Gregory C. Beroza

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Positions

Wayne Loel Professor of Earth Sciences, Stanford University	2008-present
Professor of Geophysics, Stanford University	2003-present
Associate Professor of Geophysics, Stanford University	1994-2003
Assistant Professor of Geophysics, Stanford University	1990-1994
Postdoctoral Associate, Massachusetts Institute of Technology	1989-1990

Education

Ph.D.	Geophysics, Massachusetts Institute of Technology	1989
B.S.	Earth Sciences, University of California at Santa Cruz	1982

Honors and Awards

Elected to the National Academy of Sciences	2022
AGU Gutenberg Lecture	2021
Humboldt Research Award (Humboldt Prize), Alexander von Humboldt Foundation	2020
Lawson Lecture, University of California Berkeley	2015
Beno Gutenberg Medal, European Geosciences Union	2014
Citation, Geophysical Research Letters, 40th Anniversary Collection	2014
IRIS/SSA Distinguished Lecture	2012
RIT Distinguished Lecture	2011
Wayne Loel Professorship of Earth Sciences	2009
Brinson Lecture, Carnegie Institution of Washington	2008
Fellow, American Geophysical Union	2008
NSF Presidential Young Investigator Award	1991
NSF Graduate Fellowship	1983
ARCS Foundation Scholarship	1983
UCSC Chancellor's Award for Undergraduates	1983
Highest Honors in Major	1982
Undergraduate Thesis Honors	1982

Professional Activities (Past 5 years)

Deputy Director; Co-Director, Southern California Earthquake Center	2007-2014; 2014-present
Co-Director, Stanford Center for Induced and Triggered Seismicity	2013-present
Chair, USGS Scientific Earthquake Studies Advisory Committee	2018-present
Member, US-Japan (UJNR) Panel on Earthquake Research	2018-present
NEHRP Advisory Committee on Earthquake Hazards Reduction	2018-present

Handling Editor, *Seismica* (Diamond Open Access Journal)	2022-present
Guest Editor, Special AGU Volume on Machine Learning and Solid Earth	2020-2022
External Review Panel, SNL Low-Yield Nuclear Modeling	2021
LANL Capability Review Committee for the Science of Signatures Focus Area	2021
Georgia Tech School of Earth and Atmospheric Sciences Academic Program Review	2021
International Scientific Committee, Mechanistic Machine Learning and Digital Twins	2021
NAS Committee on Catalyzing Opportunities for Research in Earth Sciences (CORES): A Decadal Survey for NSF's Division of Earth Sciences	2018-2020
AGU Expert Outreach Network (AEON)	2013-present
California Earthquake Prediction Evaluation Council	2012-present
IRIS-Industry Working Group	2015-present
Senior Advisor, Unconventional Seismic Inc.	2014-present
External Review Committee, Dept. of Earth and Planetary Science, Univ. Tokyo	2019-2020
Visiting Committee, Dept. of Earth, Environ., and Planet. Sci., Brown University	2018-2019
Organizing Committee, Workshop on Machine Learning in Solid Earth Geoscience	2018-2019
Associate Editor, *Science Advances*	2016-2018
Chair, USGS Advanced National Seismic System Steering Committee	2013-2018
USGS Scientific Earthquake Studies Advisory Committee	2013-2018
California Seismic Safety Commission	2013-2017
AGU Seismology President-Elect/President/Past-President	2013-2014/2015-2016/2017-2018
Organizing Committee, SCEC/ERI/DPRI Summer School on Earthquake Science	2016
External Review Panel, Sandia National Laboratory Signal Analysis Program	2016
External Review Panel, LLNL Geophysical Monitoring Program	2016
IRIS Grand Challenge Committee on Faulting and Deformation Processes	2015-2016

2022 Invited Talks (8): Data-driven physical simulation seminar series (LLNL); IS Terre (Grenoble, France); École Normale Supérieure (Paris, France); Deutschen Geophysikalischen Gesellschaft, Munich, Germany (remote); Seismological Society of America (Bellevue, Washington); Japan Geophysical Union (Chiba, Japan); Turkish-German Symposium on Seismotectonic Research in the Marmara Region (Istanbul, Türkiye (remote); 3rd International Conference on Coupled Processes in Fractured Geological Media: Observation, Modeling, and Application (Berkeley, California)

2021 Invited Talks (15): Plenary Speaker NITRD Big Data Interagency Working Group Virtual Workshop on Pioneering the Future of Federally Supported Data Repositories (remote); ERC TECTONIC-FEAR Seminars on Earthquake Physics, Sapienza, Rome (remote); SSA Special Session on "Data Fusion and Uncertainty Quantification in Shallow Crust Characterization and Modeling" (remote); Center for Nonlinear Studies and LANL workshop on "Machine Learning in Solid Earth Geosciences," Santa Fe (remote); Machine Learning to Illuminate the Earth, KAUST (remote); Peking University Summer School on Summer School on Mathematical AI (remote); The Physics of Earthquake Faulting: Machine Learning to Illuminate Earthquake Precursors and Predict Laboratory

Earthquakes, Sapienza (Rome, Italy); 3rd School on "Earthquakes: Nucleation, Triggering, and Relationships With Aseismic Processes" (Cargese, France); Tel Aviv University Geophysics Colloquium (remote); ETH Geophysical institutes colloquium (Zurich, Switzerland); International Symposium for the 4th anniversary of the Pohang Earthquake, Pohang, South Korea (remote); Geo-Forschung Zentrum Potsdam (Potsdam, Germany); Ludwig-Maximilians-Universität (remote); Université de Neuchâtel (Neuchâtel, Switzerland); Freie Universitaet (Berlin, Germany); AGU Gutenberg Lecture (remote).

2020 Invited Talks (7): University of Chile (Santiago), Chile; G2Net Second Training School on Gravitational Waves, Geophysics, and Computational Science (Valetta, Malta); Powell Center Workshop on Earthquake Monitoring with Machine Learning (Fort Collins, Colorado); Mexico Through Earthquakes: More than 100 Years of Monitoring and Regulation (Mexico City, Mexico); Dept. of Computational Mathematics, Michigan State University (East Lansing, Michigan); Georgia Tech (Atlanta, GA); Distinguished Speaker Series, Dept. of Earth and Environmental Sciences, Michigan State University (East Lansing, Michigan).

Administrative Activities (Past 5 years)

Chair, Stanford VPDoR Limited Submissions Faculty Review Committee	2022-present
Stanford Judicial Panel Pool	2021-present
Department Admissions Committee	2018-present
Stanford Sustainability Blueprint Advisory Committee	2020-2021
Stanford IDEAL Initiative Working Group	2018-2021
Chair, Stanford Earth Postdoctoral Fellows Committee	2020-2021
Stanford University Title IX Sexual Misconduct Review Panel	2015-2020
Stanford Earth Council	2015-2020
Stanford Earth, Energy, and Environmental Sciences Building Executive Committee	2015-2017
Stanford School of Earth, Energy, and Environmental Sciences Ambassador	2014-2017

Affiliations/Memberships

American Geophysical Union	1983-present
Seismological Society of America	1984-present
Society of Exploration Geophysics	2008-present
American Association for the Advancement of Science	2010-present
European Geosciences Union	2014-present
Japan Geosciences Union	2018-present

Research Advisor for Undergraduate Students (with current positions)

Karen Felzer (BS 1998) Research Scientist, U.S. Geological Survey, Pasadena

Brandon Schow (BS, 2015) Database Engineer, Hensel Phelps, Colorado.

Research Advisor for Graduate Students (with current positions)

Trey Knudsen (PhD 2025 – expected) Graduate Student, Stanford University

Rosamiel Ries (PhD 2025 – expected) Graduate Student, Stanford University

Albert Aguilar (PhD 2024 – expected) Graduate Student, Stanford University

Ian McBrearty (PhD 2024 – expected) Graduate Student, Stanford University

Ryan Schultz (PhD 2022 – expected) Graduate Student, Stanford University

Yongsoo Park (PhD 2022 – expected) Graduate Student, Stanford University

Kaiwen Wang (PhD 2021) Postdoctoral Associate, Lamont-Doherty Earth Observatory

Weiqiang Zhu (PhD 2021) Postdoctoral Associate, Caltech

Marina Kim (MS 2021) Unknown

Fatimah Al Ismail (PhD 2020) Research Scientist, ARAMCO

Shanna Chu (PhD 2020) Postdoctoral Associate, US Geological Survey, Mountain View

Yixiao Sheng (PhD 2020) Postdoctoral Associate, ISTerre, Universite des Alpes

Cyndi Kelly (PhD 2018) Unknown

Clara Yoon (PhD 2018) Research Geophysicist, US Geological Survey, Pasadena

Karianne Bergen (PhD 2018) Assistant Professor, Brown University

Sarah Barrett (PhD 2015) Earthquake Specialist, SwissRE

Ana Christina Aguiar (PhD 2015) Staff Researcher, Lawrence Livermore National Laboratory

Marine Denolle (PhD 2013) Assistant Professor, University of Washington

Justin R. Brown (MS 2008, PhD 2012) Deceased

Annemarie Baltay (PhD 2011) Research Geophysicist, US Geological Survey, Mountain View

Seok Goo Song (PhD 2007) Research Scientist, Earthquake Research Center, Korea Institute of Geoscience and Mineral Resources

David R. Shelly (PhD 2007) Research Geophysicist, US Geological Survey, Golden

Justin Rubinstein (MS 2002, PhD 2006) Research Geophysicist, US Geological Survey, Mountain View

Eva Zanzerkia (PhD 2003) Program Manager in Seismology, National Science Foundation

Xyoli Pérez-Campos (MS 1999, PhD 2002) Professor, Universidad National Autonoma de Mexico

P. Martin Mai (MS 1999, PhD 2001) Professor, King Abdullah University of Science and Technology

David P. Schaff (PhD 2001) Associate Research Professor, Lamont-Doherty Earth Observatory

Mariagiovanna Guatteri (MS 1999, PhD 2000) CEO, Swiss Re Insurance-Linked Investment Advisors Corporation

Douglas A. Dodge (PhD 1997) Geophysicist, Lawrence Livermore National Laboratory

Brian P. Cohee (PhD 1996) Senior Vice President of Data Sciences, Mixpo

Martijn Verwoerd (MS 1996) Geophysicist, Shell Oil

Harold Mendoza (MS 1995) Professor, Bakersfield College

Research Advisor for Postdoctoral Scholars (with current positions)

Artemii Novoselov	(2022-present) Postdoctoral Fellow, Stanford University
Shujuan Mao	(2021-present) Thompson Postdoctoral Fellow, Stanford University
Lei Yang	(2018-2021) Assistant Professor, IGG Chinese Academy of Sciences, Beijing

Mostafa Mousavi	(2017-2019) Research Scientist, Google; Adjunct Professor, Stanford University
Xin Liu	(2016-2020) Research Scientist, JAMSTEC, Yokosuka, Japan
Lise Retailleau	(2017-2020) Deputy Physicist, Observatoire Volcanologique du Piton de la Fournaise, France
Zack Spica	(2015-2019) Assistant Professor, University of Michigan
Nana Yoshimitsu	(2016-2018) Assistant Professor, Kyoto University
Rob Skoumal	(2016) Research Scientist, U.S. Geological Survey
Yihe Huang	(2014-2016) Assistant Professor, University of Michigan
Nori Nakata	(2013-2016) Principal Research Scientist, MIT
Julian Lozos	(2014-2015) Assistant Professor, Cal State University, Northridge
Amanda Thomas	(2013-2015) Associate Professor, University of Oregon
Pierre Boué	(2014-2015) Assistant Professor, Université Grenoble Alpes, Grenoble
German Prieto	(2007-2008) Associate Professor, Universidad Nacional de Colombia
Shuo Ma	(2006-2008) Associate Professor, San Diego State University
Hiroe Miyake	(2003) Associate Professor, ERI, University of Tokyo
Anu Venkataraman	(2002-2004) Geophysicist, Exxon-Mobil
Mariagiovanna Guatteri	(2002-2003) Head of Insurance-Linked Securities, Swiss Re
Xyoli Pérez-Campos	(2002) Professor, Universidad Nacional Autonoma de Mexico
Jeff McGuire	(2001-2002) Research Scientist, US Geological Survey, Menlo Park
Felix Waldhauser	(2000) Research Scientist, Lamont-Doherty Earth Observatory

Honors and Awards (Advisees)

David Shelly (grad student)	Keiiti Aki Early Career Award (AGU)	2008
Karen Felzer (undergrad student)	Charles F. Richter Early Career Award (SSA)	2009
German Prieto (postdoc)	Keiiti Aki Early Career Award (AGU)	2010
David Shelly (grad student)	Charles F. Richter Early Career Award (SSA)	2011
David Shelly (grad student)	Presidential Early Career Award (US Government)	2011
David Shelly (grad student)	James B. MacElwane Medal (SSA)	2012
Annemarie Baltay (grad student)	Charles F. Richter Early Career Award (SSA)	2017
Nori Nakata (postdoc)	Young Scientist Award (SSJ)	2017
Hiroe Miyake (postdoc)	Early Career Award (JSPS)	2018
Amanda Thomas (postdoc)	Charles F. Richter Early Career Award (SSA)	2018
Xyoli Pérez-Campos (grad student)	Early-to-Mid Career Alumni Award (Stanford)	2019
Annemarie Baltay (grad student)	Presidential Early Career Award (US Government)	2019
Marine Denolle (grad student)	Charles F. Richter Early Career Award (SSA)	2019
Mostafa Mousavi (postdoc)	Charles F. Richter Early Career Award (SSA)	2021

Publications

2022 Ben-Zion, Y., G. Beroza, M. Bonhoff, A. Gabriel, and M. Mai, A grand challenge international infrastructure for earthquake sciences, *Seismol. Res. Lett.* (submitted).

2022 Scotto di Uccio, F., A. Scala, G. Festa, M. Picozzi, and G. C. Beroza, Comparing and integrating artificial intelligence and similarity search detection techniques for seismic sequences in Southern Italy (submitted).

2022 Ide, S. and G. C. Beroza, Slow Earthquake Scaling Revisited, *Nature* (submitted).

2022 Martínez-Garzón, P., G. C. Beroza, G. M. Bocchini, M. Bohnhoff, Stress loading from sea level increases can trigger earthquake sequences in a hydrothermal system near Istanbul, *Geophys. Res. Lett.* (submitted).

2022 Zhu, W., A. B. Hou, R. Yang, A. Datta, S. Mostafa Mousavi, W. L. Ellsworth, and G. C. Beroza QuakeFlow: A Scalable Machine-learning-based Earthquake Monitoring Workflow with Cloud Computing, *Geophys. J. Int.* (in revision).

2022 Schultz, R., A. M. Muttendam-Bos, W. Zhu, G. C. Beroza, and W. L. Ellsworth, Induced Seismicity Red-Light Thresholds for Enhance Geothermal Prospects in the Netherlands, *Geothermics* (in revision).

2022 Mancini, S., M. Segou, M. J. Werner, T. Parsons, G. Beroza, and L. Chiaraluce, On the Use of High-Resolution and Deep-Learning Seismic Catalogs for Short-Term Earthquake Forecasts: Potential Benefits and Current Limitations, *J. Geophys. Res.* (in revision).

2022 Mousavi, M. and G. C. Beroza, Machine Learning in Earthquake Seismology, *Annu. Rev. Earth. Planet. Sci.* (in press).

2022 McBrearty, I. A. and G. C. Beroza, Earthquake Location and Magnitude Estimation with Graph Neural Networks, *Proceedings of IEEE International Conference on Image Processing* (in press).

2022 Park, Y., G. C. Beroza, and W. L. Ellsworth, Basement fault activation before larger earthquakes in Oklahoma and Kansas, *The Seismic Record*, **2** (3): 197–206. doi: https://doi-org.stanford.idm.oclc.org/10.1785/0320220020.

2022 Mousavi, M. and G. C. Beroza, Deep-Learning Seismology, *Science,* **377**, 607, doi:10.1126/science.abm4470.

2022 Liu, X., G. C. Beroza, and Y. Ben-Zion, Ambient Noise Attenuation Tomography Reveals an Asymmetric Damage Zone across San Jacinto Fault near Anza, California, *Geophys. Res. Lett*., *49*, e2022GL099562. https://doi.org/10.1029/2022GL099562.

2022 Wang, K., W. Ellsworth, G. C. Beroza, W. Zhu, J. Rubinstein, DevelNet: Earthquake Detection on Develocorder films with Deep Learning: Application to the Rangely Earthquake Control Experiment, *Seismol. Res. Lett.,* doi: https://doi-org/10.1785/0220220066.

2022 Retailleau, L., J.-M. Saurel, M. Laporte, A. Lavayssière, V. Ferrazzini, W. Zhu, G.C. Beroza, C. Satriano, J.-C. Komorowski, OVPF team, Automatic detection for a comprehensive view of Mayotte seismicity, *Comptes Rendus Géoscience,* **354** (S2), 1-18.

2022 Zorzi, A., S. M. Tikoo, G. C. Beroza , and N. H. Sleep, Reevaluating Links Between Meteorite Impacts and Early Cenozoic Global Warming, *Geophys. Res. Lett.* **49**, e2022GL099313. https://doi.org/10.1029/2022GL099313.

2022 Mousavi, M. and G. C. Beroza, A dataset of published journal papers using neural networks for seismological tasks (version 101) [Data set], *Zenodo*, doi.org/10.5281/zenodo.6386952.

2022 Shi, P., F. Grigoli, F. Lanza, G C. Beroza, L. Scarabello, and S. Wiemer, MALMI: an Automated Earthquake Detection and Location Workflow based on Machine Learning and Waveform Migration, *Seismol. Res. Lett.,* doi: https://doi.org/10.1785/0220220071.

2022 Zhu, W., I. W. McBrearty, S. Mostafa Mousavi, W. L. Ellsworth, and G. C. Beroza, Earthquake Phase Association using a Bayesian Gaussian Mixture Model, *J. Geophys. Res.,* **127***, e2021JB023249,* doi: 10.1029/2021JB023249.

2022 Yang, L., X. Liu, W. Zhu, L. Zhao, and G. C. Beroza, Towards improved urban earthquake monitoring through deep-learning-based noise suppression, *Science Advances,* **8** (15),

doi:10.1126/sciadv.abl3564.

2022 Zhu, W., K. S. Tai, S. Mostafa Mousavi, P. Bailis, and G. C. Beroza, An End-to-End Earthquake Detection Method for Joint Phase Picking and Association using Deep Learning, *J. Geophys. Res.,* **127**, e2021JB023283. https://doi.org/10.1029/2021JB023283.

2022 Schultz, R., W. L. Ellsworth, and G. C. Beroza, Statistical bounds on how induced seismicity stops, *Scientific Reports*, **12**(1), 1-11.

2022 Chu, S. and G. C. Beroza, Aftershock productivity of intermediate-depth earthquakes in Japan, *Geophys. J. Int,* **2***,* ggac024, https://doi.org/10.1093/gji/ggac024.

2022 Retailleau, L., J.-M. Saurel, W. Zhu, C. Satriano, G. C. Beroza, S. Issartel, P. Boissier, OVPF Team, OVSM Team, A Wrapper to Use a Machine-Learning-Based Algorithm for Earthquake Monitoring, *Seismol. Res. Lett.,* https://doi.org/10.1785/0220210279.

2022 Zhu, W., K. Xu, E. Darve, B. Biondi, and G. C, Beroza, Integrating Deep Neural Networks with Full-waveform Inversion: Reparametrization, Regularization, and Uncertainty Quantification, *Geophysics*, **87**: R93-R109, https://doi.org/10.1190/geo2020-0933.1.

2021 Schultz, R., G. Beroza, and W. Ellsworth, A strategy for choosing red-light thresholds to manage hydraulic fracturing induced seismicity in North America, *J. Geophys Res.,* **126**, e2021JB022340. https://doi.org/10.1029/2021JB022340.

2021 Zhou, P., W. L. Ellsworth, H. Yang, Y.J. Tan, G. C. Beroza, M. H. Sheng, and R. Chu, Machine-learning-facilitated earthquake and anthropogenic source detections near the Weiyuan Shale Gas Blocks, Sichuan, China, *Earth and Planetary Physics*, 5(6), 501-519, http://doi.org/10.26464/epp2021053.

2021 Beroza, G. C., M. Segou, and S. M. Mousavi, Machine learning and earthquake forecasting – next steps, *Nature Comm.,* **12,** 4761 (2021). doi:10.1038/s41467-021-24952-6.

2021 Liu, X., G. C. Beroza, L. Yang, and W. L. Ellsworth, Ambient noise Love wave attenuation tomography for the LASSIE array across the Los Angeles Basin, *Science Advances,* **7** (22), eabe1030, doi:10.1126/sciadv.abe1030.

2021 Tan, Y. J., F. Waldhauser, W. L. Ellsworth, M. Zhang, W. Zhu, M. Michele, L. Chiaraluce, G. C. Beroza, and M. Segou, Machine-Learning-Based High-Resolution Earthquake Catalog Reveals How Complex Fault Structures Were Activated During the 2016-2017 Central Italy Sequence, *The Seismic Record*, 2021; **1**(1) 11–19, doi: 10.1785/0320210001.

2021 Schultz, R., G. C. Beroza, and W. L. Ellsworth, A Risk-Based Approach for Managing Hydraulic-Fracturing Induced Seismicity, *Science,* **372**, 6541, 504-507, doi:10.1126/science.abg5451.

2021 Zhu, W., E. Darve, K. Xu, G. Beroza, A General Approach to Seismic Inversion with Automatic Differentiation, *Computers and Geosciences,* **151**, 104751, doi: 10.1016/j.cageo.2021.104751.

2021 Grigoli, F., W. Ellsworth, M. Zhang, M Mousavi, S. Cesca, C. Satriano, G. Beroza, and S. Wiemer, Single station location of seismic clusters by solving a distance geometry problem, *Geophys. J. Int.,* **225***, 1, 608-626, doi:10.1093/gji/ggaa607.*

2021 Sheng, Y., Q. Kong, and G. C. Beroza, Earthquake Ground Motion Spatial Correlation: Network Analysis with the San Jacinto Seismic Nodal Array, *Geophys. J. Int.,* **225**, 1704–1713.

2021 Retailleau, L., and G. C. Beroza, Towards Structural Imaging using Seismic Ambient Field Correlation Artifacts, *Geophys. J. Int.,* **225***,* 1453–1465.

2021 Sheng, Y., W. L. Ellsworth, A. Lellouch, and G. Beroza, Depth constraints on coseismic velocity changes from frequency-dependent measurements of repeating earthquake waveforms, *J. Geophys. Res.*, **126**, e2020JB020421.

2021 Schultz, R., V. Quitoriano, D. J. Wald, and G. C. Beroza, Quantifying nuisance ground motion thresholds for induced earthquakes, *Earthquake Spectra*, doi:10.1177/8755293020988025.

2021 Yang, L. Liu, X., and G. C. Beroza, Revisiting evidence for widespread seismicity in the upper mantle under Los Angeles, *Science Advances,* **7**, eabf2862 (2021).

2021 Johnson, P. A., L. J. Pyrak-Nolte, B. Rouet-LeDuc, G. C. Beroza, C. Marone, C. Hulbert, A. Howard, P. Singer, D. Gordeev, D. Karaflos, C. J. Levinson, P. Pfeiffer, K. M. Puk, and W. Reade, Laboratory earthquake forecasting: a machine learning competition, *Proc. Nat. Acad. Sci.*, **118**, No. 5, e2011362118, doi: 10.1073/pnas.2011362118.

2020 Zhu, W., S. M. Mousavi, and G. C. Beroza, Seismic Signal Augmentation to Improve, Generalization of Deep Neural Networks, *Chapter 4 in Advances in Geophysics – Special Issue on Machine Learning*, **61**, 151-176, doi: 10.1016/bs.agph.2020.07.003.

2020 Curtis, A., D. O'Malley, G. C. Beroza, P. A. Johnson, E. Li, and E. Haber, Tackling 21st century geoscience problems with machine learning, *Eos,* **101***,* https://doi.org/10.1029/2020EO150184.

2020 Beroza, G. C., A. N. Flores, D. Glickson, K. W. Huntington, C. Lithgow-Bertelloni, D. J. Whitney, J. A. Yoder, and the members of the Catalyzing Opportunities for Research in the Earth Sciences (CORES) Committee, Time for Earth, *GSA Today*, **30** (9), 20.

2020 Mousavi, S. M., W. Zhu, W. L. Ellsworth, and G. Beroza, Earthquake Transformer: An Attentive Deep-learning Model for Simultaneous Earthquake Detection and Phase Picking, *Nature Communications,* **11,** 3952, https://doi-org.stanford.idm.oclc.org/10.1038/s41467-020-17591-w.

2020 Mousavi, S. M. and G. C. Beroza, Bayesian-deep-learning estimation of earthquake location from single-station observations, *IEEE Transactions on Geoscience and Remote Sensing*, **58** (11), 8211-8224, doi: 10.1109/TGRS.2020.2988770.

2020 Wang, K., W. L. Ellsworth, and G. C. Beroza, Revisiting the Timpson induced earthquake sequence: a system of two parallel faults, *Geophy. Res. Lett.*, **47**, e2020GL089192. doi-org.stanford.idm.oclc.org/10.1029/2020GL089192.

2020 Chai, C., M. Maceira, H. J. Santos-Villalobos, S. V. Venkatakrishnan, M. Schoenball, W. Zhu, G. C. Beroza, C. Thurber, and EGS Collaboration Team, Transfer-Learning Aided Double-Difference Seismic Tomography at Meter-Scale: Application to a geothermal project, *Geophys. Res. Lett*., **47**, e2020GL088651.

2020 National Academies of Sciences, Engineering, and Medicine. 2020. *A Vision for NSF Earth Sciences 2020-2030: Earth in Time*. Washington, DC: The National Academies Press. https://doi.org/10.17226/25761.

2020 Schultz, R., G. C. Beroza, W. L. Ellsworth, and J. Baker, Risk-informed recommendations for managing hydraulic fracturing induced seismicity via traffic light protocols, *Bull. Seismol. Soc. Am*., doi-org.stanford.idm.oclc.org/10.1785/0120200016.

2020 Al-Ismail, F., W. L. Ellsworth, and G. C. Beroza, Empirical and synthetic approaches to the calibration of the local magnitude scale, ML, in southern Kansas, *Bull. Seismol. Soc. Am.*, **110** (2), 689-697.

2020 Park, Y., S. M. Mousavi, W. Zhu, W. L. Ellsworth, and G. C. Beroza, Machine learning based analysis of the Guy-Greenbrier, Arkansas earthquakes: a tale of two sequences, *Geophys. Res. Lett.*, **47** (6), doi:10.1029/2020GL087032.

2020 Spica, Z. J., M. Perton, E. R. Martin, G. C. Beroza, and B. Biondi, Urban seismic site characterization by fiber-optic seismology, *J. Geophys. Res.*, **125**, doi: 10.1029/2019JB018656.

2020 Liu, X. and G. C. Beroza. Quantifying the Effects of Nondiffuse Noise on Ballistic and Coda Wave Amplitude from Variances of Seismic Noise Interferometry in Southern California, *J. Geophys. Res.*, **125**, e2019JB017617. https://doi.org/ 10.1029/2019JB017617.

2020 Mousavi, S. M., and Beroza, G. C. A machine-learning approach for earthquake magnitude estimation, *Geophys. Res. Lett.*, **47**, e2019GL085976. https://doi.org/ 10.1029/2019GL085976.

2019 Perton, M., Z. Spica, R. Clayton, and G. C. Beroza, Shear wave structure of a transect of the Los Angeles Basin from multimode surface waves and H/V spectral ratio analysis, *Geophys. J. Int.,* **220,** 415–427.

2019 Zhang, M., W. L. Ellsworth, and G. C. Beroza, Rapid earthquake association and location, *Seismol. Res Lett.* **90** (6), 2276-2284.

2019 Chu, S., G. C. Beroza, and W. L. Ellsworth, Source parameter variability of intermediate-depth earthquakes in Japanese subduction zones, *J. Geophys. Res.,* **124**, 8704-8725.

2019 Mousavi, S. M., Y. Sheng, W. Zhu, and G. C. Beroza, Stanford EArthquake Dataset (STEAD): A global data set of seismic signals for AI, *IEEE Access,* 1-13, doi.org:10.1109/ACCESS.2019.2947848.

2019 Yoon, C. E., W. L. Ellsworth, G. C. Beroza, K. J. Bergen, K. Rong, H. Elezabi, P. Bailis, and P. Levis, Unsupervised large-scale search for similar earthquake signals, *Bull. Seismol. Soc. Am. Bull. Seismol. Soc. Am.,* doi:10.1785/0120190006.

2019 Liu, X., G. C. Beroza, and N. Nakata, Isolating and Suppressing Non-Diffuse Contributions to Ambient Seismic Field Correlations, *J. Geophys, Res.,* **124** (9), 9653-9663

2019 Zhu, W., A. M. Mousavi, Y. Sheng, and G. C. Beroza, Seismic Signal Denoising and Decomposition Using Deep Neural Networks, *IEEE Transactions on Geoscience and Remote Sensing*, 57(11), 9476-9488, doi:10.1109/TGRS.2019.2926772.

2019 Mousavi, S. M., W. Zhu, Y. Sheng, and G. C. Beroza, CRED: A Deep Residual Network of Convolutional and Recurrent Units for Earthquake Signal Detection, *Scientific Reports,* **9**:10267, https://doi.org/10.1038/s41598-019-45748-1.

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