

Earth & Environmental Sciences
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Education

- 2006 Ph.D., Geophysics, *Massachusetts Institute of Technology*
Department of Earth, Atmospheric and Planetary Sciences
- 2000 M.A., Geology, *State University of New York, Binghamton*
Department of Geological Sciences
- 1996 B.S., Physics (minor in Mathematics) *University of California, Santa Cruz*
Department of Physics

Professional Positions

- 2015–present Associate Professor, *University of Michigan*
- 2008–2015 Assistant Professor, *University of Michigan*
- 2005–2008 Postdoctoral Scholar, *California Institute of Technology*

Publications

Students supervised by EAH indicated by † (graduate) or ‡ (undergraduate); other students advised by EAH indicated by ⊕

- P1 Medina Luna[†], L., **E.A. Hetland**, & O.L. Walbert[†] Potential ambiguities in the estimation of stress from focal mechanisms: An application to aftershocks of the 2008 Wenchuan earthquake.

submitted:

- S1 Walbert[†], O.L., & **E.A. Hetland**. Inferences of seismogenic stress for northeastern South Island, New Zealand. submitted to *Bull. Seismol. Soc. Am.* 28 Jun 2021.

published:

- 40 Calogero[†], M., **E.A. Hetland**, & R.A. Lange (2020). High-Resolution numerical modeling of heat and volatile transfer from basalt to wall rock: Application to the crustal column beneath Long Valley Caldera, CA. *J. Geophys. Res.*, 125, e2018JB016773. doi:10.1029/2018JB016773.
- 39 He, P., **E.A. Hetland**, N.A. Niemi, Q. Wang, Y. Wen, & K. Ding (2018). The 2016 Mw 6.5 Nura earthquake in the Trans Alai range, northern Pamir: Possible rupture on a back-thrust fault constrained by Sentinel-1A radar interferometry. *Tectonophysics*, doi:10.1016/j.tecto.2018.10.025.

- 38 Hedlin, M.A.H, J. Ritsema, C.D de-Groot-Hedlin, **E.A. Hetland** (2018). A Multidisciplinary Study of the 17 January 2018 Bolide Terminal Burst over Southeast Michigan, *Seismol. Res. Lett.*, 89, 2183-2192, doi:10.1785/0220180157.
- 37 Zhang, Y., G. Zhang, **E.A. Hetland**, H. Zhang, D. Zhao, W. Gong, & C. Qu (2018). Source fault and slip distribution of the 2017 Mw 6.5 Jiuzhaigou, China, earthquake and its tectonic implications. Submitted to *Seismol. Res. Lett.*, 89, 1345-1353, doi:10.1785/0220170255.
- 36 Hines[†], T.T., & **E.A. Hetland** (2017), Revealing transient strain in geodetic data with Gaussian process regression. *Geophys. J. Int.*, 212, doi:10.1093/gji/ggx525.
- 35 He, P., **E.A. Hetland**, Q. Wang, K. Ding, & R. Zou (2017), Coseismic slip in the 2016 Ecuador Mw 7.8 earthquake imaged from Sentinel-1A radar interferometry. *Seismol. Res. Lett.*, 88, doi:10.1785/0220160151
- 34 Zhang, G., Shan, X., Zhang, Y., **E.A. Hetland**, C. Qu, & G. Feng (2016), Blind thrust rupture of the 2015 Mw 6.4 Pishan earthquake in the Northwest Tibetan Plateau by joint inversion of InSAR and seismic data. *J. Asian Earth Sci.*, 132, 118–128, doi:10.1016/j.jseaes.2016.10.005
- 33 Hines[†], T.T., & **E.A. Hetland** (2016), Rheologic constraints on the upper mantle from five years of postseismic deformation following the El Mayor-Cucapah earthquake. *J. Geophys. Res.*, 121, 6809–6826, doi:10.1002/2016JB013114
- 32 Hines[†], T.T. & **E.A. Hetland** (2016), Rapid and simultaneous estimation of fault slip and heterogeneous lithospheric viscosity from postseismic deformation. *Geophys. J. Int.*, 204, 569–582, doi:10.1093/gji/ggv477.
- 31 Zhang, Y., G. Zhang, **E.A. Hetland**, X. Shan, S. Wen, & R. Zou (2016), Coseismic fault slip of the September 16, 2015 Mw 8.3 Illapel, Chile earthquake estimated from InSAR data. *Pure Appl. Geophys.*, 173, 1029. doi:10.1007/s00024-016-1266-3.
- 30 Zhang, G., **E.A. Hetland**, X. Shan, M. Vallè, Y. Liu, Y. Zhang, & C. Qu (2016), Triggered slip on a back reverse fault in the Mw6.8 2013 Lushan, China earthquake revealed by joint inversion of local strong motion accelerograms and geodetic measurements. *Tectonophysics*, 672, 24–33, doi:10.1016/j.tecto.2016.01.031
- 29 Arendt[⊕], C.A., S.M. Aciego, & **E.A. Hetland** (2015), An open source Bayesian Monte Carlo isotope mixing model with applications in earth surface processes. *Geochem. Geophys. and Geosyst.*, 16, 1274–1292, doi:10.1002/2014GC005683.
- 28 Styron, R.H., & **E.A. Hetland** (2015), The weight of the mountains: Constraints on tectonic stress, friction, and fluid pressure in the 2008 Wenchuan earthquake from estimates of topographic loading (2015), *J. Geophys. Res.*, 120, 2697–2716, doi:10.1002/2014JB011338.
- 27 Zhang, G., E.A. Hetland, & X. Shan (2015), Slip in the 2015 Mw 7.9 Gorkha and Mw 7.3 Kodari, Nepal, earthquakes revealed by seismic and geodetic data: Delayed slip in the Gorkha and slip deficit between the two earthquakes, *Seismol. Res. Lett.*, 86, 1578-1586, doi: 10.1785/0220150139.

- 26 Bai, L., L. Medina Luna[†], **E.A. Hetland**, & J.R. Ritsema (2014), Focal depths and mechanisms of Tohoku-Oki aftershocks from teleseismic P wave modeling. *Earthquake Sci.*, doi:10.1007/s11589-013-0036-x.
- 25 **Hetland, E.A.**, & G. Zhang (2014), Effect of shear zones on postseismic deformation with application to the 1997 M_w 7.6 Manyi earthquake. *Geophys. J. Int.*, doi:10.1093/gji/ggu127.
- 24 Styron, R.H., & **E.A. Hetland** (2014), Estimated likelihood of observing an earthquake on a low-angle normal fault. *Geophys. Res. Lett.*, 41, doi:10.1002/2014GL059335.
- 23 Hines[†], T.T., & **E.A. Hetland** (2013), Bias in estimates of lithosphere viscosity from interseismic deformation. *Geophys. Res. Lett.*, 40, 4260–4265, doi:10.1002/grl.50839.
- 22 Meade, B.J., Y. Klinger, & **E.A. Hetland** (2013), Inference of multiple earthquake cycle relaxation time scales from stochastic geodetic sampling of interseismic deformation. *Bull. Seismol. Soc. Am.*, 5, 2824–2835, doi:10.1785/0120130006.
- 21 Medina Luna[†], L., & **E.A. Hetland** (2013), Regional Stresses Inferred from Coseismic Slip Models of the 2008 M_w 7.9 Wenchuan, China, Earthquake. *Tectonophysics*, 584, 43–53, doi:10.1016/j.tecto.2012.03.027.
- 20 Kanda, R.V.S., **E.A. Hetland**, & M. Simons (2012), An asperity model for fault creep and interseismic deformation in northeastern Japan. *Geophys. J. Int.*, doi:10.1093/gji/ggs028.
- 19 Zhan, Z., D. Helmberger, M. Simons, H. Kanamori, W. Wu, N. Cubas, Z. Dupatel, J.-P. Avouac, R. Chu, V.C. Tsai, K.W. Hudnut, S. Ni, **E. Hetland**, & F.H. Ortega Culaciati (2012), Anomalously steep dips in the source region of the 2011 Tohoku-Oki earthquake and possible explanations. *Earth, Planet. Sci. Lett.*, 353–354, 121–133.
- 18 **Hetland, E.A.**, P. Musé, M. Simons, N. Lin, P. Agram, & C. DiCaprio (2012), Multiscale InSAR time series (MInTS) analysis of surface deformation. *J. Geophys. Res.*, 117, B02404, doi:10.1029/2011JB008731.
- 17 Simons, M., S.E. Minson, A. Sladen, F. Ortega, J. Jiang, S.E. Owen, L. Meng, J.-P. Ampuero, S. Wei, R. Chu, D.V. Helmberger, H. Kanamori, **E. Hetland**, A.W. Moore, & F.H. Webb (2011), The 2011 magnitude 9.0 Tohoku-Oki earthquake: Mosaicking the megathrust from seconds to centuries. *Science*, 322, 1421, doi:10.1126/science.1206731.Y
- 16 Lin, Y.-N., M. Simons, **E.A. Hetland**, P. Musè, & C. DiCaprio (2011), A multi-scale approach to estimating topographically-correlated propagation delays in radar interferograms. *Geochem. Geophys. and Geosyst.*, 11, Q09002, doi:10.1029/2010GC003228.
- 15 Liu, Z., S. Owen, D. Dong, P. Lundgren, F. Webb, **E. Hetland**, & M. Simons (2010), Estimation of interplate coupling in the Nankai trough, Japan using GPS data from 1996 to 2006. *Geophys. J. Int.*, 181, 1313–1328, doi:10.1111/j.1365-246X.2010.04600.x.

- 14 Liu, Z., S. Owen, D. Dong, P. Lundgren, F. Webb, **E. Hetland**, & M. Simons (2010), Integration of transient strain events with models of plate coupling and areas of great earthquakes in southwest Japan. *Geophys. J. Int.*, 181, 1292–1312, doi:10.1111/j.1365-246X.2010.04599.x.
- 13 **Hetland, E.A.**, M. Simons, & E.M. Dunham (2010), Postseismic and interseismic deformation due to fault creep I: Model description. *Geophys. J. Int.*, 181, 81–98, doi:10.1111/j.1365-246X.2010.04522.x.
- 12 **Hetland, E.A.**, & M. Simons (2010), Postseismic and interseismic deformation due to fault creep II: Transient creep and interseismic stress shadows on megathrusts. *Geophys. J. Int.*, 181, 99–112, doi:10.1111/j.1365-246X.2009.04482.x.
- 11 Feng[⊕], G., **E.A. Hetland**, X. Ding, Z. Wei, & L. Zhang (2010), Coseismic Fault Slip of the 2008 M_w 7.9 Wenchuan Earthquake Estimated from InSAR and GPS Measurements. *Geophys. Res. Lett.*, 37, L01302, doi:10.1029/2009GL041213.
- 10 Lundgren, P., **E.A. Hetland**, Z. Liu, & E.F. Fielding (2009), Southern San Andreas-San Jacinto fault system slip rates estimated from earthquake cycle models constrained by GPS and InSAR observations. *J. Geophys. Res.*, 114, B02403, doi:10.1029/2008JB005996.
- 9 Song, J.L., **E.A. Hetland**, F.T. Wu, X.K. Zhang, G.D. Liu, & Z.X. Yang (2007), P-wave velocity structure under the Changbaishan volcanic region, China, from wide-angle reflection and refraction data. *Tectonophysics*, 433, 127–139.
- 8 **Hetland, E.A.**, & B.H. Hager (2006), The effects of rheological layering on postseismic deformation. *Geophys. J. Int.*, 166, 272–292.
- 7 **Hetland, E.A.**, & B.H. Hager (2006), Interseismic strain accumulation: Spin-up, cycle invariance, and irregular rupture sequences. *Geochem. Geophys. and Geosyst.*, 7, Q05004, doi:10.1029/2005GC001087.
- 6 **Hetland, E.A.**, & B.H. Hager (2005), Postseismic and interseismic displacements near a strike-slip fault: A 2D theory for general linear viscoelastic rheologies. *J. Geophys. Res.*, 110, B10401, doi:10.1029/2005JB003689.
- 5 **Hetland, E.A.**, & B.H. Hager (2004), Relationship of geodetic velocities to velocities in the mantle. *Geophys. Res. Lett.*, 31, L17604, doi:10.1029/2004GL020691.
- 4 **Hetland, E.A.**, F.T. Wu, & J.L. Song (2004), Crustal structure in the Changbaishan volcanic area, China, determined by modeling receiver functions. *Tectonophysics*, 386, 157–175.
- 3 **Hetland, E.A.**, & B.H. Hager (2003), Postseismic relaxation across the Central Nevada Seismic Belt. *J. Geophys. Res.*, 108(B8), 2394, doi:10.1029/2002JB002257.
- 2 **Hetland, E.A.**, & F.T. Wu (2001), Crustal structure at the intersection of the Ryukyu Trench and the arc-continent collision in Taiwan: Results from an offshore-onshore seismic experiment. *Terr. Atmos. Ocean Sci.*, Suppl. Issue for the Ocean Drilling Program, 231–248.
- 1 **Hetland, E.A.**, & F.T. Wu (1998), Deformation of the Philippine Sea Plate under the Coastal Range, Taiwan: Results from an offshore-onshore seismic experiment. *Terr. Atmos. Ocean Sci.*, 9, 363–378.

technical reports & other:

- R2 Agram, P., R. Jolivet, B. Riel, N. Lin, M. Simons, **E. Hetland**, M.-P. Doin, & C. Lassere (2013), New radar interferometric time series analysis toolbox released. *Eos Trans. Am. Geophys. Union*, 94, 67–70.
- R1 Independent Expert Panel on New Madrid Seismic Zone Earthquake Hazards Report, *National Earthquake Prediction Evaluation Council*. J. Vidale (Chair), G. Atkinson, R. Green, **E. Hetland**, L. Grant Ludwig, S. Mazzotti, S. Nishenko, & L. Sykes, 16 Apr 2011. <http://earthquake.usgs.gov/aboutus/nepec/reports/>

Select Professional Service

2019–present	<i>Remote Sensing</i> , Associate Editor
2019–2020	WInSAR Executive Committee
2018–2019	<i>Remote Sensing</i> , Special Issue: InSAR for Earth Observation, Guest Editor
2014–2020	Computational Infrastructure for Geodynamics, Short-Term Crustal Dynamics working group committee
2017–2019	WInSAR Executive Committee, Secretary
2011	Independent Expert Panel on New Madrid Seismic Zone Earthquake Hazard, National Earthquake Prediction Evaluation Council.
2007–2008	American Geophysical Union, Tectonophysics Program Committee

Select University of Michigan Service

2019–2021	Strategic Planning Committee, EES
2018–2021	Qualifying Exam Committee, Chair, EES
2019–2020	Launch Committee for A. Wright, Mathematics, UM
2018–2020	Executive Committee, EES
2018–2019	Faculty Search Committee, Geology & Geophysics, Chair, EES
2015–2018	LSA IT Faculty Advisory Committee, UM
2014–2018	Computer Committee, Chair, EES
2013–2017	Advanced Research Computing Advisory Team, UM

2015	Faculty Search Committee, Geophysics, EES
2013–2016	Student Awards Committee, EES
2010–2012	Graduate Program & Admissions, EES
2001	Task Force on Mental Health, MIT

Postdocs, Students, & Visiting Scholars Hosted

postdocs: Meredith Calogero (2021), Richard Styron (2013–2014), Guohong Zhang (2012–2013)

graduate students: Eric Szymanski (PhD), Olivia Walbert (PhD), Meredith Calogero (PhD 2021), Trever Hines (PhD 2017), Lorena Medina Luna (PhD 2015), Vera Hehn (MS 2014), Susan West (MS 2014), Nora Lewandowski (MS 2010).

undergraduate students: Erin Connor (2011–present), Emma Springsteen (2019–2010), Yijia Zhang (2019–2010), Cassandra Seltzer (2017–2018), Hannah Rane (2017–2018), Erica Lucas (2015–2017), Michael Rader (2016–2017), Perry Fiero (2016), Larrisa Lu (2015–2016), Raven O'Rourke (2015–2016), Rachel Willis (2015–2016), Seth Johnson (2014–2016), Ann Rosett (2014), Joseph McConeghy (2013), Edwin Tang (2013), Paige DeRaedt (2013), Soon Hoe Lim (2011–2013), Lauren Fitzgerald (2012), Ka Yan Semechah Lui (2009–2011), Gene Yi (2010–2011), Peter Koehler (2009–2010), Samantha Moore (2009–2010), Nattavadee Srisutthiyakorn (2009–2010), Nnoduka Eruchalu (2008), Andrew Rickerby (2008), Benjamin Yang (2007)

visiting scholars hosted: Ping He (2016–2017; Assistant Prof. Wuhan Univ., China), Weidong Li (2015–2016; Associate Prof. Henan Univ. of Tech., China) Richard Styron (2012; PhD student, Univ. of Kansas) Pablo Musè (2010; Assistant Prof. Facultad de Ingeniera, Universidad de la Republica, Uruguay) Guangcai Feng (2009; PhD student, Hong Kong Polytech. Univ.)

Teaching

Data Analysis, Inference, & Estimation (EARTH 468: F20, F19, F18, F17, F16, F15, F14, W14, W12; GeoSci 468: W10, W09)

Tectonophysics (co-taught; EARTH 525: W20, W18, W15, F12; GeoSci 525: W11)

When Earth Attacks: The Science Behind Natural Disasters (EARTH 108: W19, F18, W18, F15, W15, F14, S14, W14, F13, S13, W13, F12, S12; GeoSci 108: W11, F10, F09)

Natural Hazards (EARTH 147: W18, W16; GeoSci 147: F10)

Natural & Environmental Hazards: Uncertainties, Risks, & Forecasts (EARTH/ENVIRON 230: W21, W20, W19)

Earth System Dynamics (EARTH/AOSS 321: W15, W14, W13, W12; GeoSci/AOSS 321: W11, W10, W09)

Seminar in Geophysics, Tectonics, & Structure (EARTH 524: F16, *Power-Law Scaling in the Earth Sciences*; F12, *The Earthquake Cycle*; GeoSci 534, F10 *Earthquakes & Erosion*, co-led by Prof. M. Clark)

Michigan Math & Science Summer Scholars, *Predicting & Forecasting Natural Hazards* (2017, 2016, 2015; two-week duration, highschool students)

Community Outreach

2020 Osher Lifelong Learning Institute, Natural Disasters: Vulnerability, Resilience, and a Changing World (shortcourse)

2015 Detroit Free Press, 30 June 2015, interview, M3.3 Battle Creek, MI, earthquake.

2015 Associated Press, 13 May 2015, interview, M7.8 Gorkha and M7.3 Kodari, Nepal earthquakes

2015 WLNS News, Lansing-Jackson, 04 May 2015, video interview, M4.2 Galesburg, MI, earthquake

2015 WDIV, Click on Detroit, 02 May 2015, video interview, M4.2 Galesburg, MI, earthquake

2011 LSA Wire, 24 August 2011, video interview, M5.8 Virginia earthquake & Hurricane Irene

2011 WXYZ, Detroit ABC affiliate, 23 August 2011, live interview on afternoon and 5PM news, M5.8 Virginia earthquake

2011 WWJ/CBS Newsradio 950, 23 August 2011, live interview, M5.8 Virginia earthquake

2011 Wall Street Journal, Mark Maremont, Senior Editor, 23-24 June 2011, background interviews on earthquake hazard in eastern US

2011 WXYZ, Detroit ABC affiliate, 11 March 2011, video interview and live interview, Tohoku-oki, Japan, Earthquake

Professional Society Memberships

American Geophysical Union

Seismological Society of America

Society of Industrial and Applied Mathematicians