

JUSTIN CLIFFORD BURTON

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RESEARCH INTERESTS

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

ACADEMIC APPOINTMENTS

Emory University Associate Professor, <i>Department of Physics</i>	Atlanta, GA, USA 2019-Present
Emory University Assistant Professor, <i>Department of Physics</i>	Atlanta, GA, USA 2013-2019
University of Chicago <i>Postdoctoral Researcher, Department of Physics</i> Advisor: Professor Sidney Nagel	Chicago, IL, USA 2009-2013
Fred Hutchinson Cancer Research Center <i>Postdoctoral Researcher, Department of Basic Sciences</i> Advisor: Professor Wenying Shou	Seattle, WA, USA 2008-2009
University of California, Irvine <i>Postdoctoral Researcher, Department of Physics</i> Advisor: Professor Peter Taborek	Irvine, CA, USA 2006-2008

EDUCATION

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

HONORS AND AWARDS

- Gordon and Betty Moore Experimental Investigator Award (2023)
- Physical Review Outstanding Referee Award (2023)
- Sustainability Innovator Award, Emory University (2018)
- NSF CAREER Award (2015)
- Arthur H. Compton Lecturer, University of Chicago (2010)
- ICAM Postdoctoral 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)

OTHER PROFESSIONAL ACTIVITIES

- Program chair for 2024 APS March Meeting, Division of Soft Matter
- Vice program chair for 2023 APS March Meeting, Division of Soft Matter

- Member of editorial board for Physical Review Research, 2019-Present.
- Executive Committee for the APS topical group on Climate Physics (APS GPC Member-at-Large)
- Organizer for APS Division of Fluid Dynamics Meeting in Atlanta, GA, 11/2018.
- Primary organizer for 11th Southeast workshop on soft materials, 5/2018.
- Primary organizer for 10th Southeast workshop on soft materials, 5/2017.
- 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

- Emory QEP workshop, 5/2018
- AAPT Young Faculty Workshop, 6/2014
- University of Minnesota IMA workshop on singularities and singular geometries, 7/2008.

PEER-REVIEWED PUBLICATIONS (From work at Emory)

- 1) [Physics of the cryosphere](#)
A. F. Banwell, J. C. Burton, C. Cenedese, K. Golden, and J. Åström. Nature Reviews Physics (2023). <https://doi.org/10.1038/s42254-023-00610-2>
- 2) [3D tracking of particles in a dusty plasma by laser sheet tomography](#)
Wentao Yu and Justin C. Burton. Physics of Plasmas 30, 063701 (2023).
- 3) [Dynamics of Mass Polar Spheroids During Sedimentation](#)
Kavinda Nissanka, Xiaolei Ma, and Justin C. Burton. Journal of Fluid Mechanics. 2023, DOI: 10.1017/jfm.2023.32
- 4) [The lifetime of charged dust in the atmosphere](#)
Josh Méndez Harper, Dana Harvey, Tianshu Huang, Jack McGrath III, David Meer, and Justin C. Burton. PNAS Nexus 1, 2022, pgac220.
- 5) [Extracting Forces from Noisy Dynamics in Dusty Plasmas](#)
Wentao Yu, Jonathan Cho, and Justin C. Burton. Phys. Rev. E 106, 035303 (2022).
- 6) [Physically intuitive continuum mechanics model for QCM: Viscoelasticity of rubbery polymers at MHz frequencies](#)
Yannic J. Gagnon, Justin C. Burton, Connie B. Roth. Journal of Polymer Science (2021).
- 7) [Improved Estimation of Glacial-Earthquake Size Through New Modeling of the Seismic Source](#)
Kira G. Olsen, Meredith Nettles, L. Mac Cathles, Justin C. Burton, Tavi Murray, Timothy D. James. Journal of Geophysical Research: Earth Surface (2021).
- 8) [Reflections on Physics Education and Communication with Tibetan Monastics](#)
Justin Burton, Judith Beck, Martin Kamela, Michelle Kuchera, Amy J Lovell, Kerstin Nordstrom, Thinley Tenzin, Julie Ziffer. Frontiers in Communication, section Science and Environmental Communication (2021).
- 9) [Granular decoherence precedes ice mélange failure and glacier calving at Jakobshavn Isbræ](#)
R. K. Cassotto, Justin C. Burton, Jason M. Amundson, Mark A. Fahnestock, and Martin Truffer. Nature Geoscience (2021), DOI: 10.1038/s41561-021-00754-9
- 10) [Relaxation and Recovery in Hydrogel Friction on Smooth Surfaces](#)
Brady Wu, Joshua Méndez Harper, Justin C. Burton. Experimental Mechanics (2021).
- 11) [The minimum Leidenfrost temperature on smooth surfaces](#)
D. Harvey, J. Méndez Harper, and J. C. Burton. Phys. Rev. Lett. 127, 104501 (2021). **Featured in Physics**
- 12) [The origin of large amplitude oscillations of dust particles in a plasma sheath](#)
J. Méndez Harper, G. Gogia, B. Wu, Z. Laseter, and J. C. Burton. Phys. Rev. Research 2, 033500 (2020)
- 13) [Intermittent "turbulence" in a many-body system](#)
G. Gogia, W. Yu, and J. C. Burton. Phys. Rev. Research 2, 023250 (2020).

- 14) [Pore-size dependence and slow relaxation of hydrogel friction on smooth surfaces](#)
Nicholas L. Cuccia, Suraj Pothineni, Brady Wu, Joshua Méndez-Harper, Justin C. Burton. Proc. Natl. Acad. Sci. USA. 117, 11247-11256 (2020).
- 15) [How to make a giant bubble](#)
S. Frazier, X. Jiang, and J. C. Burton. Physical Review Fluids 5, 013304 (2020)
- 16) [Tuning contact line dynamics and deposition patterns in volatile liquid mixtures](#)
A. Mouat, C. E. Wood, J. E. Pye, and J. C. Burton. Physical Review Letters 124, 064502 (2020).
- 17) [Liquid Deposition Through Evaporation](#)
Asher P. Mouat, Clay E. Wood, Justin E. Pye, and Justin C. Burton. Phys. Rev. Fluids 4, 100512 (2019)
- 18) [Microscopy quantification of microbial birth and death dynamics](#)
S. F. M. Hart and D. Skelding and A. J. Waite and J. Burton and L. Xie and W. Shou. Quantitative Biology (2018).
- 19) [Universal Scaling of Polygonal Desiccation Crack Patterns](#)
Xiaolei Ma and Justin C. Burton. Phys. Rev. E 99, 012802 (2019).
- 20) [Quasi-static granular flow of ice mélange](#)
Jason M. Amundson and Justin C. Burton. Journal of Geophysical Research 123, DOI: 10.1029/2018JF004685 (2018)
- 21) [Precursors to Molecular Slip on Smooth Hydrophobic Surfaces](#)
J. E. Pye, C. E. Wood, and J. C. Burton. Physical Review Letters 121, 134501 (2018).
- 22) [Self-organized Oscillations of Leidenfrost Drops](#)
X. Ma and J. C. Burton. Journal of Fluid mechanics 846, 263-291 (2018).
- 23) [Quantifying flow and stress in ice mélange, the world's largest granular material](#)
J. C. Burton, J. M. Amundson, R. Cassotto, C.-C. Kuo, and M. Dennin. PNAS, DOI: 10.1073/pnas.1715136115 (2018).
- 24) [Emergent Bistability and switching in a nonequilibrium crystal](#)
G. Gogia and J. C. Burton. Phys. Rev. Lett. 119, 178004 (2017).
- 25) [Star-shaped oscillations of Leidenfrost drops](#)
X. Ma, J. J. Liétor-Santos, and J. C. Burton. Phys. Rev. Fluids 2, 031602 (2017).
- 26) [Casimir effect between pinned particles in two-dimensional jammed systems](#)
Juan-José Liétor-Santos and Justin C. Burton. Soft Matter 13, 1142 (2016).
- 27) [Echoes from anharmonic normal modes in model glasses](#)
J. C. Burton and S. R. Nagel. Phys. Rev. E 93, 032905 (2016).
- 28) [The many faces of a Leidenfrost drop](#)
X. Ma, J. J. Liétor-Santos, and J. C. Burton. Physics of Fluids 27, 091109 (2015).
- 29) [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).

PEER-REVIEWED PUBLICATIONS (Prior to Emory)

- 30) [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).
- 31) [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).
- 32) [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).
- 33) [The Role of Cooperative Iceberg Capsizes in Ice-Shelf Disintegration](#)
J. C. Burton, L. Mac Cathles, and W. G. Wilder. Annals of Glaciology 54, 84-90 (2013).
- 34) [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).
- 35) [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).

- 36) [Impact of Hydrodynamics on Seismic Signals Generated by Iceberg Collisions](#)
J. M. Amundson, J. C. Burton, and S. Correa-Legis. Annals of Glaciology 53, 106-112 (2012).
- 37) [Laboratory Investigations of Iceberg-Capsizes dynamics, Energy Dissipation and Tsunamiogenesis](#)
J. C. Burton, J. M. Amundson, D. S. Abbot, A. Boghosian, L. Mac. Cathles, S. Correa-Legis, K. N. Darnell, N. Guttenberg, D. M. Holland, and D. R. MacAyeal. JGR - Earth Surface 117, F01007 (2012).
- 38) [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).
- 39) [Simulations of Coulombic Fission of Charged Inviscid Drops](#)
J. C. Burton and P. Taborek. Physical Review Letters 106, 144501, (2011).
- 40) [Viscous to Inertial Crossover in Liquid Drop Coalescence](#)
J. D. Paulsen, J. C. Burton, and S. R. Nagel. Physical Review Letters 106, 114501 (2011).
- 41) [A Computational Investigation of Iceberg Capsizes 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).
- 42) [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).
- 43) [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).
- 44) [Bifurcation from Bubble to Droplet Behavior in Inviscid Pinch-off](#)
J. C. Burton and P. Taborek. Physical Review Letters 101, 214502, (2008).
- 45) [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).
- 46) [Role of Dimensionality and Axisymmetry in Fluid Pinch-off and Coalescence](#)
J. C. Burton and P. Taborek. Physical Review Letters 98, 224502, (2007).
- 47) [Fluid Pinch-off in Superfluid and Normal \$\text{He}^4\$](#)
J. C. Burton, J. E. Rutledge and P. Taborek. Physical Review E 75, 036311, (2007).
- 48) [Temperature Dependence of Friction under Cryogenic Conditions in Vacuum](#)
J. C. Burton, P. Taborek, and J. E. Rutledge. Tribology Letters 23, 131 (2006).
- 49) [Scaling and Instabilities in Bubble Pinch-off](#)
J. C. Burton, R. Waldrep and P. Taborek. Physical Review Letters 94, 184502, (2005).
- 50) [Fluid Pinch-off Dynamics at Nanometer Length Scales](#)
J. C. Burton, J. E. Rutledge and P. Taborek. Physical Review Letters 92, 244505, (2004).
- 51) [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).
- 52) [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

- “Study unveils the minimum temperature for droplets levitating from smooth surfaces”, Phys.org, 2021
- “Slushy iceberg aggregates control calving timing on Greenland’s Jakobshavn Isbræ”, Phys.org, 2021 (and other multiple news outlets)
- “Evaporating mixtures of two liquids create hypnotic designs,” Science News, March 2020
- “Physics of giant soap bubbles,” featured in Wired, Smithsonian, and many other news outlets, 2020
- “Physics of a glacial ‘slushy’ reveal granular forces on a massive scale,” eScience Commons, Emory
- “Physicists show how lifeless particles can become ‘life-like’ by switching behaviors”, Phys.org, Nov. 2017
- American Physical Society DFD meeting webcast: “How to make a giant bubble”, Nov. 2016
- “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.

OUTREACH ACTIVITIES

- Science panelist at “[The Many Wondrous Realities of Jasmine Starr-Kidd](#)”, a play at the Woodruff Arts Center (3/2023)
- Tumble podcast for kids: Dr. Bubbles and “[The Science of Bubbles](#)” (04/2022)
- Organizer for numerous K-12 outreach events: STEM Saturday at Champion Middle School in Dekalb County (04/2016), D. M. Therrell High School STEM day, and Spread The Word Christian Ministries, Youth Department Enrichment Program (09/2022).
- Atlanta Botanical Gardens Science Café: Breaking ice: climate change, glaciers, and our melting planet (4/2018)
- Primary organizer for “Physics Live!” and “Physics for All” as part of the Atlanta Science Festival (3/2015, 3/2016, 3/2017, 3/2018, 3/2019, 3/2022, 3/2023)
- 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).