JUSTIN C. BURTON

Winship Distinguished Research Professor, Department of Physics, Emory University
400 Dowman Drive, MSC N206 • Atlanta, GA 30322 • justin.c.burton@emory.edu
jcburtonlab.com • Google Scholar

RESEARCH INTERESTS

Soft condensed matter physics, fluid dynamics, geophysics, plasma physics, and nonequilibrium systems. Experiments and models spanning dusty plasmas, granular and glassy materials, hydrogels, drops and interfaces, electrostatics in nature, and the physics of glaciers and ice mélange.

APPOINTMENTS

Emory University — **Atlanta, GA**
Winship Distinguished Research Professor, *Department of Physics* — *2025–present*

Emory University — **Atlanta, GA**
Associate Professor (2019–2025); Assistant Professor (2013–2019), *Department of Physics* — *2013–2025*

University of Chicago — **Chicago, IL**
Postdoctoral Researcher with Sidney Nagel, *Department of Physics* — *2009–2013*

Fred Hutchinson Cancer Research Center — **Seattle, WA**
Postdoctoral Researcher with Wenying Shou, *Basic Sciences* — *2008–2009*

University of California, Irvine — **Irvine, CA**
Postdoctoral Researcher with Peter Taborek, *Department of Physics* — *2006–2008*

EDUCATION

University of California, Irvine — **Irvine, CA**
Ph.D., Physics (advisor: Peter Taborek) — *2006*

University of Cincinnati — **Cincinnati, OH**
B.S., Physics — *2001*

HONORS AND AWARDS

- PNAS Cozzarelli Prize (2026)
- Fellow of the American Physical Society (2024)
- Winship Distinguished Research Professor, Emory University (2024)
- Gordon and Betty Moore Foundation Experimental Physics Investigator (2023)
- Physical Review Outstanding Referee (2023)
- NSF CAREER Award (2015)
- Arthur H. Compton Lecturer, University of Chicago (2010)

SELECTED RESEARCH SUPPORT

- Gordon and Betty Moore Foundation, Experimental Physics Investigator: *The shaping of Earth's soft matter landscape*
- U.S. Department of Energy, Genesis Mission: *Data-Driven Discovery of Multicomponent Plasma Fluid Dynamics*
- NSF Science and Technology Center TEMPEST: *Transformative Explorations in Multi-Physics and Engineering of Scientific Turbulence* (Experiment pillar)
- W. M. Keck Foundation: *Mechanistic Studies of Airborne Microbes*
- NSF CAREER: *Nonlinear Waves and Fluctuations in Jammed Systems*

SELECTED PUBLICATIONS

More than 70 peer-reviewed publications; full list at jcburtonlab.com/publications.

1) *Physics-tailored machine learning reveals unexpected physics in dusty plasmas*
W. Yu, E. Abdelaleem, I. Nemenman, and **J. C. Burton**. *Proc. Natl. Acad. Sci. U.S.A.* **122**, e2505725122 (2025); **Cozzarelli Prize**.
2) *Electrostatics facilitate midair host attachment in parasitic jumping nematodes*
R. Ran, **J. C. Burton**, S. Kumar, S. Bhamla, A. R. Dillman, and V. M. Ortega-Jimenez. *Proc. Natl. Acad. Sci. U.S.A.* **122**, e2503555122 (2025).
3) *Nonreciprocal interactions drive intermittent melting of Coulomb clusters*
Z. Shu, W.-C. Li, W. Yu, and **J. C. Burton**. *Newton* **2**, 100633 (2026).
4) *Sudden collapse of ice mélange under increasing submarine melt at tidewater glaciers*
P. T. Summers, A. A. Robel, R. H. Jackson, M. D. King, J. M. Amundson, and **J. C. Burton**. *Nat. Commun.* **17**, 11761 (2026).
5) *Hyperelastic swelling of stiff hydrogels*
J. Wang and **J. C. Burton**. *Phys. Rev. Lett.* **134**, 148203 (2025).
6) *Seasonal changes of mélange thickness coincide with Greenland calving dynamics*
Y. Meng, C.-Y. Lai, R. Culberg, M. G. Shahin, L. A. Stearns, **J. C. Burton**, and K. Nissanka. *Nat. Commun.* **16**, 573 (2025).
7) *Soft matter physics of the ground beneath our feet*
A. Voigtländer, M. Houssais, K. A. Bacik, I. C. Bourg, **J. C. Burton**, K. E. Daniels, S. S. Datta, E. Del Gado, N. S. Deshpande, O. Devauchelle, B. Ferdowsi, R. Glade, L. Goehring, I. J. Hewitt, D. Jerolmack, R. Juanes, A. Kudrolli, C.-Y. Lai, W. Li, C. Masteller, K. Nissanka, A. M. Rubin, H. A. Stone, J. Suckale, N. M. Vriend, J. S. Wettlaufer, and J. Q. Yang. *Soft Matter* **20**, 5859 (2024).
8) *Physics of the cryosphere*
A. F. Banwell, **J. C. Burton**, C. Cenedese, K. Golden, and J. Åström. *Nat. Rev. Phys.* **5**, 446 (2023).
9) *Granular decoherence precedes ice mélange failure and glacier calving at Jakobshavn Isbræ*
R. K. Cassotto, **J. C. Burton**, J. M. Amundson, M. A. Fahnestock, and M. Truffer. *Nat. Geosci.* **14**, 417 (2021).
10) *Minimum Leidenfrost temperature on smooth surfaces*
D. Harvey, J. Méndez Harper, and **J. C. Burton**. *Phys. Rev. Lett.* **127**, 104501 (2021); featured in *Physics*.
11) *Pore-size dependence and slow relaxation of hydrogel friction on smooth surfaces*
N. L. Cuccia, S. Pothineni, B. Wu, J. Méndez Harper, and **J. C. Burton**. *Proc. Natl. Acad. Sci. U.S.A.* **117**, 11247 (2020).
12) *Tuning contact line dynamics and deposition patterns in volatile liquid mixtures*
A. P. Mouat, C. E. Wood, J. E. Pye, and **J. C. Burton**. *Phys. Rev. Lett.* **124**, 064502 (2020).
13) *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. *Proc. Natl. Acad. Sci. U.S.A.* **115**, 5105 (2018).
14) *Emergent bistability and switching in a nonequilibrium crystal*
G. Gogia and **J. C. Burton**. *Phys. Rev. Lett.* **119**, 178004 (2017).
15) *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. Martin, T. O'Farrell, R. Aspey, I. Rutt, and T. Baugé. *Science* **349**, 305 (2015).
16) *Coalescence of bubbles and drops in an outer fluid*
J. D. Paulsen, R. Carmigniani, A. Kannan, **J. C. Burton**, and S. R. Nagel. *Nat. Commun.* **5**, 3182 (2014).
17) *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. *Phys. Rev. Lett.* **109**, 074301 (2012).

18) *The inexorable resistance of inertia determines the initial regime of drop coalescence*
J. D. Paulsen, **J. C. Burton**, S. R. Nagel, S. Appathurai, M. T. Harris, and O. A. Basaran. *Proc. Natl. Acad. Sci. U.S.A.* **109**, 6857 (2012).

19) *Scaling and instabilities in bubble pinch-off*
J. C. Burton, R. Waldrep, and P. Taborek. *Phys. Rev. Lett.* **94**, 184502 (2005).

SELECTED INVITED TALKS

- 2026: Keynote, IEEE International Conference on Plasma Science (ICOPS), Lake Tahoe
- 2026: Department Colloquium, Swarthmore College
- 2026: Department Colloquium, New York University
- 2026: Departmental Seminars, University of Chicago (March and October)
- 2026: Society of Engineering Science Annual Meeting, Purdue University
- 2026: Department Colloquium, University of Pennsylvania
- 2026: *Hard Problems in Soft Earth Geophysics*, Kavli Institute for Theoretical Physics, Santa Barbara
- 2025: Department Colloquium, University of California, Berkeley
- 2025: Society of Rheology Annual Meeting, Santa Fe
- 2024: Department Colloquia, EPFL (Lausanne) and Penn State University
- 2024: Institute for Complex Adaptive Matter Week of Science, Wellington, New Zealand
- 2023: American Physical Society March Meeting, Las Vegas
- 2018: Granular Matter Gordon Research Conference; Euromech Colloquium on Dense Granular Media, Bologna

PROFESSIONAL LEADERSHIP AND SERVICE

- Vice Chair, APS Topical Group on the Physics of Climate (2026–present)
- Editorial Board, *Physical Review Research* (2019–present)
- Program Chair (2024) and Vice Program Chair (2023), APS March Meeting, Division of Soft Matter
- Organizer, APS Division of Fluid Dynamics Annual Meeting, Atlanta (2018)
- Director of Graduate Studies, Emory Physics (2020–2023)
- Co-Director, Interdisciplinary Sustainability Minor, Emory University (2015–present)

SELECTED MEDIA COVERAGE

- *The New York Times*, “The Electric Worm Gets the Fly” (2025)
- ScienceDaily and many outlets, AI reveals unexpected new physics in dusty plasma (2025–2026)
- BBC Radio, “Curious Cases: Space Bubbles” (2024)
- *Wired*, *Smithsonian*, and others, the physics of giant soap bubbles (2020); *Science News*, evaporating liquid mixtures (2020)
- *The Washington Post* and NPR, the cause of glacial earthquakes (2015)
- Cover of *Physical Review Letters* (2013); *Physics Today*, fluid pinch-off (2009)

OUTREACH

- Organizer of “Physics Live!” and “Physics for All” at the Atlanta Science Festival (2015–present)
- Founder, Emory Science Club at Laurel Ridge Elementary, a monthly after-school club (2015–present)
- Giant-bubble demonstrations at “Squishy Science Sunday,” APS Global Physics Summit (2025, 2026)
- Guest on the Tumble Science Podcast for Kids, “The Science of Bubbles” (2022)
- Arthur H. Compton public lecture series, University of Chicago (2010)