Robert C. Viesca (July 2024)

CONTACT

207 Anderson Hall
200 College Avenue
Medford, Massachusetts, 02155, USA

office: +1 617 627 5165
website: viesca.github.io
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 Dublanchet

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

Viesca, R. C. (2024), Asymptotic solutions for self-similar fault slip induced by fluid injection at constant rate, arXiv:2401.13828

Ciardo, F., and **R. C. Viesca** (2024) Non-linear stability analysis of slip in a single-degree-of-freedom elastic system with frictional evolution laws spanning aging to slip, subm. to *J. Mech Phys. Solids.*, July 2024, arXiv:2407.16846

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

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. Dublanchet (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 prob-

lems, *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*, *Philosophical Transactions of the Royal Society A*, *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

10/24: ARMA Hydraulic Fracturing Seminar Series
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: GèoAzur, 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: GèoAzur, 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: GèoAzur, 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. Fellows	*Pathikrit Bhattacharya*, Ph.D., Geophysics, Princeton University Currently: Assistant Professor, School of Earth and Planetary Sciences, NISER *Federico Ciardo*, PhD. Engineering Mechanics, EPFL Starting 1 Sep. 2024: Assistant Professor, Northwestern University *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 (springs: 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 & Department Service & Committees	*School of Engineering committees*: academic standing: 09/12–08/14, 09/15–present; chair 09/18–present graduate studies and research: 09/14–05/15, 09/19–08/24 *Department of Civil and Environmental Engineering committees*: graduate program: 09/14–08/24; interim chair 09/14–01/15; chair 09/19–08/24 undergraduate program: 09/12–08/14; BSCE program director, 09/24–present undergraduate advising: 03/13–05/17, 09/19–present