

Md. Zishan Akhter



📍 Technology Innovation Institute (TII)
Yas Island - Abu Dhabi, UAE

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Research Areas/Interests: Fluid Dynamics, Multiphase flows, Fluid-Structure Interaction, Biomechanics, Aeroacoustics & Noise Control, Thermofluids & Heat Transfer, Combustion & Propulsion, Metamaterials, Numerical Modeling & Simulation, Renewable Energy Systems, Design and Innovation.

Patents	Journal Articles	Conference Articles	Research Grants	Awards
06	11	10	02	05

Academics

- **Doctor of Philosophy – Mechanical & Aerospace Engineering** Aug'19-Dec'23
United Arab Emirates University, Al Ain, UAE.
Thesis: *Aerodynamic & Aeroacoustic Performance of Wind Turbine Blades Featuring Enhanced Flow-Control*
- **Master of Science – Aerospace Engineering (Joint Degree)** Jul'15-Apr'18
Technical University of Munich (TUM, Germany) & Nanyang Technological University (NTU, Singapore).
Thesis: *Ballistic and Thermomechanical Characterisation of Hybrid Rocket Fuels*
- **Bachelor of Technology – Mechanical Engineering** Aug'11-May'15
Sharda University, Greater Noida, India.
Thesis: *Experimental Study of Airfoil in Wind-Tunnel*

Appointments

- **Researcher** Jun'23–present
Project/Role: Renewable Energy R&D with focus on Solar and Wind Energy
Organization: Technology Innovation Institute (TII), UAE.
- **Research Intern** Jul'16–Oct'16
Project/Role: Research on fluid structure interactions.
Organization: Institute of High-Performance Computing, A*STAR, Singapore.

Projects

- Solar Reactor
- Unconventional Propellers for UAM
- Duct-Augmented Wind Turbines
- H₂-Based Solid-State Cooling
- Electrocaloric Cooling
- Waste Heat Recovery
- Hydropanels Design and Development
- Ceramic Membranes for Water Treatment
- Atmospheric Fog-Harvesting
- Passive Air Cooling
- 4D-Printed Biomimetic Morphing Hydrogel
- Wind Turbine Flow Control
- Acoustically Enhanced Landing Pads
- Hybrid Antimicrobial Solvents and Fabrics
- Biodegradable Date Palm Straws
- Twist Morphing Wind Turbine Blades
- Functionally Graded Rocket Fuels
- Solar Thermal Syphon Pump

Patents (6 Granted & 1 Filed)

1. **Akhter, M. Z.**, & Omar, F. K. (2024). *Wind Turbine Blade Having Air Passage with Air Cleaning Member*. (US12123391B2, P6000067/2024). US & UAE Patent Office.
2. **Akhter, M. Z.**, & Omar, F. K. (2024). *Aerofoil Module for Propeller and Turbine Blades with Passive Variable Air Passage Cover* (US 12,110,864). US Patent Office.
3. **Akhter, M. Z.**, & Omar, F. K. (2024). *Wind Turbine Blade with Self-Adaptive Tip-Sweep* (US 11,988,187, P2024-01588). US & UAE Patent Office.
4. **Akhter, M. Z.**, & Omar, F. K. (2024). *Acoustically Enhanced Landing Pad for Ground-Effect Noise Suppression*. (US 11,939,082, P2024-00690). US & UAE Patent Office.
5. Ranjan, P., **Akhter, M. Z.**, & Devaraj, J. (2023). *Biodegradable and Safe Drinking Straws from Date Palm Leaves as Substitute for Plastic Straws* (US 11,559,157). US Patent Office.
6. **Akhter, M. Z.**, Omar, F. K., & Ali, A. R. (2022). *Self-adaptive Variable Twist Morphing Blade for Wind Turbine* (US 11,448,184). US Patent Office.
Filed applications:
7. Ranjan, P., **Akhter, M. Z.**, & Devaraj, J. (2022). *Hybrid Solvents and Fabrics for Antimicrobial Application* (Filed: US 17/849,115). US Patent Office.

Publications (220 Google scholar citations; h-index 8)

Journals

1. Jawahar, H. K., Hanson, L., **Akhter, M. Z.**, & Azarpeyvand, M. (2025). Porous Ground Treatments for Propeller Noise Reduction in Ground Effect. *Scientific Reports*, 15, 2170.
2. Baig, F., Kassem, A., **Akhter, M. Z.**, Kabeer, S., Faiz, M. A., Baig, M. F., & Sherif, M. (2025). Synergies and Struggles: Water Security and Climate Action in South Asia's Quest for SDG 6 and SDG 13. *Gondwana Research*. (accepted)
3. **Akhter, M. Z.**, Jawahar, H. K., Omar, F. K., & Elnajjar, E. (2024). Performance Characterization of a Slotted Wind Turbine Airfoil Featuring Passive Blowing. *Energy Reports*, 11, 720-735
4. **Akhter, M. Z.**, Ali, A. R., Jawahar, H. K., Omar, F. K., & Elnajjar, E. (2023). Enhanced Energy Extraction in Small-Scale Wind Turbines Through Slot-Based Passive Blowing. *Energy Conversion and Management: X*, 100400.
5. **Akhter, M. Z.**, Ali, A. R., Jawahar, H. K., Omar, F. K., & Elnajjar, E. (2023). Performance Enhancement of Small-Scale Wind Turbine Featuring Morphing Blades. *Energy*, 278, 127772.
6. **Akhter, M. Z.**, Ali, A. R., & Omar, F. K. (2022). Aerodynamics of a three-dimensional bionic morphing flap. *Sustainable Energy Technologies and Assessments*, 52, 102286.
7. Ali, A. R., **Akhter, M. Z.**, & Omar, F. K. (2021). Performance enhancement of a small-scale wind turbine featuring morphed trailing edge. *Sustainable Energy Technologies and Assessments*, 46, 101229.
8. **Akhter, M. Z.**, & Omar, F. K. (2021). Review of Flow-Control Devices for Wind-Turbine Performance Enhancement. *Energies 2021, Vol. 14, Page 1268, 14(5)*, 1268.
9. **Akhter, M. Z.**, & Hassan, M. A. (2021). Ballistic and thermomechanical characterisation of paraffin-based hybrid rocket fuels loaded with light metal hydrides. *Acta Astronautica*, 178, 370–381.
10. **Akhter, M. Z.**, & Mysa, R. C. (2019). Prescribed motion flow dynamics. *Journal of Mechanical Science and Technology*, 33(1), 289–297.
11. **Akhter, M. Z.**, & Hassan, M. A. (2018). Characterisation of paraffin-based hybrid rocket fuels loaded with nano-additives. *Journal of Experimental Nanoscience*, 13(sup1), S31–S44.
Forthcoming:
12. Jawahar, H. K., **Akhter, M. Z.**, & Azarpeyvand, M. (2024). Jet plate tone interaction.
13. Designing Mechanically Robust Ceramic Membrane Scaffolds for Sustainable Clean Water Production

Conferences

1. **Akhter, M. Z.**, Shabaan, A., & Marini, A. (2024). Enhancing Power Output of Ducted Wind Turbines through Flow Control. *TORQUE 2024*.
2. **Akhter, M. Z.**, Omar, F. K., & Elnajjar, E. (2023). Aerodynamic and Aeroacoustic Characteristics of a Bionic Morphing Flap. *8th International Conference on Sustainable and Renewable Energy Engineering, ICSREE 2023*.
3. Chaithanya, B., **Akhter, M. Z.**, Ramachandran, T., Al-Marzouqi, A. H., & Omar, F. K. (2023). Trends in Solar Powered Water Desalination Using Hydrogels: A Short Review. *2023 Advances in Science and Engineering Technology International Conferences, ASET 2023*.
4. **Akhter, M. Z.**, Ali, A. R., & Omar, F. K. (2022). Effect of flow Reynolds number on the aerodynamics of a novel bionic morphing flap. *2022 Advances in Science and Engineering Technology International Conferences, ASET 2022*.
5. **Akhter, M. Z.**, Ali, A. R., & Omar, F. K. (2021). Design and Analysis of a Morphing Trailing Edge System. *2021 6th International Conference on Renewable Energy: Generation and Applications, ICREGA 2021*, 58–62.
6. **Akhter, M. Z.**, Ali, A. R., & Omar, F. K. (2021). Wind Turbine Power Augmentation Using Virtually Morphed Trailing Edge. *2021 6th International Conference on Renewable Energy: Generation and Applications, ICREGA 2021*, 233–236.
7. **Akhter, M. Z.**, & Hassan, M. A. (2020). Energetic additives for hybrid rocket propulsion - Review. *2020 Advances in Science and Engineering Technology International Conferences, ASET 2020*.
8. **Akhter, M. Z.**, Raza, M., & Iftikhar, S. H. (2020). Temporal and economic benefits of vertical take-off and landing vehicles in urban transport. *2020 Advances in Science and Engineering Technology International Conferences, ASET 2020*.
9. **Akhter, M. Z.**, & Hassan, M. A. (2014). Low Energy Nuclear Reaction (LENR) – Sustainable and Green Energy: A Review. *7th International Meeting on Advances in Thermofluids, IMAT 2014*.
10. **Akhter, M. Z.**, Khan, M. S., Farooque, M. S., Dubey, K., & Sinha, G. P. (2014). Design and Study of a Solar Thermal Syphon Pump. *International Conference on Emerging Trends in Science and Cutting Edge Technology, ICETSCET 2014*.

Research Grants (USD 0.3 Million)

- *Unsteady Aerodynamic and Aeroacoustics Characteristics of Unconventional Propellers for Urban Air Mobility Applications* – funded by UAEU Program for Advanced Research (UPAR), USD 200,000; 2025–2029.
- *4D-Printed Biomimetic Morphing Hydrogel for Solar-Based Water Purification* – funded by UAEU Program for Advanced Research (UPAR), USD 100,000; 2021–2023.

Honors & Awards

- Felicitated by the Chancellor for securing US Patent – ‘*Biodegradable and Safe Drinking Straws from Date Palm Leaves as a Substitute for Plastic Straws*’, (US 11,559,157).
- Chancellor’s Innovation Award (2022-23) for ‘*Futuristic Landing Pads for UAVs*’. [Link](#)
- Felicitated by the Chancellor for securing US Patent – ‘*Self-Adaptive Variable Twist Morphing Blade for Wind Turbines*’, (US 11,448,184).
- Chancellor’s Innovation Award (2021-22) for ‘*4D Bio-printed Microgels Loaded with Nanoparticles for Targeted Drug-Delivery*’. [Link](#)
- Chancellor’s Innovation Award (2020-21) for ‘*Net Zero Energy (NZE) Morphing*’. [Link](#)
- Chancellor’s Innovation Award (2020-21) for ‘*Next-Generation Meta-Material Embedded Knitted-Fabric for Defense in Aerospace Applications*’. [Link](#)
- Chancellor’s Innovation Award (2019-20) for ‘*Aerial Advertising & Display System*’. [Link](#)
- Full-Scholarship Grant for PhD (2019-2023) from the College of Graduate Studies, UAE University.

Software & Language Proficiency

- **Numerical Modeling:** ANSYS Workbench (ICEM CFD, Fluent, Mechanical, Design Modeler, Static/Transient Structural, Harmonic Acoustics/Response, ACP Pre/Post), COMSOL, OpenFOAM, LabView, XFLR5, Qblade.
- **Data Visualization & Post-Processing:** ParaView, gnuplot, CFD-Post, MATLAB, Octave, Matplotlib, SPSS, MiniTab, Bibliometrix (R-Studio), VOSviewer.
- **CAD & Design:** SolidWorks, AutoCAD, ANSYS SpaceClaim, Gmsh.
- **Computer Languages:** C, C++, Python (NumPy, SciPy, Pandas, PyTorch).
- **Productivity & Documentation:** MS Office (Windows), iWork (macOS), LibreOffice (Linux), and Latex.
- **Languages:** (SRW)- English, Urdu, and Hindi; and (RW)- Arabic.

Courses/Certifications

- *'ESG and Sustainability Masterclass: Sustainable Strategy and Framework'*, Energy Training Centre, UAE (2025)
- *'ANSYS Multiphase Advanced Training'*, Ansys Inc., UAE (2025)
- *'Energy Management - Certified Energy Professionals'*, International Center for Training & Development, UAE (2025)
- *'COMSOL Multiphysics extended course'*, Echo Dynamics, UAE (2024)
- *'Open-source Computational Fluid Dynamics'*, PhD Module Course, Aalborg University, Denmark (2024)
- *'PhD Students Teaching Academy Program'* – Apprenticeship in teaching pedagogies, The Center for Excellence in Teaching and Learning, UAE University, UAE (2021).

Media Coverage

- *'Grass surfaces drastically reduce drone noise making the way for soundless city skies'*, 24/Jan/25, Microbiology Study. [Link](#)
- *'Grass Surfaces Slash Drone Noise for Quieter Skies'*, 23/Jan/25, Mirage News. [Link](#)
- *'Porous ground treatments drastically reduce drone noise, making way for soundless city skies'*, 22/Jan/25, Tech Xplore, MSN News. [Link](#)
- *'Simple Grass Could Be the Secret to Silent Flying Taxis'*, 22/Jan/25, Science Blog. [Link](#)
- *'Grass surfaces reduce drone noise'*, 22/Jan/25, Airports International. [Link](#)
- *'Drone noise reduced by porous vegetative surfaces'*, 22/Jan/25, The Engineer. [Link](#)
- *'Grass surfaces drastically reduce drone noise making the way for soundless city skies'*, 22/Jan/25, ScienceDaily. [Link](#)
- *'Grass surfaces drastically reduce drone noise making the way for soundless city skies'*, 22/Jan/25, EurekAlert! [Link](#)
- *'Grass surfaces drastically reduce drone noise making the way for soundless city skies'*, 20/Jan/25, Newswise. [Link](#)
- *'Grass surfaces drastically reduce drone noise making the way for soundless city skies'*, 22/Jan/25, University of Bristol News. [Link](#)
- *'With Four Patents in 2024, UAEU PhD Researcher Achieves a Significant Breakthrough in Renewable Wind Energy and Drones'*, 26/Dec/24, United Arab Emirates University News. [Link](#)
- *'بأحث من «جامعة الإمارات» يسجل أربع براءات اختراع* (A researcher from the United Arab Emirates University registers four patents), 26/Dec/24, Alkhaleej News. [Link](#)
- *'Self-adaptive' wind turbine patent granted to UAEU inventors'*, 9/Jul/24, The National News. [Link](#)
- *'UAE researchers innovate to create sustainable solutions'* 31/Mar/23, University World News. [Link](#)

Community Engagement

- Regular donor to international organizations aiding disaster and war-torn zones, contributing to global relief efforts and humanitarian aid.
- Actively support local organizations that provide interest-free loans, free education for children, and health check-up camps for underprivileged communities, enhancing their quality of life and opportunities.

Interests

- Passionate about exploring diverse cultures, cuisines, and landscapes, enhancing global perspective and cultural awareness. I have traveled to 11 countries so far (Malaysia, Singapore, UAE, Kuwait, KSA, USA, Spain, Italy, Vatican City, Netherlands, and Denmark), and wish to explore many more.
- Passionate about mentoring and supporting the younger generation, providing guidance in career and personal development. Always available and eager to assist them in overcoming life challenges.

Referees: Available upon request

Md. Zishan Akter

05 February 2025