

CONTACT INFORMATION	<p>Department of Geosciences, Princeton University Princeton, NJ 08544, USA <i>E-mail:</i> behrooz@princeton.edu <i>Research homepage:</i> http://behroozf.github.io <i>Web profiles:</i> Google scholar, ResearchGate</p>						
RESEARCH INTERESTS	<ul style="list-style-type: none"> — Fault friction, rock mechanics and earthquake physics — Physics of disordered media, cohesionless and cohesive amorphous materials — 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 — Statistical mechanics and nonlinear dynamics applied to Earth systems 						
EDUCATION	<table> <tr> <td>Ph.D. (Dr. sc.), Civil and Environmental Engineering, ETH Zurich, Switzerland</td><td>2014</td></tr> <tr> <td>M.Sc., Geological Engineering, Tehran Polytechnic, Iran</td><td>2010</td></tr> <tr> <td>B.Sc., Civil Engineering, University of Guilan, Iran</td><td>2007</td></tr> </table>	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
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M.Sc., Geological Engineering, Tehran Polytechnic, Iran	2010						
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ACADEMIC COURSE	<table> <tr> <td> <p>Harry H. Hess Postdoctoral Fellow Department of Geosciences Princeton University, Princeton, USA</p> <p>Postdoctoral researcher Department of Earth and Environmental Science University of Pennsylvania, Philadelphia, USA</p> <p>Synthesis Postdoctoral fellow National Center for Earth-surface Dynamics (NCED), Minneapolis, USA</p> <p>Graduate Student and Research Assistant Department of Civil, Environmental and Geomatic Engineering ETH Zurich, Switzerland</p> <p>Research Assistant Institute for Infrastructure and Environment University of Edinburgh, Edinburgh, Scotland, UK</p> </td><td> <p>June 2017 - present</p> <p>February 2015 - June 2017</p> <p>February 2015 - June 2017</p> <p>January 2011 - November 2014</p> <p>September 2010 - January 2011</p> </td></tr> </table>	<p>Harry H. Hess Postdoctoral Fellow Department of Geosciences Princeton University, Princeton, USA</p> <p>Postdoctoral researcher Department of Earth and Environmental Science University of Pennsylvania, Philadelphia, USA</p> <p>Synthesis Postdoctoral fellow National Center for Earth-surface Dynamics (NCED), Minneapolis, USA</p> <p>Graduate Student and Research Assistant Department of Civil, Environmental and Geomatic Engineering ETH Zurich, Switzerland</p> <p>Research Assistant Institute for Infrastructure and Environment University of Edinburgh, Edinburgh, Scotland, UK</p>	<p>June 2017 - present</p> <p>February 2015 - June 2017</p> <p>February 2015 - June 2017</p> <p>January 2011 - November 2014</p> <p>September 2010 - January 2011</p>				
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HONORS AND AWARDS	<ul style="list-style-type: none"> — 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, D. J. Jerolmack
Glassy dynamics of hillslope evolution
(in review) at Proceedings of the National Academy of Sciences of the USA, August 2017
<https://arxiv.org/abs/1708.06032>
- 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 revision) 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

9. B. Ferdowsi, C. P. Ortiz, M. Houssais, D. J. Jerolmack
River-bed armoring as a granular segregation phenomenon
Nature Communications, accepted, 2017.
<https://arxiv.org/abs/1609.06673>
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.

1. A. Soroush and B. Ferdowsi
Three dimensional discrete element modeling of cyclic undrained behavior of granular media: a micromechanical perspective
Powder Technology, **212**(1), pp. 1-16 , 2011.

MANUSCRIPTS IN
PREPARATION

- B. Ferdowsi, B. C. Jones, J. L. Stein, T. Shinbrot
Pattern formation in vibrated granular layers and implications for landforms on Earth and Mars
In preparation for Nature Physics
- B. Ferdowsi, A. M. Rubin
Non-local rheology of (granular) rocks and damaged fault zones
In preparation for Proceedings of the National Academy of Sciences of the USA
- B. Ferdowsi, D. J. Jerolmack, D. L. Goldsby
A granular perspective on the rate and state frictional behavior of earthquake fault gouge
In preparation for Review of Geophysics

RESEARCH
FUNDINGS

- 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)

TALKS AND
CONFERENCE
PRESENTATIONS

- December 2017, New Orleans, USA - American Geophysical Union Fall Meeting. *Toward a physics-based rate and state friction law for earthquake nucleation processes in fault zones with granular gouge* (talk)
- December 2017, New Orleans, USA - American Geophysical Union Fall Meeting. *A Physical Interpretation of Hillslope Soil Creep as Deformation of an Amorphous Solid* (talk by Prof. Jerolmack)
- November 2017, Denver, USA - Annual Meeting of the American Physical Society Division of Fluid Dynamics, *Formation and life of a granular cyclone* (talk, Galley of Fluid Motion video submission)
- May 2017, State College, USA - Department of Geosciences, Pennsylvania State University. *Creepy landscapes: the granular origins and slow dynamics of soil transport on hillslopes* (poster)
- March 2017, Princeton, USA - Department of Geosciences, Princeton University. *A unifying framework for slow and fast dynamics deformation and transport in Earth systems* (invited talk)
- December 2016, San Francisco, USA - American Geophysical Union Fall Meeting. *Creepy landscapes: the granular origins of soil transport on hillslopes* (talk)
- December 2016, San Francisco, USA - American Geophysical Union Fall Meeting. *Nature of transition from jamming to creep and dense flow in granular heaps* (poster)
- December 2016, San Francisco, USA - American Geophysical Union Fall Meeting. *Insights on landscape dynamics from tiny spheres in oil, or: How I learned to stop worrying and love the lab* (talk by Prof. Jerolmack)

- September 2016, Palm Springs (CA), USA - Southern California Earthquake Center (SCEC) Annual Meeting, *Physical controls of spontaneous and triggered slow-slip and stick-slip at the fault gouge scale* (poster)
- July 2016, Stonehill College, Easton (MA), USA - Gordon Research Conference and Seminar: Particulate Systems in Science and Technology. *Granular segregation in an experimental river* (GRC poster, GRS talk)
- June 2016, Université Pierre-et-Marie-Curie, Paris, France - 31st edition of the Conference on Mathematical Geophysics (CMG). *Creepy landscapes: the origins and consequences of sub-threshold transport* (invited talk given by Prof. Jerolmack)
- May 2016, USGS National Center, Reston (VA), USA - 2016 River & Regolith Erosion and Deposition Summit (Amtrak club): Amtrak Soil to Sea Meeting. *Creepy landscapes: the granular origins of soil transport on hillslopes* (presentation)
- 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*

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

- Reviewer for:
National Science Foundation (USA) - Geomorphology and Land-use Dynamics,
Army Research Office | U.S. Army Research Laboratory,
Nature Geoscience, Physical Review Letters, Scientific Reports, Journal of Geophysical Research -
Earth Surface, Journal of Geophysical Research - Solid Earth, Geophysical Research Letters,
Computers & Geosciences, Tribology Letters, International Journal of Solids and Structures,
Powder Technology
 - Lecturer for the Summer Institute for Earth-surface Dynamics, NCED2, University of Minnesota
(years 2015, 2016)
 - Organizer of Solid Earth Brownbag seminars at Princeton Geosciences together with
another postdoc colleague in the department (2017-2018)
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PROFESSIONAL AFFILIATIONS

- Regular member, American Physical Society (APS), 2017-present
 - 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
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REFERENCES

Available upon request