Naghmash Ali

Ph.D. Electrical Engineering
Nanshan District, Shenzhen, P.R. China.
+86 18689487001 naghmash_ali
naghmash@sz.tsinghua.edu.cn
Date of Birth: 13-April-1991
Google Scholar

Education

Ph.D. Electrical Engineering *Shandong University* **Shandong, China** *2018-2022*
Thesis: Controller Design for Electric Vehicle Wireless Charging System Using LCC-S Compensation Topology
Advisor: Dr. Liu Zhizhen
CGPA: 4.00/4.00

M.S. Electrical Engineering *National University of Science and Technology* **Islamabad, Pakistan** *2014-2016*
Thesis: Backstepping Based Non-linear Controller for Maximum Power Point Tracking in Photovoltaic System
Advisor: Dr. Iftikhar Ahmed
CGPA: 3.55/4.00

B.S. Electrical Engineering *COMSATS University* **Islamabad, Pakistan** *2010-2014*
Thesis: Compensation of Distribution System Voltage Using Dynamic Voltage Restorer
Advisor: Dr. Laiq Khan
CGPA: 3.38/4.00

Research Direction

Ocean Energy Systems (Wave and Tidal Energy Integration) - Offshore Microgrid Optimization - Intelligent Energy Management System - Power System Optimization - Non-Linear Control - AC/DC Microgrid - Artificial Intelligence - Electric-Gas Systems - Wireless Power Transfer - Electric Vehicle Control - Large Action Models

Honour and Awards

- **Excellent Postdoc Award (Tsinghua University):** Honored for outstanding contributions in postdoctoral research.
- **Chinese Government Scholarship:** Awarded the prestigious Chinese Government Scholarship for PhD studies.
- **Excellent Researcher Award:** Awarded the excellent research award for publishing high quality research work during my masters.
- **Taleem Fund Scholarship:** Recipient of the esteemed Taleem Fund Scholarship for undergraduate studies

Professional Experience

Postdoctoral Fellow, *(SIGS, Tsinghua University)* **Shenzhen, China** *03/2023 - present*
Advisor: Dr. Xinwei Shen
Research Direction:

- **Hierarchical Strategy Based Higher-Order Nonlinear Control for Offshore Microgrids with Ocean Energy Integration**
  Focuses on developing advanced control strategies to manage offshore microgrids incorporating wave and tidal energy systems, addressing stability and reliability challenges.
- **Multistage Controller Design and Energy Management in Multi-Microgrid Clusters with Wave and Tidal Energy Sources**
  Explores the design of layered controllers for coordinated operation and energy sharing among microgrids powered by diverse renewable sources, including ocean energy.
- **Data-Driven Energy Management for Offshore Microgrids Integrating Ocean Energy**
  Applies data-driven techniques to optimize energy management in offshore microgrids, leveraging predictive analytics for efficient utilization of ocean-based energy resources.

Primary Responsiblities:

- Assisting MS and PhD Student in research.
- Publishing Conducted research in reputable journal
- Applying for research grant to complete the research work

Chief Data Scientist, *(CyberGen Inc)* **Florida, USA (Part-Time)** *12/2022 - present*

Primary Responsiblities:

- Provide Insights on developing and implementing data-driven solutions.
- Advising a team of data scientists, AI engineers and data analysts
- Provide Industry-Academia Linkage through Zero Point Labs.

Assistant Professor, *(Mohammad Ali Jinnah University)* **Karachi, Pakistan** *01/2022 - 12/2022*

Primary Responsibilities:

- Chairman of Project Coordinating Committee.
- Member of Board of Advanced Studies and Research (BASAR)
- Supervising Master and Doctoral Students In Research Thesis.

Modules Taught: Renewable Energy Systems - Power System Analysis - Circuit Analysis

Lecturer, *(The University of Faisalabad)* **Faisalabad, Pakistan** *03/2017 - 08/2018*

Primary Responsibilities:

- Supervising undergraduate fellows for their Final Year Project.
- Assisting in Designing the Course Curriculum
- Implementing the objective based learning Course Curriculum

Modules Taught: Digital Signal Processing - Power System Distribution and Utilization - Signal and System - Power System Transients

Research Projects & Grants

Grant# 52350410456 **National Natural Science Foundation of China**

Description: "Research on Hybrid Control Methods based on Machine Learning and Nonlinear Control for Improving the Operation and Integration of Low-Carbon Multi-Energy Power Systems." **Research Expert**, funding: 200,000 CNY. Focused on developing hybrid control strategies integrating machine learning and nonlinear control to enhance the efficiency and integration of low-carbon multi-energy systems.

Grant# 375213500 **Ministry of Education in Saudi Arabia**

Description: "Application of Intelligent Nonlinear Controller in Renewable Systems and Energy Storage Units." **Co-Principal Investigator**, funding: 192,000 SAR. Aimed at optimizing the performance of renewable energy systems and energy storage units using advanced nonlinear control techniques.

Efficient Energy Storage Technology Foreign Expert Studio **Shandong Academy of Sciences**

Description: , Research on "Designing of Charging and Discharging Process Control System Integration and Debugging of Energy Storage System" as a **Core Researcher**.

Postdoctoral Project **Tsinghua University** *03/2023 - 03/2025*

Title: Optimized controller for renewable energy sources integration into offshore microgrid

Description: This study contributes towards the design of optimized hierarchical control for offshore microgrids, utilizing wind and tidal energy. It proposes an energy management system for a hydrogen-powered microgrid and incorporates machine learning algorithms for intelligent control of these microgrid systems.

Post Ph.D Project **Mohammad Ali Jinnah University** *09/2022 - 12/2022*

Title: Higher Order Sliding Mode Controller Design for AC/DC Microgrid

Description: This research contributes towards designing of advanced and intelligent controller for powering the wireless in-wheel motor system with maximum efficiency.

Ph.D Project **Shandong University** *09/2018 - 06/2022*

Title: Controller Design for Electric Vehicle Wireless Charging System

Description: This research contributes towards designing of advanced and high order sliding mode controller for wireless charging of electric vehicle using LCC-S compensation topology.

Ph.D Project **Shandong University** *09/2018 - 06/2022*

Title: Controller Design for Wireless In-wheel Motor System

Description: This research contributes towards designing of advanced and intelligent controller for powering the wireless in-wheel motor system with maximum efficiency.

M.S Project **National University of Science and Technology** *09/2014 - 11/2016*

Title: Non-linear controller Design for Tracking Maximum Power Point in Photovoltaic System

Description: This research contributes towards designing of backstepping based non-linear controller for tracking maximum power point in photovoltaic system.

Skills

- **Engineering:** MATLAB & Simulink, Maxwell Ansys, Python, PSim, Pspice, Proteus...
- **Documentation:** LaTeX, Microsoft Office, Visio, Endnote...
- **Research Techniques:** Non-linear Control, Mixed Integer Linear Programming, Artificial Neural Network, Optimization Techniques, Machine Learning Algorithms, Hardware-In-Loop, Optimal Control

Languages

- **English**
- **Pashto**
- **Urdu**
- **Punjabi**

Professional Activities

Reviewer: IEEE Transactions on Power Electronics, IEEE Transactions on Industrial electronics, IEEE Transactions on Smart Grids, Applied Energy, Solar Energy, ISA Transactions, Journal of Energy
Storage, Energy, Journal of Franklin Institure, Sustainable Energy Technologies and Assessments, International Journal of Energy Research, IEEE Transactions on Industrial Electronics, Applied Sciences, Energy Reports, Electric Power Systems.

Citation Statistics

- **Citations:** 800+
- **h-index:** 15
- **i-10 index:** 16

Research Publications (Accumulative Impact Factor: 152.1)

Papers In Review:

- **J29**: **Naghmash Ali**, Xinwei Shen Hammad Armghan. "A Data-Driven Approach for Economic Dispatch and Maximum Power Point Tracking in an Electric-Hydrogen Powered Offshore Microgrid" in IEEE Transactions on Smart Grid.

- **J28**: **Naghmash Ali**, Xinwei Shen Hammad Armghan. "Multi-level Control For Shared Hydrogen Storage System Based Offshore DC Microgrid Cluster Involving Adaptive Barrier Function" in Energy.

Journal Papers:

- **J27**: **Naghmash Ali**, Xinwei Shen, Hammad Armghan, Yunfei Du."Hierarchical control combined with higher order sliding mode control for integrating wind/tidal/battery/hydrogen powered DC offshore microgrid" in Journal of Energy Storage, 2024 (I.F-9.4)

- **J26**: Hammad Armghan, Yinliang Xu, Xiang Bai, **Naghmash Ali**, Xinyue Chang, Yixun Xue "A tri-level control framework for carbon-aware multi-energy microgrid cluster considering shared hydrogen energy storage" in Applied Energy, 2024 (I.F-11.2)

- **J25**: Hammad Armghan, Yinliang Xu, **Naghmash Ali**. "Coordination Control in Hybrid Energy Storage Based Microgrids Providing Ancillary Services: A Three-Layer Control" in Journal of Energy Storage, 2024 (I.F-9.4)

- **J24**: Hammad Armghan, Yinliang Xu, Xiang Bai, **Naghmash Ali**, Yixun Xue "Deep Learning Based Barrier-function Super-twisting Sliding Mode Control For Integrating Renewables In Smart Grid" in IET Smart Grid, 2024 (I.F-2.4)

- **J23**: Hammad Armghan, Yinliang Xu, Hongbin Sun, **Naghmash Ali**, Jiajin Liu."Event-triggered multi-time scale control and low carbon operation for electric-hydrogen DC microgrid" in Applied Energy, 2024 (I.F-11.2)

- **J22**: Mohamed A Sharaf, Hammad Armghan, **Naghmash Ali**, Amr Yousef, Yasser S Abdalla, Anis R Boudabbous, Hafiz Mehdi, Ammar Armghan."Hybrid Control of the DC Microgrid Using Deep Neural Networks and Global Terminal Sliding Mode Control with the Exponential Reaching Law" in Sensors, 2023 (I.F-3.9)

- **J21**: Yasser S Abdalla, **Naghmash Ali**, Abdulaziz Alanazi, Mohana Alanazi, Hammad Armghan, Mohamed A Sharaf, Anis R Boudabbous, Ammar Armghan."Fast reaching law based integral terminal sliding mode controller for PV-fuel cell-battery-super capacitor based direct-current microgrid" in Journal of Energy Storage, 2022 (I.F-9.4)

- **J20**: **Naghmash Ali**, Zhizhen Liu, Hammad Armghan, Ammar Armghan."Super-twisting sliding mode controller for maximum power transfer efficiency tracking in hybrid energy storage based wireless in-wheel motor" in Sustainable Energy Technologies and Assessments, 2022 (I.F-8.0)

- **J19**: **Naghmash Ali**, Zhizhen Liu, Hammad Armghan, Ammar Armghan."Double integral sliding mode controller for wirelessly charging of fuel cell-battery-super capacitor based hybrid electric vehicle" in Journal of Energy Storage, 2022 (I.F-9.4)

- **J18**: Hammad Armghan, Ming Yang, **Naghmash Ali**, Ammar Armghan, Abdulaziz Alanazi."Quick reaching law based global terminal sliding mode control for wind/hydrogen/battery DC microgrid" in Applied Energy, 2022 (I.F-11.2)

- **J17**: Xiaozhao Wei, Yanjin Hou, Zhizhen Liu, Sen Qiao, Liuhuan Liang, **Naghmash Ali**, Shuyao Sun, Xueqing Luo, Ran Ding, and Guowen Feng. "A novel dual-load wireless power transfer system applied to electric vehicles and its characteristics analysis." Energy Reports 8 (2022) (I.F-5.2)

- **J16**: Ammar Armghan, Mudasser Hassan, Hammad Armghan, Ming Yang, Fayadh Alenezi, Muhammad Kashif Azeem, **Naghmash Ali**."Barrier Function Based Adaptive Sliding Mode Controller for a Hybrid AC/DC Microgrid Involving Multiple Renewables" in Applied Sciences, 2021 (I.F-2.7)

- **J15**: Kamran Ali, Laiq Khan, Qudrat Khan, Shafaat Ullah, and **Naghmash Ali**. "Neurofuzzy robust backstepping based MPPT control for photovoltaic system." Turkish Journal of Electrical Engineering and Computer Sciences 29, no. 1 (2021) (I.F-1.1)

- **J14**: Hammad Armghan, Ming Yang, Ammar Armghan, **Naghmash Ali**."Double integral action based sliding mode controller design for the back-to-back converters in grid-connected hybrid wind-PV system" in International Journal of Electrical Power & Energy Systems, 2021 (I.F-5.2)

- **J13**: Shujing Fan, Zhizhen Liu, Guowen Feng, **Naghmash Ali**, and Yanjin Hou. "Dynamic process analysis and voltage stabilization control of multi-load wireless power supply system." Energies 14, no. 5 (2021) (I.F-3.252)

- **J12**: **Naghmash Ali**, Zhizhen Liu, Hammad Armghan, Iftikhar Ahmad, Yanjin Hou."LCC-S-based integral terminal sliding mode controller for a hybrid energy storage system using a wireless power system", in Energies, 2021 (I.F-3.2)

- **J11**: Mudasser Hassan, Zahir Javed Paracha, Hammad Armghan, **Naghmash Ali**, Hafiz Ahsan Said, Umar Farooq, Ammar Afzal, Muhammad Arshad Shehzad Hassan."Lyapunov based adaptive controller for power converters used in hybrid energy storage

systems", in Sustainable Energy Technologies and Assessments, 2020 (I.F-8.0)

- **J10**: Liuhuan Liang, Zhizhen Liu, Shujing Fan, Tang Guoshen, Yanjin Hou **Naghmash Ali**."Dual-band wireless power transmission system for dual-load synchronous power supply." Proc. CSEE 40.10 (2020)

- **J9**: Muhammad Faizan Munir, Iftikhar Ahmad, Syed Ahmad Siffat, Mohammad Ahmed Qureshi, Hammad Armghan, **Naghmash Ali**. "Non-linear control for electric power stage of fuel cell vehicles", in ISA transactions, 2020 (I.F-7.3)

- **J8**: Hammad Armghan, Ming Yang, Ammar Armghan, **Naghmash Ali**, MQ Wang, Iftikhar Ahmad. "Design of integral terminal sliding mode controller for the hybrid AC/DC microgrids involving renewables and energy storage systems", in International Journal of Electrical Power & Energy Systems, 2020 (I.F-5.2)

- **J7**: Hammad Armghan, Ming Yang, MQ Wang, **Naghmash Ali**, Ammar Armghan. "Nonlinear integral backstepping based control of a DC microgrid with renewable generation and energy storage systems" in International Journal of Electrical Power & Energy Systems, 2020 (I.F-5.2)

- **J6**: **Naghmash Ali**, Zhizhen Liu, Yanjin Hou, **Hammad Armghan**, Xiaozhao Wei, Ammar Armghan. "LCC-S based discrete fast terminal sliding mode controller for efficient charging through wireless power transfer" in Energies, 2020 (I.F-3.2)

- **J5**: Kamran Ali, Laiq Khan, Qudrat Khan, Shafaat Ullah, Saghir Ahmad, Sidra Mumtaz, Fazal Wahab Karam, **Naghmash Ali**. "Robust integral backstepping based nonlinear mppt control for a pv system." Energies 12, no. 16 (2019) (I.F-3.252)

- **J4**: Muhammad Saud Khan, Iftikhar Ahmad, Hammad Armghan, **Naghmash Ali**. "Backstepping sliding mode control of FC-UC based hybrid electric vehicle" in IEEE Access, 2018 (I.F-3.9)

- **J3**: Hammad Armghan,Iftikhar Ahmad, **Naghmash Ali**, Muhammad Faizan Munir, Saud Khan, Ammar Armghan. "Nonlinear controller analysis of fuel cell–battery–ultracapacitor-based hybrid energy storage systems in electric vehicles" in Arabian Journal for Science and Engineering, 2018 (I.F-2.9)

- **J2**: Ramsha Iftikhar,Iftikhar Ahmad,Muhammad Arsalan, Neelma Naz, **Naghmash Ali**,Hammad Armghan. "MPPT for photovoltaic system using nonlinear controller" in International Journal of Photoenergy, 2018 (I.F-2.5)

- **J1**: **Naghmash Ali**, Hammad Armghan, Iftikhar Ahmad, Ammar Armghan,Saud Khan,Muhammad Arsalan. "Backstepping based non-linear control for maximum power point tracking in photovoltaic system" in Solar Energy, 2018 (I.F-6.7)

Confererence Papers:

- **C1**: **Naghmash Ali**, Xinwei Shen Hammad Armghan, Umar Farooq. "Improved Grey Wolf Optimized Integral Terminal Sliding Mode Controller for Wind/PV/Tidal based Offshore Microgrid System" 8th IEEE Conference on Energy Internet and Energy System Integration. IEEE, 2024
- **C2**: Rehman, Atiq Ur, Laiq Khan, **Naghmash Ali**, Zaheer Alam, Zain Ahmad Khan, and Malak Adnan Khan. "Soft Computing Technique based Nonlinear Sliding Mode Control for Stand-Alone Photovoltaic System." In 2020 International Conference on Emerging Trends in Smart Technologies (ICETST), pp. 1-6. IEEE, 2020

References

- **Prof. Liu Zhizhen**: Professor, School of Electrical Engineering,
  Shandong University, Jinan China.
  Email: liuzhizhen@sdu.edu.cn
  Phone: +86 15169099790
  Web: `https://www.ee.sdu.edu.cn/info/1543/12133.htm`

- **Dr. Xinwei Shen**: Assistant Professor, Institute of Ocean Engineering,
  Shenzhen International Graduate School, Tsinghua University. Shenzhen, China.
  Email: sxw.tbsi@sz.tsinghua.edu.cn
  Phone: +86 13554871126

Web: https://www.sigs.tsinghua.edu.cn/sxw/main.htm/

- **Dr. Chunfang Wang**: Professor, School of Electrical Engineering,
  Qingdao University, Shandong, China.
  Email: qduwcf@163.com
  Phone: +86 158798871588
  Web: https://ee.qdu.edu.cn/info/1328/1070.htm

- **Dr. Laiq Khan**: Professor, Department of Electrical and Computer Engineering
  COMSATS University, Pakistan.
  Email: laiqkhan@comsats.edu.pk
  Phone: +92 3009009472
  Web: http://ww2.comsats.edu.pk/faculty/FacultyDetails.aspx?Uid=28428