

M. Lisa Manning

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RESEARCH INTERESTS Soft Matter and Biophysics. Modeling and analysis of structure, deformation, and flow in glassy materials and collective and emergent behavior in biological tissues using theory and simulations.

EDUCATION **University of California, Santa Barbara**, California, USA
 Ph.D. Physics, September 2008
 Dissertation title: *Effective temperature and strain localization in amorphous solids*
 Committee: Jean Carlson (advisor), James Langer, Ralph Archuleta
 M.A. Physics, May 2005

University of Virginia, Charlottesville, Virginia USA
 B.S. Physics, *with highest distinction*, 2002
 B.A. Mathematics, 2002

ACADEMIC POSITIONS **2015-present** Associate Professor, Syracuse University.
 2011-2015 Assistant Professor, Syracuse University.
 2008-2011 Postdoctoral Fellow, Princeton University.

AWARDS AND FELLOWSHIPS **2015** Cottrell Scholar, Research Corporation.
 2014 Scialog Fellow, Moore Foundation & Research Corporation.
 2014 Physics Department Teaching Award, Phys 211, Syracuse University.
 2014 Research Fellow, Alfred P. Sloan Foundation.
 2013 Physics Department Teaching Award, Phys 576, Syracuse University.
 2008-2011 Postdoctoral fellowship, Princeton Center for Theoretical Science.
 2008-2011 Postdoctoral fellowship, Princeton Council on Science and Technology.
 2004-2008 National Science Foundation Graduate Research Fellowship, NSF.
 2007 Department Chair's Service Award, UCSB Department of Physics.
 2003-2004 National Science Foundation Graduate K-12 Education Fellowship, NSF.
 2004-2006 Physics Circus Outreach award, Department of Physics, UCSB.
 2002 Barry M. Goldwater Scholarship, University of Virginia.
 2002 Elected to Phi Beta Kappa, University of Virginia.
 2001 Energy Research Lab. Undergrad. Fellow, Stanford Linear Accelerator.

RESEARCH SUPPORT **Cottrell Scholar** *Research Corporation*, \$75,000.
 Sloan Fellowship *Alfred P. Sloan Foundation*, \$50,000.
 NSF-DMR-CMMT *CAREER: Flow, Failure, and Migration in Glassy Materials*,
 1352184 \$450,000 from 6/1/2014-5/31/2019.
 NSF-BMMB-CMMI *Collaborative Research: Utilization of Smart Materials and Predictive Modeling to Integrate Intracellular Dynamics with Cell Biomechanics and Collective Tissue Behavior*, co-PI with Jay Henderson(PI) and Chris Turner, \$290,978 from 7/15/2013-7/31/2016.
 1334611

PH.D. STUDENTS
SUPERVISED

Sven Wijtmans	Ph.D. expected 2016
Giuseppe Passucci	Ph.D. expected 2017
Michael Czajkowski	Ph.D. expected 2017

POSTDOCTORAL
ASSOCIATES

Dapeng (Max) Bi	Ph.D. Brandeis University 2012
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PEER-REVIEWED
PUBLICATIONS

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).

18. M. L. Manning and A. J. Liu, “A random matrix definition of the boson peak,” *Europhys. Lett.* **109**, 36002, (2015).

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). Recommended with a commentary in the 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).

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). Recommended with a commentary in the 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).

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).

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).

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).

9. M. L. Manning and A. J. Liu, “Vibrational modes identify soft spots in a sheared disordered packing,” *Phys. Rev. Lett.* **107**, 108302, (2011).

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).

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).
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).
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).
4. E. G. Daub, M. L. Manning and J. M. Carlson, "Shear strain localization in elastodynamic rupture simulations," *Geo. Res. Lett.* **35**, L12310, (2008).
3. J. S. Langer and M. L. Manning, "Steady-state, effective-temperature dynamics in a glassy material," *Phys. Rev. E* **76**, 056107, (2007).
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).
1. M. Manning, J. M. Carlson and J. Doyle, "Highly Optimized Tolerance in dense and sparse resource regimes," *Phys. Rev. E* **72**, 016108, (2005).

ADDITIONAL
PUBLICATIONS

- A. Jin-Ah Park, Jae Hun Kim, Dapeng Bi, Jennifer A. Mitchel, Nader Taheri Qazvini, Kelan Tantisira, ChanYoung Park, Maureen McGill, Sae-Hoon Kim, Robert Steward, Jr., Stephanie Burger, Weiliang Qiu, Scott H. Randell, Alvin Kho, Dhananjay Tambe, Corey Hardin, Stephanie A. Shore, Elliot Israel, David A. Weitz, Daniel J. Tschumperlin, Scott T. Weiss, Elizabeth P. Henske, M. Lisa Manning, James P. Butler, Jeffrey M. Drazen, Jeffrey J. Fredberg, "Unjamming transition to cellular hypermobility in the asthmatic airway epithelium," *submitted*, (2015).
- B. Dapeng Bi, J. Lopez, J. M. Schwarz, M. L. Manning, "A density-independent rigidity transition in biological tissues," *submitted*, arXiv:1409.0593 (2015).
- C. Sven Wijtmans and M. L. Manning, "Disentangling sound modes and defects in disordered solids," *submitted*, arXiv:1502.00685 (2015).
- D. Steve Pawlizak, Anatol Fritsch, Steffen Grosser, Dave Ahrens, Tobias Thalheim, Stefanie Riedel, Tobias Kieling, M. Lisa Manning, Mareike Zink and Josef A. Kas, "Cellular adhesion and cell sorting in cancer cell aggregates," *submitted*, (2015).
- E. M. L. Manning, "Effective temperature and strain localization in amorphous solids," *Dissertation, University of California Santa Barbara*, (2008).

INVITED TALKS

- 2015 Capillarity at Soft Interfaces workshop, Lorentz Center, Leiden (Nov).
 2015 Gordon Conference on Soft Matter, Colby Sawyer College (Aug).

- 2015 American Physical Society Meeting, Frontiers of Soft Matter Symposium (Mar).
 - 2015 Scialog conference, Molecules come to Life (Mar).
 - 2015 Unifying Concepts in Glass Physics, Aspen Center for Physics (Feb).
 - 2014 Statistical Physics Conference, Rutgers, NJ (Dec).
 - 2014 Physics Colloquium, MPIDS Gottingen, (Nov).
 - 2014 Physics Seminar, LPTMS University Paris-Sud (Nov).
 - 2014 Lecture, Multi-scale integration of biological systems, Institute Curie (Nov).
 - 2014 Complexity in Mechanics conference, KITP, UCSB (Oct).
 - 2014 Workshop on Intermittency in disordered solids, KITP, UCSB (Oct).
 - 2014 Center for Studies in Physics and Biology seminar, Rockefeller University (Sept).
 - 2014 Widely Applied Math Seminar, Harvard University (Sept).
 - 2014 World Congress of Biomechanics: Cell-cell adhesion, Boston (July).
 - 2014 88th ACS Colloids Symposium, University of Pennsylvania (June).
 - 2014 Molecular and Cellular Physiology seminar, Stanford University (May).
 - 2014 Physics Colloquium, Duke University (April).
 - 2014 Active Matter Conference, Kavli Institute for Theoretical Physics, UCSB (Feb).
 - 2013 Physics Colloquium, North Carolina State University (Nov).
 - 2013 Northeastern Granular Materials Workshop, Yale University (June).
 - 2013 Materials Science and Engineering seminar, Johns Hopkins (Feb).
 - 2013 Soft Matter Group seminar, New York University (Jan).
 - 2012 New England Soft Matter workshop, Harvard University (Nov).
 - 2012 Condensed Matter Seminar, Brown University (Nov).
 - 2012 Physics of Cancer Conference, Leipzig Germany (Nov).
 - 2012 Quantissue Mechanics of Tissues workshop, Ljubliana Slovenia (Oct).
 - 2012 Defect Workshop Baltimore (September).
 - 2012 Seminar, Aspen Center for Physics (July).
 - 2012 Seminar, Granular Materials Gordon Conference (July).
 - 2012 Workshop on Jammed Active Matter, New York University (May).
 - 2012 Developmental Biology Interest Group, Syracuse University (May).
 - 2012 Physics Colloquium, Leipzig Germany (April).
 - 2012 Soft Matter Seminar, University of Rochester (March).
 - 2012 Embryogenesis Explained, online lecture series (March).
 - 2012 Material Science Seminar, Harvard University (February).
 - 2012 Growth and Form in Biology workshop, Aspen Center for Physics (January).
 - 2011 Defects and Interfaces workshop, Los Alamos National Lab (November).
 - 2011 Soft matter Gordon Research Seminar, Colby-Sawyer College (August).
 - 2011 New York Complex Matter Seminar, Syracuse University (June).
 - 2011 Focus session on Structural and Mechanical Properties of Jammed Amorphous Materials, APS March meeting (March).
 - 2011 Statistical physics seminar, Massachusetts Institute of Technology (March).
- prior **33 additional invited talks.**

TEACHING

Syracuse University, Syracuse, NY USA

- Spring 2015, Spring 2013,
Fall 2011** *Physics 576*
Introduction to Solid State Physics
- Fall 2012, Spring 2014(2)** *Physics 211*
General Physics I: Mechanics

University of California, Santa Barbara, Santa Barbara, California USA

- 2006** *Summer Institute in Mathematics and Science (SIMS) Instructor*
Developed and taught an intensive two-week introductory physics course targeting entering University freshman from under-represented groups.
- 2005-2006** *Teaching Assistant*
Physics 1 (Intro Physics) and Physics 3L (Intro lab)
- 2003-2004** *Leaps NSF GK-12 Graduate Fellow*
Designed and executed curricula and demonstrations, as well as an after school program at Santa Barbara Junior High School.

DEPARTMENTAL
AND UNIVERSITY
SERVICE

- 2016 Chair, Conference for Undergraduate Women in Physics (selected by APS)
- 2014-2015 Member, Soft Matter Experimental Physics Faculty Search Committee.
- 2014-2015 Member, College of Arts and Sciences Dean Search Committee.
- 2013-2014 Chair, Graduate Recruiting Committee, Physics Department Syracuse University.
- 2013 - Panelist for Women in Science and Engineering (WiSE) workshops: Dual Career, Writing a Dissertation, Peer Mentoring.
- 2012- Coordinator, Soft Interfaces IGERT graduate orientation and student seminar('12-'13), Syracuse University.
- 2012- Oral exam committee member, Xingbo Yang, Jorge Lopez and Sean Sweeney (Physics), Kevin Davis and Megan Brasch(Bio. Eng.), Syracuse University.
- 2011- Thesis committee: Shiliyang Xu, Zhenwei Yao, Jorge Lopez (Physics), Kosmas Diveris (Math-Chair), Sean Delaney (Chemistry-Chair), Thomas Juliano, (Chemistry - Chair), Syracuse University.
- 2011- Graduate Academic Advisor: Sven Wijtmans, Craig Fox, Jie Yang, Fu-Hao Chen (Physics).
- 2011-2013 Chair('13) and co-Chair, Undergraduate Research Day, Physics Department Syracuse University.
- 2011-2013 Coordinator: condensed matter theory group meeting, Syracuse University.

PROFESSIONAL
ACTIVITIES AND
OUTREACH

- NSF Review Panelist.
- 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 (Nov).
- 2014 Syracuse Soft Matter Program public lecture, “The sound of disorder” (Oct).
- 2013- Guest Editor, New Journal of Physics special 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., New Jour. Phys., PLOS Comp. Bio, and Rev. Mod. Phys.
- 2013 Zonta Women’s group Amelia Earheart scholarship dinner guest speaker, Syracuse NY
- 2012 Jr. Science Cafe Seminar, Museum of Science and Technology (MoST) Syracuse NY
- 2013 Panel Speaker, Gordon Research Seminar on Soft Matter.
- 2010 Co-organizer: Princeton/Penn/NYU Soft Matter Meeting, Princeton.
- 2009-2010 Coordinator: Cell and tissue mechanics seminar, Princeton University.
- 2005-2008 Co-chair and Webmaster: Women in Physics Group, UCSB.
- 2006-2008 Co-chair and Webmaster: Graduate Student Life committee, UCSB.
- 2003-2008 Volunteer: Physics Circus, UCSB.
- 2006 Invited Speaker and Chaperone: Conference for Undergraduate Women in Physics, USC.
- 2004, 2005 Judge: Santa Barbara Junior High Science Fair.
- 2004-2006 Graduate Mentor: Women in Science and Engineering, University of California, Santa Barbara.
- 2000-2002 Coordinator: Science Fair Mentoring Program, University of Virginia.
- 1999-2001 Associate Editor and Staff Writer: Cavalier Daily Health and Science Section, University of Virginia.