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Current Position

Postdoctoral researcher in the group of Prof. Christian D. Santangelo, Department of Physics, University of Massachusetts Amherst (since September 2015).

Education

University of Pennsylvania

Philadelphia, PA

Ph.D. in Physics and Astronomy, May 2012

Advisor: Randall D. Kamien

Dissertation title: Topological defects in nematic and smectic liquid crystals

Harvard University

Cambridge, MA

A.B./A.M. in Physics *magna cum laude*, June 2007

Previous Employment

Postdoctoral researcher in the group of Prof. Vincenzo Vitelli, Instituut-Lorentz for Theoretical Physics, Leiden University (September 2012-August 2015).

Honors and Awards

GSNP Student Speaker Award Finalist

March 2012

American Physical Society Topical Group on Statistical and Nonlinear Physics

Herbert B. Callen Memorial Prize

Fall 2011

University of Pennsylvania

SAS Dissertation Completion Fellowship

Fall 2011-Spring 2012

University of Pennsylvania

SAS Dissertation Research Fellowship

Summer 2010

University of Pennsylvania

Werner B. Teutsch Prize "Awarded annually to the graduate student who, by his or her performance in the first year courses, shows the most promise for outstanding achievement in research"

Fall 2008

University of Pennsylvania

Graduate Research Fellowship Honorable Mention

Spring 2008

National Science Foundation

Graduate Research Fellowship Honorable Mention

Spring 2007

National Science Foundation

Publications and Preprints

1. *Kink-antikink asymmetry and impurity interactions in topological mechanical chains*, Y. Zhou, B.G. Chen, N. Upadhyaya, and V. Vitelli, arXiv:1608.02127.
2. *The role of rigidity in controlling material failure*, M.M. Driscoll, B.G. Chen, T.H. Beuman, S. Ulrich, S.R. Nagel, V. Vitelli, *Proc. Natl. Acad. Sci.* 113, 10813-10817 (2016), arXiv:1501.04227.
3. *Mechanical Weyl modes in topological Maxwell lattices*, D.Z. Rocklin, B.G. Chen, M. Falk, V. Vitelli, and T.C. Lubensky, *Phys. Rev. Lett.* 116, 135501 (2016), arXiv:1510.04970.
4. *Topological mechanics of origami and kirigami*, B.G. Chen, B. Liu, A.A. Evans, J. Paulose, I. Cohen, V. Vitelli, C.D. Santangelo, *Phys. Rev. Lett.* 116, 135503 (2016), arXiv:1508.00795.
5. *Rigidity percolation by next-nearest-neighbor braces on generic and regular isostatic lattices*, L. Zhang, D.Z. Rocklin, B.G. Chen, X. Mao, *Phys. Rev. E* 91, 032124 (2015), arXiv:1412.6609.
6. *Origami multistability: from single vertices to metasheets*, S. Waitukaitis, R. Menaut, B.G. Chen, M. van Hecke, *Phys. Rev. Lett.* 114, 055503 (2015), arXiv:1408.1607.
7. *Topological mechanisms as classical spinor fields*, V. Vitelli, B.G. Chen, N. Upadhyaya, arXiv:1407.2890.
8. *Topological modes bound to dislocations in mechanical metamaterials*, J. Paulose, B.G. Chen, V. Vitelli, *Nat. Phys.* 11, 153-156 (2015), arXiv:1406.3323.
9. *Nonlinear conduction via solitons in a topological mechanical insulator*, B.G. Chen, N. Upadhyaya, V. Vitelli, *Proc. Natl. Acad. Sci.* 111, 13004-13009 (2014), arXiv:1404.2263.
10. *Structure and coarsening at the surface of a dry three-dimensional aqueous foam*, A.E. Roth, B.G. Chen, D.J. Durian, *Phys. Rev. E* 88, 062302 (2013), arXiv:1306.2939.
11. *Generating the Hopf Fibration Experimentally in Nematic Liquid Crystals*, B.G. Chen, P.J. Ackerman, G.P. Alexander, R.D. Kamien, and I.I. Smalyukh, *Phys. Rev. Lett.* 110, 237801 (2013), arXiv:1212.6688.
12. *Disclination Loops, Hedgehogs, and All That*, G.P. Alexander, B.G. Chen, E.A. Matsumoto, and R.D. Kamien, *Rev. Mod. Phys.* 84, 497 (2012), arXiv:1107.1169.
13. *Solution of the Roth-Marques-Durian Rotational Abrasion Model*, B.G. Chen, *Phys. Rev. E* 83, 031304 (2011), arXiv:1012.2356.
14. *Minimal resonances in annular non-Euclidean strips*, B.G. Chen and C.D. Santangelo, *Phys. Rev. E* 82, 056601 (2010), arXiv:1007.2862.
15. *Power of the Poincaré Group: Elucidating the Hidden Symmetries in Focal Conic Domains*, G.P. Alexander, B.G. Chen, E.A. Matsumoto and R.D. Kamien, *Phys. Rev. Lett.* 104, 257802 (2010), arXiv:1004.0465.
16. *Helical Packings and Phase Transformations of Soft Spheres in Cylinders*, M.A. Lohr, A.M. Alsayed, B.G. Chen, Z. Zhang, R.D. Kamien, and A.G. Yodh, *Phys. Rev. E* 81, 040401(R) (2010), arXiv:1004.0362.
17. *Symmetry Breaking in Smectics and Surface Models of Their Singularities*, B.G. Chen, G.P. Alexander and R.D. Kamien, *Proc. Natl. Acad. Sci.* 106, 15577-15582 (2009), arXiv:0905.3535.
18. *Nematic Films and Radially Anisotropic Delaunay Surfaces*, B.G. Chen and R.D. Kamien, *Eur. Phys. J. E* 28, 315-329 (2009), arXiv:0811.2193.
19. *The Wetting Agent Required for Swarming in Salmonella enterica Serovar Typhimurium is not a Surfactant*, B.G. Chen, L. Turner, and H.C. Berg, *J. Bacteriol.* 189, 8750-8753 (2007).

Talks and Presentations

Invited Talks

<i>Periodicity-changing deformations in infinite frameworks</i> ICERM workshop: Unusual Configuration Spaces	September 2016
<i>Mechanisms and nonlinear waves from topological modes</i> APS March Meeting: Baltimore, MD	March 2016
<i>Topological mechanics: linkages, kinks, and Weyl modes</i> Seminar: UMass Amherst	November 2015
<i>Topological soft matter: from linkages to kinks</i> ICERM workshop: Small Clusters, Polymer Vesicles and Unusual Minima	March 2015
<i>Topological soft matter: from linkages to kinks</i> Seminar: Johns Hopkins	March 2015
<i>Topological soft matter: from linkages to kinks</i> Seminar: Cornell	February 2015
<i>Topological soft matter: from linkages to kinks</i> Seminar: MIT	February 2015
<i>Topological modes bound to dislocations in mechanical metamaterials</i> Seminar: CU Boulder	January 2015
<i>Topological soft matter: from linkages to kinks</i> Colloquium: CU Boulder	January 2015
<i>Topological soft matter: from linkages to kinks</i> Seminar: University of Warwick	December 2014
<i>Topological soft matter: from linkages to kinks</i> Seminar: Aalto University	November 2014
<i>Topological soft matter: from linkages to kinks</i> Seminar: Brandeis University	June 2014
<i>Topological soft matter: from linkages to kinks</i> Seminar: University of Pennsylvania	June 2014
<i>Topological soft matter: from linkages to kinks</i> Seminar: University of Michigan	June 2014
<i>Topological soft matter: from linkages to kinks</i> Seminar: UMass Amherst	June 2014
<i>Kinks in topological mechanics</i> 16th Dutch Soft Matter Meeting: VU Amsterdam	May 2014

- Topological soft matter: from linkages to kinks* May 2014
Van der Waals Colloquium: Leiden University
- Building with butterflies: folding concentric pleated polygons* December 2012
PCTS Workshop: Through the looking glass
- Seeing and sculpting nematic liquid crystal textures with the Thom construction* June 2012
KITP miniprogram: Knotted Fields
- Seeing and sculpting nematic liquid crystal textures with the Thom construction* April 2012
Seminar: University of Leiden
- Seeing and sculpting nematic liquid crystal textures with the Thom construction* March 2012
Seminar: Syracuse University
- Seeing and sculpting nematic liquid crystal textures with the Thom construction* February 2012
Seminar: University of Wisconsin
- Seeing and sculpting nematic liquid crystal textures with the Thom construction* December 2011
Seminar: Brown
- Seeing and sculpting nematic liquid crystal textures with the Thom construction* November 2011
Seminar: Harvard
- Seeing and sculpting nematic liquid crystal textures with Pontryagin-Thom* October 2011
Workshop on Topology: Identifying Order in Complex Systems: Rutgers
- Seeing and sculpting nematic liquid crystal textures with Pontryagin-Thom* August 2011
IMA PI Summer Graduate Program: Topological Methods in Complex Systems: UPenn
- Geometry of 2D Foams: Spaces of Foams and Their Topology* April 2011
Gotham Metro Condensed Matter Meeting: NYAS
- Geometry of 2D Foams: Spaces of Foams and Their Topology* October 2010
Seminar: Academia Sinica
- Ideal 2D foams and spherical foams from Mancini's equations* October 2009
Geometry and Materials seminar: Institute for Advanced Study
- Realization spaces of bubble clusters and coarsening trajectories* May 2009
Penn-NYU Soft Matter Workshop: NYU

Contributed Talks

- Rigid origami as a marginal solid* June 2016
Active and Smart Matter at Syracuse University
- Topologically 'polarized' periodic frameworks and applications to toys and origami* June 2016
ICMS Program: Geometric rigidity theory and applications
- Weyl Modes and Periodicity-Changing Mechanisms in Mechanical Metamaterials* May 2016
SIAM Conference on Mathematical Aspects of Materials Science
- Mechanisms and nonlinear waves from topological modes* January 2016
KITP Program: Geometry, elasticity, fluctuations, and order in 2D soft matter
- Dynamics in Marginally Rigid Mechanical Lattices with Topological Zero-Energy Bulk Modes at Finite Wavevector* November 2015
MRS Fall Meeting: Boston, MA
- Topological phonons and mechanisms: kinks and toys* September 2015
Shape up 2015: Berlin
- Topologically polarized periodic frameworks and applications to toys and origami* July 2015
BIRS Workshop: Advances in Combinatorial and Geometric Rigidity
- Topological soft matter: from linkages to kinks* October 2014
Lorentz Center Workshop: Topological Mechanics
- Kinks in topological soft matter* June 2014
ACS Colloids and Surface Science Symposium: Philadelphia, PA
- Kinks in topological soft matter* March 2014
APS March Meeting: Denver, CO
- Fracture mechanics and crack propagation in fragile matter* March 2013
APS March Meeting: Baltimore, MD
- Seeing and sculpting nematic liquid crystal textures* March 2012
APS March Meeting: Boston, MA
- Minimal resonances in annular non-Euclidean strips* March 2011
APS March Meeting: Dallas, TX
- Orientalional order and topological defects in smectics* March 2010
APS March Meeting: Portland, OR
- Realization spaces of bubble clusters and coarsening trajectories* March 2009
APS March Meeting: Pittsburgh, PA
- Nematic order on foams* March 2008
APS March Meeting: New Orleans, LA

Poster / Table Presentations

<i>Bracing a crooked building: rigidity percolation on isostatic lattices</i> GBASM: Brandeis University	October 2015
<i>Minimal resonances in annular non-Euclidean strips</i> IMA Hot Topics Workshop: Strain Induced Shape Formation: University of Minnesota	May 2011
<i>Smectic Topology, Topography, and Tomography</i> Liquid Crystals Gordon Research Conference: Colby-Sawyer College	June 2009
<i>Smectic Topology, Topography, and Tomography</i> Hougen Symposium on Frontiers of Liquid Crystals: University of Wisconsin	April 2009

Teaching Experience

<i>Teaching Assistant</i> : General Physics Laboratory, Mathematical Methods of Physics I and II, Graduate Statistical Mechanics University of Pennsylvania	Fall 2007-Spring 2011
<i>Halpern Room Tutor</i> University of Pennsylvania	Fall 2007-Fall 2008
<i>Physics Question Center Tutor</i> Harvard University	Fall 2004-Spring 2006

Professional Service

Co-organizer Soft and Biological Matter Seminar: Leiden University	Fall 2013-Spring 2015
Co-founder, lecturer Graduate student topological insulators reading group: University of Pennsylvania	Spring 2010-Summer 2010
Vice-President of Finance Department Representative SASgov (graduate student government): University of Pennsylvania	Summer 2009-Spring 2010 Fall 2008-Spring 2009

Conferences and Workshops Attended

NEW.Mech 2016	October 2016
ICERM Semester Program: Topology in Motion	September-December 2016
Active and Smart Matter: Syracuse University	June 2016
Lancaster Workshop on Geometric Rigidity	June 2016
ICMS program: Geometric rigidity theory and applications	June 2016
SIAM Conference on Mathematical Aspects of Materials Science	May 2016
APS March Meeting	March 2016
KITP Program: Geometry, elasticity, fluctuations, and order in 2D soft matter	January-February 2016
NYU-Oxford Workshop on Mathematical Models of Defects and Patterns	January 2016
MRS Fall Meeting	November 2015

17th Annual Greater Boston Area Statistical Mechanics Meeting	October 2015
NEW.Mech 2015	October 2015
Shape Up! Exercises in Materials Geometry and Topology	September 2015
BIRS workshop on Advances in Combinatorial and Geometric Rigidity	July 2015
ICERM workshop: Small Clusters, Polymer Vesicles and Unusual Minima	March 2015
APS March Meeting	March 2015
Physics@FOM	January 2015
17th Dutch Soft Matter Meeting	November 2014
Lorentz Center workshop: Topological Mechanics	October 2014
ACS Colloids and Surface Science Symposium	June 2014
16th Dutch Soft Matter Meeting	May 2014
Physics@FOM	January 2014
15th Dutch Soft Matter Meeting	November 2013
14th Dutch Soft Matter Meeting	June 2013
APS March Meeting	March 2013
Physics@FOM	January 2013
PCTS workshop: Through the looking glass	December 2012
Lorentz Center workshop: Modern Perspectives on Thin Sheets	September 2012
KITP miniprogram: Knotted fields	June-July 2012
APS March Meeting	March 2012
Boulder School in Condensed Matter and Materials Physics	July 2011
Liquid Crystals Gordon Research Conference	June 2011
IMA Hot Topics Workshop: Strain Induced Shape Formation	May 2011
APS March Meeting	March 2011
Aspen Winter Conference: Materials and the Imagination	January 2011
Princeton/Penn/NYU Soft Matter Meeting	December 2010
Clay Mathematics Institute Summer School: Probability and Statistical Physics in Two and more Dimensions	July-August 2010
UMass Amherst Soft Solids and Complex Fluids Summer School	June 2010
CUNY ITS: Taming Complexity	April 2010
APS March Meeting	March 2010
Princeton Summer School on Condensed Matter Physics	August 2009
Liquid Crystals Gordon Research Conference	June 2009
UMass Amherst Soft Solids and Complex Fluids Summer School	June 2009
UWisc Hougen Symposium on Frontiers of Liquid Crystals	April 2009
APS March Meeting	March 2009
100th Statistical Mechanics Conference	December 2008
UMass Amherst Soft Solids and Complex Fluids Summer School	June 2008
Mid-Atlantic Soft Matter Meeting	June 2008
APS March Meeting	March 2008
Mid-Atlantic Soft Matter Meeting	December 2007