

JUSTIN CLIFFORD BURTON

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RESEARCH INTERESTS

Soft condensed matter physics, geophysics, fluid dynamics, granular physics, nonequilibrium systems

ACADEMIC APPOINTMENTS

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| Emory University Assistant Professor, <i>Department of Physics</i> | Atlanta, GA, USA 2013-Present |
| University of Chicago Postdoctoral Researcher, <i>Department of Physics</i> Advisor: Professor Sidney Nagel | Chicago, IL, USA 2009-2013 |
| Fred Hutchinson Cancer Research Center Postdoctoral Researcher, <i>Department of Basic Sciences</i> Advisor: Professor Wenying Shou | Seattle, WA, USA 2008-2009 |
| University of California, Irvine Postdoctoral Researcher, <i>Department of Physics</i> Advisor: Professor Peter Taborek | Irvine, CA, USA 2006-2008 |

EDUCATION

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|---|---|
| University of California, Irvine Doctor of Philosophy, <i>Physics</i> Advisor: Professor Peter Taborek | Irvine, CA, USA 2001-2006 |
| University of Cincinnati Bachelor of Science, <i>Physics</i> | Cincinnati, OH, USA 1998-2001 |

HONORS AND AWARDS

- Arthur H. Compton Lecturer, University of Chicago (2010)
- ICAM Post-doctoral Institutional Fellowship (2007)
- ICAM Travel Award (2007)
- Faculty Career Development Award (2007)
- Orange County ARCS Fellowship (2004)
- University of Cincinnati Honors Program (1998)
- Sigma Pi Sigma Physics Honors Society (1998)
- University of Cincinnati, Cincinnati Scholar (1998)

DEPARTMENTAL TEACHING

- Physics 151: 1st semester introductory physics, calculus based
Taught: Fall 2013, 2014; number enrolled = 100
Student evaluations: 7.5 out of 9.0
- Physics 528: graduate course in fluid and solid mechanics
Taught: Spring 2015, Fall 2015; number enrolled = 9
Student evaluations: 8.67 out of 9.0
- Physics 190: freshman seminar (The Science of Climate Change)
Taught: Spring 2016; number enrolled = 9
Student evaluations: not yet known

UNIVERSITY TEACHING

- Foundations of Sustainability: introduction to sustainability
Guest lecture: Fall 2014, 2015; number enrolled = 20
- University course: discourse for disaster
Guest lecture: Spring 2016; number enrolled = 15
- Piedmont project (course for helping faculty teach sustainability)
Guest lecture: 5/2015, 5/2016

PHD STUDENTS SUPERVISED

- Currently: supervising two students admitted to Ph.D. candidacy (Guram Gogia, Xiaolei Ma).

M.S. STUDENTS SUPERVISED

- Stephen Frazier, graduation 5/2016.
- Currently: supervising Jiaqi Zheng.

OTHER GRADUATE STUDENT MENTORING

- Supervised 5 graduate research rotation students.
- Member of qualifier committee for 4 physics graduate students.
- Member of Ph.D. committee for 6 physics graduate students.
- Member of M.S. committee for 2 physics graduate students.

POSTDOCTORAL FELLOWS SUPERVISED

- Justin Pye, 6/2014—present.
- Juan-José Liétor-Santos, 9/2013—8/2015. Current position: Assistant editor for Physical Review E.

UNDERGRADUATE MENTORING

- Member of honors thesis committee for 2 undergraduates (physics and chemistry).
- Supervised 6 undergraduate research projects (apart from honors theses).

DEPARTMENTAL SERVICE

- Member of graduate recruiting committee, 2015—present.
- Member of graduate admissions committee, 2013—present.
- Engineering Sciences program design, 2014.

EMORY COLLEGE SERVICE

- Director of the IDS Sustainability Minor, 2015—present.
- Sustainability minor steering committee, 2014-2015.

EMORY UNIVERSITY SERVICE

- Member of organizing committee, Emory STEM Symposium, 1/2014, 1/2015.
- Reviewer for annual URC grants, 1/2015, 1/2016.
- Faculty advisor for the Society of Physics Students, 2014—present.
- Faculty advisor for Emory Global HEED student club, 2014—present.
- Speaker for 1836 sustainability dinner, 10/2015.

OTHER PROFESSIONAL ACTIVITIES

- Founding member of Climate@Emory initiative, 2014—present.
- Primary organizer for QuanTM Climate Change seminar series, Spring 2016.
- Primary organizer for Climate@Emory Day of Scholarship, 5/2015.
- Primary organizer for 8th Southeast workshop on soft materials, 5/2014.

PROFESSIONAL DEVELOPMENT

- AAPT Young Faculty Workshop, 6/2014
- University of Minnesota IMA workshop on singularities and singular geometries, 7/2008.

CURRENT FUNDING

- NSF DMR - 1455086: \$625,910 (3/2015—2/2020)
“CAREER: Nonlinear Waves and Fluctuations in Jammed Systems”
- NSF DMR - 1506446: \$576,629 (\$256,355 for Emory) (7/2015—6/2018)
“Collaborative Research: Investigating jamming in iceberg-choked fjords with field observations, laboratory experiments, and numerical models”

PUBLICATIONS

- 1) [Casimir forces between particles in two-dimensional jammed systems](#)
Juan-José Liétor-Santos and Justin C. Burton. Submitted to PRX, (2016). arXiv:1604.05360v1
- 2) [Echoes from anharmonic normal modes in model glasses](#)
J. C. Burton and S. R. Nagel. Phys. Rev. E, 032905 (2016).

- 3) [The many faces of a Leidenfrost drop](#)
X. Ma, J. J. Liétor-Santos, and J. C. Burton. *Physics of Fluids* 27, 091109 (2015).
- 4) [Reverse glacier motion during iceberg calving and the cause of glacial earthquakes](#)
T. Murray, M. Nettles, N. Selmes, L. M. Cathles, J. C. Burton, T. D. James, S. Edwards, I. Martins, T. O'Farrel, R. Aspey, I. Rutt, and T. Baugé, *Science* 349, 305 (2015).
- 5) [Coalescence of Bubbles and Drops in an Outer Fluid](#)
J. D. Paulsen, R. Carmigniani, A. Kannan, J. C. Burton, and S. R. Nagel. *Nature Comm.* 5, 3182 (2014).
- 6) [Collision Dynamics of Particle Clusters in a Two-dimensional Granular Gas](#)
J. C. Burton, P. Y. Lu, and S. R. Nagel. *Physical Review E* 88, 062204 (2013).
- 7) [Energy Loss at Propagating Jamming Fronts in Granular Gas Clusters](#)
J. C. Burton, P. Y. Lu, and S. R. Nagel. *Physical Review Letters* 111, 188001 (2013).
- 8) [The Role of Cooperative Iceberg Capsize in Ice-Shelf Disintegration](#)
J. C. Burton, L. Mac Cathles, and W. G. Wilder. *Annals of Glaciology* 54, 84-90 (2013).
- 9) [Geometry of the Vapor Layer Under a Leidenfrost Drop](#)
J. C. Burton, A. L. Sharpe, R. C. A. van der Veen, A. Franco, and S. R. Nagel. *Physical Review Letters* 109, 074301 (2012).
- 10) [The Inexorable Resistance of Inertia Determines the Initial Regime of Drop Coalescence](#)
J. D. Paulsen, J. C. Burton, S. R. Nagel, S. A. Appathurai, M. T. Harris, and O. A. Basaran. *PNAS* 109 (18), 6857-6861 (2012).
- 11) [Impact of Hydrodynamics on Seismic Signals Generated by Iceberg Collisions](#)
J. M. Amundson, J. C. Burton, and S. Correa-Legisos. *Annals of Glaciology* 53, 106-112 (2012).
- 12) [Laboratory Investigations of Iceberg-Capsize dynamics, Energy Dissipation and Tsunamigenesis](#)
J. C. Burton, J. M. Amundson, D. S. Abbot, A. Boghosian, L. Mac. Cathles, S. Correa-Legisos, K. N. Darnell, N. Guttenberg, D. M. Holland, and D. R. MacAyeal. *JGR - Earth Surface* 117, F01007 (2012).
- 13) [A Continuous \$^3\text{He}\$ cryostat with pulse-tube pre-cooling and optical access](#)
J. C. Burton, E. Van Cleve, and P. Taborek. *Cryogenics* 51, 209-213 (2011).
- 14) [Simulations of Coulombic Fission of Charged Inviscid Drops](#)
J. C. Burton and P. Taborek. *Physical Review Letters* 106, 144501, (2011).
- 15) [Viscous to Inertial Crossover in Liquid Drop Coalescence](#)
J. D. Paulsen, J. C. Burton, and S. R. Nagel. *Physical Review Letters* 106, 114501 (2011).
- 16) [A Computational Investigation of Iceberg Capsize as a Driver of Explosive Ice-shelf Disintegration](#)
N. Guttenberg, D. S. Abbot, J. M. Amundson, J. C. Burton, L. M. Cathles, D. R. MacAyeal, and W. W. Zhang. *Annals of Glaciology* 52, 51-59 (2011).
- 17) [An Experimental and Numerical Investigation of the Equilibrium Geometry of Liquid Lenses](#)
J. C. Burton, F. Huisman, P. Alison, D. Rogerson, and P. Taborek. *Langmuir* 26, 15316-15324, (2010).
- 18) [Cryogenic Vacuum Tribology of Diamond and Diamond-like Carbon Films](#)
M. Aggleton, J. C. Burton, and P. Taborek. *Journal of Applied Physics* 106, 013504, (2009).
- 19) [Bifurcation from Bubble to Droplet Behavior in Inviscid Pinch-off](#)
J. C. Burton and P. Taborek. *Physical Review Letters* 101, 214502, (2008).
- 20) [Two-dimensional Inviscid Pinch-off: An Example of Self-Similarity of the Second Kind](#)
J. C. Burton and P. Taborek. *Physics of Fluids* 19, 102109, (2007).
- 21) [Role of Dimensionality and Axisymmetry in Fluid Pinch-off and Coalescence](#)
J. C. Burton and P. Taborek. *Physical Review Letters* 98, 224502, (2007).

- 22) [Fluid Pinch-off in Superfluid and Normal He⁴](#)
J. C. Burton, J. E. Rutledge and P. Taborek. Physical Review E 75, 036311, (2007).
- 23) [Temperature Dependence of Friction under Cryogenic Conditions in Vacuum](#)
J. C. Burton, P. Taborek, and J. E. Rutledge. Tribology Letters 23, 131 (2006).
- 24) [Scaling and Instabilities in Bubble Pinch-off](#)
J. C. Burton, R. Waldrep and P. Taborek. Physical Review Letters 94, 184502, (2005).
- 25) [Fluid Pinch-off Dynamics at Nanometer Length Scales](#)
J. C. Burton, J. E. Rutledge and P. Taborek. Physical Review Letters 92, 244505, (2004).
- 26) [Superfluid Drops: Dynamics of Pinch-off and Sliding Motion](#)
J. C. Burton, P. Taborek, and J. E. Rutledge. Journal of Low Temperature Physics 134, 237 (2004).
- 27) [Supercooling Helium Vapor: Nucleation and Fog Formation induced by Strong Evaporation](#)
J. C. Burton, A. T. Nguyen Le, J. E. Rutledge and P. Taborek. Journal of Low Temp. Physics 134, 275 (2004).

PUBLICITY

- "Giant earthquakes are shaking Greenland — and scientists just figured out the disturbing reason why", Washington Post, June 25, 2015.
- "Study Reveals What Happens During A 'Glacial Earthquake'", NPR, June 25, 2015.
- "Calving icebergs fall back, spring forward, causing glacial earthquakes", eScience Commons, Emory
- "Physicist's research of glassy materials nets NSF CAREER award", eScience Commons, Emory
- "An Iceberg Flipped Over, and Its Underside Is Breathtaking", Smithsonian.com, Jan. 22, 2015.
- "Hydrodynamic Forces to Blame for Glacial Earthquakes?", APS News, April 2014.
- "Energy Loss at Propagating Jamming Fronts in Granular Gas Clusters", Cover of Physical Review Letters, Nov. 2013.
- "As the Stanley Cup Final rolls into mid-June, crews work to keep the ice cold and smooth", Chicago Tribune, June 15, 2013.
- "Capsizing icebergs pack the punch of a nuclear bomb", NBCNews.com, Mar. 2014.
- "Flipping icebergs", Science News for Students, April 3, 2012.
- "Signs of the season: 'Caution: Falling ice'", Jan. 22, 2012.
- "Crosschecking the physics of hockey", June 4, 2010.
- "Pressure unites two regimes of fluid breakup", Physics Today, 62, 2009.
- "Drippy faucets offer lesson in physics", Science Daily, Feb. 6, 2009.

INVITED TALKS

- 10/2015: Department Colloquium, College of Charleston, Charleston, SC, USA
- 4/2015: 9th IMACS Conference, Athens, GA, USA
- 10/2014: Department Colloquium, Georgia Institute of Technology, Atlanta, GA, USA
- 3/2014: Public Lecture, Atlanta Science Festival, Atlanta, GA, USA
- 7/2013: 7th. IDMRCS, Barcelona, Spain
- 3/2013: Department Seminar, University of Pennsylvania, Philadelphia, PA, USA
- 2/2013: Department Seminar, Yale University, New Haven, CT, USA
- 1/2013: Department Seminar, Emory University, Atlanta, GA, USA
- 10/2012: Computations in Science Seminar, University of Chicago, Chicago, IL, USA
- 11/2011: Department Seminar, University of California, Irvine, CA, USA

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- 10/2011: Department Seminar, University of Pennsylvania, Philadelphia, PA, USA
- 4/2010: Department Seminar, City College of New York, New York, NY, USA
- 2008: Department Seminar, University of California, Los Angeles, CA, USA
- 2008: Department Seminar, University of California, Merced, CA, USA
- 10/2007: Computations in Science Seminar, University of Chicago, Chicago, IL, USA

CONTRIBUTED TALKS

- 3/2016: American Physical Society March Meeting, Baltimore, MD, USA
- 3/2014: American Physical Society March Meeting, Denver, CO, USA
- 12/2013: American Geophysical Union Fall Meeting, San Francisco, CA, USA
- 3/2013: American Physical Society March Meeting, Baltimore, MD, USA
- 11/2012: American Physical Society DFD Meeting, San Diego, CA, USA
- 6/2012: International Glaciological Society Meeting, Fairbanks, AK, USA
- 3/2012: American Physical Society March Meeting, Boston, MA, USA
- 12/2011: American Geophysical Union Meeting, San Francisco, CA, USA
- 8/2011: Soft Matter Physics Gordon Conference, Colby-Sawyer College, NH, USA
- 3/2011: American Physical Society DFD Meeting, Baltimore, MD, USA
- 3/2010: American Physical Society March Meeting, Portland, OR, USA
- 1/2010: Institute for Complex and Adaptive Matter Meeting, Davis, CA, USA
- 11/2010: American Physical Society DFD Meeting, Long Beach, CA, USA
- 6/2010: Granular Physics Gordon Conference, Colby College, ME, USA
- 6/2010: International Glaciological Society Meeting, Columbus, OH, USA
- 7/2008: IMA Summer Program, University of Minnesota, Minneapolis, MN, USA
- 3/2008: American Physical Society March Meeting, New Orleans, LA, USA
- 1/2008: Institute for Complex and Adaptive Matter Meeting, Santa Fe, NM, USA
- 7/2007: Interface Dynamics, Stability and Fragmentation Conference, Grenoble, France
- 3/2006: American Physical Society March Meeting, Baltimore, MD, USA
- 11/2006: American Physical Society DFD Meeting, Tampa, FL, USA
- 11/2005: Focusing Stress in Soft Interfaces Workshop, Chicago, IL, USA
- 11/2005: American Physical Society DFD Meeting, Chicago, IL, USA
- 3/2005: American Physical Society March Meeting, Los Angeles, CA, USA
- 1/2005: Dynamics Days Conference, Long Beach, CA, USA
- 3/2004: American Physical Society March Meeting, Montreal, Quebec, Canada
- 3/2003: American Physical Society March Meeting, Austin, TX, USA
- 8/2003: Quantum Fluids and Solids Meeting, Albuquerque, NM

OUTREACH ACTIVITIES

- Primary organizer for “Physics Live!” as part of the Atlanta Science Festival (3/2015, 3/2016)
- Founded the [Emory Science Club](#) at Laurel Ridge Elementary, a monthly, after-school club for 4th and 5th grade students (2015—present)
- Public lecturer at the Atlanta Science Festival event “Lab Changing the World” (2014).
- Lecturer for the [University of Chicago SESAME program](#), professional development for K-12 science teachers (2013).