DR. MUBASHIR H. WANI, PHD, CENG, PMP

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scholar.google.com/citations?user=QhK1MIMAAAAJ&hl=en in linkedin.com/in/mubashir-hussain-wani-6b309452/

Electrical Engineer and Researcher

Profile

Dr. Mubashir Hussain Wani is a Chartered Engineer (CEng) and PMP-certified researcher with a strong background in mathematical modeling, AI-driven energy systems, and multi-objective optimization. He completed his PhD at the University of Auckland, where he developed computational frameworks for energy-efficient building management by integrating EnergyPlus, MATLAB, and AI-based surrogate models.

Dr. Wani's expertise spans smart grids, HVAC control strategies, and renewable energy integration. His research, supported by MBIE, New Zealand, has been published in high-impact journals. He is also an experienced educator and mentor, guiding students in energy modeling, optimization techniques, and control systems design.

Research Interests

- Smart Grid and Energy Optimization
- Multi-Objective Optimization for Building Energy Systems
- AI and Machine Learning for Sustainable Energy Solutions
- Formal Modeling and Simulation (EnergyPlus, MATLAB, CFD)
- Control Strategies for HVAC and Renewable Energy Integration
- Digital Twins and Cyber-Physical Systems for Smart Cities

Education

PhD in Electrical Engineering
The University of Auckland, New Zealand (2024)

- **Thesis**: "Intelligent Control Strategies for Efficient Building Energy Management Systems (BEMS)"
- Developed computational models to optimize energy efficiency while ensuring occupant comfort.
- Funded by **Ministry of Business, Innovation and Employment (MBIE), New Zealand** via **Callaghan Innovation**

MSc in Energy and Sustainability with Electrical Power Engineering
University of Southampton, United Kingdom (2017)

- Specialization in **Renewable Energy Systems and Power Networks**

BEng in Electronics and Telecommunication
University of Kashmir, India (2015)

Distinctions/Honours

Receiver of ***Callaghan Innovation R&D Fellowship Grant*** from the Ministry of Business, Innovation and Employment (MBIE), New Zealand.

Research Experience

Research & Development Fellow – Building Energy Management Systems (BEMS)

Fisher & Paykel Technologies Limited, Auckland, New Zealand (2020-2022)

- Developed a **multi-objective optimization framework** for smart energy management in buildings.
- Designed AI-driven control strategies balancing **energy consumption** and **thermal comfort**.
- Integrated **formal modeling techniques** to improve predictive accuracy in energy simulations.
- Published findings in **Annals of Operations Research**, **Electronics**, and **Building and Environment**.

Graduate Research Assistant

Department of Electrical, Computer, and Software Engineering, The University of Auckland (2018-2022)

- Conducted research on **meta-heuristic algorithms for thermal parameter estimation**.
- Developed **co-simulation models (MATLAB & EnergyPlus)** for optimizing HVAC systems.
- Published multiple IEEE and Springer research papers on **energy-efficient building control**.

Professional Experience

Electrical Design Engineer

Jacobs Engineering Group Inc., Dubai, UAE (2023 – Present)

- Contributing to high-profile projects such as **Islamic Civilization Village (ICV), NEOM - Time Travel Tunnel (TTT), NEOM – Sindalah Islands, and NEOM – Vault**.
- Responsibilities include **electrical load calculations, space planning, ELV/ICT systems, Security, and Building Management Systems (BMS)**.
- Leading **QA/QC reviews, BIM coordination, and interdisciplinary collaboration** to optimize energy efficiency in large-scale projects.

Sales (Solution) Engineer – Power Management Systems

Electrotest Limited, Auckland, New Zealand (2022 – 2023)

- Provided **technical solutions for power management systems**, enhancing client satisfaction and operational efficiency.

Embedded Systems Lab Technician

The University of Auckland (2019 – 2020)

- Designed experimental setups for **control systems & embedded electronics**.
- Provided guidance on **simulation-based learning** in MATLAB and Python.

Electrical Automation Engineer

Teknocrat's Control Systems (I) Pvt Ltd, Mumbai, India (2017 – 2018)

- Designed and implemented **automation solutions for industrial applications**.

Assistant Professor

SSM College of Engineering and Technology, J&K, India (2017)

- Taught courses in **electrical engineering** and supervised **student projects**.

Publications and Research Output

Peer-Reviewed Journal Articles

1. **Wani, M., Hafiz, F., Swain, A., & Broekaert, J.** (2023). *Balancing Energy Consumption and Thermal Comfort in Buildings: A Multi-Criteria Framework*. **Annals of Operations Research**. DOI: https://link.springer.com/article/10.1007/s10479-023-05747-y
2. **Wani, M., Hafiz, F., Swain, A., & Ukil, A.** (2023). *A Multi-Objective Approach to Robust Control of Air Handling Units for Optimized Energy Performance*. **Electronics**. DOI: https://www.mdpi.com/2079-9292/12/3/661
3. **Wani, M., Swain, A., Ukil, A., Ploder, M., & Koole, R.** (2022). *Optimizing the Performance of Forced Extraction Systems: A Multi-Objective Framework*. **Building and Environment**. DOI: https://www.sciencedirect.com/science/article/pii/S0360132322004504
4. **Wani, M., Hafiz, F., Swain, A., & Ukil, A.** (2019). *Parameter Estimation of Thermal Models using a Meta-Heuristic Approach*. **Energy and Buildings**. DOI: https://www.sciencedirect.com/science/article/pii/S0378778820316832

Conference Proceedings

1. **Wani, M., Swain, A., & Ukil, A.** (2021). *Intelligent Controller for Thermal Comfort Management in Buildings*. **IECON 2021 - IEEE Industrial Electronics Society - Canada.** DOI: https://ieeexplore.ieee.org/abstract/document/9589666
2. **Wani, M., Swain, A., & Ukil, A.** (2019). Control Strategies for Energy Optimization of HVAC Systems in Small Office Buildings using EnergyPlus. **ISGT 2019 - Innovative Smart Grid Technologies - Asia.** DOI: https://ieeexplore.ieee.org/abstract/document/8880806

Ongoing Research Outputs

1. **Monograph (Book):** Extended version of my PhD Thesis titled as: **"Digital Twins for Building Optimization: Enhancing Energy and Comfort, *Next-Gen Control Strategies for Smart and Sustainable Environments, with examples using Python™ and EnergyPlus™*"** to be published in *Springer-Nature's Studies in Infrastructure and Control* series (Proposal has been Accepted by the Book Editors)
2. **Journal/Article:** Many (more than three) Objective Optimization based problem with Constraints in Building Energy Systems, to be published in *Energy Economics (Elsevier)*

Technical Skills

- **First-principles Modeling & Simulation:** EnergyPlus, MATLAB, MLE+, Simcenter FloVENT (CFD)
- **AI & Machine Learning:** Python (Scikit-learn, TensorFlow), Meta-Heuristic Algorithms
- **Optimization Techniques:** Multi-Objective Optimization, Decision-Making Algorithms
- **Building Energy Systems:** HVAC Control, Smart Grid Integration, BMS & IoT
- **Programming & Tools:** Python, MATLAB, FORTRAN, Revizto (BIM), SketchUp, EnergyPlus, AutoCAD, Revit (BIM)

Certifications and Memberships

- **Chartered Engineer (CEng)** – Institution of Engineering and Technology (IET), UK
- **Member, IEEE Power and Energy Society (PES)**
- **Project Management Professional (PMP)** – PMI, UAE Chapter

Hobbies and Interests

- **Sports:** Excellent team and leadership skills developed through playing cricket competitively since early teens. Interested in other outdoor games like football and hockey as well.

- **Travel:** Always love the opportunity of traveling to various places whether it concerns work or just for rejuvenation as I enjoy learning about new countries and cultures through travel.

Academic References

- **Dr. Akshya Swain:** The University of Auckland; E-mail: a.swain@auckland.ac.nz; Tel: +642102340207
- **Dr. Thomas Andritsch:** University of Southampton; E-mail: T.Andritsch@soton.ac.uk; Tel: +442380599613
- **Dr. James Pilgrim:** University of Southampton; E-mail: jp2@ecs.soton.ac.uk; Tel: +442380593429