

Robert C. Viesca (January 2024)

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Medford, Massachusetts, 02155, USA *e-mail:* robert.viesca@tufts.edu
- ACADEMIC POSITIONS** **Tufts University**, *Department of Civil and Environmental Engineering*, Medford, MA
Research Assistant Professor, 09/11–08/12; Assistant Professor, 09/12–08/18;
Associate Professor, 09/18–present
Dalhousie University, *Department of Civil and Resource Engineering*, Halifax, NS, Canada
Postdoctoral Fellow with Prof. Dmitry I. Garagash, 09/11–08/12
- VISITING POSITIONS** **Institut de Physique du Globe**, *Tectonique et Mécanique de la Lithosphère*, Paris, France
Professeur Invité, 06/14–07/14; Visitor, 06/13–07/13, 07/15, hosts: Harsha Bhat, Yann Klinger
MINES ParisTech, *Centre de Géosciences (Géophysique)*, Fontainebleau, France
Professeur Invité, 06/16–07/16, host: Pierre Dublanquet
GeoAzur, *Observatoire de la Côte d’Azur*, Sophia Antipolis, France
Chercheur Invité, 06/19–07/19, hosts: Frederic Cappa, Jean-Paul Ampuero
- EDUCATION** **Harvard University**, *School of Engineering and Applied Sciences*, Cambridge, MA
Engineering Sciences: S.M. 06/06, Ph.D. 11/11 with Prof. James R. Rice
Tufts University, *Department of Civil and Environmental Engineering*, Medford, MA
B.S., Civil Engineering, *summa cum laude*, 05/05
- PUBLICATIONS** Thomas, C., I. Svetlizky, G. Albertini, **R. C. Viesca**, S. M. Rubinstein, F. Spaepen, C. Yuan, M. Denolle, Y.-Q. Song, L. Xiao, D. A. Weitz (2024) Propagation of extended fractures by local nucleation and rapid transverse expansion of crack-front distortion, *Nature Phys.*, doi:10.1038/s41567-023-02365-0
Viesca, R. C. (2024), Asymptotic solutions for self-similar fault slip induced by fluid injection at constant rate, arXiv:2401.13828
Jacquey, A. B. and **R. C. Viesca** (2023) Nucleation and arrest of fluid-induced aseismic slip, *Geophys. Res. Lett.*, 50, e2022GL101228, doi:10.1029/2022GL101228
Viesca, R. C. (2023), On the existence of a nucleation length for dynamic shear rupture, *J. Mech. Phys. Solids*, 173, 105221, doi:10.1016/j.jmps.2023.105221
Sáez, A., B. Lecampion, P. Bhattacharya, and **R. C. Viesca** (2022) Three-dimensional fluid-driven stable frictional ruptures, *J. Mech. Phys. Solids*, 160, 104754, doi:10.1016/j.jmps.2021.104754
Viesca, R. C. (2021), Self-similar fault slip in response to fluid injection, *J. Fluid Mech.*, 928, A29, doi:10.1017/jfm.2021.825
Ray, S., and **R. C. Viesca** (2019), Homogenization of fault frictional properties, *Geophys. J. Int.*, 219, 1203–1211, doi:10.1093/gji/ggz327
Viesca, R. C., and P. Dublanquet (2019), The slow slip of viscous faults, *J. Geophys. Res.*, 124, 4959–4983, doi:10.1029/2018JB016294
Bhattacharya, P. and **R. C. Viesca** (2019), Fluid-induced aseismic fault slip outpaces pore-fluid migration, *Science*, 364(6439), 464–468, doi:10.1126/science.aaw7354
Viesca, R. C., and D. I. Garagash (2018), Numerical methods for coupled fracture problems, *J. Mech. Phys. Solids*, 113, 13–34. doi:10.1016/j.jmps.2018.01.008
Ray, S., and **R. C. Viesca** (2017), Earthquake nucleation on faults with heterogeneous frictional properties, normal stress, *J. Geophys. Res.*, 122. doi: 10.1002/2017JB014521

Brantut, N., and **R. C. Viesca** (2017), The fracture energy of ruptures driven by flash heating, *Geophys. Res. Lett.*, 44. doi:10.1002/2017GL074110

Viesca, R. C. (2016), Self-similar slip instability on interfaces with rate- and state-dependent friction, *Proc. Roy. Soc. A*, 472(2192), 20160254. doi:10.1098/rspa.2016.0254

Viesca, R. C. (2016), Stable and unstable development of an interfacial sliding instability, *Phys. Rev. E.*, 93(6), 060202(R). doi:10.1103/PhysRevE.93.060202

Platt, J. D., **R. C. Viesca**, and D. I. Garagash (2015), Steadily propagating slip pulses driven by thermal decomposition, *J. Geophys. Res.*, 120, B12200. doi:10.1002/2015JB012200

Viesca, R. C., and D. I. Garagash (2015), Ubiquitous weakening of faults by thermal pressurization, *Nature Geoscience*, 8(11), 875–879. doi:10.1038/ngeo2554

Brantut, N., and **R. C. Viesca** (2015), Earthquake nucleation in intact or healed rocks, *J. Geophys. Res.*, 119, B11518. doi:10.1002/2014JB011518

Viesca, R. C., and J. R. Rice (2012), Nucleation of slip-weakening rupture instability in landslides by localized increase of pore pressure, *J. Geophys. Res.*, 117, B03104. doi:10.1029/2011JB008866

Viesca, R. C. (2011), The near and far of pore pressure during landslide and earthquake ruptures, *Ph.D. thesis* Harvard University, 165 pp.

Viesca, R. C., and J. R. Rice (2011), Elastic reciprocity and symmetry constraints on the stress field due to a surface-parallel distribution of dislocations, *J. Mech. & Phys. Solids*, 59, 753–757. doi:10.1016/j.jmps.2011.01.011

Viesca, R. C., and J. R. Rice (2010), Modeling slope instability as shear rupture propagation in a saturated porous medium, in *Submarine Mass Movements and Their Consequences IV* (proceedings of the 4th Int'l. Symp. on Submarine Mass Movements and Their Consequences, Austin, Texas, 8-11 November 2009), eds. D. C. Mosher et al., R.C. Shipp, L. Moscardelli, J. D. Chaytor, C. D. P. Baxter, H. J. Lee, and R. Urgeles, Springer. doi:10.1007/978-90-481-3071-9_18

Viesca, R. C., E. L. Templeton, and J. R. Rice (2008), Off-fault plasticity and earthquake rupture dynamics, 2. Effects of fluid saturation, *J. Geophys. Res.*, 113, B09307. doi:10.1029/2007JB005530

PROFESSIONAL SERVICE & CONSULTING Manuscript reviews for 25+ journals: *Acta Geotechnica*, *Bulletin of the Seismological Society of America*, *Earth and Planetary Science Letters*, *Earth Planets and Space*, *Geology*, *Geomechanics for Energy and the Environment*, *Geophysical Journal International*, *Geophysical Research Letters*, *International Journal of Engineering Science*, *International Journal of Greenhouse Gas Control*, *International Journal of Numerical and Analytical Methods in Geomechanics*, *Journal of Fluid Mechanics*, *Journal of Geophysical Research*, *Journal of Seismology*, *Nature Communications*, *Nature Geoscience*, *Nature Physics*, *Physical Review Letters*, *Proceedings of the National Academy of Science*, *Proceedings of the Royal Society of London A*, *Pure and Applied Geophysics*, *Solid Earth*, *Science*, *Scientific Reports*, and *Tectonophysics*

Ad hoc and panel reviews for publishers, funding agencies, and companies: *American Geophysical Union Books*, *BP America Production Co.*, *Comisión Nacional de Investigación Científica y Tecnológica*, *Elsevier Science and Technology Books*, *Israel Science Foundation*, *National Science Foundation*, and *United States Geological Survey*

Scientific or selection committee for:

MITES summer program, MIT (2014–2017)

6th Intl. Conf. on Coupled THMC Processes in Geosystems (GeoProc), 5-7 Jul. 2017, Paris
Engineering Mechanics Institute Conference 2019, 18-21 Jun. 2019, Pasadena, CA

INVITED TALKS 11/23: Northwestern University, Dept. of Civil & Environmental Eng., SPREE Seminar
10/23: IRP SlowFaults Workshop

09/23: Tufts University, Dept. of Mechanical Engineering Seminar
 09/23: Statewide California Earthquake Center (SCEC), Annual Meeting
 06/23: CECAM Workshop, EPFL, 3D Cracks and Crack Stability
 06/22: Gordon Research Conference, Flow and Transport in Permeable Media
 04/22: Caltech, Mechanical and Civil Engineering Department Seminar
 09/21: MIT, Dept. of Earth, Atmospheric, and Planetary Sciences, Geophysics Seminar
 06/21: Lab. des Fluids Complexes et Leurs Réservoirs, U. de Pau et des Pays de l'Adour
 04/20: MIT, Earth Resources Laboratory, FISH Seminar (postponed)
 06/19: GèòAzur, Université Nice Sophia Antipolis and Observatoire de la Côte d'Azur
 06/19: Centre International des Sciences Mécaniques (CISM), Advanced School
 04/19: Columbia University, Lamont-Doherty Earth Observatory, Geodynamics Seminar
 09/18: APEC Cooperation for Earthquake Science (ACES), International Workshop
 06/18: GèòAzur, Université Nice Sophia Antipolis and Observatoire de la Côte d'Azur
 06/18: Banff International Research Station (BIRS), Workshop on Hydraulic Fracturing
 11/16: Weizmann Institute of Science, COST Workshop on Dynamics of Frictional Interfaces
 10/16: Harvard University, School of Eng. and Applied Sci., Applied Mechanics Colloquium
 09/16: Southern California Earthquake Center, Annual Meeting Workshop
 06/16: MINES ParisTech, Centre de Géosciences
 04/16: MIT, Earth Resources Laboratory, FISH Seminar
 12/15: Georgia Tech, Sigma Xi, Monie Ferst Award Symposium in honor of James R. Rice
 11/15: Tufts University, Department of Physics and Astronomy, Condensed Matter Seminar
 09/15: Utrecht University, Exp. Rock Def. Laboratory, Modeling Fault Friction Workshop
 06/15: ETH Zurich, Institute for Geotechnical Engineering
 02/15: Tufts University, Dept. of Mathematics, Computational and Applied Math Seminar
 09/14: Princeton University, Department of Geosciences, Solid Earth Brown Bag Series
 06/14: École Normale Supérieure, Laboratoire de Géologie
 06/14: International Hydraulic Fracturing Summit XI, Schlumberger-Doll, Cambridge, MA
 10/13: Brown University, Department of Geological Sciences, Solid Earth Dynamics Seminar
 10/13: Caltech, Seismolab, Dix Seminar
 10/13: Stanford University, Department of Geophysics, Quake Seminar
 07/13: Institut de Physique du Globe de Paris, Séminaires communs Tectonique-Sismologie
 05/11: GèòAzur, Université Nice Sophia Antipolis and Observatoire de la Côte d'Azur
 04/11: Dalhousie University, Faculty of Engineering
 03/11: Tufts University, Department of Civil and Environmental Engineering
 03/11: Stanford University, Department of Geophysics
 02/11: Northwestern University, Department of Civil and Environmental Engineering
 12/10: DUSEL Workshop on Earthquake Rupture Experiments in the Homestake Mine
 10/09: Rice University, Department of Earth Science
 07/09: U.S. Advisory Committee Meeting for Scientific Ocean Drilling
 06/09: Numerical Modeling of Crustal Deformation and Earthquake Faulting Workshop
 06/09; 04, 09/10; 4/11: Total S.A. meetings for North American sponsored researchers

HONORS
& AWARDS

2018: Tufts University Center for STEM Diversity Faculty Award
 2017–2022: National Science Foundation CAREER Award (Geophysics)
 2008–9: Schlanger Ocean Drilling Fellowship
 2008: Outstanding Student Paper, Seismology Section, American Geophysical Union
 2005: Tufts University Lt. Cmdr. Robert J. Manning Memorial Prize
 2005: Tufts University Dept. of Civil and Env. Eng. Earle F. Littleton Scholarship
 2004: Tufts University Dept. of Civil and Env. Eng. Cataldo Research Fellowship
 2004: Boston Society of Civil Engineers Section/ASCE William P. Morse Award
 2003: Society of American Military Engineers Max O. Urbahn Scholarship
 2001–10: Bill and Melinda Gates Millennium Scholar (deferred during doctorate)

EXTERNAL
SUPPORT

National Science Foundation, Geophysics program, 01/14–01/17, 04/19–03/24
 National Science Foundation, CAREER program, 04/17–04/23
 Southern California Earthquake Center, 02/13–01/16, 05/17–04/19, 02/22–04/23
 United States Geological Survey, Earthquake Hazards program, 01/17–12/17

GRADUATE
STUDENTS

Graduate students in geosystems engineering:

Parker Aubin, B.S., Mathematics, Boston College; M.S., Tufts University (May 2018)
Currently: Geophysicist, Infrasense, Inc., Boston, MA

Sohom Ray, B.S., Physics, University of Delhi; M.S., Applied Geophysics, IIT, Roorkee
Ph.D. thesis: Earthquake nucleation with heterogeneous physical properties (August 2019)
Currently: Assistant Professor, Dept. Earthquake Engineering, IIT Roorkee

Lichen Wang, B.Eng, Geotechnical Engineering, China University of Geosciences, Wuhan;
M.S., Tufts University (May 2019)
Currently: Geotechnical Engineer, GEI Consultants, Boston, MA

POSTDOC. *Pathikrit Bhattacharya*, Ph.D., Geophysics, Princeton University
FELLOWS Currently: Assistant Professor, School of Earth and Planetary Sciences, NISER

Federico Ciardo, PhD. Engineering Mechanics, EPFL

Antoine Jacquey, Ph.D., GFZ, RWTH Aachen University
Currently: Assistant Professor, Polytechnique Montréal

TEACHING *Undergraduate:*
ES 5: Statics and Dynamics (falls: 2012–2014, 2016–2017)
ES 7: Thermodynamics (spring: 2023–present)
ES 8: Fluid Mechanics (falls: 2019–present)
CEE 12: Introduction to Hydraulic Engineering (springs: 2015–2018, 2020–2023)

Graduate:
CEE 142: Advanced Soil Mechanics (springs: 2014, 2016)
CEE 194E: Mechanics of the Natural Environment (spring: 2013)
CEE 245: Geomechanics (springs: 2017, 2020)

UNIVERSITY & *School of Engineering committees:*
DEPARTMENT academic standing: 09/12–08/14, 09/15–present; chair 09/18–present
SERVICE & graduate studies and research: 09/14–05/15, 09/19–present
COMMITTEES

Department of Civil and Environmental Engineering committees:
graduate program: 09/14–present; interim chair 09/14–01/15; chair 09/19–present
undergraduate curriculum: 09/12–08/14
undergraduate advising: 03/13–05/17, 09/19–present