

Anthony T. Chieco

Curriculum Vitae
September 28, 2022

University of Pennsylvania
Department of Physics and Astronomy
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Education

Ph.D. Physics
University of Pennsylvania: May 2020

“Quantifying Structure in Quasi-2D Foams at All Length Scales by Uncovering Long-Range Hidden Order with Hyperuniformity Disorder Length Spectroscopy and Relating Local Bubble Shape to Aging Dynamics”

Thesis Advisor: Douglas J. Durian

B.S. Physics
James Madison University: May 2012

Research Interests

Disorder Networks

Granular Packings

Foam Physics

Professional Appointments

Postdoctoral Research Fellow, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA: June 2020-present.

Graduate Research Fellow, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA: July 2013-December 2019.

Undergraduate Research Assistant, Department of Physics, James Madison University, Harrisonburg, VA: September 2010-June 2012.

Undergraduate Research Assistant, Department of Mathematics, James Madison University, Harrisonburg, VA: June 2010-August 2010.

Publications

A. T. Chieco, and D. J. Durian, “Modelling the approach to statistical self-similarity for systems that coarsen by the diffusion of material between neighboring bubbles, droplets, or grains” *in prep.*

A. T. Chieco, J. Sethna and D. J. Durian, “Average evolution and size-topology relations for coarsening 2d dry foams” *Frontiers in Soft Matter* **2** (2022).

A. T. Chieco, and D. J. Durian, “Experimentally Testing a Generalized Coarsening Model for Quasi-2-Dimensional Wet Foams” *Phys. Rev. E* **103** (2021).

A. T. Chieco, and D. J. Durian, “Quantifying the Structure of Space Filling Disordered Cellular Patterns with Hyperuniformity Disorder Length Spectroscopy,” *Phys. Rev. E* **103** (2021).

A. T. Chieco, M. Zu, A.J. Liu, N. Xu and D. J. Durian, “Spectrum of Structure for Jammed and Unjammed Soft Disks,” *Phys. Rev. E* **98**, 042606 (2018).

A. T. Chieco, R. Dreyfus and D. J. Durian, “Characterizing Pixel and Point Patterns with a Hyperuniformity Disorder Length,” *Phys. Rev. E* **96**, 032909 (2017).

Conference, Seminar, and Workshop Participation

Invited Talks

“Quantifying Local and Long-Range Structure of Quasi-2-Dimensional Foams,” *JMU Alumni Lecture*, James Madison University, Harrisonburg, VA: March 22, 2018.

Contributed Talks

“A Generalized Size-Topology Identity for 2-dimensional Dry Foams,” *APS March Meeting 2022*, Chicago, IL: March 14-18, 2022.

“Using Machine Learning to Analyze 3-d Coarsening Foams of Various Liquid Fractions in Microgravity,” *37th American Society for Gravitational and Space Research Meeting*, Baltimore, MD: November 2-6, 2021.

“Coarsening Behavior in Quasi-2d Foams of Increasing Wetness,” *APS March Meeting 2021*, Virtual: March 15-19, 2021.

“How Fluid Accumulation Affects the Dynamics of Bubble Growth,” *73rd Annual Meeting of the APS Division of Fluid Dynamics*, Virtual: November 22-24, 2020.

“How Wetness Affects Bubble Coarsening in Standard- and Micro-gravity Environments,” *36th American Society for Gravitational and Space Research Meeting*, Virtual: November 5-6, 2020.

“Methods to test a Generalized Coarsening Model for Quasi-Two-Dimensional Wet Foams,” *ad hoc March Meeting 2020*, Virtual: March 2-6, 2020.

“Soundbite: Experimentally Testing the Border-Crossing Model for Coarsening of Quasi-Two-Dimensional Wet Foams,” *22nd Mid-Atlantic Soft Matter Workshop*, Johns Hopkins University, Baltimore, MD: August 2, 2019

“Quantifying the Structure of Space-Filling Disordered Cellular Patterns with Hyperuniformity Disorder Length Spectroscopy,” *APS March Meeting 2019*, Boston, MA: March 4-8, 2019.

“Soundbite: Hyperuniformity Disorder Length Spectroscopy in Quasi-2D Foams,” *20th Mid-Atlantic Soft Matter Workshop*, Georgetown University, Washington, DC: August 3, 2018

“Experimentally Testing the Border-Crossing Model for Coarsening of Quasi-Two-Dimensional Wet Foams,” *APS March Meeting 2018*, Los Angeles, CA: March 5-9, 2018.

“Soundbite: Quantifying Uniformity in Disordered Soft Systems with a Hyperuniformity Disorder Length,” *19th Mid-Atlantic Soft Matter Workshop*, University of Maryland, College Park, MD: February 2, 2018

“Soundbite: Analyzing the Structure of Jammed Systems with the Hyperuniformity Disorder Length,” *7th Northeast Complex Fluids and Soft Matter Workshop*, Princeton University, Princeton, NJ: May 26, 2017.

“The Uniformity of Jammed Soft Disk Packings,” *APS March Meeting 2017*, New Orleans, LA: March 13-17, 2017.

“The Role of Shape and Wetness on Coarsening of Individual Bubbles,” *32th American Society for Gravitational and Space Research Meeting*, Cleveland, OH: October 26-29, 2016.

“Growing Hyperuniformity of Bidisperse Soft Disks on Approach to Jamming,” *APS March Meeting 2016*, Baltimore, MD: March 14-18, 2016.

“Soundbite: Characterizing Pixelized Patterns with a Hyperuniformity Disorder Length,” *12th Mid-Atlantic Soft Matter Workshop*, University of Maryland, College Park, MD: July 29, 2015

“Hyperuniformity Length in Experimental Foam and Simulated Point Patterns,” *APS March Meeting 2015*, San Antonio, Texas: March 2-6, 2015.

“Testing for Hyperuniformity in Two Dimensional Foam,” *30th American Society for Gravitational and Space Research Meeting*, Pasadena, CA: October 22-26, 2014.

“Soundbite: Testing the Border Blocking Model in Quasi-2-Dimensional Foam,” *12th Mid-Atlantic Soft Matter Workshop*, University of Pennsylvania, Philadelphia, PA: May 17, 2014.

“Coarsening Dynamics for Individual Bubbles,” *88th ACS Colloid and Surface Symposium*, Philadelphia, PA: June 22-25, 2014.

“Testing for Hyperuniformity in Two Dimensional Foam,” *APS March Meeting 2014*, Denver, Colorado: March 3-7, 2014.

“Optical Tomography of Polydisperse Dry Foam,” *64th Annual Meeting of the APS Division of Fluid Dynamics*, Baltimore, MD: November 20-22, 2011.

Posters

“Experimentally Testing the Border-Crossing Model for Coarsening of Quasi-Two-Dimensional Wet Foams,” *Gordon Research Conference & Seminar: Soft Condensed Matter*, Colby-Sawyer College, New London, NH: August 11-16, 2019.

“Hyperuniformity Disorder Length Spectroscopy for Quasi-2D Foams,” *10th Northeast Complex Fluids and Soft Matter Workshop*, Rutgers University, Piscataway, NJ: January 18, 2019.

“Hyperuniformity Disorder Length Spectroscopy for Quasi-2D Foams,” *Gordon Research Conference & Seminar: Granular Matter*, Stonehill College, Easton, MA: July 22-27, 2018.

“Quantifying Disorder in Soft Disk Configurations with a Hyperuniformity Disorder Length,” *Gordon Research Conference & Seminar: Soft Condensed Matter*, Colby-Sawyer College, New London, NH: August 13-18, 2017.

“The Role of Shape and Wetness on the Coarsening of Individual Bubbles in a Quasi-2D Foam,” *Gordon Research Conference & Seminar: Granular Matter*, Stonehill College, Easton, MA: July 24-29, 2016.

“Digital Reconstruction of 3D Polydisperse Dry Foam,” *APS March Meeting 2012*, Boston, MA: February 27 - March 2, 2012.

Outreach & Service

Organizing Committee, *Gotham-Metro Condensed Matter Meeting*, New York University, New York, NY: October 5 2019.

Volunteer, General Physics Demonstrations, *Philly Materials Science and Engineering Day*, Drexel University, Philadelphia, PA: Feb 2 2019.

Volunteer, General Physics Demonstrations, Beer Brunch: Fizzics Class, Philadelphia Science Festival, Philadelphia, PA: April 22 2018.

Volunteer, General Physics Demonstrations, Philly Materials Science and Engineering Day, Drexel University, Philadelphia, PA: Feb 7 2015.

Professional Memberships

American Physical Society (APS)

APS Division of Soft Matter (DSOFT)

APS Topical Group on Statistical and Nonlinear Physics (GSNP)

Professional Skills

Imaging Techniques: Bright-field Photography with DSLR camera and multiple lenses

Computer Vision: Particle tracking in 2D and 3D, Monte Carlo like method of identifying foam vertices, Steepest descent method to correct locations of vertices, Image reconstruction of random networks, Lens distortion correction

Numerical Techniques: Curve Fitting, Data Smoothing, Fourier Space Analysis, Voronoi constructions

Machine Learning: Using TensorFlow library in Python to perform classification tasks

Computer Skills

Office/Data Management Software: Box, Google Drive, Microsoft Office

Scientific Computing Software: MATLAB, ImageJ/Fiji, Python (libraries tensorflow, openCV, scikitlearn, matplotlib)

Programming Languages: L^AT_EX

Operating Systems: Windows, Mac OS X

References

Douglas J. Durian, Graduate Adviser
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Klebert Feitosa, Undergraduate Adviser
Department of Physics, James Madison University
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