**Nandan L. Nerurkar, Ph.D.**
Associate Professor of Biomedical Engineering
Columbia University

## A. Field of Specialization

My laboratory employs a combination of **biomechanics and molecular biology** to study **embryonic development**, with the ultimate goal of understanding how complex tissues and organs in the body are precisely shaped by genetic regulation of mechanical processes, and feedback of physical forces on these regulatory mechanisms. The broader motivation for our work is to understand the basis of severe **congenital disorders**, as well as to elucidate a "molecular-mechanical toolbox" employed during embryonic development and refined during **evolution**, so that it can ultimately be repurposed for regenerative medicine and tissue engineering.

## B. Education

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| 2010 | Ph.D. | Mechanical Engineering and Applied Mechanics<br>University of Pennsylvania, Philadelphia, PA<br>Advisors: Robert Mauck, Ph.D., and Dawn Elliott, Ph.D.<br>*Thesis: Integrating theoretical and experimental methods for muli-scale tissue engineering of the annulus fibrosus of the intervertebral disc.* |
| 2005 | M.S. | Biomedical Engineering<br>Washington University in St. Louis, St. Louis, MO<br>Advisor: Larry Taber, Ph.D. |
| 2003 | B.S. | Bioengineering<br>University of Maryland, College Park, MD |

## C. Positions Held Since Final Degree

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| 2025 – Present | Associate Professor (without tenure), Department of Biomedical Engineering, Columbia University, New York, NY |
| 2018 – Present | Affiliate Member, Department of Genetics and Development, Columbia University Irving Medical Center (CUIMC), New York, NY |
| 2018 – 2024 | Assistant Professor, Department of Biomedical Engineering, Columbia University, New York, NY |
| 2011 – 2017 | Postdoctoral Fellow, Department of Genetics, Harvard Medical School, Boston, MA<br>Advisor: Cliff Tabin, Ph.D. |

## D. Honors and Awards

- 2024 Columbia University Digestive & Liver Disease Research Center (DLDRC) Award for intestinal Clinical Basis Team (CBT)
- 2023 American Society of Mechanical Engineers (ASME) Grood Interdisciplinary Team Science Medal
- 2020 National Science Foundation (NSF) CAREER Award
- 2020 NIH Early Career Reviewer
- 2018 Society for Developmental Biology New Faculty Boot Camp
- 2016 Travel award, Society for Developmental Biology 75th Annual Meeting
- 2014 Best short talk, Gordon Research Conference: FGFs in Development and Disease
- 2012 Awardee, AAAS/Science Program for Excellence in Science
- 2009 2nd Place poster, Biomechanics, Penn Center for Musculoskeletal Disorders Symposium
- 2009 Finalist, PhD Student Paper Competition in Cell & Tissue Mechanics, Imaging, ASME Summer Bioengineering Conference
- 2008 ISSLS Prize in Biomechanics, International Society for the Study of Lumbar Spine
- 2007 1st Place poster, Biomechanics, Penn Center for Musculoskeletal Disorders Symposium

## E. Grant Support

### E.1 Current

**R01DK131236** **PI: Nerurkar**
National Institutes of Health 08/2022 – 05/2026
**Title:** Molecular control of mechanical forces driving buckling morphogenesis of the small intestine.
**Description:** The goals of this proposal are to understand how molecular and mechanical factors regulate cell behaviors that shape the small intestine during embryonic development.

**R35GM142995** **PI: Nerurkar**
National Institutes of Health 08/2021 – 07/2026
**Title:** Investigation of a neuromesendodermal progenitor population in the posterior avian endoderm.
**Description:** This proposal aims to identify, characterize, and test the function of a subpopulation in the posterior avian endoderm that undergoes an epithelial to mesenchymal transition and expresses neuromesodermal progenitor markers.

**R01HL170188** **PI: Targoff (Col Nerurkar)**
National Institutes of Health 07/2023 – 06/2028
**Title:** Mechanisms of outflow tract morphogenesis regulated by extracellular matrix
**Description:** The major goals of this project are related to understanding the role that elastic fibers play in proper development of the cardiovascular system in zebrafish embryos, with a particular focus on the outflow tract.

**AI-Enhanced Education** **PI: Heckelman** 0 months
SEAS, Columbia University 09/2025 – 06/2026 Allocation to Nerurkar: $30,000

**Title:** “GenAI Integration in Required Junior-Level Undergraduate BME Courses.”
**Description:** Integration of generative AI tools into biomedical engineering coursework including solid and fluid biomechanics.

## E.2 Completed

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| **R01DK131236-02S1** | **PI: Nerurkar** | 0 months |
| National Institutes of Health | 08/2023 – 06/2025 | $186,346 |

**Title:** Molecular control of mechanical forces driving buckling morphogenesis of the small intestine.
**Description:** This diversity supplement supports the advancement of an underrepresented minority trainee within the research objectives of the parent grant above.

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| **NSF CAREER1944562** | **PI: Nerurkar** | 0.3 months |
| National Science Foundation | 06/2020 – 05/2025 | $500,000 |

**Title:** Mechanobiology of vertebrate morphogenesis.
**Description:** This award supports research and education outreach activities centered on mechanical instabilities as a mechanism of morphogenesis, with focus on organogenesis of the small intestine.

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| **R35GM142995-02S1** | **PI: Nerurkar** | 0 months |
| National Institutes of Health | 06/2022 – 05/2024 | $181,303 |

**Title:** Investigation of a neuromesendodermal progenitor population in the posterior avian endoderm.
**Description:** This diversity supplement supports the advancement of an underrepresented minority trainee within the research objectives of the parent grant above.

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| **R21 HD099529** | **PI: Nerurkar** | 0.6 months |
| National Institutes of Health | 07/2019 – 06/2021 | $475,000 |

**Title:** Morphogenesis and patterning of the vertebrate gut tube.
**Description:** The major goals of this project are related to characterizing the mechanics and cell movements underlying formation of the amniote foregut and midgut tubes.

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| **SEAS/SIRS Seed Funding** | **PI: Nerurkar** | 0 months |
| SEAS, Columbia University | 07/2024 – 06/2025 | $85,000 |

**Title:** Mechanobiology of early embryonic brain development
**Description:** This seed funding supports preliminary investigations into the role of fluid pressure and biochemical cues in regulating growth and stem cell differentiation during embryonic development of the brain.

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| **Research Initiatives in Science & Engineering (RISE)** | **MPI: Nerurkar (lead), Targoff** | 0 months |
| Columbia University (SEAS) | 07/2022 – 06/2024 | Allocation to Nerurkar: $160,000 |

**Title:** Mechanisms of outflow tract morphogenesis regulated by extracellular matrix
**Description:** The major goals of this pilot project are to establish tools for studying the mechanics of outflow tract morphogenesis in the zebrafish embryo.

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| **Research Equipment Assistance Program (REAP)** | **PI: Nerurkar** | 0 months |
| Columbia University (SEAS) | 06/2021 | $37,667 |

**Title:** High performance 4-D image analysis workstation with Imaris 9.7
**Description:** This award supported purchase of a high power computer workstation and license for Imaris, a powerful image analysis software.

**Digestive & Liver Disease Research Center Pilot Grant** **PI: Nerurkar** 0 months
CUIMC 07/2020 – 06/2021 $25,000
**Title:** Molecular and cellular basis of intestinal morphogenesis.
**Description:** This pilot grant supported investigation of the molecular control of forces driving looping of the small intestine, providing the key preliminary data that ultimately resulted in successful funding of an R01 by the PI.

**Research Equipment Assistance Program (REAP)** **PI: Nerurkar** 0 months
Columbia University (SEAS) 02/2019 $36,250
**Title:** Cryostat for preparation of histologic samples
**Description:** This award supported purchase of a Leica cryostat serving the needs of several Biomedical Engineering labs.

**Keegan's Hope Research Grant** **PI: Nerurkar** 0 months
Avery's Angels Foundation 01/2017 – 12/2018 $7,000
**Title:** Investigating the role of BMP signaling in retraction of the small intestine.
**Description:** The major goals of this project are based on the finding that inhibition of BMP signaling leads to gastroschisis, a devastating birth defect in which internalization of the intestine fails. The project proposes to investigate the mechanisms underlying this phenotype following inhibition of BMP signaling in the developing chick embryo.

**F32HD069074** **PI: Nerurkar** 12 months
National Institutes of Health 07/2011 – 06/2013 $146,070
**Title:** Molecular and mechanical factors underlying morphogenesis of the intestinal villi.
**Description:** The major goals of this project are to understand how mechanically driven tissue deformations are linked with biochemical cues to coordinate morphogenesis and patterning in the vertebrate intestine.

## F. Publications

*h-index 26*
*4,894 total citations*
*(Google Scholar 09/26/2025)*

Key:
- *, **, ***, and **** indicate ≥ 25, 50, 100, and 250 citations (Google Scholar)
- # indicates senior/corresponding author(s).
- Underline indicates trainees of Nerurkar Lab
- **Bold** indicates Nerurkar
- † indicates equal contribution
- Impact factor (IF) reflects 2023 Clarivate Journal Citation Reports

### F.1 Doctoral Thesis

Integrating theoretical and experimental methods for muli-scale tissue engineering of the annulus fibrosus of the intervertebral disc. University of Pennsylvania, 2010.

## F.2 Pre-prints and manuscripts in preparation/review

1. Yan R, Hoffman LR, Oikonomou P, Li D, Lee CH, Gill H, Mongera A, **Nerurkar NL**, Mahadevan L, Tabin CJ. Directional flow-mediated mesenchymal force drives embryonic foregut constriction and splitting (in review, *Nature Communications*, IF 14.7) *Biorxiv (https://doi.org/10.1101/2025.01.22.634318)*.

## F.3 Peer-reviewed publications

1. Oikonomou P[†], Calvary L[†], Cirne HC, Welch AE, Durel JF, Powell O, Kim K, **Nerurkar NL[#]**. Direct application of tissue-scale tension to epithelia reveals mechanical coupling of germ layers and multi-scale mechanical properties in the developing chick embryo, *Development* (in press) IF 4.6.

2. Powell O, Garcia E, Qu Y, Sriram V, **Nerurkar NL[#]**. Elongation of the nascent avian foregut requires coordination of intrinsic and extrinsic cell behaviors, *Developmental Biology* (in press). IF 2.5.

3. Gao J, Martin L, Loffet EA, Durel JF, Oikonomou P, **Nerurkar NL[#]**. Material properties of the embryonic small intestine during buckling morphogenesis, *Acta Biomaterialia*, 198(257), 2025. IF 9.4.

4. Du D, **Nerurkar NL[#]**. Buckling mechanics: A Nosetta Stone for understanding rhinoglyphics. *Current Biology*, 34(22), 2024. IF 8.1

5. Gill HK, Yin S, **Nerurkar NL**, Lawlor JC, Huycke TR, Mahadevan L, Tabin CJ. Hox genes modulate physical forces to differentially shape small and large intestinal epithelia, *Developmental Cell*, 59(21), 2024. IF 11.8

6. Gill HK, Yin S, Lawlor JC, Huycke TR, **Nerurkar NL**, Mahadevan L, Tabin CJ. The developmental mechanics of divergent buckling patterns in the chick gut, *Proceedings of the National* Academy of Sciences, 121(28), 2024. IF 10.7

7. Loffet EA, Durel JF, Gao J, Lim H, Kam R, **Nerurkar NL[#]**. Elastic fibers confer tensile stiffness to the dorsal mesentery to drive buckling morphogenesis of the small intestine. *Biomaterials*, 303 (122405), 2023. IF 14

8. Oikonomou P, Cirne HC, **Nerurkar NL[#]**. A chemo-mechanical model of collective cell movements driving hindgut morphogenesis. *Development*, 150 (22), 2023. IF 4.6

9. Loffet EA, Durel JF, **Nerurkar NL[#]**. Evo-Devo Mechanobiology: The Missing Link. *Integrative & Comparative Biology*, 63(6): 1455-1473, 2023. IF 2.6

10. **Nerurkar NL[#]**. Synthetic Developmental Biology. *Seminars in Cell and Developmental Biology*, 141 (30): 1-2, 2023. IF 7.3

11. Durel JF, **Nerurkar NL[#]**. Mechanobiology of vertebrate gut morphogenesis. *Current Opinion in Genetics & Development,* 12(63): 45-52, 2020. IF 4.0

12. ***Huycke TR, Miller BM, **Nerurkar NL**, Mahadevan L, Tabin CJ. Genetic and mechanical regulation of intestinal smooth muscle development. *Cell*, 179(1): 90-105, 2019. IF 64.5

13. **__Nerurkar NL__[#], Lee CH, Mahadevan L, Tabin CJ[#]. Molecular control of macroscopic forces drives formation of the vertebrate hindgut. *Nature*, 565(7740): 480-484, 2019. IF 64.8

14. ****Nerurkar NL**, Mahadevan L, Tabin CJ. BMP signaling controls buckling forces to modulate looping morphogenesis of the gut. *Proceedings of the National Academy of Science*, 114(9): 2277-2282, 2017. IF 10.7

15. ***Heo SJ, Driscoll TP, Thorpe SD, **Nerurkar NL**, Baker BM, Yang MT, Chen CS, Lee DA, Mauck RL. Differentiation alters stem cell nuclear architecture, mechanics, and mechano-sensitivity. *eLife*, 5:e18207, 2016. IF 7.7

16. *Shah RS[†], **Nerurkar NL**[†#], Wang C, Galloway JL[#]. Tensile properties of craniofacial tendons in the mature and aged zebrafish. *Journal of Orthopaedic Research*, 33(6): 867-873, 2015. IF 2.8

17. ****Shyer AE, Tallinen T, **Nerurkar NL**, Wei Z, Gil E, Kaplan DL, Tabin CJ, Mahadevan L. Villification: How the gut gets its villi. *Science*, 342(6155): 212-218, 2013. IF 56.9

18. **Han WJ, **Nerurkar NL**, Jacobs NT, Smith LJ, Mauck RL, Elliott DM. Multi-scale structural and tensile mechanical response of annulus fibrosus to osmotic loading. *Annals of Biomedical Eng*, 40(7): 1610-1621 2012. IF 3.8

19. **Smith LJ, Chiaro JA, **Nerurkar NL**, Cortes DH, Horava S, Hebela N, Mauck RL, Dodge GR, Elliott DM. Nucleus pulposus cells synthesize a functional extracellular matrix and respond to inflammatory cytokine challenge following long term agarose culture. *European Cells & Materials*, 20(22): 291-301, 2011. IF 3.1

20. **Heo SC, **Nerurkar NL**, Baker BM, Mauck RL. Microstructure dictates stretch-induced cell and nucleus reorganization on aligned nanofibrous scaffolds. *Annals of Biomedical Engineering*, 39(11): 2780-2790, 2011. Cover article. IF 3.8

21. **Driscoll TP, **Nerurkar NL**, Jacobs NT, Elliott DM, Mauck RL. Fiber angle and aspect ratio influence the shear mechanics of oriented electrospun nanofibrous scaffolds. *Journal of the Mechanical Behavior of Biomedical Materials* 4(8): 1627-1636, 2011. IF 3.9

22. ****Nerurkar NL**, Mauck RL, Elliott DM. Modeling inter-lamellar interactions in angle-ply biologic laminates for annulus fibrosus tissue engineering. *Biomechanics and Modeling in Mechanobiology*, 10(6): 973-984, 2011. IF 3.5

23. ****Smith LJ, **Nerurkar NL**, Harfe BD, Elliott DM. Degeneration and regeneration of the intervertebral disc: lessons from development. *Disease Models and Mechanisms*, 4(1): 31-41, 2011. IF 4.3

24. ***__Nerurkar NL__, Mauck RL, Elliott DM. Homologous structure-function relationships between native fibrocartilage and tissue engineered from MSC-seeded nanofibrous scaffolds. *Biomaterials*, 32(2): 461-468, 2011. IF 14

25. ***__Nerurkar NL__, Sen S, Baker BM, Elliott DM, Mauck RL. Dynamic culture enhances stem cell infiltration and modulates extracellular matrix production on aligned electrospun nanofibrous scaffolds. *Acta Biomaterialia* 7(2):485-491, 2011. IF 9.7

26. ***Nathan AS, Baker BM, **Nerurkar NL**, Mauck RL. Mechano-topographic modulation of stem cell nuclear shape on nanofibrous scaffolds. *Acta Biomaterialia*, 7(1): 57-55, 2011. IF 9.7

27. ***Nerurkar NL**, Sen S, Huang AH, Elliott DM, Mauck RL. Engineered disc-like angle-ply structures for intervertebral disc replacement. *Spine*, 35(8): 867-873, 2010. IF 3.0

28. ****Nerurkar NL**, Elliott DM, Mauck RL. Mechanical design criteria for intervertebral disc tissue engineering. *Journal of Biomechanics*, 43(6): 1017-1030, 2010. IF 2.4

29. ****Nerurkar NL**, Baker BM, Sen S, Wible EE, Elliott DM, Mauck RL. Nanofibrous biologic laminates replicate the form and function of the annulus fibrosus. *Nature Materials*, 8(12): 986-992, 2009. Cover article; Highlighted in News & Views. IF 41.2

30. ***Baker BM, **Nerurkar NL**, Burdick JA, Elliott DM, Mauck RL. Fabrication and modeling of multi-polymer nanofibrous scaffolds. *Journal of Biomechanical Engineering*, 131 (10): 1010121-10101210, 2009. Cover article. IF 1.7

31. ****Mauck RL, Baker BM, **Nerurkar NL**, Burdick JA, Li WJ, Tuan RS, Elliott DM. Engineering on the straight and narrow: the mechanics of nanofibrous assemblies for fiber-reinforced tissue regeneration. *Tissue Engineering B: Reviews,* 15(2): 171-193, 2009. IF 6.4

32. **Ramasubramanian A, **Nerurkar NL,** Achtien KH, Filas BA, Voronov DA, Taber LA. On modeling morphogenesis of the looping heart following mechanical perturbation. *Journal of Biomechanical Engineering,* 130 (6): 0610181-06101811, 2008. IF 1.7

33. ***Nerurkar NL**, Mauck RL, Elliott DM. ISSLS prize winner: Integrating theoretical and experimental methods for functional tissue engineering of the annulus fibrosus. *Spine,* 33 (25): 2691-2701, 2008. IF 3.0

34. ****Nerurkar NL**, Elliott DM, Mauck RL. Mechanics of oriented electrospun nanofibrous scaffolds for annulus fibrosus tissue engineering. *Journal of Orthopaedic Research*, 25(8): 1018-1028, 2007. Cover article; 2008 most cited JOR paper. IF 2.8

35. **Nerurkar NL**, Ramasubramanian A, Taber LA. Morphogenetic adaptation of the looping embryonic heart to altered mechanical loads. *Developmental Dynamics*, 235(7): 1822-1829, 2006. IF 2.5

36. ***Wagenseil JE, **Nerurkar NL**, Knutsen RH, Okamoto RJ, Li DY, Mecham RP. Effects of elastin haploinsufficiency on the mechanical behavior of mouse arteries. *Am J Phys Heart Circ Phys*, 289(3): H1209-H1217, 2005. IF 4.8

37. ***Anderson GP, **Nerurkar NL**. Improved fluoroimmunoassays using the dye Alexa Fluor 647 with the RAPTOR, a fiber optic biosensor. *Journal of Immunological Methods*, 271 (1-2): 17-24, 2002. IF 2.2

## F.4 Conference papers

1. Powell O, Garcia E, Qu Y, Sriram V, **Nerurkar NL**. Elongation of the Nascent Avian Foregut Requires Coordination of Intrinsic and Extrinsic Cell Behaviors. Society for Developmental Biology Virtual Structural Birth Defects Trainee Symposium Sept 25, 2025.
2. Loffet E, **Nerurkar**. Mechanics-led evo-devo in avian gut looping morphogenesis. Shaping Life 3, Cassis, France June 3 – 6, 2025.

3. Powell O, Garcia E, Sriram V, Qu Y, **Nerurkar NL**. Elongation of the nascent avian foregut requires coordination of intrinsic and extrinsic cell behaviors. Annual Biomedical Research Conference for Minoritized Scientists, Pittsburgh, PA Nov 16-17, 2024.
4. Powell O, Qu Y, Sriram V, **Nerurkar NL**. Investigating the cell and tissue-scale movements that drive avian foregut morphogenesis. 83rd Annual Meeting of the Society for Developmental Biology, Atlanta, GA, July 14 – 17, 2024.
5. Loffet EA, **Nerurkar NL**. Exploiting morphological diversity to identify regulators of buckling morphogenesis in the avian gut. Society for Developmental Biology Mid-Atlantic Regional Meeting, College Park, MD, May 10 – 11, 2024.
6. Oikonomou, Calvary L, Cirne HC, Welch A, **Nerurkar NL**. Direct application of tissue-scale tension to epithelia reveals mechanical coupling of germ layers and multi-scale mechanical properties in the developing chick embryo. American Physical Society March Meeting, Minneapolis, MN, March 3 – 8, 2024 (podium).
7. Durel JF, Lim H, **Nerurkar NL**. Cellular prestress of ECM fibers regulates nonlinear morphogenetic mechanics in the looping intestine. Developmental Biology Gordon Research Conference, Hadley, MA, June 25 – 30, 2023.
8. Durel JF, Lim H, **Nerurkar NL**. Cellular prestress of ECM fibers regulates nonlinear morphogenetic mechanics in the looping intestine. Annual Meeting of the Society for Developmental Biology, Chicago, IL, July 20 – 23, 2023.
9. Powell O, Sriram V, **Nerurkar NL**. Investigating cell and tissue scale movements that drive avian foregut morphogenesis. Annual Meeting of the Society for Developmental Biology, Chicago, IL, July 20 – 23, 2023.
10. Oikonomou P, Cirne HC, **Nerurkar NL**. A chemo-mechanical model of collective cell movements driving hindgut morphogenesis. Annual Meeting of the Society for Developmental Biology, Chicago, IL, July 20 – 23, 2023.
11. Loffet EA, Durel JF, Lim H, Kam R, **Nerurkar NL**. Elastic fibers confer tensile stiffness to the dorsal mesentery to drive buckling morphogenesis of the small intestine. Sumer Biomechanics, Bioengineering, and Biotransport Conference, Vail, CO, June 4 – 8, 2023 (podium).
12. Powell O, Sriram V, **Nerurkar** NL. Investigating cell and tissue scale movements that drive avian foregut morphogenesis. Northeast Regional Meeting of the Society for Developmental Biology, Wood's Hole, MA, April 28 – 30, 2023 (podium).
13. Durel JF, Lim H, **Nerurkar NL**. Cellular prestress of ECM fibers regulates nonlinear morphogenetic mechanics in the looping intestine. Mid-Atlantic Regional Meeting of the Society for Developmental Biology, Princeton, NJ, April 20 – 23, 2023 (podium).
14. Powell O, Sriram V, **Nerurkar NL**. Molecular control of forces driving morphogenesis of the avian foregut. Annual Meeting of the Biomedical Engineering Society, San Antonio, TX, Oct 12 – 15, 2022 (podium).
15. Powell O, Sriram V, **Nerurkar NL**. Molecular control of forces driving morphogenesis of the avian foregut. Ivy Collective Inclusivity in Engineering Doctoral Symposium, Philadelphia PA, Oct 20 – 21, 2022.
16. Cirne HC, Oikonomou P, **Nerurkar NL**. Morphogenetic adaptation of the gut-forming endoderm in response to tissue scale mechanical forces. Annual Meeting of the Biomedical Engineering Society, San Antonio, TX, Oct 12 – 15, 2022.
17. Durel JF, Lim H, **Nerurkar NL**. Acto-myosin contractility controls organ-scale buckling in the developing small intestine. Annual Meeting of the Society for Developmental Biology, Vancouver, BC, July 17 – 20, 2022.
18. Loffet E, Durel JF, Lim H, **Nerurkar NL**. Transcriptome-wide upregulation of ECM genes during buckling morphogenesis of the avian small intestine. Annual Meeting of the Society for Developmental Biology, Vancouver, BC, July 17 – 20, 2022.

19. Gill H, Yin S, **Nerurkar NL**, Tabin CJ, Mahadevan L. Linking regional genetic identity to physical forces in chick intestinal morphogenesis. Annual Meeting of the Society for Developmental Biology, Vancouver, BC, July 17 – 20, 2022.
20. Durel JF, **Nerurkar NL**. Acto-myosin contractility controls organ-scale buckling in the developing small intestine. Sumer Biomechanics, Bioengineering, and Biotransport Conference, Cambridge, MD, June 20 – 2, 2022 (podium).
21. Powell O, **Nerurkar NL**. Molecular control of forces driving morphogenesis of the avian foregut. Northeast Regional Biomedical Engineering Conference, New York, NY, April 23-24, 2022.
22. Oikonomou P, **Nerurkar NL**. A chemo-mechanical model of collective cell movements driving hindgut morphogenesis. Northeast Regional Biomedical Engineering Conference, New York, NY, April 23-24, 2022.
23. Durel JF, **Nerurkar NL**. Actomyosin contractility contributes to organ-scale buckling morphogenesis of the small intestine. From Molecular to Organs: The Mechanobiology of Morphogenesis Virtual Conference, October 28 – 30, 2020 (podium).
24. Gill H, Yin S, **Nerurkar NL**, Huycke TR, Mahadevan L, Tabin CJ. Morphogenesis of Distinct Lumen Wrinkling Patterns Along the Developing Intestinal Tract. Society for Developmental Biology 79th Annual Meeting, Virtual meeting, July 7 – 13, 2020.
25. Gill H, Yin S, **Nerurkar NL**, Huycke TR, Mahadevan L, Tabin CJ. Morphogenesis of Distinct Lumen Wrinkling Patterns Along the Developing Intestinal Tract. Society for Developmental Biology 79th Annual Meeting, Virtual meeting, July 7 – 13, 2020.
26. Durel JF, **Nerurkar NL**. Acto-myosin activity drives organ scale buckling morphogenesis of the small intestine. Sumer Biomechanics, Bioengineering, and Biotransport Conference, Virtual meeting, June 17 – 20, 2020 (podium).
27. Gill H, Huyck TR, **Nerurkar NL**, Yin S, Tabin CJ. Compartments along the developing intestinal tract have distinct lumen wrinkling patterns and tissue mechanics. Sumer Biomechanics, Bioengineering, and Biotransport Conference, Virtual meeting, June 17 – 20, 2020.
28. Durel JF, **Nerurkar NL**. Investigating a Role for Cell Contraction in Buckling Morphogenesis of the Small Intestine. Biomedical Engineering Society Annual Meeting, Philadelphia, PA, October 16 – 19, 2019.
29. Durel JF, **Nerurkar NL**. Active cell forces contribute to organ-scale buckling morphogenesis of the avian small intestine. Society for Developmental Biology 78th Annual Meeting, Boston, MA, July 26 – 30, 2019.
30. Gill H, Huycke TR, **Nerurkar NL**, Tabin CJ. Variation in tissue mechanical properties along the developing chick gut. Society for Developmental Biology 78th Annual Meeting, Boston, MA, July 26 – 30, 2019.
31. Mathur A, **Nerurkar NL**. Transfection of the chick neural tube to study the mechanics of midbrain-hindbrain boundary morphogenesis. 2019 Scientista Symposium: Science without borders, Boston, MA, March 29 – 31, 2019.
32. **Nerurkar NL**. BMP signaling modulates differential growth to control buckling morphogenesis of the small intestine. Biomedical Engineering Society Annual Meeting, Atlanta, GA, October 17 – 20, 2018 (podium).
33. Galloway JL, Niu XB, Shah RR, **Nerurkar NL**, Noedl M. Tendon developmetal placticity and functional regeneration. Annual Meeting of the American Association of Anatomists, San Diego, CA, April 21 – 25, 2018.
34. **Nerurkar NL**, Mahadevan L, Tabin CJ. BMP signaling regulates differential growth to drive buckling during looping morphogenesis of the small intestine. Sumer Biomechanics, Bioengineering, and Biotransport Conference, Tuscon, AZ, June 21 – 24, 2017 (podium).

35. **Nerurkar NL**, Mahadevan L, Tabin CJ. FGF-Mediated Tensional Gradients Drive Morphogenesis of the Avian Hindgut. Summer Biomechanics, Bioengineering, and Biotransport Conference, Tuscon, AZ, June 21 – 24, 2017 (podium).
36. **Nerurkar NL**, Mahadevan L, Tabin CJ. BMP signaling modulates differential growth to control mechanical buckling morphogenesis of the small intestine. Workshop: The Biological Challenges in Morphogenesis. Mathematical Biology Institute, Ohio State University, Columbus, Ohio, Feb 20 – 24, 2017.
37. Shah RS, Noedl M, **Nerurkar NL**, Niu X, Galloway JL. Establishment of a Tendon And Tendon-bone Attachment Site Regeneration Model In The Zebrafish. Orthopaedic Research Society 2017 Meeting , San Diego, CA, March 19 – 122, 2017.
38. **Nerurkar NL**, Mahadevan L, Tabin CJ. FGF8-mediated tensional gradients drive collective cell movements during early endoderm morphogenesis. Biomedical Engineering Society 2016 Annual Meeting, Minneapolis, MN, October 5 – 8, 2016 (podium).
39. **Nerurkar NL**, Mahadevan L, Tabin CJ. FGF-mediated tensional gradients drive collective cell movements to form the avian hindgut. 75th Meeting of the Society for Developmental Biologys Satellite Symposium Collective Cell Migration: Biomechanics to Organogenesis, Boston, MA, Aug 4, 2016 (podium).
40. **Nerurkar NL**, Tabin CJ. Molecular control of differential growth during looping of the embryonic small intestine. Sumer Biomechanics, Bioengineering, and Biotransport Conference, National Harbor, MD, June 29 –July 2, 2016 (podium).
41. **Nerurkar NL**, Tabin CJ. BMP signaling modulates physical forces to control intestinal coiling. 74th Meeting of the Society for Developmental Biology, Snowbird, UT, July 9 -13, 2015 (podium).
42. Huycke T, **Nerurkar NL**, Tabin CJ. Generating morphological variation in the gut. 74th Meeting of the Society for Developmental Biology, Snowbird, UT, July 9 -13, 2015.
43. Schwartz M, Young J, **Nerurkar NL**, Tabin CJ. Determining skeletal element number in the avian forelimb zeugopod. 74th Meeting of the Society for Developmental Biology, Snowbird, UT, July 9 -13, 2015.
44. **Nerurkar NL**, Tabin CJ. Fgf8 establishes a contractile gradient to drive directed cell movements in the developing avian gut. Summer Biomechanics, Bioengineering, and Biotransport Conference, Snowbird, UT, Jun 17 – 20, 2015 (podium).
45. **Nerurkar NL**, Tabin CJ. FGF-mediated tension gradients drive antero-posterior endoderm movements to form the avian hindgut. Keystone Symposium: Endoderm in Development and disease, Keystone, CO, Feb 8 – 13, 2015 (podium).
46. **Nerurkar NL,** Tabin CJ. FGF signaling establishes a contractile gradient to drive polarized endoderm movements underlying morphogenesis of the avian hindgut. Society for Developmental Biology 73rd Annual Meeting, Seattle, WA, July 17 – 21, 2014 (podium).
47. **Nerurkar NL**, Tabin CJ. FGF-mediated contractile gradients drive polarized cell movements to form the avian hindgut. World Congress of Biomechanics, Boston, MA, July 6 – 11, 2014 (podium).
48. **Nerurkar NL**, Tabin CJ. FGF-mediated mechanical force gradients drive antero-posterior endoderm cell flows to form the avian hindgut. Gordon Research Conference and Seminar: Fibroblast Growth Factor in Development and Disease, Ventura, CA, March 1 – 7, 2014 (podium).
49. **Nerurkar NL,** Tabin CJ. Polarized collective cell movements underlie antero-posterior folding during formation of the avian hindgut. ASME Summer Bioengineering Conference, Sun river, OR, June 26 – 29, 2013 (podium).
50. **Nerurkar NL,** Tabin CJ. Polarized collective cell movements drive antero-posterior folding to form the avian hindgut. 17th International Congress of Developmental Biology, Cancun, Mexico, June 16 – 20, 2013.

51. **Nerurkar NL**, Tabin CJ. Cell velocity gradients underlie early morphogenesis of the avian gut tube. ASME Summer Bioengineering Conference, Fajardo, Puerto Rico, June 19 – 23, 2012 (podium).
52. Han WJ, **Nerurkar NL**, Smith LJ, Jacobs NT, Mauck RL, Elliott DM. Multiscale structural and mechanical response of the annulus fibrosus to osmotic loading. ASME Summer Bioengineering Conference, Fajardo, Puerto Rico, June 19 – 23, 2012.
53. Heo SC, Driscoll TP, **Nerurkar NL**, Mauck RL. Dynamic tensile stretch promotes lamin a/c reorganization and chromatin condensation in adult stem cells. 58th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA, January 4 – 7, 2012.
54. Han WJ, **Nerurkar NL**, Jacobs NT, Smith LJ, Mauck RL, Elliott DM. Differential structure function mechanisms of the inner and outer annulus fibrosus in tension. International Society for the Study of Lumbar Spine Annual Meeting, Gothenburg, Sweden, June 14 – 18, 2011.
55. Heo SC, **Nerurkar NL**, Driscoll TP, Mauck RL. Dynamic tensile loading alters nuclear mechanics and mechanoreception. Proceedings of the ASME 2010 Summer Bioengineering Conference, Farmington, PA, June 22 – 25, 2011.
56. Driscoll TP, **Nerurkar NL**, Jacobs NT, Elliott DM, Mauck RL. Fiber angle and aspect ratio influence the shear mechanics of electrospun nanofibrous scaffolds. Proceedings of the ASME 2010 Summer Bioengineering Conference, Farmington, PA, June 22 – 25, 2011.
57. Han WJ, Jacobs NT, **Nerurkar** NL, Smith LJ, Mauck RL, Elliott DM. Differential tensile mechanical behavior of the inner and outer annulus fibrosus following treatment with chondroitinase ABC and buffer solutions. 6th Annual Philadelphia Spine Symposium, Philadelphia, PA, December 14, 2010.
58. Driscoll TP, **Nerurkar NL**, Jacobs NT, Mauck RL, Elliott DM. Shear mechanics of electrospun scaffolds for annulus fibrosus tissue engineering. 6th Annual Philadelphia Spine Symposium, Philadelphia, PA, December 14, 2010.
59. Kluge JA, **Nerurkar NL**, Martin JT, Amaniera FA, Pampati RA, Elliott DM, Mauck RL. Functional enhancement of disc-like angle-ply structures via dynamic culture. 6th Annual Philadelphia Spine Symposium, Philadelphia, PA, December 14, 2010.
60. Heo SC, **Nerurkar NL**, Mauck RL. Differentiation and deformation modulate nuclear mechanics during mesenchymal stem cell fibrochondrogenesis. The Society for Physical Regulation in Biology and Medicine 29th Scientific Conference, Miami, FL, January 4 – 8, 2011.
61. Han WJ, **Nerurkar NL**, Jacobs NT, Smith LJ, Mauck RL, Elliott DM. Differential structure-function mechanisms of the inner and outer annulus fibrosus in tension. International Society for the Study of Lumbar Spine Annual Meeting, Gothenburg, Sweden, June 14 – 18, 2011.
62. Driscoll TP, **Nerurkar NL**, Jacobs NT, Mauck RL, Elliott DM. Shear mechanics of electrospun scaffold for annulus fibrosus tissue engineering. 57th Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 13 – 16, 2011.
63. Heo SC, **Nerurkar NL,** Baker BM, Mauck RL. Microstructure dictates stretch-induced cell and nucleus reorganization on aligned nanofibrous scaffolds. 57th Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 13 – 16, 2011.
64. Heo SC, **Nerurkar NL**, Baker BM, Mauck RL. Fibrochondrogenesis attenuates stretch-induced nuclear deformation on aligned nanofibrous electrospun scaffolds. 57th Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 13 – 16, 2011.
65. Smith LJ, **Nerurkar NL**, Cortes DH, Horava SD, Dodge GR, Hebela NM, Mauck RL, Elliott DM. Functional matrix degradation and inhibition in a cytokine-mediated in-vitro model of nucleus pulposus degeneration. 57th Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 13 – 16, 2011.

66. Kluge JA, Martin JT, **Nerurkar NL**, Amaniera FA, Pampati RA, Elliott DM, Mauck RL. Functional enhancement of disc-like angle-ply structures via dynamic culture. 57th Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 13 – 16, 2011.
67. Farrell MJ, Comeau ES, **Nerurkar NL**, Mauck RL. Depth-dependent mechanical properties of MSC-laden engineered cartilage constructs. 57th Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 13 – 16, 2011.
68. Han WJ, Jacobs NT, **Nerurkar** NL, Smith LJ, Mauck RL, Elliott DM. Differential tensile mechanical behavior of the inner and outer annulus fibrosus following treatment with chondroitinase ABC and buffer solutions. 57th Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 13 – 16, 2011.
69. Elliott DM, **Nerurkar NL**, O'Connell GD, Vresilovic EJ, Mauck RL. Tissue engineering from the ground up: building an annulus fibrosus that has mechanical function at each scale. The 25th Annual Research Meeting of the Japanese Orthopaedic Association, Kyoto, Japan, October 14 – 15, 2010.
70. Elliott DM, **Nerurkar NL**, Huang AH, Kluge JA, Smith LJ, Martin JT, Hebela N, Mauck RL. Disc Tissue Engineering – Can We Make it Stick? 6th World Congress on Biomechanics, Singapore, August 1 – 6, 2010.
71. **Nerurkar NL**, Mauck RL, Elliott DM. Modeling inter-lamellar interactions in engineered nanofibrous biologic laminates for annulus fibrosus tissue engineering. Proceedings of the ASME 2010 Summer Bioengineering Conference, Naples, FL, June 16 – 19, 2010 (podium).
72. **Nerurkar NL**, Sen S, Baker BM, Zachry TL, Elliott DM, Mauck RL. Dynamic culture enhances stem cell ingress and extracellular matrix deposition on electrospun nanofibrous scaffolds. 56th Annual Meeting of the Orthopaedic Research Society, New Orleans, March 6 – 9, 2010.
73. **Nerurkar NL**, Sen S, Huang AH, Elliott DM, Mauck RL. Functional maturation of composites that mimic the hierarchical organization of the intervertebral disc. 56th Annual Meeting of the Orthopaedic Research Society, New Orleans, March 6 – 9, 2010 (podium, Spotlight Session: Tissue Engineering).
74. **Nerurkar NL**, Sen S, Mauck RL, Elliott DM. Selective removal of extracellular matrix components reveals homologous structure-function relationships between engineered and native fibrocartilage. 56th Annual Meeting of the Orthopaedic Research Society, New Orleans, March 6 – 9, 2010 (podium).
75. Nathan AS, Baker BM, **Nerurkar NL**, Mauck RL. Time-dependent and anisotropic nuclear deformations on aligned nanofibrous scaffolds. 56th Annual Meeting of the Orthopaedic Research Society, New Orleans, March 6 – 9, 2010.
76. **Nerurkar NL**, Mauck RL, Elliott DM. Alternating Fiber Orientation Enhances the Functional Growth of Nanofibrous Laminates for Annulus Fibrosus Tissue Engineering. BMES 2009 Fall Scientific Meeting, Pittsburgh PA, October 7-10, 2009.
77. **Nerurkar NL**, Elliott DM, Mauck RL. Functional maturation of engineered composites that mimic the hierarchical organization of the intervertebral disc. 5th Annual Philadelphia Spine Symposium, Philadelphia, PA, December 9, 2009.
78. Mauck RL, Baker BM, Ionescu LC, **Nerurkar NL**, Burdick JA. Multi-functional and dynamic fibrous scaffolds for tissue engineering and controlled release. Materials Research Society Conference, Boston, MA, November 30 –December 4, 2009.
79. **Nerurkar NL**, Sen S, Wible EE, Stambough JB, Elliott DM, Mauck RL. Mesenchymal Stem Cell Seeded Nanofibrous Laminates Mimic the Multi-scale Form and Function of the Annulus Fibrosus. Proceedings of the ASME 2009 Summer Bioengineering Conference, Lake Tahoe, CA, June 17 – 21, 2009 (podium).
80. **Nerurkar NL**, Sen S, Mauck RL, Elliott DM. Bilamellar Engineered Constructs Mimic Form and Function of the Native Annulus Fibrosus. Annual Meeting of the International Society for the Study of Lumbar Spine, Miami, FL, May 4-9, 2009 (podium).

81. **Nerurkar NL**, Sen S, Wible EE, Stambough JB, Elliott DM, Mauck RL. MSC-Seeded Nanofibrous Laminates Mimic Multi-Scale Form and Function of the Annulus Fibrosus. 55th Annual Meeting of the Orthopaedic Research Society, Las Vegas, NV, 0209; February 22-25, 2009 (podium).
82. Baker BM, **Nerurkar NL**, Burdick JA, Elliott DM, Mauck RL. Instilling Time-Dependent Behavior in Electrospun, Multi-Polymer Nanofibrous Composites. 55th Annual Meeting of the Orthopaedic Research Society, Las Vegas, NV, 0473; February 22-25, 2009.
83. Baker BM, **Nerurkar NL**, Burdick JA, Mauck RL. The Temporal Behavior of Electrospun, Multi-Polymer Nanofibrous Composites. Proceedings of TERMIS-NA 2008 Conference, San Diego, CA, December 7-11, 2008.
84. **Nerurkar NL**, Sen S, Wible EE, Stambough JB, Elliott DM, Mauck RL. "MSC-Seeded Nanofibrous Laminates Mimic Multi-Scale Form and Function of the Annulus Fibrosus." Philadelphia Spine Research Symposium, Philadelphia, PA, November 13, 2008.
85. Baker BM, **Nerurkar NL**, Burdick JA, Elliott DM, Mauck RL. "Fabrication and Modeling of an Electrospun Tri-Polymer Composite for the Engineering of Fibrous Tissues," Proceedings of ASME 2008 Summer Bioengineering Conference, Marco Island, FL, June 25-29, 2008.
86. **Nerurkar NL**, Nguyen AM, Mauck RL, Elliott DM. Functional evolution of engineered annulus fibrosus using constitutive modeling. 54th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA, 0292; March 2-5, 2008 (podium).
87. **Nerurkar NL**, Orlansky AS, Sen S, Elliott DM, Mauck RL. Multi-scale tissue engineering of the intervertebral disc. 54th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA, 0340; March 2-5, 2008 (podium).
88. Lake SP, **Nerurkar NL**, Mauck RL, Kaldowec JA, Elliott DM, Soslowsky LJ. Development of a Nonlinear Anisotropic Fiber Dispersion Model to Quantify and Predict Mechanics of Normal and Injured Tendon. 54th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA, p. 0824; March 2-5, 2008.
89. **Nerurkar NL**, Elliott DM, Mauck RL. Architecture of nanofibrous scaffolds influences fibrocartilaginous gene expression of annulus fibrosus and mesenchymal stem cells. 6th Combined meeting of the Orthopaedic Research Society, Honolulu, Hawaii, p. 0388; October 20-24, 2007.
90. **Nerurkar NL**, Nguyen AM, Tsing P, Mauck RL, Elliott DM. A hyperelastic fiber-reinforced continuum model to assay functional evolution of tissue engineered annulus fibrosus. 6th Combined meeting of the Orthopaedic Research Society, Honolulu, Hawaii, p. 0389; October 20-24, 2007.
91. Taber LA, **Nerurkar NL**, Ramasubramanian A. Finite element modeling of the looping embryonic heart including mechanical feedback. 9th US National Congress on Computational Mechanics, San Francisco, CA, July 22-26, 2007.
92. Ramasubramanian A, **Nerurkar NL**, Taber LA. Role of mechanical feedback in restoration of normal cardiac c-looping following perturbed loading. 2007 Summer Bioengineering Conference, Keystone, CO, June 20-24, 2007.
93. **Nerurkar NL**, Nguyen AM, Elliott DM, Mauck RL. Annulus Fibrosus tissue engineering with aligned electrospun nanofibrous scaffolds. 53rd Annual Meeting of the Orthopaedic Research Society, San Diego, CA, p. 0249; February 11-14, 2007 (podium).
94. **Nerurkar NL**, Baker BM, Elliott DM, Mauck RL. Engineering of fiber-reinforced tissues with anisotropic biodegradable nanofibrous scaffolds. 2006 IEEE-EMBS Meeting, New York, NY, Aug 30-Sept 3, 2006 (podium).
95. **Nerurkar NL**, Ramasubramanian A, Taber LA. Morphogenetic adaptation of the embryonic heart to perturbed loading. 2006 ASME Summer Bioengineering Conference, Amelia Island, FL, June 21-25, 2006 (podium).

## G. Patents

Mauck RL, Elliott DM, **Nerurkar NL**. Disc-like angle-ply structures for intervertebral disc tissue engineering and replacement (US12911166).

## H. Teaching and Mentoring

### H.1 Teaching at Columbia University (2018 – Present)

BMEN E3010: Introduction to Biomedical Engineering I (Co-Instructor, Solid Biomechanics Module)

BMEN E3020: Introduction to Biomedical Engineering II (Co-Instructor, Fluid Biomechanics Module)

BMEN E4350: Biomechanics of Developmental Biology

BME Senior Design Advising:

- CAUTIcare: Ozgenur Celik, Prithi Chakrapani, Emma Glajchen, Neil Kennedy, Michaela O'Donnell (2021 – 2022)
- AutoCap: Nicolas Acosta, Vincent Guo, Rachel Park, Brian Ross, Ashley Rosenberg (2020 – 2021)
- ValeraIUD: Hilme Athar, Elisa Fang, Alex Kim, Lillian Wang (2019 – 2020)
- Clear Vision: Steven Bessler, Jonathon Kapilian, Michael Kirschner, Moshe Willner, Lekha Yesantharao (2019 – 2020)

### H.2 Research Training and Mentoring at Columbia University (2018 – Present)

| | | Total | Completed | In Progress |
|---|---|---|---|---|
| **Columbia University** | Doctoral students | 6 | 2 | 4 |
| | Postdoctoral/ARS | 6 | 2 | 4 |
| | Masters students | 3 | 2 | 1 |
| | Undergraduate students | 30 | 23 | 7 |
| | **Total** | 45 | 29 | 16 |

**Doctoral Students Sponsored**

1. Juni Polansky (09/2025 – Present)
   Department of Biomedical Engineering, Columbia University.
   Project: *Mechanobiology of dorsoventral symmetry breaking and initiation of gut tube morphogenesis.*

2. Jiahui Du (09/2023 – Present)
   Department of Biomedical Engineering, Columbia University.
   Project: *Identification of a neuromesodermal progenitor population in the posterior avian endoderm.*

3. Jenny Gao (09/2022 – Present)
   Department of Biomedical Engineering, Columbia University.
   Project: *The role of YAP-dependent mechanical feedback in buckling morphogenesis of the small intestine.*

4. Panagiotis Oikonomou (09/2020 – Present)
   Department of Biomedical Engineering, Columbia University.
   Project: *Molecular, cellular, and mechanical interactions between the endoderm and mesoderm during development of the chick embryo.*

5. Olivia Powell (09/2019 – 05/2025)
   Department of Biomedical Engineering, Columbia University.
   Project: *Molecular control of forces driving morphogenesis of the amniote foregut.*

6. John Durel (09/2018 – 08/2024)
   Department of Biomedical Engineering, Columbia University.
   Project: *Cell contractility establishes a mechanical clutch for conversion of differential growth to mechanical instability during organogenesis of the small intestine.*
   Current position: Postdoctoral fellow, Sgro Lab, HHMI Janelia Farm

**Postdoctoral and Associate Research Scientists Sponsored**

1. Nimesh Chahare (06/2024 – Present)
   Postdoctoral Researcher, Department of Biomedical Engineering, Columbia University.
   Project: *Mechanobiology of embryonic brain development.*

2. Lisa Calvary, PhD (07/2023 – Present)
   Postdoctoral Researcher, Department of Biomedical Engineering, Columbia University.
   Project: *Long range mechanical regulation of cell polarity coordinates morphogenesis of the amniote foregut, midgut, and hindgut.*

3. Elise Loffet (03/2022 – Present)
   Postdoctoral Researcher, Department of Biomedical Engineering, Columbia University.
   Project: *Evolutionary selection on tissue mechanics as a driver of morphological diversity of the gut.*

4. Kwantae Kim (03/2024 – 08/2025)
   Postdoctoral Researcher, Department of Biomedical Engineering, Columbia University.
   Project: *Identification of a neuromesodermal progenitor population in the posterior avian endoderm.*

5. Nathalie Houssin (07/2022 – 07/2024)
   Associate Research Scientist, Department of Biomedical Engineering, Columbia University.
   Project: *Identification of a neuromesodermal progenitor population in the posterior avian endoderm.*

Current Position: Research Associate Scientist, Department of Genetics and Genomic Sciences. Icahn School of Medicine at Mount Sinai Mount Sinai, New York NY

6. Pamela Mancini (03/2021 – 12/2021)
   Postdoctoral Researcher, Department of Biomedical Engineering, Columbia University.
   Project: *Identification of a neuromesodermal progenitor population in the posterior avian endoderm.*
   Current Position: Technical Specialist, Sterne, Kessler, Goldstein & Fox PLLC, Washington D.C.

**Masters Students Sponsored**

1. Achsah Aruva (09/2024 – Present)
   Department of Biomedical Engineering, Columbia University.
   Project: Chemomechanical modeling of avian foregut morphogenesis.

2. Raphael Bertin (04/2024 – 12/2024)
   Department of Biomedical Engineering, Columbia University.
   Project: Morphoelastic modeling of spiral morphogenesis in the vertebrate gut.

3. Hyunjee Lim (09/2023 – 12/2024)
   Department of Biomedical Engineering, Columbia University.
   Project: The role of contractility in establishing tissue mechanics of the embryonic dorsal mesentery.

**Undergraduate Students Sponsored**

1. Biomedical Engineering (17): Michael Anne Bolene, Hunter Hasley, Panagiotis Oikonomou, Elizabeth Caso, Hyunjee Lim, Vanshika Sriram, Anjali Parande, Helena Cirne, Yi Qu, Richard Kam, Lucia Martin, Yasemin Yuksel, Kayla Williamson, Nosakhare Iyoha, Makenzie Colbert, Chieko Imamura, Iva-Amanda Nelson
2. School of Arts & Sciences (10): Anubhuti Mathur, Ruoyi Gong, Jenn Beardsley, Elizabeth Huggins, Faith Stanley, Andreas Welch, Reni Alakiu, Ettienne Paris Lewis, Joanna Lin, Isabel Amyx
3. Other Programs (3): Emily Kang (Biochemistry, Amherst College), Liana Hitts (New York Institute of Technology), Emily Garcia (Barnard College)

## H.3 Other Mentoring

**Doctoral Co-Advising**

1. Ella McGovern (2024 – Present)
   Department of Biomedical Engineering, Columbia University.
   Primary Advisor: Alice Huang, Department of Orthopaedic Surgery, Columbia University Irving Medical Center

2. Elaine Nagahara (2023 – Present)
   Department of Biomedical Engineering, Columbia University.
   Primary Advisor: Alice Huang, Department of Orthopaedic Surgery, Columbia University Irving Medical Center

3. Emily King (2022 – Present)
   Department of Biomedical Engineering, Columbia University.
   Primary Advisor: Alice Huang, Department of Orthopaedic Surgery, Columbia University Irving Medical Center

4. Erika Kusaka (2021 – Present)
   Department of Biomedical Engineering, Columbia University.
   Primary Advisor: Karen Kasza, Department Mechanical Engineering, Columbia University

**Ph.D. Thesis Defense Committees**

1. Daniella Fodera (2025), Department of Biomedical Engineering, Columbia University
   Advisor: Kristin Myers
2. McKenzie Sup (2024), Department of Biomedical Engineering, Columbia University
   Advisor: Stavros Thomopoulos
3. Lianna Gangi (2024), Department of Biomedical Engineering, Columbia University
   Advisor: Clark Hung
4. Katherine Spack (2024), Department of Biomedical Engineering, Columbia University
   Advisor: Gerard Ateshian
5. Iden Kurtaliaj (2023), Department of Biomedical Engineering, Columbia University
   Advisor: Stavros Thomopoulos
6. Teo Dinescu (2023), Department of Biomedical Engineering, Columbia University
   Advisor: X. Ed Guo
7. Paolo Caldarelli (2021), Institute Pasteur, Paris, FR
   Advisor: Jerome Gros
8. Michael Duffy (2021), Department of Biomedical Engineering, Columbia University
   Advisor: Christopher Jacobs
9. Dantong Danielle Huang (2021), Department of Biomedical Engineering, Columbia University
   Advisor: Kam Leong
10. Yizhong Jenny Hu (2021), Department of Biomedical Engineering, Columbia University
    Advisor: X. Ed Guo
11. Dennis Yuan (2021), Department of Biomedical Engineering, Columbia University
    Advisor: Lance Kam
12. Stanislav Tsitkov (2020), Department of Biomedical Engineering, Columbia University
    Advisor: Henry Hess
13. Joanne Lee (2020), Department of Biomedical Engineering, Columbia University
    Advisor: Lance Kam
14. Sam Robinson (2020), Department of Biomedical Engineering, Columbia University
    Advisor: X. Ed Guo
15. Neda Kazeruni (2019), Department of Biomedical Engineering, Columbia University
    Advisor: Henry Hess

**Ph.D. Thesis Proposal Committees**

1. Juan Rodriguez (2025), Department of Biomedical Engineering, Columbia University
   Advisor: Henry Hess
2. Andrew Countryman (2025), Department of Biomedical Engineering, Columbia University
   Advisor: Karen Kasza
3. Emily King (2025), Department of Biomedical Engineering, Columbia University
   Advisor: Alice Huang
4. Daniella Fodera (2024), Department of Biomedical Engineering, Columbia University
   Advisor: Kristin Myers

5. Katherine Spack (2023), Department of Biomedical Engineering, Columbia University
   Advisor: Gerard Ateshian
6. Lianna Gangi (2023), Department of Biomedical Engineering, Columbia University
   Advisor: Clark Hung
7. McKenzie Sup (2024), Department of Biomedical Engineering, Columbia University
   Advisor: Stavros Thomopoulos
8. Yumei Chen (2023), Department of Biomedical Engineering, Columbia University
   Advisor: X. Ed Guo
9. Peter Shyu (2023), Department of Biomedical Engineering, Columbia University
   Advisor: X. Ed Guo
10. Philip Brudnicki (2020), Department of Biomedical Engineering, Columbia University
    Advisor: Helen Lu
11. Dennis Yuan (2019), Department of Biomedical Engineering, Columbia University
    Advisor: Lance Kam
12. Joanne Lee (2019), Department of Biomedical Engineering, Columbia University
    Advisor: Lance Kam

**Ph.D. Qualifying Exam Committees**

1. Department of Biomedical Engineering, Columbia University (27):
   2025: Abinaya Anbuchelvan, Aniket Dhar, Jiahui Du, Chengxi Fan, Shiqi Hu, Yilan Hu, Anna Kylat, Lynette Lopez, Elaine Nagahara, Kaitlyn Wong
   2024: Jenny Gao, Emily King, Tammy Qui
   2023: Yaseman Aghli, Lauren Chiriboga, Erika Kusaka, Cosima Liang
   2022: Andrew Countryman, Shikhar Dhingra, Panagiotis Oikonomou, Juan Rodriguez
   2021: Daniella Fodera, Olivia Powell, Anna Schoonen
   2020: John Durel, Richard Yan
   2019: Andrew Basilio
2. Department of Genetics & Development, Columbia University Irving Medical Center (2):
   2021: Julia Mo
   2020: Corey Hansen

**High School Trainees**

1. Daniela Cruz, Hypothekids Bioforce Program, New York City, NY (2025)
2. Joyee Mandal, Hypothekids Bioforce Program, New York City, NY (2024)
3. Daria Landry, Hypothekids Bioforce Program, New York City, NY (2023)
2. Daniel Arias, Hypothekids Bioforce Program, New York City, NY (2022)
3. Kenia Delgado, Hypothekids Bioforce Program, New York City, NY (2021)
4. Brianna Leung, Stuyvesant High School, New York City, NY (2020 – 2021)
5. Liana Hitts, Academy of American Studies, Long Island City, NY (2019)
6. Daniela Plaza, Bard High School, Queens, NY (2019)
7. Eben Hess, Trinity High School, New York City, NY (2019)

## I. Invited Talks

1. American Gastroenterological Association DDW Conference, San Diego, CA (2025)
2. SUNY Binghamton, Department of Mechanical Engineering, Binghamton, NY (2025)
3. Vertebrate Gastrulation Zoom Talks (VGZT) Seminar Series (Virtual, 2024)
4. University of Maryland, Baltimore County (2024)
5. Kyoto University, Department of Zoology, Kyoto, Japan (2024)

6. Japan Science and Technology Agency International Symposium on “Dynamics of Cellular Interactions in Multicellular Systems” Kyoto, Japan (2024)
7. University of Basel, Department of Environmental Sciences, Basel, Switzerland (Virtual, 2023)
8. University of Delaware, Department of Biomedical Engineering, Newark DE (2023)
9. Keynote: 11th Avian Model Systems Meeting, Portsmouth, United Kingdom, (2023)
10. Society for Integrative and Comparative Biology Annual Meeting, Austin TX, (2023)
11. University of Maryland College Park, Department of Biomedical Engineering, College Park MD (2022)
12. University of Minnesota, Developmental Biology Symposium, Minneapolis, MN (2022)
13. Northeast Regional Bioengineering Conference, New York, NY (2022)
14. Barnard College, Department of Biology, New York, NY (Virtual) (2022)
15. University of Michigan, Cell Plasticity and Organoid Design Ann Arbor MI (Virtual, 2022)
16. Developmental Mechanics International Seminar Series (Virtual, 2021)
17. Vanderbilt University, Program in Developmental Biology, Nashville, TN (Virtual, 2021)
18. Gordon Research Conference on FGFs in Development and Disease, Lucca, Italy (2020) (Canceled due to COVID19 pandemic)
19. Yale University, Physics Engineering Biology Program, New Haven, CT (2020) (Canceled due to COVID19 pandemic)
20. Mount Sinai Icahn School of Medicine, Department of Cell, Developmental, and Regenerative Biology, New York, NY (2020)
21. University of Pennsylvania, Penn Institute for Regenerative Medicine Stem Cell Club, Philadelphia, PA (2019)
22. University of Utah, Department of Biomedical Engineering, Salt Lake City UT (2019)
23. Rutgers University, Department of Molecular Biology and Biochemistry, New Brunswick NJ (2019)
24. 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), New York, NY (2019)
25. Rensselaer Polytechnic Institute, Department of Biomedical Engineering, Troy, NY (2018)
26. City College of New York, Department of Biology, New York, NY (2018)
27. Mount Sinai Icahn School of Medicine, Department of Orthopaedic Research, New York, NY (2017)
28. University of Pennsylvania, Department of Bioengineering, Philadelphia, PA (2017)
29. Boston University, Department of Biomedical Engineering, Boston, MA (2017)
30. Massachusetts Institute of Technology, Department of Biological Engineering, Cambridge, MA (2017)
31. Tufts University, Department of Biology, Boston, MA (2017)
32. Washington University in St. Louis, Department of Biomedical Engineering, St. Louis, MO (2017)
33. Princeton University, Department of Molecular Biology, Princeton NJ (2017)
34. University of Delaware, Department of Biological Sciences, Newark DE (2016)
35. Union College, Department of Biological Sciences, Schenectady NY (2016)
36. Massachusetts Institute of Technology, Biophysics in Development Discussion Group, Cambridge, MA (2016)
37. Harvard University, School of Engineering and Applied Sciences, Cambridge, MA (2016)
38. Biocompare Webinar Series: Effective Means to Transfect and Immunoprecipitate GFP-Fusion Constructs (Virtual, 2014)
39. University of Massachusetts, Department of Biology, Amhesrt, MA (2014)
40. Massachusetts Institute of Technology, Mechanical Forces in Development Seminar Series, Cambridge, MA (2012)
41. Harvard Medical School, Department of Genetics, Boston, MA (2010)
42. 35th Annual Meeting of the International Society for the Study of Lumbar Spine, Geneva, Switzerland (2008)

Internal - Columbia University and Columbia University Irving Medical Center (CUIMC):

1. Growing Up in Science Seminar, Department of Biomedical Engineering (2025)
2. Egelston Scholars Seminar, SEAS (2024)
3. 3rd "Molecules, Materials, Devices and Systems" Workshop (2024)
4. Engineering in Medicine Symposium, Columbia University and CUIMC (2024)
5. CUIMC Digestive & Liver Diseases Research Center Seminar Series (Virtual, 2023)
6. CUIMC Digestive & Liver Diseases Research Center Annual Retreat (Virtual, 2020)
7. *BME Breaks* (Virtual, 2020)
8. Engineering in Medicine Symposium, Columbia University and CUIMC (2020)
9. CUIMC College of Dental Medicine (2019)
10. Department of Biological Science (2018)
11. Hypothekids Hk Makers, Department of Biomedical Engineering (2018)
12. Department of Biomedical Engineering (2018)
13. CUIMC Department of Genetics & Development (2018)
14. Engineering in Medicine Symposium, Columbia University and CUIMC (2018)
15. Department of Biomedical Engineering (2017)

# J. Service

## J.1 Academic Service

**Department of Biomedical Engineering (DBME)**

- DBME Graduate Committee (2018 – Present)
  - Chair, Doctoral Qualifying Examinations, DBME (2024 – Present)
  - Biomechanics Lead Examiner, Doctoral Qualifying Examinations, DBME (2023 – Present)
  - Cell and Tissue Engineering co-Lead Examiner, Doctoral Qualifying Examinations, DBME (2024)
  - Under-represented Minority (URM) Advocate, Graduate Committee, DBME (2020 – 2024)
  - Recruitment Visit, Meyerhoff Scholars Program, University of Maryland Baltimore County (UMBC) Columbia Campus Connection (2024)
- DBME Laboratory Committee (2024 – Present)
- Seminar Series Planning Committee (2022 – Present)
- Engineering in Medicine Symposium Planning Committee (2019 – Present)
- Co-Chair, Engineering in Medicine Symposium Planning Committee (2022 – 2023)
- Session Co-Chair, “Development and Ageing”, Engineering in Medicine Symposium (2023)
- Northeast Regional Bioengineering Conference Planning Committee (2022)
- Rising Stars Workshop Committee (2022)
- Poster Chair, Engineering in Medicine Symposium (2020)
- Faculty Retreat Subcommittee, DBME (2020)
- Co-Chair, 2020 Engineering in Medicine Symposium (2020)
- Search Committee, Open Rank/Field, DBME (2019 – 2020)

**Columbia University School of Engineering & Applied Sciences (SEAS), School of Arts and Sciences (SAS), and Irving Medical Center (CUIMC)**

- Member, Board of Undergraduate Research Advisors (2025 – Present)

- Speaker/Panelist, “Responsible and Ethical Conduct of Research (RECR): Mentoring & Mentorship,” Office of Postdoc Affairs, Columbia University and Columbia University Irving Medical Center (2023)
- Reviewer, Avanessians Doctoral Fellowships in Data Science (2023, 2024)
- Reviewer, Neuromodulation Pilot Award (2023)
- Speaker/Panelist, “Responsible and Ethical Conduct of Research (RECR): Mentoring & Mentorship,” Office of Postdoc Affairs, Columbia University and Columbia University Irving Medical Center (2022)
- Reviewer (various), SEAS (2024)
- Reviewer, Herbert Irving Comprehensive Cancer Center – SEAS Joint Seed Grant (2022)
- Reviewer, Research Initiatives in Science and Engineering (RISE) Award (2021)
- Reviewer, Research Initiatives in Science and Engineering (RISE) Award (2020)
- Reviewer, Research Initiatives in Science and Engineering (RISE) Award (2019)
- Reviewer, Revson Senior Fellows (2019)
- Session Chair, MechanoMedicine Symposium, SEAS (2018)

## J.2 Service to the Discipline

**Grant Reviewing Activities**

- National Institutes of Health (NIH)
  - Standing member, Maximizing Investigator’s Research Award – C (MRA-C) Study Section, Cell Biology Integrated Review Group (CB IRG, 2024 – 2028)
  - Ad Hoc, MRA-C Study Section, CB IRG (06/12/23 – 06/13/23)
  - Ad Hoc, Special Emphasis Panel ZRG1CB-L(55)R: Maximizing Investigators Research Award for Early Stage Investigators (03/16/23 – 03/17/23)
  - Ad Hoc, NICHD Special Emphasis Panel ZHD1 DSR – A (12/02/22)
  - Ad Hoc, Special Emphasis Panel: Biological Chemistry and Macromolecular Biophysics (10/2021)
  - Ad Hoc, Intercellular Interactions (ICI) Study Section, 10/05/20 – 10/06/20
- National Science Foundation (NSF)
  - NSF Integrative Research in Biology Working Group (03/2023)
  - NSF Review Panel (01/24/11 – 01/26/22)
  - NSF Review Panel (03/29/21 – 03/30/21)
- U.S.-Israel Binational Science Foundation (2024)
- Swiss National Science Foundation (2024)
- Human Frontiers Science Program (HFSP) Postdoctoral Long Term Fellowship (2024)
- Human Frontiers Science Program (HFSP) Research Grant (2023)
- United Kingdom Research & Innovation Biotechnology and Biological Sciences Research Council (2023)
- United Kingdom Research & Innovation Medical Research Council (MRC, 2022)
- Wellcome Trust Senior Research Fellowship (2021)
- United Kingdom Research & Innovation MRC (2020)
- Wellcome Trust Sir Henry Dale Fellowship (2018)

**Journal Editorial Activities**

- Academic Editor, Editorial Board, *Scientific Reports* (2025 – Present)
- Academic Editor, Editorial Board, *PLoS Genetics* (2024 – Present)
- Guest Associate Editor, *PLoS Genetics* (2023)

- Guest Editor, *Seminars in Cell & Developmental Biology,* Special Issue on Synthetic Developmental Biology (2022)

**Journal Peer-review**
*Nature, Science, Proc Natl Acad Sci, Developmental Cell, Development, eLife, Current Biology, Developmental Biology, Biophysical Journal, Nature Communications, Cells & Development, Seminars in Cell and Developmental Biology, iScience, Biomaterials, Advanced Science, PNAS Nexus, Advanced Healthcare Materials, ACS Biomaterials Science & Engineering, Biomechanics in Modeling and Mechanobiology, Cell Reports, Biophysical Reviews, Cell Health and Cytoskeleton, Clinical Case Reporrs, Colloids and Surfaces B: Biointerfaces, Communications Biology, European Cells and Materials, Engineering Science & Technology: an Int'l Journal, IEEE Life Sciences Letters, Integrative Biology, Journal of the Mechanical Behavior of Biomedical Materials, Journal of Biomechanical Engineering, Journal of Cellular and Molecular Medicine, Journal of Orthopaedic Research, Journal of the Royal Society Interface, Materials Today Magazine, Philos Trans Royal Soc B, PLoS One, Stem Cell Research & Therapy, Tissue Engineering*

**Membership to Professional Societies**
- Avian Research Network (2023 – Present)
- Society for Integrative and Comparative Biology (2022 – Present)
- International Society of Differentiation (2016 – Present)
- Biomedical Engineering Society (2016 – Present)
- Summer Biomechanics, Bioengineering, and Biotransport, Conference (SB3C) Foundation (2014 – Present)
- Society for Developmental Biology (2013 – Present)
- American Society of Mechanical Engineers, Bioengineering Division (2011 – 2014)

**Panels and Workshop**
- Panelist, "Interviewing for STEM Faculty Jobs", University of Pennsylvania, Philadelphia, PA (10/20/22, Virtual)
- Contributor, GetHired! E-course on the academic career path for the Society for Developmental Biology (2022, Virtual)
- Panelist, NIH Centers for Scientific Review Listening Session on Reviewer Training (12/11/20, Virtual)

## J.3 Conference and Workshop Organizing Activities

- Session Chair, Biomedical Engineering Society Meeting, San Antonio, TX (2022)
- Track co-Chair, Morphogenesis & Development, Bioengineering Division, American Society of Mechanical Engineers/Summer Bioengineering Conference (SB3C, 2012 – 2022)
- Member, Cell & Tissue Engineering Technical Committee, SB3C (2016 – Present)
- Member, Solid Mechanics Technical Committee, SB3C (2016 – Present)
- Judge, M.S. Student Paper competition, ASME/SB3C (2020)
- Session Organizer and Chair, Biomechanics of Morphogenesis, 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, New York, NY (2019)
- Session Chair, Biomechanics of Morphogenesis, 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, New York, NY (2019)
- Judge, Student Poster competition, 78th Annual Meeting of the Society for Developmental Biology, Boston, MA (2019)
- Judge, PhD Student Paper/Poster Competition, ASME/SB3C (2012 – 2017)
- Conference Abstract Review
    - Northeast Regional Bioengineering Conference

- Biomedical Engineering Society: Tissue Engineering Track
- Biomedical Engineering Society: Stem Cell EngineeringTrack
- Biomedical Engineering Society: Undergraduate Track
- Summer Biomechanics Bioengineering and Biotransport Conference (SB3C)

## J.4 Outreach

- Research mentor, HYPOTHEkids Bioforce Program, New York City Scientific Research Mentorship Consortium (2019 - Present)
- Embryology lab, Girls' Science Day, Columbia University (2023)
- Mentor, Meet ups Program, Division of Evolutionary Developmental Biology, Society for Integrative and Comparative Biology (SICB, 2023)
- Diversity Mentor, Summer Bioengineering, Biomechanics, and Biotransport Conference (2022)
- Guest speaker, HYPOTHEkids Hk Makers Program, New York City Scientific Research Mentorship Consortium (2020, Virtual)
- Guest speaker, HYPOTHEkids Bioforce Program, New York City Scientific Research Mentorship Consortium (2020, Virtual)
- Guest speaker, HYPOTHEkids Hk Makers Program, New York City Scientific Research Mentorship Consortium (2019)