

M. Lisa Manning

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RESEARCH INTERESTS	Biological physics and Soft Matter. Modeling and analysis of collective and emergent behavior in biological tissues and mechanical metamaterials, as well as structure, deformation, and flow in glassy materials using theory and simulations.	
EDUCATION	University of California, Santa Barbara , California, USA Ph.D. Physics, September 2008 Dissertation title: <i>Effective temperature and strain localization in amorphous solids</i> Committee: Jean Carlson (advisor), James Langer, Ralph Archuleta M.A. Physics, May 2005 University of Virginia , Charlottesville, Virginia USA B.S. Physics, <i>with highest distinction</i> , 2002 B.A. Mathematics, 2002	
ACADEMIC POSITIONS	2020- 2019-2023 2015-2019 2011-2015 2008-2011	William R. Kenan, Jr. Professor of Physics, Syracuse University. Director, Bioinspired Institute, Syracuse University. Associate Professor, Syracuse University. Assistant Professor, Syracuse University. Postdoctoral Fellow, Princeton University.
AWARDS AND FELLOWSHIPS	2026 2025 2022 2019 2019 2018 2018 2016 2016 2015 2014 2014 2014 2013 2008-2011 2004-2008 2003-2004 2002	Fellow, American Association for the Advancement of Science. Co-chair, NAS Condensed Matter and Materials Research Committee. One University Research Excellence Award, Syracuse University. APS Fellow, American Physical Society DCMP. Emerging Leader Alumni Award, UC Santa Barbara. Top 10 Scientists to Watch List, Science News. Maria Goeppert Mayer Award, American Physical Society. Simons Investigator MMLS, Simons Foundation. IUPAP Young Investigator Prize, C3 (Statistical Physics) commission. Cottrell Scholar, Research Corporation. Scialog Fellow, Moore Foundation & Research Corporation. Physics Department Teaching Award, Phys 211, Syracuse University. Research Fellow, Alfred P. Sloan Foundation. Physics Department Teaching Award, Phys 576, Syracuse University. Postdoctoral fellowship, Princeton Center for Theoretical Science. National Science Foundation Graduate Research Fellowship, NSF. National Science Foundation Graduate K-12 Education Fellowship, NSF. Barry M. Goldwater Scholarship, University of Virginia.
EXTERNAL SUPPORT	9/2025-8/2028 \$450,000	NSF-DMR-CMMT Predicting and programming plasticity, flow, and arrest in dense active matter.

9/2024-8/2029	\$2,993,166	NSF-NRT 2345686 NRT-URoL: Emergent Intelligence Research for Graduate Excellence in Biological and Bio-Inspired Systems (EmIRGE-Bio) <i>with 5-department leadership team.</i>
9/2023-9/2026	\$300,000	CZI 2023329572 Chan-Zuckerberg Theory in Biology Initiative, advised fund of Silicon Valley Community Foundation.
5/2023-4/2026	\$338,480	NSF-CMMI-BMMB 3D mechanical modeling of epithelial stratification and turnover <i>with collaborators Carien Niessen and Sara Wickstrom.</i>
9/2020-9/2026	\$2.1M	NIH-R01 HD099031 Four-dimensional prediction and quantification of how physical forces impact organogenesis in zebrafish. <i>With collaborator Jeff Amack, Upstate Medical University.</i>
9/2022-9/2023	\$96,689	NSF-ITE-2232327 Conference: Convergence Accelerator Workshop: Bio-inspired Design <i>with co-PIs Don Ingber, Aimey Wissa, Wallace Marshall.</i>
9/2020-8/2024	\$450,000 co-PI	NSF-POLS- 2014192 Modeling Tumor Invasion with Spheroids Embedded in Extracellular Matrix, <i>Jen Schwarz(PI), Mimgming Wu(co-PI).</i>
7/2020-6/2024	\$369,914	NSF-DMR-1951921 Predicting dynamics in unstable and active solids.
7/2016-6/2023	\$873,000	Simons Foundation 454947 Cracking the Glass Problem Collaboration.
7/2016-6/2021	\$500,000	Simons Foundation 446222 Simons Investigator: Mathematical Modeling of Living Systems.
5/2015-4/2020	\$ 1,020,000	NIH-1R01GM117598 Quantitative Modeling of Cell Shape Changes During Organogenesis. <i>Jeff Amack (co-PI).</i>
7/2016-6/2020	\$686,000	NSF-PHY-1607416 Predicting How Fluid-Solid Transitions in Cancer Tumors Help Govern Invasion and Metastasis. <i>With co-PIs Cristina Marchetti and Jennifer Schwarz.</i>
6/2014-5/2019	\$ 450,000	NSF-DMR-CMMT 1352184 CAREER Flow, Failure, and Migration in Glassy Materials.
7/2017-6/2019	\$25,000	Cottrell Collaborative Award Workshop on developing authentic partnerships between Minority Serving Institutions and Primarily White Institutions. <i>PI, with 13 additional co-PIs.</i>
7/2015-6/2018	\$396,068 co-PI	NSF ACI-1541396 CC*DNI Engineer: Leading the Way for Research Computing at Syracuse University and Beyond. <i>With Samuel Scozzafava,PI and 3 other co-PIs.</i>
7/2015-6/2017	\$ 56,250	Scialog Gordon and Betty Morre Foundation.
6/2015-5/2018	\$ 75,000	Cottrell Scholar Research Corporation.
6/2014-5/2016	\$ 50,000	Sloan Fellowship Alfred P. Sloan Foundation.
7/2013-7/2017	\$ 290,978 co-PI	NSF-BMMB-CMMI 1334611 Utilization of Smart Materials <i>Jay Henderson(PI) and Chris Turner (co-PI).</i>

PH.D. STUDENTS SUPERVISED	Spring 2017	Sven Wijtmans	
	Spring 2018	Giuseppe Passucci	
	Summer 2018	Michael Czajkowski (co-advised with Cristina Marchetti)	
	Spring 2020	Ethan Stanifer	
	Summer 2020	Preeti Sahu (co-advised with Jen Schwarz and Cristina Marchetti)	
	Spring 2023	Elizabeth Lawson-Keister	
	Fall 2023	Julia Giannini	
	expected 2026	Tyler Hain	
	expected 2028	Kelly Aspinwall	
	expected 2029	Tanya Chhabra	
POSTDOCTORAL ASSOCIATES	2012-15	Dapeng (Max) Bi	Ph.D. Brandeis 2012
	2015-16	Jonathan Dawson	Ph.D. MPI-PKS 2012
	2015-18	Matthias Merkel	Ph.D. MPI-PKS 2015
	2016-19	Peter Morse	Ph.D. U. Oregon 2016
	2016-19	Daniel Sussman	Ph.D. Illinois 2014
	2017-19	Gonca Erdemci-Tandogan	Ph.D. UC Riverside 2017
	2019-20	Sudeshna Roy	Ph.D. Twente Netherlands 2017
	2018-21	Amanda Parker	Ph.D. UC Berkley 2018
	2019-21	David Richard	shared, Ph.D. Mainz Germany 2018
	2019-21	Ojan Damavandi	Ph.D. Michigan 2019
	2018-22	Varda Hagh	shared, Ph.D. Arizona State 2018
	2019-22	Paula Sanematsu	Ph.D. LSU 2015
	2022-23	Raj Kumar Manna	Ph.D. Indian Inst. Tech. Palakkad 2019
	2022-24	Cam Denis	shared, Ph.D. Oregon 2021
	2022-25	Sadjad Arzash	shared, Ph.D. Rice 2021
	2023-	Somiealo Azote	Ph.D. Stellenbosch University 2019
	2024-	Rajendra Singh Negi	Ph.D. Forschungszentrum Jlich 2024
	2024-	Alex Grigas	Ph.D. Yale University 2024
PREPRINTS AND SUBMITTED MANUSCRIPTS	A. Tyler Hain, Edan Lerner, and M Lisa Manning, “Using the force landscape of an active solid to predict plastic deformation,” <i>arXiv preprint 2603.11425</i> https://arxiv.org/abs/2603.11425 , (2026).		
	B. Clmentine Villeneuve*, Somiealo Azote Epse Hassikpezi*, Marga Albu, Matthias Rbsam, Leah C. Biggs, Sabrina Vinzens, Kai Kruse, Anubhav Prakash, Peter Zentis, Elizabeth Lawson-Keister, Gautier Follain, Johanna Ivaska, Carien M. Niessen, M. Lisa Manning, and Sara A. Wickstrm, “Tissue-scale mechanics controls differentiation strategy and dynamics of epithelial multilayering,” http://www.biorxiv.org/content/10.64898/2026.02.08.704529v1 , (2026).		
	C. Ghaznavi, A., Rossi, S., Zamponi, F., Manning, M. L., “Yielding in dense active matter,” <i>arXiv preprint arXiv:2512.03252</i> . https://arxiv.org/abs/2512.03252 , (2025).		
	D. Alex T. Grigas, Rajendra Singh Negi, Eirini Maniou, Gabriel L. Galea, Arthur Michaut, Alessandro Mongera, M. Lisa Manning., “Sparse mesenchymal cell networks as a fluid under tension,” <i>bioRxiv 2025.12.07.692626</i> ; doi: https://doi.org/10.64898/2025.12.07.692626 , (2025).		
	E. Sadjad Arzash, Andrea J. Liu, M. Lisa Manning, “Epithelial convergent extension as a tuning process,” <i>bioRxiv 2025.11.06.687029</i> ; doi: https://doi.org/10.1101/2025.11.06.687029 , (2025).		

PEER-REVIEWED
PUBLICATIONS

- 79.** Aspinwall, Kelly, Tyler Hain, and M. Lisa Manning, “Rigidity and mechanical response in biological structures (Review).,” *to appear in Ann. Rev. Biophysics. arXiv preprint arXiv:2508.18432* <https://arxiv.org/abs/2508.18432> , , (2026).
- 78.** Ruppel, Artur, Vladimir Misiak, Sadjad Arzash, Daniel Selma Herrador, Giovanni Cappello, Thomas Boudou, Lisa Manning, Francois Fagotto, and Martial Balland, “Morphogenesis-on-chip: A minimal in vitro assay for cell intercalation highlights the importance of interfacial tension and migratory forces,” *accepted to Nature Physics. bioRxiv: <https://doi.org/10.1101/2025.06.30.662274>* , , (2026).
- 77.** Raj Kumar Manna*, Emma M. Retzlaff*, Anna Maria Hinman, Yiling Lan, Osama Abdel-Razek, Mike Bates, Heidi Hehnly, Jeffrey D. Amack, M. Lisa Manning, “Dynamical forces drive organ morphology changes during embryonic development,” *Proc. Nat. Acad. Sci.* **122(92)**, e2418111122, (2025). DOI: <https://doi.org/10.1073/pnas.2418111122>
- 76.** Ojan Khatib Damavandi*, Sadjad Arzash*, Elizabeth Lawson-Keister, M. Lisa Manning, “Universality in the Mechanical Behavior of Vertex Models for Biological Tissues,” *PRX Life* **3**, 033001, (2025). DOI: <https://doi.org/10.1103/9ktk-6rqc>
- 75.** Ludovic Berthier, Giulio Biroli, M. Lisa Manning, Francesco Zamponi, “Yielding and plasticity in amorphous solids,” *Nature Reviews Physics* **7**, 313330, (2025). <https://arxiv.org/abs/2401.09385>
- 74.** Amanda Parker, M. Cristina Marchetti, M. Lisa Manning, J. M. Schwarz, “How does the extracellular matrix affect the rigidity of an embedded spheroid?,” *Phys. Rev E* **111**, 044410, (2025). <https://arxiv.org/abs/2006.16203>
- 73.** Sadjad Arzash, Indrajit Tah, Andrea J. Liu, M. Lisa Manning, “Rigidity of Epithelial Tissues as a Double Optimization Problem,” *Phys. Rev. Research* **7**, 013157, (2025). <https://doi.org/10.1103/PhysRevResearch.7.013157>
- 72.** Tyler Hain, Chris Santangelo, and M. Lisa Manning, “Optimizing properties on the critical rigidity manifold of underconstrained central-force networks,” *Phys. Rev. E* **111**, 015418, (2025). <https://doi.org/10.1103/PhysRevE.111.015418>
- 71.** M. Lisa Manning, “Rigidity in mechanical biological networks (Review),” *Current Biology* **34(20)**, R1024-R1030, (2024). [https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)00917-5](https://www.cell.com/current-biology/fulltext/S0960-9822(24)00917-5)
- 70.** Carien M. Niessen, M. Lisa Manning, and Sara A. Wickstrom, “Mechanochemical Principles of Epidermal Tissue Dynamics.(Review),” *Cold Spring Harb Perspect Biol* **a041518**, 2024, (doi:10.1101/cshperspect.a041518).
- 69.** Packard, C. R., Unnikrishnan, S., Phuyal, S., Cheong, S. H., Manning, M. L., Tung, C. K., and Sussman, D. M., “Self-organized vortex phases and hydrodynamic interactions in *Bos taurus* sperm cells,” *Physical Review E* **110(1)**, 014407, (2024). <https://journals.aps.org/pre/abstract/10.1103/PhysRevE.110.014407>
- 68.** Erin McCarthy*, Raj Kumar Manna*, Ojan Damavandi, M. Lisa Manning, “Demixing in binary mixtures with differential diffusivity at high density,” *Phys. Rev. Lett.* **132**, 098301, (2024). <https://doi.org/10.1103/PhysRevLett.132.098301>

- 67.** Julia A. Giannini, Edan Lerner, Francesco Zamponi, M. Lisa Manning, “Scaling regimes and fluctuations of observables in computer glasses approaching the unjamming transition,” *J. Chem. Phys.* **160**, 034502, (2024). <https://doi.org/10.1063/5.0176713>
- 66.** Clementine Villeneuve, Ali Hashmi#, Irene Ylivinkka#, Elizabeth Lawson-Keister#, Yekaterina A. Miroschnikova, Carlos Prez-Gonzalez, Bhagwan Yadav, Tao Zhang, Danijela Matic Vignjevic, Marja L. Mikkola, M. Lisa Manning* and Sara A. Wickstrom*, “Mechanical forces across compartments coordinate cell shape and fate transitions to generate tissue architecture,” *Nature Cell Biology* **26**, 207218, (2024). <https://doi.org/10.1038/s41556-023-01332-4>
- 65.** Elizabeth Lawson-Keister, Tao Zhang, Fatemeh Nazari, Francois Fagotto, M. Lisa Manning, “Differences in boundary behavior in the 3D vertex and Voronoi models,” *PLOS Comp Bio* **20(1)**, e1011724, (2024). <https://doi.org/10.1371/journal.pcbi.1011724>
- 64.** David Richard, Ahmed Elgailani, Damien Vandembroucq, M. Lisa Manning, Craig E Maloney, “Mechanical excitation and marginal triggering during avalanches in sheared amorphous solids,” *Phys. Rev. E* **107**, 034902, (2023). <https://doi.org/10.1103/PhysRevE.107.034902>
- 63.** Elizabeth Lawson-Keister and M. Lisa Manning, “Collective chemotaxis in a Voronoi model for confluent clusters,” *Biophysical Journal* **121**, 23:4624-4634, (2022). <http://dx.doi.org/10.1016/j.bpj.2022.10.029>
- 62.** Thomas Fuhs, Franziska Wetzel, Anatol W. Fritsch, Xinzhi Li, Roland Stange, Steve Pawlizak, Tobias R. Kieling, Erik Morawetz, Steffen Grosser, Frank Sauer, Jrgen Lippoldt, Frederic Renner, Sabrina Friebe, Mareike Zink, Klaus Bendrat, Jrgen Braun, Maja H. Oktay, John Condeelis, Susanne Briest, Benjamin Wolf, Lars-Christian Horn, Michael Hckel, Bahriye Aktas, M. Cristina Marchetti, M. Lisa Manning, Axel Niendorf, Dapeng Bi and Josef A. Ks, “Rigid tumors contain soft cancer cells,” *Nature Physics* **18**, 15101519, (2022). <https://doi.org/10.1038/s41567-022-01755-0>
- 61.** Ojan Damavandi, Lisa Manning, and J. M. Schwarz, “Effective medium theory of random regular networks,” *EPL* **138**, 27001, (2022). <https://doi.org/10.1209/0295-5075/ac6064>
- 60.** Varda F. Hagh, Sidney R. Nagel, Andrea J. Liu, M. Lisa Manning, Eric I. Corwin, “Transient degrees of freedom and stability,” *PNAS* **119**, e2117622119, (2022). <https://doi.org/10.1073/pnas.2117622119>
- 59.** Ethan Stanifer and M. Lisa Manning, “P,” *Avalanche dynamics in sheared athermal particle packings occurs via localized bursts predicted by unstable linear response* **Soft Matter**, **18**, (2394-2406). 2022<https://doi.org/10.1039/D1SM01451J>
- 58.** Takaki Yamamoto, Daniel M. Sussman, Tatsuo Shibata, M. Lisa Manning, “Non-monotonic fluidization generated by fluctuating edge tensions in confluent tissues,” *Soft Matter* **18**, 2168-2175, (2022). <https://doi.org/10.1039/d0sm01559h>
- 57.** Julia A. Giannini, Ethan Stanifer, M. Lisa Manning, “Searching for structural predictors of plasticity in dense active packings,” *Soft Matter* **18**, 1540-1553, (2022). DOI: 10.1039/D1SM01675J

- 56.** Ojan Damavandi, Varda Hagh, Chris Santangelo*, M. Lisa Manning*, “Energetic rigidity I: a Unifying Theory of Mechanical Stability,” *Phys. Rev. E* **105** **025003**, 2022, (<https://doi.org/10.1103/PhysRevE.105.025003>).
- 55.** Ojan Damavandi, Varda Hagh, Chris Santangelo*, M. Lisa Manning*, “Energetic rigidity II: Applications in examples of biological and underconstrained materials,” *Phys. Rev. E* **105**, 025004, (2022). <https://doi.org/10.1103/PhysRevE.105.025004>
- 54.** Julia A. Giannini, David Richard, M. Lisa Manning, and Edan Lerner, “Bond-space operator disentangles quasi-localized and phononic modes in structural glasses,” *Phys. Rev. E* **104**, 044905, (2021). <https://doi.org/10.1103/PhysRevE.104.044905>
- 53.** Preeti Sahu, J. M. Schwarz, M. Lisa Manning, “Geometric signatures of tissue surface tension in a three-dimensional model of confluent tissue,” *New J. Phys.* **23**, 093043, (2021). <https://doi.org/10.1088/1367-2630/ac23f1>
- 52.** Elizabeth Lawson-Keister and M. Lisa Manning, “Review: Jamming and arrest of cell motion in biological tissues,” *Current Opinion in Cell Biology* **72**, 146-155, (2021). <https://doi.org/10.1016/j.ceb.2021.07.011>
- 51.** Paula C. Sanematsu, Gonca Erdemci-Tandogan, Himani Patel, Emma M. Retzlaff, Jeffrey D. Amack, M. Lisa Manning, “3D viscoelastic drag forces drive changes to cell shapes during organogenesis in the zebrafish embryo,” *Inaugural issue of Cells and Development* , (2021). <https://doi.org/10.1016/j.cdev.2021.203718>
- 50.** Gonca Erdemci-Tandogan and M. L. Manning, “Effect of cellular rearrangement time delays on the rheology of vertex models for confluent tissues,” *PLOS Comp. Bio* **17(6)**, e1009049, (2021). <https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.100904>
- 49.** Peter K. Morse, Sudeshna Roy, Elisabeth Agoritsas, Ethan Stanifer, Eric I. Corwin, M. Lisa Manning, “A direct link between active matter and sheared granular systems,” *Proc. Nat. Acad. Sci.* **118 (18)** **e2019909118**, 2021, (<https://doi.org/10.1073/pnas.2019909118>).
- 48.** John Devany, Daniel M. Sussman, Takaki Yamamoto, M. Lisa Manning, Margaret L. Gardel, “Cell division Rate Controls Cell Shape Remodeling in Epithelia,” *Proc. Nat. Acad. Sci.* **118 (10)** **e1917853118**, 2021, (<https://doi.org/10.1073/pnas.1917853118>).
- 47.** Steffen Grosser, Juergen Lippoldt, Linda Oswald, Matthias Merkel, Daniel M. Sussman, Frederic Renner, Erik W. Morawetz, Steve Pawlizak, Anatol Fritsch, Lars Christian Horn, Bahriye Aktas, M. Lisa Manning, and Josef A. Ks, “Elongated cells fluidize malignant tissues,” *PRX* **11** **011033**, 2021, (<https://doi.org/10.1103/PhysRevX.11.011033>).
- 46.** David Richard* Geert Kapteijns* Julia A. Giannini, M. Lisa Manning, and Edan Lerner, “A simple and broadly-applicable definition of shear transformation zones,” *Phys. Rev. Lett.* **126(1)** **015501**, 2020, (<https://doi.org/10.1103/PhysRevLett.126.015501>).
- 45.** Diogo E. P. Pinto, Gonca Erdemci-Tandogan, M. Lisa Manning, and Nuno A. M. Araujo, “The cell adaptation time sets a minimum length scale for patterned substrates,” *Biophysical Journal* **119**, 11, (<https://doi.org/10.1016/j.bpj.2020.10.026>).

44. D. Richard, M. Ozawa, S. Patinet, E. Stanifer, B. Shang, S. Ridout, B. Xu, G. Zhang, P. Morse, J.-L. Barrat, L. Berthier, M.L. Falk, P. Guan, A. Liu, K. Martens, S. Sastry, D. Vandembroucq, E. Lerner, and M.L. Manning, “Predicting plasticity in disordered solids from structural indicators,” *Physical Review Materials* **4**, 113609, (2020). <https://doi.org/10.1103/PhysRevMaterials.4.113609>
43. Peter Morse, Merlijn van Deen, Sven Wijtmans, Martin Van Hecke, M. L. Manning, “Two classes of events in sheared particulate matter,” *Physical Review Research* **2**, 023179, (2020). <https://link.aps.org/doi/10.1103/PhysRevResearch.2.023179>
42. Xun Wang*, Matthias Merkel*, Leo B. Sutter*, Gonca Erdemci-Tandogan, M. Lisa Manning, Karen E. Kasza., “A solid-to-fluid transition is predicted by cell shape and alignment in an anisotropic tissue of the developing fly embryo,” *Proceedings of the National Academy of Sciences* **201916418**, 2020, (<https://doi.org/10.1073/pnas.1916418117>).
41. Preeti Sahu, Daniel M. Sussman, Matthias Rbsam, Aaron F. Mertz, Valerie Horsley, Eric R. Dufresne, Carien M. Niessen, M. Cristina Marchetti, M. Lisa Manning, J. M. Schwarz., “Small-scale demixing in confluent biological tissues,” *Soft Matter* **16**, 3325-3337, (2020). <https://doi.org/10.1039/C9SM01084J>
40. Rathbun L, Colicino E, Coyne S, Reilly N, Erdemci-Tandogan G, Garrastegui A, Freshour J, Santra P, Manning ML, Amack J, Hehnlly H., “Cytokinetic bridge triggers de novo lumen formation in vivo,” *Nature Communications* **11**, 1269, (2020). <https://www.nature.com/articles/s41467-020-15002-8>
39. Preeti Sahu*, Janice Kang*, Gonca Erdemci-Tandogan, M. Lisa Manning, “Linear and nonlinear mechanical responses can be quite different in models for biological tissues,” *Soft Matter* **16**, 1850-1856, (2020). DOI: 10.1039/C9SM01068H
38. Michael Czajkowski, Daniel M. Sussman, M. Cristina Marchetti, M. Lisa Manning, “Glassy Dynamics in Models of Confluent Tissue with Mitosis and Apoptosis,” *Soft Matter*, arXiv:1905.01603, (2019).
37. Matthias Merkel, Karsten Baumgarten, Brian P. Tighe, M. Lisa Manning., “A unifying perspective on rigidity in under-constrained materials,” *Proc. Nat. Acad. Sci* **116**, 6560-6568, (2019). <https://doi.org/10.1073/pnas.1815436116>
36. M.E. Brasch*, G. Passucci*, A. Gulvady, C. E. Turner, M. L. Manning, J. H. Henderson, “Nuclear position relative to the Golgi body and nuclear orientation are differentially responsive indicators of cell polarized motility,” *PLOS ONE*, 2019, (<https://doi.org/10.1371/journal.pone.0211408>).
35. G. Passucci, M.E. Brasch, V. J. H. Henderson, M. L. Manning, “Identifying the mechanisms that generate super-diffusivity in mouse fibroblast trajectories on 2D substrates,” **PLOS Comp. Bio**, 2019, (<https://doi.org/10.1371/journal.pcbi.1006732>, arxiv:1712.05049).
34. Tristan Sharp, Matthias Merkel, M. Lisa Manning, Andrea J. Liu, “Statistical properties of 3D cell geometry from 2D slices,” **PLOS ONE**, 2019, (<https://doi.org/10.1371/journal.pone.0209892>).

- 33.** Gonca Erdemci-Tandogan, Madeline Clark, Jeff Amack, M. L. Manning, “Tissue flow induces shape change during morphogenesis,” *Biophysical Journal* **115**, 2259-2270, (2018). <https://doi.org/10.1016/j.bpj.2018.10.028>
- 32.** M. Czajkowski, Dapeng Bi, M. L. Manning, M. C. Marchetti, “A Hydrodynamic Model for the Density-Independent Flocking Transition in Confluent Tissues,” *Soft Matter* **14**, 5628-5642, (2018). doi:10.1039/C8SM00446C
- 31.** Fabio Giavazzi, Matteo Paoluzzi, Marta Macchi, Dapeng Bi, Giorgio Scita, M. Lisa Manning, Roberto Cerbino, M. Cristina Marchetti, “Flocking Transition in Confluent Tissues,” *Soft Matter* **14**, 3471-3477, (2018). doi: 10.1039/C8SM00126J
- 30.** Daniel M. Sussman, M. Paoluzzi, M. Cristina Marchetti, M. Lisa Manning, “Anomalous glassy dynamics in simple models of dense biological tissue,” *Euro. Phys. Lett.* **121**, 36001, (2018). doi: 10.1209/0295-5075/121/36001
- 29.** Agnik Dasgupta, Matthias Merkel, Andrew E. Jacob, Jonathan Dawson, M. Lisa Manning and Jeffrey D. Amack, “Asymmetric cell volume changes regulate epithelial remodeling of the left-right organizer,” *eLife* **7**, e30963, (2018). doi: 10.7554/eLife.30963
- 28.** Daniel Sussman, Jennifer Schwarz, M. Cristina Marchetti, M. Lisa Manning, “Soft yet sharp interfaces in vertex-based models for confluent tissues,” *Editor’s suggestion in Phys. Rev. Letters* **120**, 058001, (2018). <https://doi.org/10.1103/PhysRevLett.120.058001>, Corresponding Synopsis
- 27.** Matthias Merkel and Lisa Manning, “A geometrically controlled rigidity transition in a model for confluent 3D tissues,” *Fast Track communication, New Journal of Physics* **20**, 022002, (2018). <https://doi.org/10.1088/1367-2630/aaaa13>
- 26.** X. Yang, Dapeng Bi, M. Czajkowski, M. Merkel, M. L. Manning, M. C. Marchetti, “Correlating Cell Shape and Cellular Stress in Motile Confluent Tissues,” *Proc. Nat. Acad. Sci.* **114**, 12663-12668, (2017). DOI: 10.1073/pnas.1705921114
- 25.** Sven Wijtmans and M. L. Manning, “Disentangling defects and sound modes in disordered solids,” *Soft Matter (cover article)* **12**, 5649-5655, (2017). DOI: 10.1039/C7SM00792B
- 24.** Matthias Merkel and M. Lisa Manning, “Using cell deformation and motion to predict forces and collective behavior in morphogenesis,” *Seminars in Developmental Biology* **67**, 161-169, (2017). DOI: 10.1016/j.semcd.2016.07.029
- 23.** Dapeng Bi, X. Yang, M. C. Marchetti, M. L. Manning, “Motility-driven glass transitions in biological tissues,” *Phys. Rev. X* **6**, 021011, (2016). <http://dx.doi.org/10.1103/PhysRevX.6.021011>
- 22.** Dapeng Bi, J. Lopez, J. Schwarz, M. L. Manning, “A density-independent rigidity transition in biological tissues,” *Nature Physics* **11**, 1074-1079, (2015). DOI: 10.1038/nphys3471
- 21.** S Pawlizak, A Fritsch, S Grosser, D Ahrens, T Thalheim, S Riedel, T Kiessling, M Zink, ML Manning, and JA Kaes, “Testing the differential adhesion hypothesis across the epithelial-mesenchymal transition,” *New Journal of Physics* **17**, 24 August, (2015). DOI: 10.1088/1367-2630/17/8/083049, Corresponding New Journal of Physics Perspective Article

- 20.** J-A Park, JH Kim, D Bi, JA Mitchel, NT Qazvini, K Tantisira, CY Park, M McGill, S-H Kim, R Steward, Jr., S Burger, W Qiu, SH Randell, A Kho, D Tambe, C Hardin, SA Shore, E Israel, DA Weitz, DJ Tschumperlin, ST. Weiss, EP Henske, ML Manning, JP Butler, J M Drazen, JJ Fredberg, “Unjamming transition to cellular hypermobility in the asthmatic airway epithelium,” *Nature Materials* **14**, 1040-1048, (2015). DOI: 10.1038/nmat4357, Corresponding Nature Material News and Views Article
- 19.** Danielle S. Bassett, Eli T. Owens, Mason A. Porter, M. Lisa Manning, Karen E. Daniels, “Extraction of Force-Chain Network Architecture in Granular Materials Using Community Detection,” *Soft Matter (cover article)* **11**, 2731-2744, (2015). DOI: 10.1039/C4SM01821D
- 18.** M. L. Manning and A. J. Liu, “A random matrix definition of the boson peak,” *Europhys. Lett.* **109**, 36002, (2015). DOI: 10.1209/0295-5075/109/36002
- 17.** Craig Fox, Lisa Manning, and Jeff Amack, “Automated tracking of beads in the ciliated zebrafish organ of asymmetry to quantify the role of fluid flow in left-right patterning,” *Methods in Cell Biology; Methods in Cilia & Flagella* **127**, 175-187, (2015). <https://doi.org/10.1016/bs.mcb.2014.12.010>
- 16.** Xingbo Yang, M. Lisa Manning and M. Cristina Marchetti, “Aggregation and Segregation of confined active particles,” *Soft Matter* **10**, 6477-6484, (2014). DOI: 10.1039/C4SM00927D, Commentary in Journal Club for Condensed Matter Physics
- 15.** R. M. Baker, M. E. Brasch, M. L. Manning, J. H. Henderson, “Automated, contour-based tracking and analysis of cell behavior over long timescales in environments of varying complexity and cell density,” *J. Roy. Soc. Interface* **11(97)**, 20140386, (2014). DOI: 10.1098/rsif.2014.0386
- 14.** Dapeng Bi, J. Lopez, J. Schwarz, M. L. Manning, “Energy barriers and cell migration in densely packed tissues,” *Soft Matter* **10**, 1885-1890, (2014). DOI: 10.1039/C3SM52893F, Commentary in Journal Club for Condensed Matter Physics
- 13.** T. Idema, J. O. Dubuis, L. Kang, M. L. Manning, P. C. Nelson, T. C. Lubensky, and A. J. Liu, “The syncytial Drosophila embryo as a mechanically excitable medium,” *PLOS ONE* **8(10)**, e77216, (2013). DOI: 10.1371/journal.pone.0077216
- 12.** E.-M. Schoetz, M. Lanio, J. Talbot, and M. L. Manning, “Glassy dynamics in three dimensional embryonic tissues,” *J. Roy. Soc. Interface* **10(89)**, 20130726, (2013). DOI: 10.1098/rsif.2013.0726
- 11.** J. D. Amack, M. L. Manning, “Knowing the Boundaries: Extending the Differential Adhesion Hypothesis in Embryonic Cell Sorting,” *Science* **338 (6104)**, 212-215, (2012). DOI: 10.1126/science.1223953
- 10.** G. Wang, M. L. Manning, and J. D. Amack, “Regional Cell Shape Changes Control Form and Function of Kupffer’s Vesicle in the Zebrafish Embryo,” *Dev. Bio.* **370 (1)**, 52-62, (2012). DOI: 10.1016/j.ydbio.2012.07.019
- 9.** M. L. Manning and A. J. Liu, “Vibrational modes identify soft spots in a sheared disordered packing,” *Phys. Rev. Lett.* **107**, 108302, (2011). DOI: 10.1103/PhysRevLett.107.108302

8. K. Chen, M. L. Manning, P. J. Yunker, W. G. Ellenbroek, Z. Zhang, A. J. Liu, and A. G. Yodh, "Measurement of Correlations between Low-Frequency Vibrational Modes and Particle Rearrangements in Quasi-Two-Dimensional Colloidal Glasses," *Phys. Rev. Lett.* **107**, 108301, (2011). DOI: 10.1103/PhysRevLett.107.108301
7. M. L. Manning, R. A. Foty, M. S. Steinberg, and E.-M. Schoetz, "Coaction of intercellular adhesion and cortical tension specifies tissue surface tension," *Proc. Nat. Acad. Sci.* **107**, 28 12517-12522, (2010). DOI: 10.1073/pnas.1003743107
6. E. G. Daub, M. L. Manning and J. M. Carlson, "Pulse-like, crack-like and supershear earthquake ruptures with shear strain localization," *J. Geophys. Res.* **115**, B05311, (2010). DOI: 10.1029/2009JB006388
5. M. L. Manning, E. G. Daub, J. S. Langer and J. M. Carlson, "Rate dependent shear bands in a shear transformation zone model for amorphous solids," *Phys. Rev. E* **79**, 016110, (2009). DOI: 10.1103/PhysRevE.79.016110
4. E. G. Daub, M. L. Manning and J. M. Carlson, "Shear strain localization in elastodynamic rupture simulations," *Geo. Res. Lett.* **35**, L12310, (2008). DOI: 10.1029/2008GL033835
3. J. S. Langer and M. L. Manning, "Steady-state, effective-temperature dynamics in a glassy material," *Phys. Rev. E* **76**, 056107, (2007). DOI: 10.1103/PhysRevE.76.056107
2. M. L. Manning, J. S. Langer and J. M. Carlson, "Strain localization in a shear transformation zone model for amorphous solids," *Phys. Rev. E* **76**, 056106, (2007). DOI: 10.1103/PhysRevE.76.056106
1. M. Manning, J. M. Carlson and J. Doyle, "Highly Optimized Tolerance in dense and sparse resource regimes," *Phys. Rev. E* **72**, 016108, (2005). DOI: 10.1103/PhysRevE.72.016108

RECENT INVITED
TALKS

195+ invited talks total

- 2026 APS Global Summit. Invited symposium. Denver, CO. March 18
- 2026 DAMTP Statistical Physics and Soft Matter seminar, University of Cambridge (virtual) March 10
- 2026 Morphometry, Morphogenesis and Mathematics Program, Harvard CMSA, Boston, MA. March 4
- 2026 Cornell University LASSP and AEP seminar. Feb 3
- 2026 University of Toronto Physics Colloquium, Toronto, CA Jan 22
- 2025 CZ Theory in Biology Meeting, Biarritz, FR, September 24
- 2025 10th Annual biophysical society of Canada Annual Meeting, Hamilton, ON, May 21
- 2025 Information processing in biological systems, College de France, May 16
- 2025 Institute seminar, CENTURI Institute Marseille, May 15
- 2025 Geometry of Materials Workshop, ICERM Brown, Providence RI April 8
- 2025 Tutorial, CZ Theory in Biology meeting, Caltech, March 15
- 2025 Theory of Living Matter Seminar, Cambridge (virtual) February 26
- 2025 Biological systems that Learn, NITMB Chicago, IL Jan 9

- 2024 Force Talk Seminar, Kings College London (virtual) Dec 13
- 2024 IST Austria Institute Colloquium, Vienna, Austria Nov 4
- 2024 Physics of multicellular systems collective cell dynamics in cancer and tissue organization, Het Trippenhuis, Amsterdam, Netherlands November 1
- 2024 Maddin Named Lecture, Materials Research Center Univ. of Pennsylvania, Oct 18
- 2024 Department of Pharmaceutical Chemistry Seminar, UCSF Sept 26
- 2024 Keynote Speaker, Chan-Zuckerberg BioHub Physics of Life Symposium, Sept 25
- 2024 Gordon Research Conference on Multiscale Mechanochemistry and Mechanobiology. Bates College, Maine. July 25
- 2024 Center for Soft and Living Matter Kickoff Event, Univ. of Pennsylvania June 12
- 2024 ICTP-SAIFR Workshop on Soft Matter and Biophysics. Sao Paulo, Brazil. May 17
- 2024 Mechanisms of Development and Disease Seminar, Syracuse University Feb 16
- 2024 Simons Foundation Presidential Lecture, New York, NY Jan 31
- 2024 Aspen Center for Physics, Computing with Physical Systems Workshop, Jan 9

- 2023 Cell and Biology Seminar, Duke University Medical, Nov 16
- 2023 Cornell Soft Matter Seminar, Ithaca, NY, Nov 1
- 2023 Edinburgh Statistical Physics Webinar(virtual), Oct 24
- 2023 Brazilian workshop of Soft Matter ICTP-SAIFR, Sao Paolo, Brazil, Oct 5
- 2023 Cell and Dev Bio Seminar(virtual), UC London Oct 19
- 2023 Max Planck Institute CBG, Dresden Germany, June 1
- 2023 Northeastern Biology Colloquium, (virtual) April 10
- 2023 Invited Plenary, UK Physics of Life conference, Leeds, UK March 27
- 2023 Mark Robbins Session, APS March meeting Las Vegas, March 8
- 2023 GNSP short course, APS March meeting, March 5
- 2023 Queens University Physics Colloquium, Kingston, Ontario, Feb 17
- 2023 Living Histories, APS DBio (virtual) Feb 15
- 2023 NYU/Simons Foundation Physical Chemistry seminar, NYC, Feb 13

- 2022 Invited talk, Int. Soc. for Dev. Bio. Conference, Algarve, Portugal October 17,
 2022 Invited talk, From physics to function: Company of Biologists workshop, Buxted
 Park,UK, October 9
 2022 Invited talk, MMM10 Materials Modeling conference, Baltimore, October 3
 2022 Invited talk, Max Planck Institute for Polymer Research, September 16
 2022 Invited talk, Edwards Symposium: Future of Soft Matter Workshop, September 7
 2022 Invited talk, Session on Tissue Mechanics, Condensed Matter Workshop (CMD29),
 Manchester UK, August 25
 2022 Invited talk, Lorentz Center: Disorders Role in Glass Formation and Deformation,
 July 15
 2022 Invited talk, Engineering Life 2021: Active matter across scales, Dresden June 28
 2022 Invited lectures (2) at the graduate summer school on Disordered Complex Matter,
 University of Orsay, June 16 and 17,
 2022 Invited talk, Mechanobiology in development and disease workshop, EMBL Heidel-
 berg, May 18, 2022 (virtual)
 2022 Nico van Kampen Colloquium @ Utrecht University, May 11, 2022
 2022 Engineering Science and Mechanics seminar, Penn State, April 27 (virtual)
 2022 DSOSFT APS March meeting tutorial on foams, March 13
 2022 Active models for confluent tissues, graduate winterschool tutorial, Paris Feb 14

TEACHING

Syracuse University, Syracuse, NY USA

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|--|---|
| Spring 2024,25 | <i>Physics 731</i>
Graduate Thermodynamics and Statistical Physics |
| Fall 2022,23,24,25 | <i>Physics 215</i>
Honors Introductory Physics |
| Spring 2021 | <i>Physics 750</i>
Advanced Topics in Condensed Matter Physics |
| Spring 2017, Spring 2018,
Fall 2019 | <i>Physics 215</i>
Honors Introductory Physics |
| Fall 2018 | <i>Phys/Ben/Cen/Bio 635</i>
Physical Cell Biology |
| Fall 2015 | <i>Physics 399/600</i>
Practicum in Science Teaching |
| Spring 2015, Spring 2013,
Fall 2011 | <i>Physics 576</i>
Introduction to Solid State Physics |
| Fall 2012, Spring 2014(2) | <i>Physics 211</i>
General Physics I: Mechanics |

DEPARTMENTAL
AND UNIVERSITY
SERVICE

- 2024- Director, BioInspired EmIRGE-Bio NRT Graduate Training program
- 2024- BioInspired Focus Group co-Leader, Mechanisms of Development and Disease
- 2023-25 University Senate Research Committee (Chair 24-25)
- 2025 Volunteer and Panelist, Syracuse University CU*IP, January 2025
- 2024-25 Member, QIS Theory Faculty search, Physics and EECS Departments
- 2024 Chair, Physics Department Chair Search Committee
- 2023,24 BioInspired CAREER workshop seminar speaker
- 2023 College of Arts and Sciences Interdisciplinary Program Working Group
- 2019-23 Director, Bioinspired Institute at Syracuse University
- 2022-23 Chair, physics faculty search in soft matter and biophysics
- 2022-23 College of Arts and Sciences Dean Search Committee
- 2019- Faculty Liaison to the Women in Physics group
- 2022 Research and Creative Excellence Strategic Planning Committee
- 2021-22 Member, Cluster Initiative Working Group
- 2021 P&T committee, Paulsen, Physics Department
- 2021 Panelist, Women in Leadership workshop, May 9
- 2020 Presentation to the CNY Alumni group, Jan 10
- 2013 - Panelist for Women in Science and Engineering (WiSE) workshops: Dual Career, Writing a Dissertation, Peer Mentoring.
- 2017-19 Faculty Liaison to Women in Science and Engineering Postdoc Group
- 2017-18 Co-chair, Physics Department Strategic Planning Research Committee
- 2017-18 Member, Physics Department Faculty Planning Committee
- 2016-17 Chair, Faculty Search committee in soft matter/biophysics
- 2016 Co-chair, Conference for Undergraduate Women in Physics
- 2015 Co-chair, Working Group of Syracuse Biomaterials Institute
- 2015 Member, Faculty Advisory Committee for College of Medicine
- 2014-15 Member, Soft Matter Experimental Physics Faculty Search Committee.
- 2014-15 Member, College of Arts and Sciences Dean Search Committee.
- 2012- Oral exam committee member, Xingbo Yang, Jorge Lopez, Sean Sweeney, Jikai Wang (Physics), Kevin Davis, Megan Brasch, Fred Donelson, Shiyan Sun (Bio. Eng.).
- 2011- Thesis committee: Shiliyang Xu, Zhenwei Yao, Jorge Lopez (Physics), Margaret David (Chem- Chair), Kosmas Diveris (Math-Chair), Sean Delaney (Chemistry-Chair), Thomas Juliano, (Chemistry - Chair), Megan Brasch (BMCE - Chair), Jeremy Schar (Chem-Chair), Lindsay Rathburn (Biology-Chair).
- 2011-13 Chair('13) Undergrad Research Day, Physics Department.

PROFESSIONAL
ACTIVITIES AND
OUTREACH

- NSF Reviewer and Review Panelist.
- Referee: Nature, Science, Proc. Nat. Acad. Science, Roc. Soc. Interface, Phys. Rev. Letters, Phys. Rev. E, Phys. Rev. B, Phys. Bio., Biophys. J., Sci. Reports, New Jour. Phys., PLOS Comp. Bio, J. Cell Science, eLife, Rev. Mod. Phys.
- 2025- Co-Chair, National Academies Condensed Matter and Materials Research Committee
- 2025- Member, Board of Directors, LifeSciencesNY
- 2023- Editorial Board Member, PRX Life
- 2023- NIH study section ad hoc panelist, K99, DEV2, MABS
- 2025,26 2025 APS DSOFT Early CAREER Award Committee
- 2025 Program Chair, StatPhys29, Section on Biological physics
- 2025 Member, PRL Lead Editor Search Committee
- 2025 Planning Committee Chair, National Academies Frontiers of Living Materials Workshop
- 2024-25 Organizer, "Learning in biological systems workshop, National Institute for Theory and Mathematics in Biology, Chicago IL
- 2024 Physics classroom outreach, Jamesville-Dewitt school district (3rd and 6th grades)
- 2024 APS GSNP canvassing committee
- 2024 Lecturer, Boulder Summer School in Condensed Matter Physics
- 2023 Chair, Onsager Prize Committee
- 2023 Member, APS Kadanoff Prize committee
- 2023 Member, Bower Award Pre-selection committee
- 2022 Organizer and PI, NSF Convergence Accelerator Workshop in Bioinspired Design, Oct 3,4, Wyss Institute.
- 2022 Lecturer, Summer school in Disordered Systems, Orsay
- 2019-22 Editorial Board Member, Biophysical Journal
- 2017-20 APS GSNP, Elected Member at Large.
- 2019 Program Committee, 2019 ACS International Conference on Glass, Boston MA
- 2019 Chair, Gordon Research Conference Soft Condensed Matter, New London, NH
- 2019 Lecturer, Boulder Condensed Matter Summer School. Also 2017 and 2015
- 2017-19 Editorial Board Member, Physical Review Applied
- 2018 Public Lecture, Simons Foundation NYC, March 7
- 2018 PI and Co-organizer, Workshop for partnerships between MSIs (Minority-Serving Institutions) and PWIs (Primarily White Institutions), UC Irvine

- 2017 APS GSOF T Program committee member.
- 2017 Public Lecture, Boulder CO, July
- 2015-17 APS GSOF T Membership committee chair.
- 2017 Public Lecture, Aspen CO, March
- 2016 Co-organizer, Workshop on the Physics of Development and Disease, Aspen Center for Physics (March).
- 2015 Co-organizer, Random walks and nonlinearity in the life of cells workshop MPI-PKS Dresden (May).
- 2014 Guest lecturer, Multiscale integration of biological systems, Institute Curie.
- 2014 Syracuse Soft Matter Program public lecture, “The sound of disorder”.
- 2013- Guest Editor, New J. Phys. issue on Multicellularity and Active Matter.
- 2012 Jr. Science Cafe Seminar, Museum of Science and Technology (MoST), Syracuse NY
- 2006 Invited Speaker and Chaperone: Conference for Undergraduate Women in Physics, USC.