

DIPAYAN MUKHERJEE, Ph.D.

Assistant Professor
Department of Mechanical Engineering, IIT Kanpur

Curriculum Vitaé
(Last update: 01 Dec '23)

CONTACT

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PROFESSIONAL APPOINTMENTS

Assistant Professor Nov 2022 - present
Department of Mechanical Engineering, Indian Institute of Technology Kanpur
Activities: Teaching & research.

Research Associate Dec 2020 - Oct 2022
Department of Engineering, University of Cambridge
Project: Kinetics of Li dendrite propagation in all-solid-state Li-ion batteries.

EDUCATION

Ph.D. in Engineering Mechanics Jul 2017 - Oct 2020
École Polytechnique, Institut Polytechnique de Paris
Thesis: Theoretical and numerical modeling of magnetorheological elastomers comprising magnetically soft and hard particles. ([doi](#))

M.Tech. in Mechanical Engineering Jul 2014 - Jun 2016
Indian Institute of Technology Kanpur
Thesis: Dynamics and stability of axially lengthening and shortening heavy cables.

B.E. in Mechanical Engineering Jul 2010 - May 2014
Indian Institute of Engineering Science and Technology, Shibpur

PUBLICATIONS

- (j9) [Mukherjee, D.](#), 2024. Numerical modeling of magnetically driven catheter propagation in confined spaces. *in preparation*.
- (j8) [Mukherjee, D.](#), Hao, S., Shearing, P.R., McMeeking, R.M., Fleck, N.A., Deshpande, V.S., 2023. Ingress of Li into solid electrolytes: cracking and sparsely filled cracks. *Small Struct.*, 2300022. ([doi](#))
- (j7) [Mukherjee, D.](#), Danas, K., 2022. A unified dual modeling framework for soft and hard magnetorheological elastomers. *Int. J. Solids Struct.* **257**, 111513. ([doi](#))
- (j6) [Rambausek, M.](#), [Mukherjee, D.](#), Danas, K., 2022. A computational framework for magnetically hard and soft viscoelastic magnetorheological elastomers. *Comput. Methods Appl. Mech. Engrg.* **391**, 114500. ([doi](#))
- (j5) [Mukherjee, D.](#), [Rambausek, M.](#), Danas, K., 2021. An explicit dissipative model for isotropic hard magnetorheological elastomers. *J. Mech. Phys. Solids* **151**, 104361. ([doi](#))
- (j4) [Mukherjee, D.](#), Bodelot, L., Danas, K., 2020. Microstructurally-guided explicit continuum models for isotropic magnetorheological elastomers with iron particles. *Int. J. Nonlin. Mech.* **120**, 103380. ([doi](#))
- (j3) [Mukherjee, D.](#), Danas, K., 2019. An evolving switching surface model for ferromagnetic hysteresis. *J. Appl. Phys.* **125**, 033902. ([doi](#))
- (j2) Danas, K., [Mukherjee, D.](#), Haldar, K., Triantafyllidis, N., 2019. Bifurcation analysis of twisted liquid crystal bilayers. *J. Mech. Phys. Solids* **123**, 61-79. ([doi](#))
- (j1) [Mukherjee, D.](#), Sharma, I., Gupta, S.S., 2019. Dynamics and stability of variable-length, vertically-traveling cables, with application to tethered aerostats. *J. Aircraft* **56**(1), 68-84. ([doi](#))

TEACHING

- 2023-24 II : (I) Nonlinear finite element methods in solid mechanics (**ME676**), (T) Design of machine elements (**ME351**)
2023-24 I : (I) Applied dynamics and vibrations (**ME625**)
2022-23 II : (T) Mechanics of solids (**ESO202**), (T) Engineering graphics (**TA111**), (P) Vibration and control (**ME354**)

MENTORING / THESIS SUPERVISION

- Postdoc : Ongoing: 1
Ph.D : Ongoing: 2 (1 shared with Prof. Sumit Basu)
M.Tech. : Ongoing: 2

INVITED TALKS

- Nov 2023 Computational challenges in simulating magneto-active catheter propagation in human body.
HPC Research Week, Organized by National Supercomputing Mission and IIT Madras.
- Jun 2023 Shape morphing of magneto-active soft elastomers — application to catheter locomotion.
Soft Matter Young Investigator's Meet, Jim Corbett, Uttarakhand, India.
- Apr 2022 Microstructurally-guided continuum modeling of hard magnetorheological elastomers.
ME Seminar, Indian Institute of Technology Kanpur.
- Feb 2022 Modeling lithium dendrite and dry crack propagation in all-solid- state Li-ion batteries.
LMS Seminar series, École Polytechnique, France. ([link](#))
- May 2021 Microstructurally-guided continuum modeling of soft and hard magnetorheological elastomers.
Bio and Micromechanics Seminar series, Cambridge University Engineering Department.

CONFERENCE PRESENTATIONS

- (c9) [Mukherjee, D.*](#), Fleck, N. A., Deshpande, V. S., 2022. Kinetics of lithium dendrites during plating and stripping in all-solid-state Li-ion batteries. *European Solid Mechanics Conference (ESMC)*, Galway, Ireland.
- (c8) [Mukherjee, D.*](#), Fleck, N. A., Deshpande, V. S., 2022. Modelling lithium dendrite and dry crack propagation in all-solid-state Li-ion batteries. *European Mechanics of Materials Conference (EMMC)*, Oxford, UK.
- (c7) [Mukherjee, D.*](#), Rambausek, M., Danas, K. 2021. Modeling and instabilities in magnetically hard, viscoelastic magnetorheological elastomers, *International Conference of Theoretical and Applied Mechanics (ICTAM)*, virtual.
- (c6) [Mukherjee, D.](#), Bodelot, L., Danas, K.* 2019. Coupled magneto-mechanical response of NdFeB particle-filled hard MREs, *ASME International Mechanical Engineering Conference and Exposition (IMECE)*, Salt Lake City, UT, USA.
- (c5) [Mukherjee, D.*](#), Bodelot, L., Danas, K. 2019. Effective response of NdFeB particle filled viscoelastic MREs, *EUROMAT*, Stockholm, Sweden.
- (c4) [Mukherjee, D.*](#), Danas, K., Triantafyllidis, N. 2018. Instabilities in twisted liquid crystal bilayers, *ASME International Mechanical Engineering Conference and Exposition (IMECE)*, Pittsburgh, PA, USA.
- (c3) [Mukherjee, D.*](#), Danas, K. 2018. A thermodynamically consistent model for ferromagnetic hysteresis, *European Solid Mechanics Conference (ESMC)*, Bologna, Italy.
- (c2) [Mukherjee, D.*](#), Gautam, H. 2015. Simulation of spin reversal of rattleback, *Indian National Conference of Applied Mechanics (INCAM)*, IIT Delhi, India.
- (c1) Chatterjee, S., [Mukherjee, D.*](#), Ghatak, S.*, Paul, S., Datta, A. 2014. Active feedback vibration control using pole-crossover optimization, *International Conference on Innovative Trends in Mechanical, Material, Manufacturing, Automobile, Aeronautical Engineering and Applied Physics*, New Delhi, India.

AWARDS AND SCHOLARSHIPS

- (a8) Student Competition Finalist, 10th European Solid Mechanics Conference, Bologna, 2018 with the paper *A thermodynamically consistent model for ferromagnetic hysteresis*.
- (a7) Mehta M.Tech. Gold Medal from IIT Kanpur on fourty ninth convocation of IIT Kanpur, June 2016.

*presenting author

- (a6) Academic Excellence Award from IIT Kanpur for the academic year 2014-15.
- (a5) Institute Silver Medal from IEST Shibpur for best academic performance in the Mechanical Engineering discipline.
- (a4) Govt. of India, Ministry of Human Resource Development (MHRD) scholarship for qualifying Graduate Aptitude Test in Engineering (GATE), from August 2014 to June 2016.
- (a3) Summer Undergraduate Research Grant for Excellence (SURGE) from IIT Kanpur in 2013.
- (a2) Merit scholarship from IEST Shibpur, 2011-14.
- (a1) Merit scholarship from MHRD for excellent performance in West Bengal Higher Secondary Examination 2010.

RESEARCH GRANTS

2023-25 : Fabrication and modeling of soft materials responsive to chemical and magnetic stimuli. IITK Initiation Grant. (submitted).

RESEARCH COMMUNITY SERVICES

Reviewers of : International Journal of Solids and Structures
European Journal of Mechanics / A (Solids)
Journal of Applied Physics
Journal of Magnetism and Magnetic Materials
International Journal of Non-Linear Mechanics