

ERIC ISAAC CORWIN

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PREVIOUS APPOINTMENTS

Asst Professor University of Oregon
2010–2016 Materials Science Institute and Department of Physics, Eugene, Oregon
Assoc Professor University of Oregon
2016–2022 Materials Science Institute and Department of Physics, Eugene, Oregon

EDUCATION

Postdoc Area of specialization: Particle packing and protein biophysics
2007–2010 Postdoc advisor: Jasna Brujic
New York University Center for Soft Matter Research, New York, NY
Physics PhD Area of specialization: Granular materials
2001–2007 Thesis: *Granular flow in a rapidly rotated system with fixed walls*
Advisors: Heinrich Jaeger and Sidney Nagel
University of Chicago, Chicago, IL
Bachelor of Arts Physics, *magna cum laude*
1997–2001 Senior project advisor: David Weitz
Harvard University, Cambridge, MA

GRANTS, RECEIVED

2021 Fund For Faculty Excellence, \$20,000.
2020 Keck Foundation grant for “Extreme Diffusion”, \$1,000,000 (\$800,000 to UO).
2016 Simons Collaboration on Cracking the Glass Transition, \$16,000,000 (\$1,145,269 to UO).
2015 NSF MRI DMR-1532225: Acquisition of an Atomic Force Microscope with Optical, Thermal, and Electrical Analysis Capabilities. Co-PI, lead PI B. J. Aleman, \$283,906 to UO.
2012 NSF CAREER Award DMR-1255370: The Jamming Phase Transition in 2D, 3D, and Beyond, \$560,000 to UO.
2011 Williams Award for development of Atomic Force Microscopy teaching module, \$30,600 to UO.

REFEREED PUBLICATIONS (* DENOTES ALPHABETICAL AUTHOR LIST)

- J.B. Hass, A.N. Carroll-Godfrey, I. Corwin, E.I. Corwin, “Anomalous fluctuations of extremes in many-particle diffusion”, *PRE*, **107**, L022101, (2023).
- *F. Arceri, E.I. Corwin, C.S. O’Hern, “The jamming transition and the marginally jammed solid”, in “Spin glass theory & far beyond—replica symmetry breaking after 40 years”, World Scientific (2023).
- J.D. Sartor, E.I. Corwin, “Predicting defects in soft sphere packings near jamming using the force network ensemble”, *PRL*, **129**, 188001 (2022).
- R.C. Dennis, V.F. Hagh, E.I. Corwin, “Emergence of zero modes in disordered solids under periodic tiling”, *PRE*, **106**, 044901 (2022).
- J.R. Dale, J.D. Sartor, R.C. Dennis, E.I. Corwin, “Hyperuniform jammed sphere packings have anomalous material properties”, *PRE*, **106**, 024903, (2022).
- V.F. Hagh, S.R. Nagel, A.J. Liu, M.L. Manning, E.I. Corwin, “Transient degrees of freedom for introducing function in materials”, *PNAS*, **119** (19) e2117622119, (2022).
- R.C. Dennis, E.I. Corwin, “Dionysian hard sphere packings are mechanically stable at vanishingly low densities”, *PRL*, **128**, 018002, (2022).
- F. Arceri, E.I. Corwin, V.F. Hagh, “Marginal stability enables memory training in jamming solids”, *PRE*, **104**, 044907 (2021).
- P. Rissone, E.I. Corwin, G. Parisi, “Long-range anomalous decay of the correlation in jammed packings”, *PRL*, **127**, 038001 (2021).
- *P. Charbonneau, E.I. Corwin, R.C. Dennis, R. Díaz Hernández Rojas, H. Ikeda, G. Parisi, F. Ricci-Tersenghi, “Finite size effects in the microscopic critical properties of jammed configurations: a comprehensive study of the effects of different types of disorder”, *PRE*, **104**, 014102 (2021).
- P.K. Morse, S. Roy, E. Agoritsas, E. Stanifer, E.I. Corwin, M.L. Manning, “A direct link between active matter and sheared granular systems”, *PNAS*, **118** (18), e2019909118 (2021).
- *G. Biroli, P. Charbonneau, E.I. Corwin, Y. Hu, H. Ikeda, G. Szamel, F. Zamponi, “Interplay between percolation and glassiness in the random Lorentz gas”, *PRE*, **103**, L030104 (2021).
- J.D. Sartor, S.A. Ridout, E.I. Corwin, “Mean-Field Predictions of Scaling Prefactors Match Low-Dimensional Jammed Packings”, *PRL*, **126**, 048001 (2021).
- F. Arceri, E.I. Corwin, “Vibrational properties of hard and soft spheres are unified at jamming”, *PRL*, **124**, 238002 (2020).
- J.D. Sartor, E.I. Corwin, “Direct measurement of force configurational entropy in jamming”, *PRE*, **101**, 050902(R) (2020).
- A.P. Hammond, E.I. Corwin, “Experimental observation of the marginal glass phase”, *PNAS*, **117** (11) 5714-5718 (2020).
- R.C. Dennis, E.I. Corwin, “The Jamming Energy Landscape is Hierarchical and Ultrametric”, *PRL*, **124**, 078002 (2020).
- *L. Berthier, G. Biroli, P. Charbonneau, E.I. Corwin, S. Franz, F. Zamponi, “Perspective: Gardner Physics in Amorphous Solids and Beyond”, *J Chem Phys*, **151**, 010901 (2019).

- *P. Charbonneau, E.I. Corwin, L. Fu, G. Tsekenis, M van der Naald, "Gardner Phase in Minimally Polydisperse Crystalline Systems", *PRE*, **99**, 020901(R) (2019).
- V.F. Hagh, E.I. Corwin, K. Stephenson, M.F. Thorpe, "A broader view on jamming: from spring networks to circle packings", *Soft Matter*, **15**, 3076 (2018).
- A.J. Trevelyan, G. Tsekenis, E.I. Corwin, "Degree product rule tempers explosive percolation in the absence of global information", *PRL*, **97**, 020301(R) (2018).
- A.P. Hammond, E.I. Corwin, "Direct measurement of the ballistic motion of a freely floating colloid in Newtonian and viscoelastic fluids", *PRL*, **96**, 042606 (2017).
- P.K. Morse, E.I. Corwin, "Echoes of the glass transition in athermal soft spheres", *PRL*, **119**, 118003 (2017).
- M.Y. Karim, E.I. Corwin, "Universality in quasi-two-dimensional granular shock fronts above an intruder", *PRL*, **95**, 060901(R), (2017).
- K.J. Welch, A. Liebman-Peláez, E.I. Corwin, Fluids by design using chaotic surface waves to create a metafluid that is Newtonian, thermal, and entirely tunable, *PNAS*, **113**(39), (2016).
- P.K. Morse, E.I. Corwin, Hidden symmetries in jammed systems, *Journal of Statistical Mechanics: Theory and Experiment*, Special Issue on Structure in Glassy and Jammed Systems, 074009, (2016).
- *P. Charbonneau, E.I. Corwin, G. Parisi, A. Poncet, F. Zamponi, Universal Non-Debye Scaling in the Density of States of Amorphous Solids, *Phys Rev Lett*, **117**, 045503, (2016).
- P.K. Morse, E.I. Corwin, Geometric order parameters derived from the Voronoi tessellation show signatures of the jamming transition, *Soft Matter*, **12**(4), 1248-1255 (2016).
- *P. Charbonneau, E.I. Corwin, G. Parisi, F. Zamponi, Jamming Criticality Revealed by Removing Localized Buckling Excitations, *Phys Rev Lett*, **114**, 125504 (2015).
- K.J. Welch, C.S.G. Kilmer, E.I. Corwin, Atomistic study of macroscopic analogs to short chain molecules, *Phys Rev E*, **91**, 022603 (2015).
- C. Zhang, C.B. O'Donovan, E.I. Corwin, F. Cardinaux, T.G. Mason, M.E. Möbius, F. Scheffold, Structure of marginally jammed polydisperse packings of frictionless spheres, *Phys Rev E*, **91**, 032302 (2015).
- P.K. Morse, E.I. Corwin, Geometric Signatures of Jamming in the Mechanical Vacuum, *Phys Rev Lett*, **112**, 115701 (2014).
- M.Y. Karim, E.I. Corwin, Eliminating friction with friction: 2D Janssen effect in a friction-driven system, *Phys Rev Lett*, **112**, 188001 (2014).
- K.J. Welch, I. Hastings-Hauss, R. Parthasarathy, E.I. Corwin, Ballistic and diffusive dynamics in a two-dimensional ideal gas of macroscopic chaotic Faraday waves, *Phys Rev E*, **89**, 042143 (2014).
- E.I. Corwin, R. Stinchcombe, M.M. Thorpe, Bond percolation in higher dimensions, *Phys Rev E*, **88**, 014102 (2013).
- C.B. O'Donovan, E.I. Corwin, M.E. Möbius, Mean-field granocentric approach in 2D & 3D polydisperse, frictionless packings, *Phil Mag*, **93**:31-33, 4030-4056 (2013).

*P. Charbonneau, E.I. Corwin, G. Parisi, F. Zamponi, Universal Microstructure and Mechanical Stability of Jammed Packings, *Phys Rev Lett*, **109**, 205501 (2012).

*M. Clusel, E.I. Corwin, Unfolding protein with an atomic force microscope: Force-fluctuation induced non-exponential kinetics, *Phys Rev E*, **84**, 041920, 2011.

J.R. Royer, B. Conyers, E.I. Corwin, P.J. Eng, H.M. Jaeger, The role of interstitial gas in determining the impact response of granular beds, *Euro Phys Lett*, **93**, 28008, 2011.

E.I. Corwin, M. Clusel, A.O.N. Siemens, and J. Brujic, Model for random packing of polydisperse frictionless spheres, *Soft Matter*, **6**, 2949-2959, 2010.

E.I. Corwin, M. Clusel, A.O.N. Siemens, J. Brujic, A “granocentric” model for random packing of jammed emulsions, *Nature* **460**, 611-615, 2009.

J.R. Royer, E.I. Corwin, B. Conyers, A. Flior, M.L. Cordero, M.L. Rivers, P.J. Eng, H.M. Jaeger, Birth and growth of a granular jet, *Phys Rev E*, **78**, 011305, 2008.

E.I. Corwin, E.T. Hoke, H.M. Jaeger, S.R. Nagel, Temporal force fluctuations measured by tracking individual particles in granular materials under shear, *Phys Rev E*, **77**, 061308, 2008.

E.I. Corwin, Granular flow in a rapidly rotated system with fixed walls, *Phys Rev E*, **77**, 031308, 2008.

J.R. Royer, E.I. Corwin, P.J. Eng, H.M. Jaeger, Gas-mediated impact dynamics in fine grained granular materials, *Phys Rev Lett*, **99**, 038003, 2007.

E.I. Corwin, H.M. Jaeger, S.R. Nagel, Structural signature of jamming in granular media, *Nature* **435**, 1075-1078, 2005.

J.R. Royer, E.I. Corwin, A. Flior, M.L. Cordero, M.L. Rivers, P.J. Eng, H.M. Jaeger, Formation of granular jets observed by high-speed X-ray radiography, *Nature Physics* **1**, 164-167, 2005.

T.P. Bigioni, X.M. Lin, T.T. Nguyen, E.I. Corwin, T.A. Witten, H.M. Jaeger, Kinetically driven self-assembly of highly ordered nanoparticle monolayers, *Nature Materials* **5**, 265-270, 2006.

E.R. Dufresne, E.I. Corwin, N.A. Greenblatt, J. Ashmore, D.Y. Wang, A.D. Dinsmore, J.X. Cheng, X.S. Xie, J.W. Hutchinson, D.A. Weitz, Flow and fracture in drying nanoparticle suspensions, *Phys Rev Lett* **91**, 224501, 2003.

UNPUBLISHED REFEREED PUBLICATIONS (* DENOTES ALPHABETICAL AUTHOR LIST)

P.K. Morse, E.I. Corwin, “Local stability of spheres via the convex hull and the radical Voronoi diagram”, under submission, *PRE* (2023).

J.B. Hass, I. Corwin, E.I. Corwin, “First Passage Time for Many Particle Diffusion in Space-Time Random Environments”, under submission, *PRE* (2023).