DIPAYAN MUKHERJEE, Ph.D.

Assistant Professor
Department of Mechanical Engineering, IIT Kanpur

Curriculum Vitaé
(Last update: 25 March '24)

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. *to be submitted.*

(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

2024-25 I : (I) Dynamics (**ME209**)

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

Jul 2024 On the stretch-independence of magnetization in hard magnetoelastic structures.
Indian National Conference of Applied Mechanics (INCAM), NIT Warangal.

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.

*presenting author

AWARDS AND SCHOLARSHIPS

(a8) Student Competition Finalist, 10^{th} 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.

(a6) Academic Excellence Award from IIT Kanpur for the academic year 2014-15.

(a5) Institute Silver Medal from IIEST 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 IIEST Shibpur, 2011-14.

(a1) Merit scholarship from MHRD for excellent performance in West Bengal Higher Secondary Examination 2010.

RESEARCH GRANTS

2024-26 : Fabrication and modeling of soft materials responsive to chemical and magnetic stimuli. IITK Initiation Grant. 25.0 L.

RESEARCH COMMUNITY SERVICES

Reviewer of : Journal of the Mechanics and Physics of Solids
Iternational Journal of Solids and Structutes
European Journal of Mechsics / A (Solids)
Journal of Applied Physics
Journal of Magnetism and Magnetic Materials
International Journal of Non-Linear Mechanics