Dr. Aghna Mukherjee

PERSONAL INFORMATION

Date of birth	June 11th, 1993, Durgapur, West Bengal
Nationality	Indian
Address	Department of Mechanical Engineering, Indian Institute of Technology Kharagpur, 721302, West Bengal, India aghna11@gmail.com/amukherjee@mech.iitkgp.ac.in

CURRENT AFFILIATION

2024-present **Assistant Professor,** Indian Institute of Technology Kharagpur**,** Department of Mechanical Engineering

EDUCATION

2016-2021 **M.S. and Ph.D.** in Applied Mechanics, Indian Institute of Technology Madras**,** India

2011-2015 **BTech** in Mechanical Engineering, National Institute of Technology Durgapur, India

RESEARCH AND PROFESSIONAL EXPERIENCE

2021-present **Postdoctoral researcher**, Composite Materials and Adaptive Structures Laboratory, ETH Zurich, Department of Mechanical and Process Engineering

2016-2021 **PhD,** Smart Materials Characterization Lab, Indian Institute of Technology Madras, Department of Applied Mechanics, Awarded on 21/09/2021.

2019-2020 **Visiting Fellow,** Swansea University, Department of Aerospace Engineering

2015-2016 **Maintenance Engineer**, Exide Industries, Automotive Strategic Business Unit, Haldia, India

2014-2015 **Undergraduate Researcher,** Central Mechanical Engineering Research Institute, Durgapur, India

PUBLICATIONS

Journals

1. Elderfield N, Mukherjee A, Ermanni P, Wong JC. 3D printed bistable composite lattice shells with tailorable coiled geometries. *Composite Structures*. 2025 Jun 11:119332.
2. Vogel T, Mukherjee A, Tarter E, Sakovsky M, Ermanni P. Kinematics-driven design of reconfigurable bistable hinges with high stiffness and stability. *Materials & Design*. 2024 Aug 1;244:113154.
3. Mukherjee P, Mukherjee A, Arockiarajan A, Ali SF. Dynamics of bistable composite plates. *International Journal of Non-Linear Mechanics*. 2024 Jun 3:104767.
4. Mukherjee A, Vogel T, Ermanni P. Enhancing the design space of bistable laminates by tailoring the attachment boundary conditions. *Journal of Vibration and Acoustics*. 2023 Dec 1;145(6).
5. Mukherjee, A., Risso, G. and Ermanni, P., 2023. Quantifying the strength of stability of multi-stable structures: A new design perspective. *Thin-Walled Structures*, *189*, p.110921.

6. Mukherjee, A., Sudersan, S., Ali, S.F. and Arockiarajan, A., 2021. Magnetic actuation of switchable bistable structures: a numerical study. *Smart Materials and Structures*, *30*(7), p.075025.
7. Mukherjee, A., Ali, S.F. and Arockiarajan, A., 2021. Hybrid bistable composite laminates for structural assemblies: A numerical and experimental study. *Composite Structures*, *260*, p.113467.
8. Mukherjee, A., Ali, S.F. and Arockiarajan, A., 2020. Modeling of integrated shape memory alloy and Macro-Fiber Composite actuated trailing edge. *Smart materials and structures*, *29*(8), p.085005.
9. Mukherjee, A., Friswell, M.I., Ali, S.F. and Arockiarajan, A., 2020. Modeling and design of a class of hybrid bistable symmetric laminates with cantilever boundary configuration. *Composite Structures*, *239*, p.112019.
10. Mukherjee, A., Ali, S.F. and Arockiarajan, A., 2019. Compliant structure under follower forces and any combined loading: Theoretical and experimental studies. *International Journal of Mechanical Sciences*, *153*, pp.75-82.

Scopus Indexed Conference Proceedings

1. Mukherjee, A., Huber, S., and Ermanni, P., 2023, July. Active stiffness tailoring of hybrid SMP-carbon epoxy bi-stable tape springs. In *X ECCOMAS Thematic Conference on Smart Structures and Materials SMART 2023 (*Paper accepted, conference date July 3-5, 2023).*
2. Mukherjee, P., Mukherjee, A., Ali, S.F., and Arockiarajan, A., 2022, December. Dynamics of MFC actuated composite plate using reduced models. In *67th congress of Indian Society of Theoretical and Applied Mechanics (*Paper accepted, conference date December 14-16, 2022).*
3. Mukherjee, A., Sridhar, S., Ali, S.F., and Arockiarajan, A., 2021, March. Modeling of the snap-through of a hybrid bistable laminate by a magnetic force field. In *Active and Passive Smart Structures and Integrated Systems XV* (Vol. 11588, pp. 119-125). SPIE.
4. Mukherjee, A., Kumar, D., Ali, S.F., and Arockiarajan, A., 2020, May. Design and conception of a trailing edge morphing wing concept with bistable composite skin. In *Active and Passive Smart Structures and Integrated Systems XIV* (Vol. 11376, pp. 497-506). SPIE.
5. Mukherjee, A., Ali, S.F., and Arockiarajan, A., 2019, March. Shape prediction of a composite wing panel under the action of an SMA wire and an MFC bimorph. In *Active and Passive Smart Structures and Integrated Systems XIII* (Vol. 10967, pp. 476-484). SPIE.

Book Chapters

1. Mukherjee, A., Mundwaik, A., Ali, S.F., and Arockiarajan, A., 2020. Design of a flow control device using a special class of hybrid symmetric bistable laminates in clamped boundary condition. In *Recent Advances in Computational Mechanics and Simulations: Volume-II: Nano to Macro* (pp. 587-596). Singapore: Springer Singapore.

INVITED TALKS

2022 **Graduate Aerospace Laboratories.** California Institute of Technology, Pasadena, US
"Analysis and design of reconfigurable space structures using bistable composites."

2022 **Programmable Structures Lab.** Purdue University, West Lafayette, US
"Multi-functional multi-stable structures for space and other applications"

RESEARCH EXPEDITIONS LED

2021-present **Innosuisse Project,** CMASLab, ETH zurich

Leading a team to develop a reconfigurable boom for a satellite using bistable tape spring rolamite (BTSR) hinges and integrated SMA actuation system in collaboration with ClearSpace. This work is part of a larger European Space Agency Project to develop a debris collection satellite for the Earth's lower orbit.

2019-2020 **Industrial Project,** SMCL, IIT Madras
I spearheaded a team responsible for creating bespoke ABAQUS subroutines designed for the indirect lot testing of metal ingots through the utilization of hardness measurement methodologies such as the Brinell Hardness test.

AWARDS AND HONORS

2021 **Keshav Ranganath Award**, Indian Institute of Technology Madras, India
Institutes best outgoing thesis for the year 2021
2021 **Prof. V Ramamurthi Award,** Indian Institute of Technology Madras, India
Best PhD thesis in Applied Mechanics
2020 **Travel grant,** awarded for the 25th International Congress of Theoretical and Applied Mechanics
2011 Top one percentile, All India Engineering Entrance Examination
2009 **Merit certificate in science**, Central board of Secondary Education
top 0.1% students in AISSE 2009

PATENTS

2021 **Indian patent,** Hybrid wing device, method of actuation thereof and aircraft with hybrid wing
Patent number: 381604
2023 **European patent (provisional filed),** Bistable tape spring rolamite hinges
European patent application No. 22189602.0, - Provisional patent filed.

FUNDING

2025 **SCM Ltd.,** INR 3,96,000
In collaboration with Prof. Siddharth Tamang, IIT Kharagpur
2025 **ISRO-KCSTC,** INR 29,99,605
In collaboration with Prof. Atul Jain, IIT Kharagpur
2023 **NSERC**, Alliance grant, 25000$/1-year (co-investigator)
In collaboration with Dr. Joanna Wong, University of Calgary.

RESEARCH SUPERVISION AND MENTORING

2024-present **MTech thesis advisor,** Department of Mechanical Engineering, IIT Kharagpur
Ankit Patel
Avanish Kumar
Shashwat Pandey
Bokam Bhaskar
Omkar Ambilwade
2021-2023 **PhD advisor,** Edouard Tarter; Co-advisor; ETH Zurich
2021-2023 **Master thesis advisor,** CMASLab, ETH Zurich
Tom Vogel
Xiuping
Stefan Scherrer
2021-2023 **Semester thesis advisor – MS students,** CMASLab, ETH Zurich

Stefan Scherrer
Marc Vogel
Geo Leona
Yves Brunner

2021-2023 **Bachelor thesis advisor,** CMASLab, ETH Zurich
Severin Huber
Alina Arranhado
Alexander Perozzi

2020-2021 **Master thesis advisor,** Department of Applied Mechanics, IIT Madras
Sakthi Arjun

2018-2021 **Summer Intern advisor,** Department of Applied Mechanics, IIT Madras
Koustav Roy, NIT Durgapur
Mohammed Iqbal, IIT Palakkad

FUNCTIONS AND COMMISSIONS OF TRUST

2021-2021 **Second Advisor (Administrative position),** D-MAVT, ETH Zurich
Giada Risso, PhD Scholar, ETH Zurich
Michael Kolbl, PhD Scholar, ETH Zurich

TEACHING EXPERIENCE

2024-present **Lecturer,** Department of Mechanical Engineering, IIT Kharagpur
Basic Engineering Mechanics, Undergraduate course
Mechanisms Sessional, Laboratory Course

2021-2023 **Co-lecturer,** Aircraft Structures, D-MAVT, ETH Zurich

2016-2021 **Teaching Assistant,** Department of Applied Mechanics, IIT Madras
Advanced Finite Element Analysis, Graduate course
Mechanics of Composite Materials and Structures, Graduate course
Finite Element Method, Graduate course
Engineering Mechanics, Undergraduate course
Linear Dynamical Systems, Graduate course
Solid Mechanics, Graduate course

REFERENCES

Prof. P. Ermanni,
Professor, Department of Mechanical and Process Engineering, ETH Zurich
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Postdoc Mentor

Prof. Shaikh Faruque Ali,
Professor, Department of Applied Mechanics, IIT Madras
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Thesis advisor

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