Philip A. Skemer

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EDUCATION

Ph.D., Yale University, Geology and Geophysics, 2007
M.Phil., Yale University, Geology and Geophysics, 2003
B.A., Pomona College, Geology, 2000

APPOINTMENTS

07/2026 – present	*Chair (interim)* Department of Earth, Environmental, and Planetary Sciences Washington University in St. Louis
01/2023 – 07/2026	*Associate Chair* Department of Earth, Environmental, and Planetary Sciences Washington University in St. Louis
07/2021 – present	*Professor* Department of Earth, Environmental, and Planetary Sciences Washington University in St. Louis
07/2016 – 06/2021	*Associate Director* Institute of Materials Science and Engineering Washington University in St. Louis
07/2016 – 06/2021	*Associate Professor* Department of Earth and Planetary Sciences Washington University in St. Louis
07/2009 - 06/2016	*Assistant Professor* Department of Earth and Planetary Sciences Washington University in St. Louis
09/2007 - 07/2009	*Postdoctoral Research Associate* Department of Geological Sciences Brown University
09/2001 - 09/2007	*Graduate Research Assistant* Department of Geology and Geophysics Yale University

PROFESSIONAL SERVICE AND ACTIVITIES

Visiting Committee, Synchrotron Earth and Environmental Science (SEES) Site Visit (April, 2026)
Organizing Committee, workshop on Integrating Seismic Anisotropy, Geodynamics, and Rock Deformation (St. Louis, MO, May 31-June 2, 2026)
Co-director of Research Opportunities in Rock Deformation (RORD) REU program (January 2022-present)
Organizing Committee, workshop on Technical Advancements in Experimental Rock Deformation for SZ4D (Portland, ME, Aug 2022)
Reviewer, Earth in Time: A Vision for NSF Earth Sciences, 2020-2030, National Academies Board on Earth Sciences and Resources (Feb 2020)
Steering Committee, Research Coordination Network: In situ Studies of Rock Deformation (ISRD) (2019 – 2022)
Organizing Committee, GeoPRISMS Synthesis and Integration, Technical and Experimental Institute (Feb 27 – Mar 1, 2019, San Antonio, TX)
Organizing Committee, Workshop on Data Standards and Vocabulary for Structural Geology, Microstructures, and Experimental Deformation (Dec 9, 2018, DC)
Organizing Committee (chair), Conference on Experimental Studies of Subduction Zone Processes (July 4-6, 2018, St Louis, MO)
Lecturer, CIDER Summer Program (June-July 2017)
Organizing Committee, Subduction Zone Observatories Workshop (September 28-30, 2016, Boise, ID)
President-elect (2013-14); President (2015-16); Past President (2017-18) Mineral and Rock Physics Focus Group, American Geophysical Union (AGU)
American Geophysical Union Council member, (2013-2016)
Executive Committee, Mineral and Rock Physics Focus Group, AGU (2010 – 2018; *chair* 2015-2016)
Organizing Committee, Workshop on Advancing Experimental Rock Deformation Research: Scientific and Technical Needs (August 16-19, 2012, Cambridge, MA)
Guest Instructor, Texture Topics in Tromsø, University of Tromsø, Norway (2011)
Steering Committee, Physical Properties of Earth Materials (Subcommittee of AGU Mineral and Rock Physics Focus Group) (2010-2012)
Washington University Elector, COMPRES consortium (2010 - 2023)
AGU Fall Meeting Session Organizer:
2017 – Recent Advances in Understanding Deformation Microstructures
2017 – Small Samples Yield Big Insights
2016 – G, LAB, and MLDs: What are they anyway? Lithospheric boundary structures within and beneath the oceans and continents
2014 – Town Hall Meeting: Developing a Digital Data System for Microstructural and Related Spatially Linked Data
2013 – Seismic Anisotropy: Predictions, Observations, and Interpretations
2011 – Deformation Processes: Microstructure, Rheology, and the Effects of Fluids

2009 – Rock Deformation from Grain Boundaries to Plate Boundaries
2007 – Shear Localization from Experimentation, Modeling, and Observation

WASHINGTON UNIVERSITY SERVICE AND ACTIVITIES

EEEPS – Department of Earth, Environmental, and Planetary Sciences; A&S – School of Arts and Sciences; IMSE – Institute of Materials Science and Engineering

Active committee and service appointments:

Arts and Sciences Review Committee on Faculty Personnel Procedures (2025-2028)
Arts & Sciences Undergraduate Education Advisory Committee (2023-present)
Building Committee, EEEPS (2023-present)
Strategic Planning Committee, EEEPS (2020-present)
Undergraduate Studies Committee (*chair*), EEEPS (2013-present)
Director of Undergraduate Studies, EEPS (2012-present)

Past committee and service appointments:

Director of Fossett Laboratory for Virtual Planetary Exploration, EEPS (2016-2025)
Faculty Transformational Leadership Institute (2025)
Faculty Search Committees, EEPS (2010, 2013 –*co-chair*, 2017 – *chair;* 2023); MEMS (2014); Physics (2019)
Center for the Environment, Environmental Education Coordinating Committee (2023)
Faculty Council, A&S, (2020-2023; 2022-2023 – *co-chair*)
ad hoc COVID committees – EEPS Lab Reopening Committee; Technology in Classrooms and Technology for Students Subcommittee (2020)
Associate Director, IMSE (2016-2021)
Facilities Committee (*chair*), IMSE (2016-2021)
Faculty Senate Council Subcommittee on Bi-Campus Experience (2019-2020)
Goldwater scholarship selection committee, A&S (2019, 2022)
Strategic Communications Committee, EEPS (2016-2022)
Institutional iLab Management Committee (2018-2019)
Course Evals Committee, A&S (2016)
Mentee in STEM Teaching (MiST) Program, A&S (2015-2016)
Ampersand Week Faculty Committee A&S (2014)
Institute of Materials Science and Engineering, Core Faculty (2013-2016)
Faculty Associate, Danforth College (2012-2014)
Curriculum Development Committee, EEPS (2012-2013)
Inst. of Materials Science and Engineering PhD Program Organizing Committee (2012)
Undergrad Recruiting Committee (*chair*), EEPS (2011-2013)
Fossett Postdoctoral Fellowship Selection Committee, EEPS (2011-2022)
Compton Scholarship Selection Committee (2010-2012)
Center for Materials Innovation Internal Advisory Group (2010-2011)
Undergrad Brochure Committee, EEPS (2009)
TA Award Committee, EEPS (2009, 2012)

Graduate Admissions Committee, EEPS (2009-2012)

AFFILIATIONS

McDonnell Center for the Space Sciences (MCSS)
Institute of Materials Science and Engineering (IMSE)
Environmental Studies Program (EnSt)
Taylor Geospatial Institute (TGI)

OUTREACH

Invited speaker, Scott Burton's Material Choices, Pulitzer Arts Foundation (Jan. 25 2025)
Outreach with 5th grade science classes at The Wilson School (November 2015-2025)
Panelist, WU Beyond Boundaries Program (October, 2020, 2021)
Outreach with 6th grade science classes at Wydown Middle School (February, 2019)
Invited speaker for Science in St. Louis seminar series (May, 2018)
Invited speaker for WU Science On Tap (September, 2015)
Outreach with curatorial staff at the Saint Louis Art Museum (2011-2019)
Outreach with Flynn Park Elementary School Lego League (April, 2014)
Panelist, Grad Student Senate forum on "The Academy and The Economy" (2010)
On-call Geologist Calvin Hill Kindergarten, New Haven, CT (2003-2006)

TEACHING

Washington University Course Number	*Title*	*Last Taught*
EEPS L19 104	Geology in the Field (Freshman Seminar)	Fall, 2019
EEPS L19 131	Natural Disasters	Spring, 2011
EEPS L19 201	Earth and the Environment	Spring, 2021
EEPS L19 202 / 2020	Earth, Environmental, and Planetary Science	Spring, 2026
EEPS L19 460	Introduction to Structural Geology	Fall, 2021
EEPS L19 496 / 4960	Undergraduate Field Geology	Spring, 2026
EEPS L19 580	Deformation of Planetary Materials	Fall, 2013

HONORS

2014: NSF CAREER award
2012: Cornerstone Faculty Mentor Award (Washington University)
2012: Sony Junior Faculty Equipment Prize (Washington University)
2012: Washington University nominee for Packard Fellowship

2005: William E. Ford Prize for excellence in Mineralogy
2004: Outstanding Student Paper, Tectonophysics Section, AGU Fall Meeting
2002-03: Frederick C. Stanley Fellowship in Mineralogy
2002: Honorable Mention, Outstanding Student Paper, Tectonophysics Section, AGU Fall Meeting
2001-02: Henry Gardiner Ferguson Fellowship in Geology

INVITED AND KEYNOTE TALKS

Tufts University, February 2023
Rice University, October 2022
Texas A&M University, Tectonophysics Seminar, April 2022
UT Austin, Lithosphere and Deep Earth Seminar, February 2022
National Academies of Science, Committee on Solid Earth Geophysics, "How are Plates Made and Preserved," October 2021
University of New Mexico, Earth and Planetary Sciences Colloquium, October 2019
COMPRES Annual Meeting, August 2019
Gordon Research Seminar (Interior of the Earth), June 2019
Carnegie Habitability Project Workshop, February 2019
Michigan State University, Department of Earth and Environmental Sciences Distinguished Speaker Series, January 2019
Gordon Research Conference on Rock Deformation, August 2018
Cooperative Institute for Dynamic Earth Research (CIDER), June 2017
University of Illinois, Chicago, Department of Earth and Environmental Sciences Seminar, April 2017
Yale University, Department of Geology and Geophysics Colloquium, February 2017
Anisotropy and Dynamics of the Lithosphere-Asthenosphere Boundary, May 2016
American Geophysical Union Fall Meeting (Physical Properties of Earth Materials: Deformation Mechanisms from Crystals to Plates), December 2015
American Geophysical Union Fall Meeting (Crustal and Mantle Deformation: Microstructure, Rheology and the Effects of Fluids), December 2015
University of Rochester, Department of Earth and Environmental Sciences Seminar, October 2015
Southern California Earthquake Center, Community Rheology Model Workshop, September, 2015
Lamont-Doherty Earth Observatory Earth Science Colloquium, February 2015
University of Pennsylvania, Department of Earth and Environmental Science Colloquium, February 2015
Structural Geology and Tectonics 3rd Biennial Forum, June 2014
American Geophysical Union Fall Meeting (Geophysical Observations and Models of Subduction), December 2013
American Geophysical Union Fall Meeting (Deformation Processes, Rheology, and the Effects of Fluids), December 2013

EarthCube End-user Domain Workshop for DEFORM and COMPRES, November 2013
Missouri University of Science and Technology, Department of Geological Sciences and Engineering Department Seminar, November 2013
Caltech, Seismological Laboratory Brown Bag, January 2013
Ruhr-Universitat Bochum, Institut fur Geologie, Mineralogie und Geophysik, Department Seminar, October 2011
Stanford University, Department of Geophysics Seminar, April 2011
European Geophysical Union, General Assembly, (Deformation processes: microstructures, textures, rheology, and fluid migration) April 2011
Gordon Research Conference on Rock Deformation, August 2010
Saint Louis University, Department of Earth and Atmospheric Sciences Seminar, April 2010
Southern Illinois University, Department of Geology Seminar Series, March 2010
University of Missouri, Department of Geological Sciences Colloquium, January 2010
Woods Hole Oceanographic Institute, Geochemistry & Geophysics Seminar, March 2009
Washington University in St. Louis, Departmental Colloquium, February 2009
University of Minnesota, Hard Rock Lunch, January 2009
Washington & Lee University, Departmental Seminar, January 2009
Lamont-Doherty Earth Observatory Seismology, Geology, and Tectonophysics Division Seminar Series, November 2006
Woods Hole Oceanographic Institute, Geophysics Seminar, November 2006

ADVISING AND RESEARCH SUPERVISION

Research and Technical Staff

Bill Winston (8/2023-9/2025)
Ethan Schaefer (10/2022-6/2023) – *jointly with Paul Byrne*
Martin Pratt (1/2017-8/2020)
Hélène Couvy (10/2013-present) – *jointly with Mike Krawczynski*

Postdoctoral Mentor

Eric Hiatt (9/2025-present)
Joshua Littleton (7/2022-6/2023)
Ethan Schaefer (7/2021-10/2022)
Hannah Mark (9/2019-8/2021) – *jointly with Doug Wiens*
Caroline Bollinger (9/2018-8/2020)
Rachel Wells (4/2015-3/2018) – *jointly with Daniel Giammar*
Andrew Cross (2/2015-6/2018)
Rolf Bruijn (9/2012-8/2014)
Jolien Linckens (2/2011-2/2013)

Graduate Student Advisor

Casper Graham (8/2026-present)
Beno Jacob (8/2022-05/2026)
Katie Billings (8/2020-05/2026)
Charis Horn (9/2017-6/2023)
Elizabeth Olree (9/2017-6/2018)
Michael Sly (9/2016-5/2022)
Yuval Boneh (9/2012-5/2017)
Brandon Mahan (9/2010-12/2012)

Visiting Graduate Students

Tim Howell, McGill University (02/2020)
Harison Wiseman, University of Minnesota (10/2019)
Masanori Kido, Tohoku University (05/2018 – 07/2018)

Graduate Thesis/Examination Committee Member

Leah Morgan (EEPS, 2026); Kindle Hon (EEPS, 2025-present); Lauren Wratchford (EEPS, 2024-present); Cesar Leon Jr. (EEPS, 2024-2025); Henry Dawson (EEPS, 2024-2025); Adrea Williams (EEPS, 2024); Yuan Liu (CSE, 2022); Cameron Moye (EEPS, 2022); Jialin Li (EEPS, 2022-2023); Kate Padilla (IMSE, 2021-present); Patrick Matulka (EEPS, 2021-2025); Zongshan Li (EEPS, 2020-2024); Arashdeep Thind (IMSE, 2018-2020); Zhengyang Zhou (EEPS, 2018-2022); Amanda Price (EEPS, 2017-2022); Ming Wu (EEPS, 2017-2018); Arjun Neupane (EEPS, 2017); Melody Eimer (EEPS, 2016-2019); Rongrong Dai (IMSE, 2015); Linhua Xu (IMSE, 2014); Wei Xiong (EECE, 2014-2017); Kelly Kranjc (MEMS/IMSE, 2013-2017); Chen Cai (EEPS, 2013-2018); Amanda Lough (EEPS, 2012-2014); Lin Wang (EECE, 2013-2015); Narelle Hillier (Physics, 2013); Andrew Lloyd (EEPS, 2012-2018); Erica Emry (EEPS, 2012); Garrett Euler (EEPS, 2012); Martin Pratt (EEPS, 2012-2016); Teresa Wong (EEPS, 2012-2016); Shawn Wei (EEPS, 2012-2016); Andy Surface (Chemistry, 2010-2013); David Heeszel (EEPS, 2011); Wenli Bi (Physics, 2011); Maitrayee Bose (Physics, 2011); Yandi Hu (EECE, 2011); Mitchell Barklage (EEPS, 2010); Kasey Wagoner (Physics, 2010)

Undergraduate Research Supervisor or co-Supervisor (in EEPS unless otherwise noted)

Jenna Eggerding (Physics, 2026-present) David Zhou (Physics, 2025); Tatum Merges (2024-2025); Jack Qidiao (2024-2026); Claire Williams (REU student; 2023); Jessa Verzosa (REU student, 2023); Matthew Yu (Physics, 2023); Emmett Ela (2022-2023); Michael Mansour (Physics, 2021-2022); Valencia Ajeh (2021); Maia Cohen (2019-2021); David Lie-Tjauw (CSE, 2017-2019); Anna Baker (2018); Kate Padilla (MEMS, 2017-2019); Ben Strozewski (Physics, 2016-2019); Josh Waddell (2017-2018); Zachary Rouse (MEMS, 2014-2016); Molly Chaney (2014); Corie Miller (MEMS, 2013); Matthew Guiang (2013-2015); Adrienne Emmerich (2012-2014); Ethan Kahn (Physics, 2012); Hannah Rabinowitz (2011-2012)

Undergraduate Major and Minor Advisor: Currently ~24 advisees

PUBLICATIONS (PEER-REVIEWED)

**denotes student or postdoc author under direct research supervision*

*Billings, K.B., Skemer, P., (in review) From a Sample to the Mantle: Analyzing CPO, Quantifying Uncertainty, and Modeling Seismic Anisotropy, *Journal of Structural Geology*

*Ela, E., Couvy, H., Cross, A.J., Skemer, P., (in review) Compositional controls on mylonite formation, *Tectonophysics*

*Qidiao, J., Skemer, P., (2026) Microstructural Evolution of Carrara Marble with Complex Strain Histories, *Journal of Geophysical Research – Solid Earth, doi:* 10.1029/2026JB033994

Byrne, P., Dawson, H., et al. (2026) Little to no active faulting likely at Europa's seafloor today, *Nature Communications*, doi: 10.1038/s41467-025-67151-3

Skemer, P., Cross, A.J., Foley, B.J., Putirka, K.D., (2025) The effect of composition on shear localization in planetary lithospheres, *Journal of Geophysical Research - Planets*, doi: 10.1029/2025JE009106

*Billings, K.B., Skemer, P. (2025) Microstructural evolution of micaceous mylonites, *Journal of Structural Geology,* doi: 10.1016/j.jsg.2025.105555

Skemer, P., Couvy, H., *Cross, A.J., *Littleton, A.H., *Bollinger, C., (2025) Large Volume Torsion (LVT) Apparatuses for Rock Deformation at High Pressure and Temperature, *Review of Scientific Instruments,* doi: 10.1063/5.0221218

*Horn, C.M., Skemer, P. (2025) Rheology of hydrous minerals in the subduction multisystem, *Earth and Planetary Science Letters,* doi:10.1016/j.epsl.2024.119171

*Billings, K.B., Skemer, P. (2024) Evolving microstructure during experimental deformation of Maryland diabase, *Earth and Planetary Science Letters,* doi:10.1016/j.epsl.2023.118564

*Sly, M., Padilla, K., Flores., K.M., Skemer, P. (2023) Low-Temperature Plastic Rheology of Granitic Feldspar and Quartz, *Tectonophysics,* doi: 10.1016/j.tecto.2023.229850

*Horn, C.M., Skemer, P. (2023) Semi-brittle deformation of talc at the base of the seismogenic zone, *Geophysical Research Letters,* doi: 10.1029/2022GL102385

Bercovici, D., Mulyukova, E., Girard, J., Skemer, P. (2023) A coupled model for phase mixing, grain damage and shear localization in the lithosphere: Comparison to lab

experiments, *Geophysical Journal International,* ***232****:2205-2230,* doi:10.1093/gji/ggac428

*Strozeweski, B., *Sly, M., Flores, K.M., Skemer, P. (2021) Viscoplastic rheology of a-quartz investigated by nanoindentation, *Journal of Geophysical Research,* doi: 10.1029/2021JB022229

*Cross, A.J., *Olree, E., Couvy, H., Skemer, P. (2020) How does viscosity contrast influence phase mixing and strain localization? *Journal of Geophysical Research*, doi: 10.1029/2020JB020323

*Horn, C., Bouilhol, P., Skemer, P. (2020) Serpentinization, deformation, and seismic anisotropy in the subduction mantle wedge, *Geochemistry, Geophysics, Geosystems,* doi: 10.1029/2020GC008950

*Kranjc, K., Thind, A., Borisevich, A.Y., Misha, R., Flores, K.M., Skemer, P. (2020) Amorphization and plasticity of olivine during low temperature micropillar deformation experiments, *Journal of Geophysical Research*, doi: 10.1029/2019JB019242

*Sly, M., Thind, A., Mishra, R., Flores, K.M., Skemer, P. (2020) Low temperature rheology of calcite, *Geophysical Journal International*, doi: 10.1093/gji/ggz577

*Cross, A.J., Skemer, P. (2019) Rates of dynamic recrystallization in geologic materials, *Journal of Geophysical Research,* 124, doi: 10.1029/2018JB016201

Xiong, W., *Wells, R.K., Horner, J.A., Schaef, H.T., Skemer, P., Giammar, D.E. (2018) CO_2 Mineral Sequestration in Naturally Porous Basalt, *Environmental Science and Technology Letters*, 5(3) 142-147, doi: 10.1021/acs.estlett.8b00047

Xiong, W., *Wells., R.K., Menefee, A.H., Skemer, P., Ellis, B.R., Giammar, D.E. (2017) CO2 mineral trapping in fractured basalt, *International Journal of Greenhouse Gas Control*, 66:204-217, doi:10.1016/j.ijggc.2017.10.003

*Wells, R.K., Xiong, W., Giammar, D., Skemer, P. (2017) Dissolution and surface roughening of Columbia River Flood Basalt at geologic carbon sequestration conditions, *Chemical Geology*, 467:100-109, doi:10.1016/j.chemgeo.2017.07.028

*Boneh, Y., Wallis, D., Hansen, L.N., Krawczynski, M.J., Skemer., P (2017) Oriented grain growth and modification of 'frozen anisotropy' in the lithospheric mantle, *Earth and Planetary Science Letters,* 474:368-374, doi:10.1016/j.EEPSl.2017.06.050

Adeoye, J.T., Menefee, A.H., Xiong, W., *Wells., R.K., Skemer, P., Giammar, D.E., Ellis, B.R. (2017) Effect of transport limitations and fluid properties on reaction products in fractures of unaltered and serpentinized basalt exposed to high P_{CO2} fluids, *International Journal of Greenhouse Gas Control*, 63:310-320, doi:10.1016/j.ijggc.2017.06.003

Bercovici, D.B., Skemer, P., (2017) Grain damage, mixing, and plate boundary formation, *Journal of Geodynamics,* 104:40-55 doi:10.1016/j.jog.2017.05.002

Skemer, P., *Chaney, M.M., *Emmerich, A.L., Miller, K.J., Zhu, W., (2017) Network topology of olivine – basalt partial melts, *Geophysical Journal International,* 210:284-290 doi:10.1093/gji/ggx160

*Cross, A. J., Skemer, P. (2017), Ultramylonite generation via phase mixing in high strain experiments, *J. Geophys. Res. Solid Earth*, 122, doi:10.1002/2016JB013801

*Wells, R.K., Xiong W., Sesti, E., Cui, J., Giammar, D., Skemer, P., Hayes, S.E., and Conradi, M.S., (2017) Spatially-variable carbonation reactions in polycrystalline olivine, *Geochimica et Cosmochimica Acta,* 252-266, doi:10.1016/j.gca.2017.02.003

Hansen, L.N., Conrad, C.P., *Boneh, Y., Skemer, P., Warren, J.M., Kohlstedt, D.L. (2016) Viscous anisotropy of textured olivine aggregates, Part 2: Micromechanical model, *Journal of Geophysical Research* doi:10.1002/2016JB013240

Rahl, J.M., Skemer, P., (2016) Microstructural evolution and rheology of quartz in a mid-crustal shear zone, *Tectonophysics*, 680:129-139, doi:10.1016/j.tecto.2016.05.022

*Kranjc, K., Rouse, Z., Flores, K.M., Skemer, P. (2016) Low temperature plastic rheology of olivine determined by nanoindentation, *Geophysical Research Letters,* 43:176-184, doi:10.1002/2015GL065837.

Skemer, P., Hansen, L.N. (2016) Inferring upper-mantle flow from seismic anisotropy: An experimental perspective, *Tectonophysics,* 668-669:1-14, doi:10.1016/j.tecto.2015.12.003

*Boneh, Y., Morales, L.F.G., Kaminski, E., Skemer, P. (2015) Modeling olivine CPO evolution with complex deformation histories – Implications for the interpretation of seismic anisotropy in the mantle, *Geochemistry Geophysics Geosystems,* 16, doi:10.1002/2015GC005964

Moore, J., Surface, J.A., Brenner, A., Wang, L., Skemer, P., Conradi, M., Hayes, S., (2015) Quantitative identification of metastable magnesium carbonate minerals by solid-

state 13C NMR Spectroscopy, *Environmental Science and Technology,* doi:10.1021/es503390d

*Boneh, Y. , Skemer, P., (2014) The effect of deformation history on the evolution of olivine CPO, *Earth and Planetary Science Letters,* 406:213-222, doi:10.1016/j.EEPSl.2014.09.018

*Bruijn, R.H.C , Skemer, P., (2014) Grain size sensitive rheology of orthopyroxene, *Geophysical Research Letters,* 41, doi: 10.1002/2014GL060607

*Linckens, J., *Bruijn. R.H.C, Skemer, P., (2014) Dynamic recrystallization and phase mixing in experimentally deformed peridotite, *Earth and Planetary Science Letters,* 388:134-142, doi:10.1016/j.EEPSl.2013.11.037

Skemer, P., Warren, J.M., Hansen, L.N., Hirth, J.G., Kelemen, P.B., (2013) The influence of water and LPO on the initiation and evolution of mantle shear zones, *Earth and Planetary Science Letters,* 375:222-233, doi:10.1016/j.EEPSl.2013.05.034

Surface, J.A., Skemer, P., Hayes, S., Conradi, M., (2012) In situ measurement of magnesium carbonate formation from CO2 using static high pressure and temperature 13C NMR, *Environmental Science and Technology*, doi:10.1021/es301287n

Skemer, P., Warren, J.M., Hirth, G., (2012) The influence of deformation history on the interpretation of seismic anisotropy, *Geochemistry Geophysics Geosystems*, 13:3, doi:10.1029/2011GC003988

Skemer, P., Sundberg, M., Hirth, G., Cooper, R., (2011), Torsion experiments on coarse-grained dunite: implications for microstructural evolution when diffusion creep is suppressed, *Deformation Mechanism, Rheology & Tectonics: Microstructures, Mechanics & Anisotropy* Geological Society of London Special Publication, 360:211-223.

Cull, S., Arvidson, R.E., Mellon, M.T., Skemer, P., Shaw, A., Morris, R.V., (2010) Composition of subsurface ices at the Mars Phoenix Landing Site, *Geophysical Research Letters*, 37:L24203, doi:10.1029/2010GL045372

Skemer, P., Warren, J.M., Kelemen, P.B., Hirth, J.G., (2010) Microstructural and rheological evolution of a mantle shear zone, *Journal of Petrology,* 51:43-53.

Skemer, P., Karato, S-i., (2008) Sheared lherzolite xenoliths revisited, *Journal of Geophysical Research,* 113*:* B07205, doi:10.1029/2007JB005286.

Karato, S-i., Jung, H., Katayama, I., Skemer, P., (2008) Geodynamic significance of seismic anisotropy of the upper mantle: New insights from laboratory studies, *Annual Review of Earth and Planetary Science* 36:59–95.

Skemer, P., Karato, S-i., (2007) Effects of solute segregation on the grain-growth kinetics of orthopyroxene with implications for the deformation of the upper mantle, *Physics of Earth and Planetary Interiors* 164:186-196.

Skemer, P., Katayama, I., Karato, S-i., (2006) Deformation fabrics of the Cima di Gagnone Peridotite Massif, Central Alps, Switzerland: Evidence of deformation at low temperatures in the presence of water, *Contributions to Mineralogy and Petrology* 152:43-51.

Skemer, P., Katayama, I., Jiang, Z., Karato, S-i., (2005) The misorientation index: Development of a new method for calculating the strength of lattice-preferred orientation, *Tectonophysics* 411:157-167.

ADDITIONAL REPORTS AND PUBLICATIONS (NOT PEER REVIEWED)

Skemer, P., French, M., Hirschmann, M., Hirth, G., Kitajima, H., Krawcyznski, M., Till, C., Zhu, W. (2019) Experimental Studies of Subduction Zone Processes: A Vision for Community-Driven Infrastructure to Support Experimental Earth Science, *Submitted to NSF*

McGuire, J.J., T. Plank, et al. (2017) The SZ4D Initiative: Understanding the Processes that Underlie Subduction Zone Hazards in 4D. Vision Document Submitted to the National Science Foundation. *The IRIS Consortium*, 63 pp.

*Wells, RK., Giammar, D., Skemer, P. (2016) Sample library of natural and artificial basalts. *National Energy Transfer Lab, Energy Data eXchange*

Bacchav, M., Dong, Y., Skemer, P., Marquis, E., (2015) Atomic Scale Investigation of Orthopyroxene and Olivine Grain Boundaries by Atom Probe Tomography, Microscopy and Micronanalysis 21 (Suppl. 3) doi:10.1017/S1431927615007369

Tullis, TE; Chester, F; Skemer, P; Zhu, W; Burgmann, R (2012) Advancing Experimental Rock Deformation Research: Scientific, Personnel, and Technical Needs, *Submitted to NSF*

Skemer, P., Karato, S-i., (2007) Reply to Comment on "The misorientation index: Development of a new method for calculating the strength of lattice-preferred orientation," *Tectonophysics* 441:119-120.

GRANT SUPPORT AND PI STATUS

** denotes grants and contracts that are currently active*

- ⇒ Total to Skemer: $4.45M
- ⇒ Total to Washington University (excluding MRI): $5.95M
- ⇒ Total to Washington University (including MRI): $8.02M

*1/2026-12/2026: Developing Standard Procedures for Imaging and Analysis of Geologic Materials Using Atomic Resolution STEM
IMSE Seed Funding – $8,792
PI

*1/2026-12/2028: Collaborative Research: REU Site: Research Opportunities in Rock Deformation
NSF Education and Human Resources, EAR-2447634–$443,481 to Skemer
PI, with Lars Hansen and Heather Savage (PIs)

*8/2024-7/2027: Collaborative Research: GLOW: CSEDI: Compositional controls on shear localization and the development of plate tectonics on Earth and rocky planets
NSF CSEDI, EAR-2348666 – $378,188 to Skemer
PI, with Brad Foley (PI)

5/2023-4/2024: A geospatial AR framework for Earth science field research
Taylor Geospatial Institute – $50,000
Co-I, with Alex Bradley (PI)

5/2023-4/2024: Advancing EEPS leadership in Geospatial Sciences
McDonnell Center for the Space Sciences – $49,309
Co-I, with Alex Bradley (PI), Claire Masteller (Co-I), and Roger Michaelides (Co-I)

7/2022-6/2023: Development of an internal load cell for accurate rock deformation experiments
McDonnell Center for the Space Sciences – $49,731
PI, with Erik Henriksen and. Chong Zu (co-PIs)

*8/2022-7/2025 (NCE to 8/2027): Collaborative Research: CSEDI: Integrating Seismic Anisotropy, Mantle Flow, and Rock Deformation in Subduction Zone Settings
NSF CSEDI, EAR-2153910 – $321,515 to Skemer
PI, with Maureen Long and Laurent Montesi (PIs)

*8/2022-7/2025 (NCE to 8/2026): Development of New Techniques for Rock Deformation Using the Large Volume Torsion Apparatus
NSF Instrumentation and Facilities, EAR-2149427–$305,553
PI

1/2022-12/2024 (NCE to 12/2025): REU Site: Collaborative Research: Research Opportunities in Rock Deformation
NSF Education and Human Resources, EAR-2050372 –$359,067 to Skemer
PI, with Lars Hansen and Heather Savage (PIs)

9/2021-8/2022: Building foundations for a geospatial research and education infrastructure at Washington University in St. Louis: a collaboration with InfraLytik, T-REX GeoSeed Program – $20,000
Co-I, with Alexander Bradley (PI) and Claire Masteller (Co-I)

7/2021-6/2022: Acquisition of a UAV Deployable Lidar System for Washington University
McDonnell Center for the Space Sciences and International Center for Energy, Environment, and Sustainability at Washington University – $107,164
Co-I, with Alexander Bradley (PI)

2/2020-1/2021 (NCE to 08/22): Acquisition of a Rock Deformation Apparatus to Study Rheology and Microstructure
NSF Instrumentation and Facilities, EAR-1945763 – $152,520
PI, with Hélène Couvy (co-PI)

6/2019-5/2021 (NCE to 05/23): Collaborative Research: Theoretical and Experimental Investigation of Grain Damage and the Formation of Plate Boundaries
NSF Geophysics, EAR-1853155 – $167,000 to Skemer
PI, with David Bercovici and Elvira Mulyukova (PIs)

5/2019-9/2023 (NCE to 05/23): Rheology and microstructural evolution of serpentine
NSF GeoPRISMS, EAR-1848824 – $311,367
PI

9/2018-4/2020: Augmented Reality Tools for Visualization, Teaching, and Data Exploration in the Planetary Sciences
Missouri Space Grant Consortium – $14,153
PI, with Ray Arvidson (co-I)

8/2018-9/2019: Satellite observations and modeling of surface meltwater flow and its impact on ice shelves
NSF Antarctic Glaciology, EAR-1743310 – $33,215
Wash U subcontract from grant to Lamont Doherty Earth Observatory (J. Kingslake – PI)

11/2017-10/2019: Conference on Experimental Studies of Subduction Zone Processes, NSF-Petrology and Geochemistry, EAR-1757791 – $39,215
PI

09/2017 – 08/2020 (NCE to 08/21): Earthcube Data Infrastructure: Collaborative Proposal: A Unified Experimental – Natural Digital Data System for Analysis of Rock Microstructure
NSF Earthcube, ICER-1639641 – $126,335
PI

09/2017 – 08/2020 (NCE to 8/22): Using Micromechanical Experiments to Investigate the Rheology of Geologic Materials
NSF Tectonics, EAR-1726165 – $447,438 ($199,336 to Skemer)
PI, with Katherine Flores (PI) and Rohan Mishra (PI)

08/2017 – 07/2018: Reaction-driven fracturing for enhanced carbon sequestration in mafic and ultramafic rocks,
Washington University CCCU - $41,195
PI, with Daniel Giammar (co-I)

07/2016 – 06/2017: Classroom Innovation Grant: Freshman Seminar: Geology in the Field
Washington University College of Arts and Sciences - $5,000 ($2,500 to Skemer)
Co-PI, with Alexander Bradley (co-PI)

08/2014 – 07/2017: Early Career: Development of a new rock deformation apparatus for investigating Earth's upper mantle
NSF Instrumentation and Facilities, EAR-1360584 - $68,420
PI, with Hélène Couvy (co-PI)

09/2014 – 03/2018: Impact of microstructure on the containment and migration of CO2 in fractured basalts
DOE/National Energy Technology Laboratory - $1,284,701 ($231,272 to Skemer)
Co-I with Daniel Giammar (PI), Mark Conradi, Brian Ellis (University of Michigan), Sophia Hayes

01/2014 – 01/2019 (NCE to 01/2020): CAREER: Microphysical evolution of highly sheared polymineralic rocks
NSF Geophysics, EAR-1352306 - $600,000
PI

2012-2017: Two-stage deformation of olivine: Effects of deformation history on seismic anisotropy
NSF Geophysics, EAR-1141795, $266,664
PI

2012-2015: MRI: Acquisition of SIMS instrument
NSF EAR-1229370 - $2,071,491
Co-PI with David Fike (PI), Jeffrey Catalano, Christine Floss, & Ernst Zinner (Co-PIs)

09/2011-09/2013: EAGER: Development of a new rock deformation apparatus for investigating Earth's upper mantle
NSF Instrumentation and Facilities, EAR-1139706, $50,000
PI

2010-2013: Development of unique NMR tools for utilization and sequestration of CO2
Washington University CCCU, $225,000 ($16,123 to Skemer)
Co-I, with Mark Conradi (PI) & Sophia Hayes

2009-2013: Deformation and microstructural evolution of harzburgite
NSF Geophysics, EAR-0911289, $285,000
PI