

**CONTACT
INFORMATION**

Earth and Environmental Science, University of Pennsylvania
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**RESEARCH
INTERESTS**

— Fault friction and rock mechanics, earthquake nucleation and rupture mechanics
— Earth surface dynamics, sediment transport and fluid-driven/coupled granular matter
— Fundamental mechanisms of landscape evolution (hillslope creep, slow earthflows and landslides)
— Computational methods for amorphous and disordered materials: Fluid-coupled Discrete Element Method (CFD-DEM), Molecular Dynamics, Boundary Element Method simulations
— Mechanics of disordered media, cohesionless and cohesive amorphous materials
— Statistical mechanics and nonlinear dynamics applied to Earth systems

EDUCATION

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|---|------|
| Ph.D. (Dr. sc.), Civil and Environmental Engineering, ETH Zurich, Switzerland | 2014 |
| M.Sc., Geological Engineering, Tehran Polytechnic, Iran | 2010 |
| B.Sc., Civil Engineering, University of Guilan, Iran | 2007 |

ACADEMIC COURSE

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|---|-------------------------------|
| Postdoctoral researcher Department of Earth and Environmental Science University of Pennsylvania, Philadelphia, USA | February 2015 - present |
| Synthesis Postdoctoral fellow National Center for Earth-surface Dynamics (NCED), Minneapolis, USA | February 2015 - present |
| Graduate Student and Research Assistant Department of Civil, Environmental and Geomatic Engineering ETH Zurich, Switzerland | January 2011 - November 2014 |
| Research Assistant Institute for Infrastructure and Environment University of Edinburgh, Edinburgh, Scotland, UK | September 2010 - January 2011 |

**HONORS AND
AWARDS**

— Harry H. Hess Postdoctoral Fellowship, Princeton University (2017).
— Nominated for ETH medal (ETH-Medaille) (2014).
— Award for best contribution, The 18th International Conference on Nonlinear Elasticity in Materials, Ascona (Centro Stefano Franscini of ETH Zurich) in Switzerland, June 9-14, 2013.
[CSF Awards 2013](#); [photo](#)
— Scholarship from Deutsche Forschungsgemeinschaft (DFG) for attending the 17th Fall Seminar on Nonlinear Dynamics at the University of Bayreuth, October 7-10, 2012.
— Scholarship for attending the Les Houches (France) winter school on Materials Deformation:

Fluctuations, Scaling, Predictability, 22-27 January 2012.

- Swiss National Science Foundation (SNSF) fellowship for PhD studies at ETH Zürich (2011-2014)
 - 3 years fellowship for PhD studies at the University of Edinburgh (Marie Curie (EU) fellowship) (2010-2013) - Declined
 - TA/RA fellowship for PhD studies at the University of Minnesota (2010-)
 - 4 years fellowship for PhD studies at the University of Southern California (2010-2014) - Declined
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ARTICLES IN REVIEW

- B. Ferdowsi, C. P. Ortiz, M. Houssais, D. J. Jerolmack
River-bed armoring as a granular segregation phenomenon
(in revision after review) at Nature Communications, May 2017
<http://arxiv.org/abs/1609.06673>
- B. Ferdowsi, C. P. Ortiz, D. J. Jerolmack
Glassy dynamics of hillslope evolution
(in revision after review) at Science, May 2017
- B. Ferdowsi, J. D. Gartner, K. N. Johnson, A. Kasprak, A. B. Limaye, K. L. Miller, W. Nardin, A. C. Ortiz, M. Perignon, A. Tejedor
(review paper, all equal contribution)
Earthcasting: Geomorphic prediction for society
(in review) at Earth's Future, May 2017
- D. B. Lee, B. Ferdowsi, D. J. Jerolmack
The imprint of vegetation on desert dune dynamics
(in review) at Geophysical Research Letters, May 2017

PEER-REVIEWED ARTICLES

8. B. Ferdowsi, M. Griffa, R. A. Guyer, P. A. Johnson, C. Marone and J. Carmeliet.
Acoustically-induced slip in sheared granular layers: application to dynamic earthquake triggering
Geophysical Research Letters, **42**(22), pp. 9750-9757, 2015.
7. B. Ferdowsi, M. Griffa, R. A. Guyer, P. A. Johnson, C. Marone and J. Carmeliet.
3D Discrete Element Modeling of triggered slip in sheared granular media
Physical Review E, **89**(4), pp. 042204(1-12), 2014.
6. B. Ferdowsi, M. Griffa, R. A. Guyer, P. A. Johnson, and J. Carmeliet.
Effect of boundary vibration on the frictional behavior of a dense sheared granular layer
Acta Mechanica, **225**(8), pp. 2227-2237, 2014.
5. P. A. Johnson, B. Ferdowsi, B. Kaproth, M. M. Scuderi, M. Griffa, J. Carmeliet, R. A. Guyer, P.-Y. Le Bas, D. T. Trugman, and C. Marone.
Acceleration of acoustical emission precursors preceding failure in sheared granular material
Geophysical Research Letters, **40**(21), pp. 5627-5631, 2013.
4. B. Ferdowsi, M. Griffa, R.A. Guyer, P.A. Johnson, C. Marone and J. Carmeliet.
Microslips as precursors of large slip events in the stick-slip dynamics of sheared granular layers: a discrete element model analysis
Geophysical Research Letters, **40**(16), pp. 4194-4198, 2013.
3. M. Griffa, B. Ferdowsi, E. G. Daub, R. A. Guyer, P. A. Johnson, C. Marone and J. Carmeliet
Influence of vibration amplitude on dynamic triggering of slip in sheared granular layers
Physical Review E, **87**(1), pp. 012205(1-12), 2013.
2. M. Griffa, B. Ferdowsi, E. G. Daub, R. A. Guyer, P. A. Johnson, C. Marone and J. Carmeliet
Meso-mechanical analysis of deformation characteristics for dynamically triggered slip in a granular medium
Philosophical Magazine, **92**(28-30), 2012.

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| | <p>1. A. Soroush and B. Ferdowsi <i>Three dimensional discrete element modeling of cyclic undrained behavior of granular media: a micromechanical perspective</i> Powder Technology, 212(1), pp. 1-16 , 2011.</p> |
| MANUSCRIPTS IN PREPARATION | <p>— C. P. Ortiz*, B. Ferdowsi*, D. J. Jerolmack <i>Nature of the transition from creep to dense rapid flow in sheared frictional granular systems</i> (*equal contributions) In preparation for Nature Physics (planned submission: July 2017)</p> <p>— B. Ferdowsi, D. J. Jerolmack, D. L. Goldsby <i>A granular perspective on the rate and state frictional behavior of earthquake fault gouge</i> In preparation for Review of Geophysics (planned submission: June 2017)</p> |
| RESEARCH FUNDINGS | <p>— Southern California Earthquake Center (SCEC), Science Collaboration Grant: “Physical controls of spontaneous and triggered slow-slip and stick-slip at the fault gouge scale”; PI: Prof. David L. Goldsby (Department of Earth and Environmental Sciences, Penn); Co-I: Behrooz Ferdowsi; in collaboration with Prof. Chris Marone (Dept. of Geosciences, Pennsylvania State University) for experimental observations. (2016, \$25300, approved)</p> |
| TALKS AND CONFERENCE PRESENTATIONS | <p>— May 2017, State College, USA - Department of Geosciences, Pennsylvania State University. <i>Creepy landscapes: the granular origins and slow dynamics of soil transport on hillslopes</i> (poster)</p> <p>— March 2017, Princeton, USA - Department of Geosciences, Princeton University. <i>A unifying framework for slow and fast dynamics deformation and transport in Earth systems</i> (invited talk)</p> <p>— December 2016, San Francisco, USA - American Geophysical Union Fall Meeting. <i>Creepy landscapes: the granular origins of soil transport on hillslopes</i> (talk)</p> <p>— December 2016, San Francisco, USA - American Geophysical Union Fall Meeting. <i>Nature of transition from jamming to creep and dense flow in granular heaps</i> (poster)</p> <p>— December 2016, San Francisco, USA - American Geophysical Union Fall Meeting. <i>Insights on landscape dynamics from tiny spheres in oil, or: How I learned to stop worrying and love the lab</i> (talk by Prof. Jerolmack)</p> <p>— September 2016, Palm Springs (CA), USA - Southern California Earthquake Center (SCEC) Annual Meeting, <i>Physical controls of spontaneous and triggered slow-slip and stick-slip at the fault gouge scale</i> (poster)</p> <p>— July 2016, Stonehill College, Easton (MA), USA - Gordon Research Conference and Seminar: Particulate Systems in Science and Technology. <i>Granular segregation in an experimental river</i> (GRC poster, GRS talk)</p> <p>— June 2016, Université Pierre-et-Marie-Curie, Paris, France - 31st edition of the Conference on Mathematical Geophysics (CMG). <i>Creepy landscapes: the origins and consequences of sub-threshold transport</i> (invited talk given by Prof. Jerolmack)</p> <p>— May 2016, USGS National Center, Reston (VA), USA - 2016 River & Regolith Erosion and Deposition Summit (Amtrak club): Amtrak Soil to Sea Meeting. <i>Creepy landscapes: the granular origins of soil transport on hillslopes</i> (presentation)</p> |

- December 2015, San Francisco, USA - American Geophysical Union Fall Meeting. *Granular controls of hillslope deformation and creep* (poster)
- December 2015, San Francisco, USA - American Geophysical Union Fall Meeting. *From surface to subsurface and back again: the contribution of subsurface particle motion to surface armoring* (Invited talk)
- December 2015, San Francisco, USA - American Geophysical Union Fall Meeting. *Controls on Dune Deformation Patterns in White Sands, New Mexico* (2nd contributor to a poster by Dylan Lee, PhD student at PennSeD)
- September 2015, Palm Springs (CA), USA - Southern California Earthquake Center (SCEC) Annual Meeting, *The granular origins of rate and state friction behavior of fault gouge* (poster)
- June 2015, Clark University, Worcester (MA), USA - 13th Annual Northeastern Granular Materials Workshop. *Segregation dynamics in fluid-driven annular couette flow: contribution of subsurface processes to surface armoring in an idealized riverbed* (poster)
- May 2015, University of Delaware, USA - 2015 River & Regolith Erosion and Deposition Summit (Amtrak club): Amtrak Soil to Sea Meeting. *From surface to subsurface and back again: the contribution of subsurface particle motion to surface armoring* (poster)
- January 2015, University of Alberta (Exploration Seismology, Department of Physics, Dr. Mirko van der Baan), Canada. *Geomechanical modeling of induced seismicity* (presentation by Behrooz)
- May 2014, Université du Maine (Group of acoustics and mechanics of materials, Lead by Dr. Vincent Tournat), France. *Acoustically-induced unjamming and slip triggering in sheared granular layers* (presentation by Behrooz)
- November 2013, Yale University (School of Engineering and Applied Science, The O'Hern group), USA. *DEM modeling of slip triggering in a sheared granular layer* (presentation by Behrooz)
- November 2013, Pennsylvania State University (Department of Geosciences), USA. Dynamic Triggering of Earthquakes, a seminar organized by Dr. P. A. Johnson (LANL) and Prof. C. Marone (Penn State). *DEM of a sheared beadpack* (presentation by Behrooz)
- June 2013, Ascona, Switzerland - The 18th International Conference of Nonlinear Elasticity of Materials. *MD simulation of slip triggering in sheared granular layers by boundary vibration* (presentation by Behrooz)
- February 2013, Les Houches, France - The 2nd winter school on "Materials Deformation: Fluctuations, Scaling, Predictability. *3D MD modeling of slip triggering in sheared granular layers by means of boundary vibration* (poster by Behrooz)
- October 2012, Bayreuth, Germany (University of Bayreuth) - The 17th Fall Seminar on Nonlinear dynamics. *How vibration changes the spontaneous stick-slip dynamics of a sheared granular layer* (poster by Behrooz)
- August 2012, Lausanne, Switzerland (EPFL) - CCMX Summer school on Multi scale modeling of materials. *Evolution of recurrence time and energy release during spontaneous and perturbed stick-slip dynamics of a granular layer* (presentation by Behrooz)
- July 2012, Graz, Austria (TU Graz) - The 8th European Solid Mechanics Conference. *How external vibration affects stick-slip dynamics in sheared granular layers: the micro- and meso-mechanics of dynamic earthquake triggering* (presentation by Behrooz)

- June 2012, Cefalù, Italy - The 17th International Conference on Nonlinear Elasticity in Materials. *3D molecular dynamics simulations of triggering of slip in stick-slipping, sheared granular media by means of external vibration: learned lessons for dynamic earthquake triggering* (presentation by Behrooz)
 - April 2012, Vienna, Austria - European Geoscience Union (EGU) General Assembly Conference. *Meso-scale analysis of deformation patterns for dynamically triggered slip in sheared granular layers* (presentation by Dr. Griffa)
 - January 2012, Les Houches, France - Winter school on "Materials Deformation: Fluctuations, Scaling, Predictability. *Deformation pattern and evolution of the internal structure of granular media during stick-slip dynamics: micromechanics of dynamic earthquake triggering* (poster by Behrooz)
 - December 2011, Enschede, Netherlands (University of Twente) - invited by the Multi-Scale Mechanics (MSM) group. *Stick-slip and anisotropy of granular structure* (talk by Behrooz)
 - June 2011, Cairns, Australia - Instabilities Across the Scales III. *Granular stick-slip and the micromechanics of dynamic earthquake triggering* (invited talk given by Prof. Carmeliet)
 - May 2011, Kowloon, Hong Kong (Hong Kong Polytechnic University) - The 14th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering. *Study of the cyclic constant volume loading of the granular media from micromechanical aspects: effects of confining pressure and cyclic strain amplitude*
 - August 2010, London, UK (Queen Mary University of London) - The 5th International Conference on Discrete Element Method. *Effect of gradation on the constant volume cyclic behavior of granular media*
 - November 2009, Barcelona, Spain (Technical University of Catalonia; UPC) - Particles 2009. *Three dimensional discrete element modeling of undrained monotonic and cyclic response of granular media*
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COLLABORATORS

- Prof. Douglas J. Jerolmack, Earth and Environmental Science, University of Pennsylvania, USA.
- Dr. Carlos P. Ortiz, Earth and Environmental Science and Physics and Astronomy, University of Pennsylvania, USA.
- Dr. Morgane Houssais, Benjamin Levich Institute, The City College of New York, USA.
- Prof. David L. Goldsby, Earth and Environmental Science, University of Pennsylvania, USA.
- Prof. Chris Paola, Department of Earth Sciences, University of Minnesota, USA.
- Prof. Allan M. Rubin, Department of Geosciences, Princeton University, USA.
- Prof. Troy Shinbrot, Department of Biomedical Engineering, Rutgers University, USA.
- Prof. Emily E. Brodsky, Earth and Planetary Sciences, University of California Santa Cruz, USA.
- Prof. Karen Daniels, Department of Physics, North Carolina State University, USA.
- Prof. Dr. Jan E. Carmeliet, Mechanical and Process Engineering (D-MAVT), ETH Zürich, Switzerland.
- Prof. Chris J. Marone, Department of Geosciences, Pennsylvania State University, USA.
- Dr. Paul A. Johnson, Leader of Nonlinear Elasticity Team and Senior Technical Staff Member, Earth and Environmental Science Division (Geophysics), Los Alamos National Laboratory (LANL), USA.
- Dr. Michele Griffa, Senior Research Scientist, Group Leader for 3D image analysis and simulation, Swiss Federal Laboratories for Materials Science and Technology (Empa, ETH-Domain), Dübendorf, Switzerland.
- Prof. Robert A Guyer, Emeritus faculty at UMass Amherst, Consultant at Earth and Environmental Science Division (Geophysics), Los Alamos National Laboratory (LANL), USA.

- Prof. Jean M. Carlson, Department of Physics, University of California Santa Barbara, USA.

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| SELECTED SERVICE | <ul style="list-style-type: none">— Reviewer for: National Science Foundation (USA) - Geomorphology and Land-use Dynamics, Army Research Office U.S. Army Research Laboratory, Nature Geoscience, Scientific Reports, Journal of Geophysical Research - Earth Surface, Journal of Geophysical Research - Solid Earth, Geophysical Research Letters, Computers & Geosciences, International Journal of Solids and Structures, Powder Technology— Lecturer, Summer Institute for Earth-surface Dynamics (2015, 2016). |
| PROFESSIONAL AFFILIATIONS | <ul style="list-style-type: none">— Regular member, Southern California Earthquake Center (SCEC), 2015-present— Regular member, American Geophysical Union AGU, 2015-present— Synthesis postdoctoral fellow, National Center for Earth-surface Dynamics, 2015-present— Regular member, Swiss Geological Society, 2013-2015 |
| REFERENCES | Available upon request |
