



Jenny Suckale

Assistant Professor of Geophysics and, by courtesy, of Civil and Environmental Engineering and Center Fellow, by courtesy, at the Woods Institute for the Environment

📄 Curriculum Vitae available Online

Bio

BIO

My research focuses on understanding disaster risk and resilience. I approach this challenge both from a fundamental point of view by advancing our understanding of the processes that govern extreme events in different natural systems and from an applied point of view by working with private and public partners to increase community resilience using a scientific co-production approach. My research group specializes in the development of customized mathematical models that are testable against observational data from a broad spectrum of scales. Our current research priorities span natural hazards like volcanic eruptions, climate hazards such as ice-sheet instability and permafrost disintegration, and hazards that arise from the interaction between natural processes and human interventions such as flooding in urban areas and induced earthquakes. I was recently awarded the Presidential Early Career Awards for Scientists and Engineers, the highest honor bestowed by the United States Government on science and engineering professionals in the early stages of their independent research careers.

ACADEMIC APPOINTMENTS

- Assistant Professor, Geophysics
- Center Fellow (By courtesy), Stanford Woods Institute for the Environment
- Faculty Affiliate, Institute for Human-Centered Artificial Intelligence (HAI)
- Member, Institute for Computational and Mathematical Engineering (ICME)
- Center Fellow, by Courtesy, Stanford Woods Institute for the Environment

ADMINISTRATIVE APPOINTMENTS

- Research Fellow, Seismic Hazards, GeoForschungsZentrum (GFZ), Potsdam, Germany, (2003-2004)
- Research Fellow, Seismic Hazards, Institute de Recherche pour le Developpement (IRD), Nice, France, (2003-2003)
- Scientific Consultant, Communities at Risk Program, South Pacific Applied Geoscience Commission, Suva, Fiji Islands, (2003-2003)
- Research Assistant, GeoForschungsZentrum (GFZ), Potsdam, Germany, (2002-2002)
- Freelancer, German National Commission for UNESCO, Berlin, Germany, (2001-2002)
- Consultant, South African National Commission for UNESCO, Pretoria, South Africa, (2000-2000)

HONORS AND AWARDS

- Miller Research Fellowship (declined), University of California, Berkeley (2010)
- Ziff Environmental Fellow, Harvard Center for the Environment (2010)
- Graduate Student Research Grant, Geological Society of America (2009)
- Outstanding Student Paper Award, American Geophysical Union, Fall Meeting (2008)
- Graduate Student Research Grant, Massachusetts Institute of Technology (2007 and 2009)

- Presidential Fellow, Massachusetts Institute of Technology (2006-2007)
- McCloy Scholar (comparable to the Rhodes Scholarship. Granted nationwide to six students per year.), German National Merit Foundation (2004-2005)
- Scholarship, Robert Bosch and German National Merit Foundation (2002-2003)
- Scholarship, German National Merit Foundation (1997-2002)

PROFESSIONAL EDUCATION

- Ph.D, Massachusetts Institute of Technology , Geophysics (2011)
- MPA, Harvard University, Kennedy School of Government , Master of Public Administration (2006)
- M.Sc., Free University Berlin, Germany , Physics (with Distinction) (2002)

LINKS

- Research Group, SIGMA: <https://pangea.stanford.edu/researchgroups/sigma/>

Research & Scholarship

PROJECTS

- Contributing towards reducing tsunami risk in Indonesia - Stanford University, SIGMA group

Teaching

COURSES

2021-22

- GEOPHYSICAL MULTI-PHASE FLOWS: GEOPHYS 385W (Aut, Win, Spr, Sum)
- Modeling Earth: GEOPHYS 128 (Spr)
- Shaping the Future of the Bay Area: AMSTUD 118X, CEE 118X (Aut)
- Shaping the Future of the Bay Area: CEE 118Y (Win)
- Shaping the Future of the Bay Area: CEE 218X (Aut)
- Shaping the Future of the Bay Area: CEE 218Y (Win)
- Shaping the Future of the Bay Area: CEE 218Z (Spr)
- Shaping the Future of the Bay Area: ESS 118X (Aut)
- Shaping the Future of the Bay Area: ESS 118Y (Win)
- Shaping the Future of the Bay Area: ESS 218X (Aut)
- Shaping the Future of the Bay Area: ESS 218Y (Win)
- Shaping the Future of the Bay Area: GEOLSCI 118X, GEOLSCI 218X, GEOPHYS 118X (Aut)
- Shaping the Future of the Bay Area: GEOPHYS 118Y (Win)
- Shaping the Future of the Bay Area: GEOPHYS 118Z (Spr)
- Shaping the Future of the Bay Area: GEOPHYS 218X (Aut)
- Shaping the Future of the Bay Area: GEOPHYS 218Y (Win)
- Shaping the Future of the Bay Area: GEOPHYS 218Z (Spr)
- Shaping the Future of the Bay Area: POLISCI 218X, PUBLPOL 118X, PUBLPOL 218X (Aut)

2020-21

- GEOPHYSICAL MULTI-PHASE FLOWS: GEOPHYS 385W (Aut, Win, Spr, Sum)

- Modeling Earth: GEOPHYS 128, GEOPHYS 228 (Win)
- Shaping the Future of the Bay Area: CEE 118X (Aut)
- Shaping the Future of the Bay Area: CEE 118Y (Win)
- Shaping the Future of the Bay Area: CEE 218X (Aut)
- Shaping the Future of the Bay Area: CEE 218Y (Win)
- Shaping the Future of the Bay Area: ESS 118X (Aut)
- Shaping the Future of the Bay Area: ESS 118Y (Win)
- Shaping the Future of the Bay Area: ESS 218X (Aut)
- Shaping the Future of the Bay Area: ESS 218Y (Win)
- Shaping the Future of the Bay Area: GEOLSCI 118X, GEOLSCI 218X, GEOPHYS 118X (Aut)
- Shaping the Future of the Bay Area: GEOPHYS 118Y (Win)
- Shaping the Future of the Bay Area: GEOPHYS 218X (Aut)
- Shaping the Future of the Bay Area: GEOPHYS 218Y (Win)
- Shaping the Future of the Bay Area: PUBLPOL 118X (Aut)
- Shaping the Future of the Bay Area: PUBLPOL 118Y (Win)
- Shaping the Future of the Bay Area: PUBLPOL 218X (Aut)
- Shaping the Future of the Bay Area: PUBLPOL 218Y (Win)

2019-20

- GEOPHYSICAL MULTI-PHASE FLOWS: GEOPHYS 385W (Aut, Win, Spr, Sum)
- Shaping the Future of the Bay Area: CEE 118X (Aut)
- Shaping the Future of the Bay Area: CEE 118Y (Win)
- Shaping the Future of the Bay Area: CEE 118Z (Spr)
- Shaping the Future of the Bay Area: CEE 218X (Aut)
- Shaping the Future of the Bay Area: CEE 218Y (Win)
- Shaping the Future of the Bay Area: CEE 218Z (Spr)
- Shaping the Future of the Bay Area: ESS 118X, ESS 218X, GEOLSCI 118X, GEOLSCI 218X, GEOPHYS 118X (Aut)
- Shaping the Future of the Bay Area: GEOPHYS 118Y (Win)
- Shaping the Future of the Bay Area: GEOPHYS 118Z (Spr)
- Shaping the Future of the Bay Area: GEOPHYS 218X (Aut)
- Shaping the Future of the Bay Area: GEOPHYS 218Y (Win)
- Shaping the Future of the Bay Area: GEOPHYS 218Z (Spr)
- Shaping the Future of the Bay Area: POLISCI 224X, PUBLPOL 118X (Aut)

2018-19

- GEOPHYSICAL MULTI-PHASE FLOWS: GEOPHYS 385W (Aut, Win, Spr, Sum)
- Sustainable Urban Systems Project: CEE 124Y (Win)
- Sustainable Urban Systems Project: CEE 124Z (Spr)
- Sustainable Urban Systems Project: CEE 224Y (Win)
- Sustainable Urban Systems Project: CEE 224Z (Spr)
- Sustainable Urban Systems Project: GEOPHYS 118Y (Win)

- Sustainable Urban Systems Project: GEOPHYS 118Z (Spr)
- Sustainable Urban Systems Project: GEOPHYS 218Y (Win)
- Sustainable Urban Systems Project: GEOPHYS 218Z (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Ben Mullet

Postdoctoral Faculty Sponsor

Sarfraz Alam

Doctoral Dissertation Advisor (AC)

Emma Weijia Liu, Katrina Magno, Paul Summers

Master's Program Advisor

Michael Mahowald, Belinda Saint-Louis

Doctoral (Program)

Emma Velterop, Zihan Wei

Publications

PUBLICATIONS

- **Science Translation During the COVID-19 Pandemic: An Academic-Public Health Partnership to Assess Capacity Limits in California.** *American journal of public health*
Maldonado, P., Peng, A., Ouyang, D., Suckale, J., Ho, D. E.
1800; 112 (2): 308-315
- **Interactions Between Gas Slug Ascent and Exchange Flow in the Conduit of Persistently Active Volcanoes** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Qin, Z., Beckett, F. M., Rust, A. C., Suckale, J.
2021; 126 (9)
- **Traffic accidents and delays present contrasting pictures of traffic resilience to coastal flooding in the San Francisco Bay Area, USA** *URBAN CLIMATE*
Kasmalkar, I., Suckale, J.
2021; 37
- **Rising Seas, Rising Inequity? Communities at Risk in the San Francisco Bay Area and Implications for Adaptation Policy** *Earth's Future*
Bick, I., Santiago Tate, A. F., Serafin, K. A., Miltenberger, A., Ayansi, I., Evans, M., Ortolano, L., Ouyang, D., Suckale, J.
2021; 9 (7)
- **Integrating urban traffic models with coastal flood maps to quantify the resilience of traffic systems to episodic coastal flooding.** *MethodsX*
Kasmalkar, I. G., Serafin, K. A., Suckale, J.
2021; 8: 101483
- **Water pressure fluctuations control variability in sediment flux and slip dynamics beneath glaciers and ice streams** *COMMUNICATIONS EARTH & ENVIRONMENT*
Damsgaard, A., Goren, L., Suckale, J.
2020; 1 (1)
- **Crystal aggregates record the pre-eruptive flow field in the volcanic conduit at Kilauea, Hawaii.** *Science advances*
DiBenedetto, M., Qin, Z., Suckale, J.
2020; 6 (49)
- **When floods hit the road: Resilience to flood-related traffic disruption in the San Francisco Bay Area and beyond.** *Science advances*

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- Kasmalkar, I. G., Serafin, K. A., Miao, Y., Bick, I. A., Ortolano, L., Ouyang, D., Suckale, J.
2020; 6 (32): eaba2423
- **The protective benefits of tsunami mitigation parks and ramifications for their strategic design.** *Proceedings of the National Academy of Sciences of the United States of America*
Lunghino, B., Santiago Tate, A. F., Mazereeuw, M., Muhari, A., Giraldo, F. X., Marras, S., Suckale, J.
2020
 - **Modelling thermomechanical ice deformation using an implicit pseudo-transient method (FastICE v1.0) based on graphical processing units (GPUs)** *GEOSCIENTIFIC MODEL DEVELOPMENT*
Rass, L., Licul, A., Herman, F., Podladchikov, Y. Y., Suckale, J.
2020; 13 (3): 955–76
 - **Crystal Fractionation by Crystal-Driven Convection** *GEOPHYSICAL RESEARCH LETTERS*
Culha, C., Suckale, J., Keller, T., Qin, Z.
2020; 47 (4)
 - **Flow-to-Sliding Transition in Crystal-Bearing Magma** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Qin, Z., Suckale, J.
2020; 125 (2)
 - **Direct numerical simulations of viscous suspensions with variably shaped crystals** *JOURNAL OF COMPUTATIONAL PHYSICS*
Qin, Z., Allison, K., Suckale, J.
2020; 401
 - **Periodic outgassing as a result of unsteady convection in Ray lava lake, Mount Erebus, Antarctica** *EARTH AND PLANETARY SCIENCE LETTERS*
Birnbaum, J., Keller, T., Suckale, J., Lev, E.
2020; 530
 - **A continuum model of multi-phase reactive transport in igneous systems** *GEOPHYSICAL JOURNAL INTERNATIONAL*
Keller, T., Suckale, J.
2019; 219 (1): 185–222
 - **Spatial heterogeneity in subglacial drainage driven by till erosion** *PROCEEDINGS OF THE ROYAL SOCIETY A-MATHEMATICAL PHYSICAL AND ENGINEERING SCIENCES*
Kasmalkar, I., Mantelli, E., Suckale, J.
2019; 475 (2228)
 - **Spatial heterogeneity in subglacial drainage driven by till erosion.** *Proceedings. Mathematical, physical, and engineering sciences*
Kasmalkar, I., Mantelli, E., Suckale, J.
2019; 475 (2228): 20190259
 - **Slug Stability in Flaring Geometries and Ramifications for Lava Lake Degassing** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Qin, Z., Soldati, A., Santana, L., Rust, A. C., Suckale, J., Cashman, K. V.
2018; 123 (12): 10431–48
 - **Bistability of buoyancy-driven exchange flows in vertical tubes** *JOURNAL OF FLUID MECHANICS*
Suckale, J., Qin, Z., Picchi, D., Keller, T., Battiato, I.
2018; 850: 525–50
 - **Adding a community partner to service learning may elevate learning but not necessarily service** *INTERNATIONAL JOURNAL OF DISASTER RISK REDUCTION*
Suckale, J., Saiyed, Z., Hilley, G., Alvisyahrin, T., Muhari, A., Zoback, M., Truebe, S.
2018; 28: 80–87
 - **A residual-based shock capturing scheme for the continuous/discontinuous spectral element solution of the 2D shallow water equations** *ADVANCES IN WATER RESOURCES*
Marras, S., Kopera, M., Constantinescu, E., Suckale, J., Giraldo, F. X.
2018; 114: 45–63
 - **Sediment behavior controls equilibrium width of subglacial channels** *JOURNAL OF GLACIOLOGY*
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- Damsgaard, A., Suckale, J., Piotrowski, J. A., Houssais, M., Siegfried, M. R., Fricker, H. A.
2017; 63 (242): 1034–48
- **Direct numerical simulations of gas-solid-liquid interactions in dilute fluids** *INTERNATIONAL JOURNAL OF MULTIPHASE FLOW*
Qin, Z., Suckale, J.
2017; 96: 34–47
 - **Physics-based forecasting of induced seismicity at Groningen gas field, the Netherlands** *GEOPHYSICAL RESEARCH LETTERS*
Dempsey, D., Suckale, J.
2017; 44 (15): 7773–82
 - **Linking social, ecological, and physical science to advance natural and nature-based protection for coastal communities.** *Annals of the New York Academy of Sciences*
Arkema, K. K., Griffin, R., Maldonado, S., Silver, J., Suckale, J., Guerry, A. D.
2017
 - **Flow-to-fracture transition in a volcanic mush plug may govern normal eruptions at Stromboli** *GEOPHYSICAL RESEARCH LETTERS*
Suckale, J., Keller, T., Cashman, K. V., Persson, P.
2016; 43 (23): 12071-12081
 - **Rapid ice flow rearrangement induced by subglacial drainage in West Antarctica** *GEOPHYSICAL RESEARCH LETTERS*
Elsworth, C. W., Suckale, J.
2016; 43 (22): 11697-11707
 - **Determining conditions that allow a shear margin to coincide with a Rothlisberger channel** *JOURNAL OF GEOPHYSICAL RESEARCH-EARTH SURFACE*
Platt, J. D., Perol, T., Suckale, J., Rice, J. R.
2016; 121 (7): 1273-1294
 - **Collective properties of injection-induced earthquake sequences: 2. Spatiotemporal evolution and magnitude frequency distributions** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Dempsey, D., Suckale, J., Huang, Y.
2016; 121 (5): 3638-3665
 - **Collective properties of injection-induced earthquake sequences: 1. Model description and directivity bias** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Dempsey, D., Suckale, J.
2016; 121 (5): 3609-3637
 - **Subglacial hydrology and ice stream margin locations** *JOURNAL OF GEOPHYSICAL RESEARCH-EARTH SURFACE*
Perol, T., Rice, J. R., Platt, J. D., Suckale, J.
2015; 120 (7): 1352-1368
 - **Deformation-induced melting in the margins of the West Antarctic ice streams** *JOURNAL OF GEOPHYSICAL RESEARCH-EARTH SURFACE*
Suckale, J., Platt, J. D., Perol, T., Rice, J. R.
2014; 119 (5): 1004-1025
 - **Deformation-induced melting in the margin of Whillans ice stream (B2), Siple Coast, Antarctica, and implications for ice-stream dynamics** *Journal of Geophysical Research*
Suckale, J., Platt, J., Rice, J. R.
2014; 119
 - **Crystals stirred up: 2. Numerical insights into the formation of the earliest crust on the Moon** *JOURNAL OF GEOPHYSICAL RESEARCH-PLANETS*
Suckale, J., Elkins-Tanton, L. T., Sethian, J. A.
2012; 117
 - **Crystals stirred up: 1. Direct numerical simulations of crystal settling in nondilute magmatic suspensions** *JOURNAL OF GEOPHYSICAL RESEARCH-PLANETS*
Suckale, J., Sethian, J. A., Yu, J., Elkins-Tanton, L. T.
2012; 117
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- **Reply to the comment by Mike R. James et al. on "It takes three to tango: 2. Bubble dynamics in basaltic volcanoes and ramifications for modeling normal Strombolian activity"** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Suckale, J., Hager, B. H., Elkins-Tanton, L. T., Nave, J.
2011; 116
- **It takes three to tango: 2. Bubble dynamics in basaltic volcanoes and ramifications for modeling normal Strombolian activity** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Suckale, J., Hager, B. H., Elkins-Tanton, L. T., Nave, J.
2010; 115
- **It takes three to tango: 1. Simulating buoyancy-driven flow in the presence of large viscosity contrasts** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Suckale, J., Nave, J., Hager, B. H.
2010; 115
- **Large to Moderate Seismicity Induced by Hydrocarbon Production** *The Leading Edge*
Suckale, J.
2010; 29: 310-319
- **Probabilistic Seismic Hazard Model for Vanuatu** *BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA*
Suckale, J., Gruenthal, G.
2009; 99 (4): 2108-2126
- **High-resolution seismic imaging of the western Hellenic subduction zone using teleseismic scattered waves** *GEOPHYSICAL JOURNAL INTERNATIONAL*
Suckale, J., Rondenay, S., Sachpazi, M., Charalampakis, M., Hosa, A., Royden, L. H.
2009; 178 (2): 775-791
- **INDUCED SEISMICITY IN HYDROCARBON FIELDS** *ADVANCES IN GEOPHYSICS, VOL 51*
Suckale, J.
2009; 51: 55-106