

Chris Marone

Dipartimento di Scienze della Terra, La Sapienza Università di Roma, 00185 Roma, Italia

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Professional Preparation/Education

Columbia University	New York, NY	Geophysics	Ph.D.	1988
Columbia University	New York, NY	Geophysics	M.A.; M.Phil	1984; 1987
Binghamton University	Binghamton, NY	Geology	B.A.	1981

Appointments/Professional Affiliations

2020	<i>Professore Ordinario</i> (ERC Adv. TECTONIC), La Sapienza Università di Roma
2025	<i>Professor Emeritus</i> , The Pennsylvania State University
2003-2025	<i>Professor of Geophysics</i> , The Pennsylvania State University
2014-2015	<i>Visiting Professor</i> , La Sapienza Università di Roma
2014-2019	<i>Assoc. Dir.</i> , Institute for Natural Gas Research, The Pennsylvania State University
2009-2014	<i>Associate Head</i> , Dept. of Geosciences, The Pennsylvania State University
2007-2008	<i>Visiting Fellow</i> , Istituto Nazionale di Geofisica e Vulcanologia, Roma
2001-2003	<i>Assoc. Prof. of Geophysics</i> , The Pennsylvania State University
1997-2000	<i>Assoc. Prof. of Geophysics</i> , Massachusetts Institute of Technology
1992-1997	<i>Asst. Prof. of Geophysics</i> , Massachusetts Institute of Technology
1991-1992	<i>Adjunct Asst. Prof.</i> , University of California at Berkeley
1989-1990	<i>Research Fellow</i> , Melbourne Univ. and CSIRO Geomechanics, Australia
1982-1988	<i>Research Assistant</i> , Lamont-Doherty Geological Obs. of Columbia University
1981-1982	<i>Exploration Geophysicist</i> , Phelps Dodge Corp., Reston Va.

Research Interests

Earthquake physics, friction, and geomechanics. Recent themes have included: 1) slow earthquakes and the spectrum of tectonic fault slip behaviors, 2) application of machine learning to earthquake physics, 3) rate-state friction mechanics, fault healing and the application of laboratory derived friction constitutive laws to faulting, 4) rock-fluid interaction, reservoir properties, and poromechanics of rock deformation, 5) granular mechanics, 6) the role of shear fabric and clay mineralogy on the frictional strength and constitutive properties of fault rocks, 7) the strength and rheology of fault rocks in nature.

Honors and Awards

Louis Néel Medal of the European Geosciences Union

Fellow of the American Geophysical Union

Academia Europaea

American Geophysical Union Outstanding Reviewer

Paul F. Robertson Award for the Breakthrough of the Year, Pennsylvania State University

Research Achievement Award, Energy Institute, Pennsylvania State University

Outstanding Member of the Community, Awarded by PSU Fraternity and Sorority Chapters

Wilson Research Award, Pennsylvania State University

Kerr-McGee Career Development Professorship, MIT

Memberships

American Geophysical Union, Seismological Society of America, European Geoscience Union, Geological Society of America, American Physical Society

Graduate Student and Postdoctoral Advising

40+ Graduate Students; 9 Post-Doctoral Scholars; 12 NSF Research Experiences for Undergraduates (REU) projects and undergraduate senior theses

Recent Publications (see others at scholar.google.com/citations?user=dQnMIVcAAAAAJ)

Affinito, R., Volpe, G., Calzolari, L., Mittal, T., Pozzi, G., and C. Marone, Fluid-driven cohesive strengthening: critical role of reaction kinetics as the determinant for frictional stability, AGU Advances, 7, doi.org/10.1029/2025AV001952, 2026.

Laurenti, L., Johnson, C. W., Trappolini, D., Tinti, E., Galasso, F., and C. Marone, Testing audio compression autoencoders for seismology: moving toward foundation models, J. Geophys. Res., doi.org/10.1029/2025JH000787, 2026.

Magrini, M., Marrocco, F., Laurenti, L., Paoletti, G., Tinti, T., and C. Marone, Explainable machine learning for earthquakes: SHAP interpretation of CNNs to distinguish seismic spectrograms of foreshocks and aftershocks, Proc. 23rd Int. Conf. Image Anal. Proc. (ICIAP), doi.org/10.1007/978-3-032-10185-3_25, 2026.

Yu, J., Eijsink, A., Wang, J., Marone, C., and D. Elsworth, Seismicity diagnostic of permeability creation from centimeter to sub-kilometer scales in crystalline rock during shear stimulation, Science Advances, doi/10.1126/sciadv.ady5201, 2026.

Eijsink, A., Marone, C., Rivière, J., Shokouhi, P., and D. Elsworth, Acoustic signatures of fault reactivation and healing under hydrothermal conditions, Geophys. Jour. Int., 245, 1–18, doi.org/10.1093/gji/ggag042, 2026.

Workshops and Outreach (recent)

- a. The 3rd Workshop on Earthquake Physics and Applications of Artificial Intelligence to Tectonic Faulting, 2025, <https://www.chrisjmarone.com/tectonic-erc>
- b. AI in Physical Sciences: Toward a Unified Approach for Physics and Geophysics, 2025 <https://sites.google.com/view/aiphys25/>
- c. Machine Learning for Solid Earth Geosciences and Earthquake Physics, <https://www.ml4seg.org/>
- d. Network Entertainment. The Age of AI <https://www.youtube.com/watch?v=0wy4u34fii4&vl=en>
Episode 7 of Robert Downey Jr.'s New A.I. Documentary Series
The lab earthquake spot starts at about 26 min.
- e. Machine Learning Predicts Labquakes from the Earthquake Machine <https://eos.org/features/machine-fault>
- f. ERC Adv. Grant TECTONIC: <https://cordis.europa.eu/project/id/835012>