustainable Development of Energy, Water and Environment Systems – SDEWES, held on November 6-10, 2022
- Franco Cotana, Simona Di Fraia, **Musannif Shah***, Andrea Nicolini, Alessandro Petrozzi, Laura Vanoli “Energy Analysis of a Biomass-Based Combined Cooling, Heating and Power System” in Proceedings of XXII Congresso Nazionale CIRIAF
- **Musannif Shah***, Adeel Javed, Hamid Ikram “Modeling and Optimization of Solar Absorption Cooling System for Cold Storages in Pakistan” in Proceedings of International Conference on Mechanical Engineering (ICME-2020)
- Hamid Ikram, Adeel Javed, **Musannif Shah**. “Designing of an Efficient Evaporative Condenser for Cold Storages” in Proceedings of 2019 10th International Conference on Management Research (ICMR)