Nitesh Arora

Postdoctoral Fellow, Georgia Tech

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Education

2023 **Ph.D. Mechanical Engineering**, University of Wisconsin–Madison

2021 **M.S. Mechanical Engineering**, University of Wisconsin–Madison

2018 **B.Tech. Mechanical Engineering**, IIT Roorkee

Work Experience

Sep 2023 – present	**Postdoctoral Fellow** Bhamla Lab, Georgia Institute of Technology
Sep 2018 – Aug 2023	**Graduate Student** Soft Matter Lab, University of Wisconsin–Madison
Jul – Sep 2022	**Visiting Student** University of Galway, Ireland
Jul 2017 – Jun 2018	**Undergraduate Researcher** Mechanical Engineering, IIT Roorkee
May – Jul 2017	**Research Internship** Centre de Recherche en Informatique, Signal et Automatique de Lille (CRIStAL), University of Lille, France

Fellowships & Awards

2024 **Top 10 Finalist** in the USNC/TAM 5MT Virtual Thesis Competition

2024 **Outreach Fellow**, U.S. National Committee for Theoretical and Applied Mechanics – Subcommittee on Outreach and Education

2023 **Future Investigator Travel Award**, Division of Soft Matter, APS

2022 **Distinguished Student Award**, APS Forum on International Physics

2021 **Thomas J. R. Hughes Fellowship**, U.S. National Committee for Theoretical and Applied Mechanics, National Academy of Sciences

2021 **NSF Presenter Fellowship** for ICTAM 2020+1

2021 **International Congress of Theoretical and Applied Mechanics Grant**, ICTAM 2020+1

2021 **MRSEC Honored Scholar Travel Award**, University of Wisconsin MRSEC

2021 **APS Division of Soft Matter Meeting Grant**, APS March Meeting 2021

2019 **Student Research Grants Competition**, UW–Madison

2018 **Chester E. & Flora Jane LeRoy Fellowship**, Mechanical Engineering, UW–Madison

2016 **Summer Undergraduate Research Award**, IIT Roorkee

PATENTS

2. A. K. Sharma, N. Arora, P. P. S. Seerha, Mechanical safety apparatus for thread failure in power screw based lifts, Indian Patent number: 540147 (2024)

1. M. M. Joglekar, K. Kashyap, N. Arora, C. Jivani, P. Kumar, A. K. Sharma, Dielectric elastomer based variable focal length reflector, Indian Patent number: 470274 (2023)
Coverage: Blitz India, Lokmat Times, Edunews, Bhaskar, etc.

PUBLICATIONS (Refereed Journal Papers)

Google Scholar: https://scholar.google.com/citations?user=PF0wHGUAAAAJ

Articles in preparation

- N. Arora, K. R. Prathyusha, A. Desai, and S. Bhamla, Light-controlled entangled active matter.
- D. Chen, N. Arora, Y. Xiang, Q. Yao, Q. Zhang, and S. Rudykh, Emergence of large-scale pattern in soft quasi-crystals.

Published Journal articles

21. N. Arora, V. Chen, A. Cherkasov, Y. Xiang, A. Juhl, P. Buskohl, and S. Rudykh,* Magnetically-programmed instability-driven pattern transformations in soft materials. **Advanced Functional Materials** 34, 2401077 (2024) [link]

20. Q. Yao, N. Arora, D. Chen, Y. Xiang, S. Rudykh,* Elastic instabilities of soft laminates with stiffening behavior. **Applied Mathematical Modelling** 130, 658-675 (2024) [link]

19. V. Chen, N. Arora, A. Goshkoderia, C. Willey, Z. Turgut, P. Buskohl, S. Rudykh,* and A. Juhl,* Mechanical instability tuning of a magnetorheological elastomer composite laminate. **Composites Part B: Engineering** 251, 110472 (2023) [link]

18. D. Chen, Y. Xiang, N. Arora, Q. Yao, J. Li, and S. Rudykh,* Post-Buckling Development in Soft Particulate Composites. **Composite Structures** 322, 117337 (2023) [link]

17. Y. Xiang, D. Chen, N. Arora, Q. Yao, and S. Rudykh,* Towards understanding the role of viscoelasticity in microstructural buckling in soft particulate composites. **Composites Part B: Engineering** 263, 110850 (2023) [link]

16. Q. Zhang,* A. Cherkasov, C. Xie, N. Arora, and S. Rudykh, Nonlinear elastic vector solitons in hard-magnetic soft mechanical metamaterials. **International Journal of Solids and Structures** 280, 112396 (2023) [link]

15. Q. Zhang,* A. Cherkasov, N. Arora, G. Hu, and S. Rudykh, Magnetic field-induced asymmetric mechanical metamaterial. **Extreme Mechanics Letters** 59, 101957 (2023) [link]

14. N. Arora, J. Li, and S. Rudykh,* Tunable buckling plane orientation via in-plane periodicity in soft 3D-fiber composites: Simulations and experiments. **International Journal of Solids and Structures** 250, 111711 (2022) [link]

13. N. Arora,* Q. Yao, and S. Rudykh, Deformation activated negative group velocity state in soft laminates. **Extreme Mechanics Letters** 51, 101592 (2022) [link]

12. M. O'Neill, D. Sessions, N. Arora, V. Chen, A. Juhl, G. Huff, S. Rudykh, R. Shepherd, and P. Buskohl,* Dielectric elastomer architectures with strain-tunable permittivity. **Advanced Materials Technologies** 7, 2200296 (2022) [link]

11. D. Chen, N. Arora, Y. Xiang, J. Li, V. Slesarenko, and S. Rudykh,* Instability-induced patterns and their post-buckling development in soft particulate composites. **Mechanics of Materials** 175, 104482 (2022) [link]

10. M. Bahreman, N. Arora, H. Darijani, and S. Rudykh,* Structural and material electro-mechanical instabilities in microstructured dielectric elastomer plates. **European Journal of Mechanics–A/Solids** 94, 104534 (2022) [link]

9. P. Pathak, N. Arora, and S. Rudykh,* Magnetoelastic instabilities in soft laminates with ferromagnetic hyperelastic phases. **International Journal of Mechanical Sciences** 213, 106862 (2022) [link]

8. N. Arora,*,† Y. Xiang,† and S. Rudykh, Multiscale analysis of elastic waves in soft materials: from molecular chain networks to fiber composites. **International Journal of Mechanical Sciences** 200, 106433 (2021) [link]

7. J. Li, N. Arora, and S. Rudykh,* Elastic instabilities, microstructure transformations, and pattern formations in soft materials. **Current Opinion in Solid State and Materials Science** 25, 100898 (2021) [link]

6. N. Arora, J. Li, V. Slesarenko, and S. Rudykh,* Microscopic and long-wave instabilities in 3D fiber composites with non-Gaussian hyperelastic phases. **International Journal of Engineering Science** 157, 103408 (2020) [link]

5. Y. Xiang, C. Schilling, N. Arora, A. Boydston, and S. Rudykh,* Mechanical characterization and constitutive modeling of visco-hyperelasticity of photocured polymers. **Additive Manufacturing** 36, 101511 (2020) [link]

4. A. Goshkoderia, N. Arora, V. Slesarenko, J. Li, V. Chen, A. Juhl, P. Buskohl, and S. Rudykh,* Tunable permittivity in dielectric elastomer composites under finite strains: Periodicity, randomness, and instabilities. **International Journal of Mechanical Sciences** 186, 105880 (2020) [link]

3. N. Arora, A. Batan, J. Li, V. Slesarenko, and S. Rudykh,* On the influence of inhomogeneous interfacial layers on instabilities in hyperelastic composites. **Materials** 12, 763 (2019) [link]

2. N. Arora, P. Kumar, M. M. Joglekar,* A modulated voltage waveform for enhancing the travel range of dielectric elastomer actuators. **Journal of Applied Mechanics** 85, 111009 (2018) [link]

1. A. K. Sharma, N. Arora, M. M. Joglekar,* DC dynamic pull-in instability of a dielectric elastomer balloon: an energy-based approach. **Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences** 474, 20170900 (2018) [link]

Invited Talk

1. "Soft Reconfigurable Materials: From Magnetoactive Elastomers to Light-driven Living Matter", Sabarmati Young Researchers' Seminar Series, IIT Gandhinagar, Jan 2025

Conference presentations

15. "Morphing entangled active matter with light", Gordon Research Conference on Complex Active and Adaptive Material Systems, Ventura, USA (2025)
14. "Light-driven transformations in entangled active matter", International Soft Matter Conference, Raleigh, USA (2024)
13. "Light-driven transformations in entangled active matter", APS March meeting, Minneapolis, USA (2024)
12. "Harnessing magneto-mechanical coupling to tailor structural transformations in soft composites" APS March meeting, Las Vegas, USA (2023)
11. "Magnetic field-controlled buckling patterns in soft magnetoactive composites", Society of Engineering Science (SES) Annual Meeting, College Station, USA (2022)
10. "Instabilities-induced microstructural transformations in soft heteregeneous materials", Gordon Research Conference on Multifunctional Materials and Structures, Ventura, USA (2022)
9. "Magnetic field-controlled buckling patterns in soft magnetoactive composites", International Conference on Recent Advances in Mechanical Engineering, IIT Jodhpur, India (2022)
8. "Magnetoelastic instabilities in microstructured magnetoactive elastomers", European Solid Mechanics Conference, Galway, Ireland (2022)
7. "Negative group velocity state induced by deformation in soft layered media", U.S. National Congress on Theoretical and Applied Mechanics, Austin, USA (2022)
6. "Magnetoelastic instability induced pattern transitions in soft ferromagnetic laminates", APS March meeting, Chicago, USA (2022)
5. "Elastic instabilities in soft fiber composites", International Congress of Theoretical and Applied Mechanics, Milan, Italy (2021)
4. "Deformation controlled negative group velocity state in soft composites", APS March meeting, Virtual (2021)
3. "Negative group velocity state in soft composites triggered via applied deformation", Rencontre du non-lineaire, France (2021)

2. “Elastic instabilities in hyperelastic composites", Society of Engineering Science (SES) Annual meeting, St. Louis, USA (2019)
1. “Numerical study of jet dynamics under transverse electric field”, Fluid Mechanics Fluid Power, Prayagraj (Allahabad), India (2016)

Teaching Experience

- Substitute Course instructor for ME 601: *Mechanics of Soft Materials* (Fall 2022)
- Course material preparation for ME 306: *Mechanics of Materials* (Spring 2023)
- Course Instructor for *Android Application Development* (Summer 2016)

Mentoring Experience

- Ranjini Ghosh (Georgia Tech, Spring 2025 – present)
- Sishnukeshav Balamurali (Georgia Tech, Fall 2024 – present)
- Syed Qamber Naqvi (Georgia Tech, Fall 2024)
- Olga Petrenko (University of Galway, Spring 2024 – present)
- Alina Popova (University of Galway, Summer 2024 – present)
- Aarsh Desai (Georgia Tech, Spring 2024 – present)
- Neerav Soneji (Georgia Tech, Summer 2024 – present)
- Chaoqun Guo (Visiting undergrad at UW–Madison, Summer 2019)

Academic Services

Board member

- Graduate Engineering Mechanics Society (GEMS) (Feb 2021 – Aug 2023)

Session Chair

- International Conference on Recent Advances in Mechanical Engineering (2022), Jodhpur, India
- European Solid Mechanics Conference (2022), Galway, Ireland

Reviewer

- Matter: Cell Press (co-reviewer)
- Nature Communications (co-reviewer)
- Advanced Materials Technologies
- Computer Methods in Applied Mechanics and Engineering
- International Journal of Non-Linear Mechanics
- Meccanica (Springer)
- International Journal of Applied Mechanics
- International Journal of Computational Methods

Outreach & Volunteering

- YouTube education channel solve(x)
- Digital conversations at Prayogillu:
  - Shape and Function: The geometry behind everyday things (TBD)
  - The physics of balance: Understanding center of mass (July 2024)
- Volunteer at Atlanta Zoo Biomechanics Day (Mar 2025)
- Lambert iGEM Outreach (Feb 2024): Presented my research on “Living modeling clay" to high school students.
- Volunteer at Atlanta Zoo Biomechanics Day (Mar 2024)
- Academic Structure Incharge at Kartavya Roorkee Chapter – an NGO working for the education of unprivileged children (2014 – 2015)