

## M. Lisa Manning

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CONTACT INFORMATION	Physics Building 229G Department of Physics Syracuse University Syracuse, NY 13244 USA	<i>Voice:</i> 805.403.0808, 315.443.3920 <i>Fax:</i> 315.443.9103 <i>E-mail:</i> mmanning@syr.edu <i>Web:</i> <a href="https://mmanning.expressions.syr.edu">https://mmanning.expressions.syr.edu</a>
RESEARCH INTERESTS	Biophysics and Soft Matter. Modeling and analysis of collective and emergent behavior in biological tissues, as well as structure, deformation, and flow in glassy materials using theory and simulations.	
EDUCATION	<b>University of California, Santa Barbara, California, USA</b> 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  <b>University of Virginia, Charlottesville, Virginia USA</b> B.S. Physics, <i>with highest distinction</i> , 2002 B.A. Mathematics, 2002	
ACADEMIC POSITIONS	<b>2015-present</b> Associate Professor, Syracuse University. <b>2011-2015</b> Assistant Professor, Syracuse University. <b>2008-2011</b> Postdoctoral Fellow, Princeton University.	
AWARDS AND FELLOWSHIPS	<b>2018</b> Maria Goeppert Mayer Award, American Physical Society. <b>2016</b> Simons Investigator MMLS, Simons Foundation. <b>2016</b> IUPAP Young Investigator Prize, C3 (Statistical Physics) commission. <b>2015</b> Cottrell Scholar, Research Corporation. <b>2014</b> Scialog Fellow, Moore Foundation & Research Corporation. <b>2014</b> Physics Department Teaching Award, Phys 211, Syracuse University. <b>2014</b> Research Fellow, Alfred P. Sloan Foundation. <b>2013</b> Physics Department Teaching Award, Phys 576, Syracuse University. <b>2008-2011</b> Postdoctoral fellowship, Princeton Center for Theoretical Science. <b>2008-2011</b> Postdoctoral fellowship, Princeton Council on Science and Technology. <b>2004-2008</b> National Science Foundation Graduate Research Fellowship, NSF. <b>2007</b> Department Chair's Service Award, UCSB Department of Physics. <b>2003-2004</b> National Science Foundation Graduate K-12 Education Fellowship, NSF. <b>2004-2006</b> Physics Circus Outreach award, Department of Physics, UCSB. <b>2002</b> Barry M. Goldwater Scholarship, University of Virginia. <b>2001</b> Energy Research Lab. Undergrad. Fellow, Stanford Linear Accelerator.	

EXTERNAL SUPPORT	7/2017-6/2019	\$25,000	<b>Cottrell Collaborative Award</b> Workshop on developing authentic partnerships between Minority Serving Institutions and Primarily White Institutions. <i>PI, with 13 additional co-PIs.</i>
	7/2016-6/2021	\$500,000	<b>Simons Foundation 454947</b> Simons Investigator: Mathematical Modeling of Living Systems.
	7/2016-6/2019	\$686,000	<b>NSF-PHY-1607416</b> Predicting How Fluid-Solid Transitions in Cancer Tumors Help Govern Invasion and Metastasis. <i>With co-PIs Cristina Marchetti and Jennifer Schwarz.</i>
	7/2016-6/2021	\$546,000	<b>Simons Foundation 454947</b> Cracking the Glass Problem Collaboration.
	7/2015-6/2018	\$396,068 co-PI	<b>NSF ACI-1541396</b> 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>
	7/2015-6/2019	\$ 1,020,000	<b>NIH-1R01GM117598</b> Quantitative Modeling of Cell Shape Changes During Organogenesis. <i>With collaborator Jeff Amack, Upstate Medical University.</i>
	7/2015-6/2017	\$ 56,250	<b>Scialog</b> Gordon and Betty Morre Foundation.
	6/2015-5/2018	\$ 75,000	<b>Cottrell Scholar</b> Research Corporation.
	6/2014-5/2016	\$ 50,000	<b>Sloan Fellowship</b> Alfred P. Sloan Foundation.
	6/2014-5/2019	\$ 450,000	<b>NSF-DMR-CMMT 1352184</b> CAREER: Flow, Failure, and Migration in Glassy Materials.
	7/2013-7/2017	\$ 290,978 co-PI	<b>NSF-BMMB-CMMI 1334611</b> Utilization of Smart Materials and Predictive Modeling to Integrate Intracellular Dynamics with Cell Biomechanics and Collective Tissue Behavior. <i>with Jay Henderson(PI) and Chris Turner.</i>
PH.D. STUDENTS SUPERVISED	Spring 2017	Sven Wijtmans	
	expected 2018	Giuseppe Passucci	
	expected 2018	Michael Czajkowski	
	expected 2019	Ethan Stanifer	
	expected 2020	Preeti Sahu	
POSTDOCTORAL ASSOCIATES	2012-15	Dapeng (Max) Bi	Ph.D. Brandeis University 2012
	2015-16	Jonathan Dawson	Ph.D. MPI-PKS 2012
	2015-	Matthias Merkel	Ph.D. MPI-PKS 2015
	2016-	Peter Morse	Ph.D. U. Oregon 2016
	2016-	Daniel Sussman	Ph.D. Illinois 2014
	2017-	Gonca Erdemci-Tandogan	Ph.D. UC Riverside 2017
PREPRINTS AND SUBMITTED MANUSCRIPTS	<b>A. M. Czajkowski, Dapeng Bi, M. L. Manning, M. C. Marchetti, "A Hydrodynamic Model for the Density-Independent Flocking Transition in Confluent Tissues," <i>submitted</i>, arXiv:1710.00708 (2017).</b>		

**B.** Fabio Giavazzi, Matteo Paoluzzi, Marta Macchi, Dapeng Bi, Giorgio Scita, M. Lisa Manning, Roberto Cerbino, M. Cristina Marchetti, “Flocking Transition in Confluent Tissues,” *submitted*, arXiv:1706.01113 (2017).

**C.** Franziska Wetzel, Anatol Fritsch, Dapeng Bi, Roland Stange, Steve Pawlizak, Tobias Kiessling, Lars-Christian Horn, Klaus Bendrat, Maja Oktay, Axel Niendorf, John Condeelis, Michael Hckel, Cristina Marchetti, Lisa Manning, Josef A. Kaes, “Why do rigid tumours contain soft cancer cells?,” *submitted*, (2017).

PEER-REVIEWED  
PUBLICATIONS

**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* **Arxiv**, 1706.02656, (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,” *accepted as an invited chapter in Methods in Cell Biology; Methods in Cilia & Flagella*, Elsevier, (2015).
- 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

SELECTED INVITED TALKS **100+ invited talks total**

- 2017 Invited talk, Mechanobiology subgroup, Am. Soc. Cell Bio. (Dec).
- 2017 Physics Colloquium, Washington University St. Louis (Oct).
- 2017 Physics Colloquium, North Carolina A&T (Sept).
- 2017 LASSP seminar, Cornell University (Aug).
- 2017 Seminar, ERC Cancer kickoff meeting Freyburg (Aug).
- 2017 Physics Colloquium, University of Chicago (May).
- 2017 Systems Biology seminar, Harvard University (April).
- 2017 Collective Motion Symposium. APS March meeting.
- 2017 Simons Cracking the glass Collaboration, NYC (March).
- 2017 Biophysical Society Mechanobiology subgroup (February).
- 2017 Physical Oncology Gordon Conference, Galveston, TX (February).
- 2017 Maryland Stat. Phys. seminar and Physics Colloquium (January).
- 2016 Simons Foundation Mathematical and Physical Sciences Meeting (Oct).
- 2016 Physics Colloquium, New York University (Oct).
- 2016 Biophysics seminar, Rice University (Oct).
- 2016 Invited talk and award, StatPhys 26, Lyon France (July).
- 2015 Frontiers in Pattern formation, Nat. Acad. of Sci. (Oct).
- 2015 Quantitative Cell Biology conference, Chicago, IL (Oct).
- 2015 Seminar, Max Planck Inst. Physics of Complex Systems, Dresden, Germany (Sept).
- 2015 Physics of Cancer conference in Leipzig, Germany (Sept).
- 2015 Gordon Conference on Soft Matter, Colby Sawyer College (Aug).
- 2015 American Physical Society Meeting, Frontiers of Soft Matter Symposium (Mar).

## TEACHING

Syracuse University, Syracuse, NY USA

<b>Spring 2017</b>	<i>Physics 215</i> Honors Introductory Physics
<b>Fall 2015</b>	<i>Physics 399/600</i> Practicum in Science Teaching
<b>Spring 2015, Spring 2013, Fall 2011</b>	<i>Physics 576</i> Introduction to Solid State Physics
<b>Fall 2012, Spring 2014(2)</b>	<i>Physics 211</i> General Physics I: Mechanics

DEPARTMENTAL  
AND UNIVERSITY  
SERVICE

2018-	Faculty Liaison to Women in Science and Engineering Postdoc Group
2017-	Co-chair, Physics Department Strategic Planning Research Committee
2017-	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.
2013-14	Chair, Graduate Recruiting Committee, Physics Department.
2013 -	Panelist for Women in Science and Engineering (WiSE) workshops: Dual Career, Writing a Dissertation, Peer Mentoring.
2012-15	Coordinator, Soft Interfaces IGERT orientation and student seminar.
2012-	Oral exam committee member, Xingbo Yang, Jorge Lopez, Sean Sweeney, Jikai Wang (Physics), Kevin Davis, Megan Brasch, Fred Donelson (Bio. Eng.).
2011-	Thesis committee: Shiliyang Xu, Zhenwei Yao, Jorge Lopez (Physics), Kosmas Diveris (Math-Chair), Sean Delaney (Chemistry-Chair), Thomas Juliano, (Chemistry - Chair), Megan Brasch (BMCE - Chair).
2011-	Graduate Academic Advisor: Sven Wijtmans, Craig Fox, Jie Yang, Fu-Hao Chen (Physics).
2011-13	Chair('13) and co-Chair, Undergraduate Research Day, Physics Department.
2011-13	Coordinator: condensed matter theory group meeting.

PROFESSIONAL  
ACTIVITIES AND  
OUTREACH

- NSF Reviewer and Review Panelist.
- 2018 Public Lecture, Simons Foundation NYC, March 7
- 2018 Co-organizer, Workshop for partnerships between MSIs (Minority-Serving Institutions) and PWIs (Primarily White Institutions), UC Irvine
- 2017- APS GSNP, Elected Member at Large.
- 2017 APS GSOF T Program committee member.
- 2017,15 Lecturer, Boulder Condensed Matter Summer School.
- 2017 Public Lecture, Boulder CO, July
- 2016 Ph.D. Thesis committee member, Merlijn van Deen, Leiden University.
- 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.
- 2008- Referee: 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, and Rev. Mod. Phys.
- 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.
- 2003-08 WiSE graduate mentor, Chair and Webmaster: Women in Physics Group UCSB.
- 99-2001 Associate Editor and Staff Writer: Cavalier Daily Health and Science Section, University of Virginia.