

2025 Northern California Earthquake Hazards Workshop

January 28 – January 30, 2025

USGS, virtual from Moffett Field, California

Pacific Standard Time (UTC-8)

Day 1, Tuesday, January 28

9:30-9:45 a.m. **Welcoming Remarks**

Christine Goulet, Earthquake Science Center Director (USGS)

Sarah Minson, Northern California Earthquake Hazards Program Coordinator (USGS)

John Grindle, Workshop Format (Grin Events)

9:45-11:15 a.m. **I'm afraid I can't do that, Dave: responsible use of machine learning and artificial intelligence**

Speakers [15 min each]:

Cody Rucker (University of Oregon) *Physics-informed Neural Networks for Rate-and-State Inversions: Possibilities and Limitations*

Karianne Bergen (Brown University) *Beyond the Buzzwords: What Every Earth Scientist Should Know Before Using AI*

Amir Behzadan (University of Colorado) *Ready for the next disaster? Building trust and fairness into AI-driven disaster damage outcomes*

Sorelle Friedler (Haverford College) *How to successfully use AI for science: experimental design, explainability, and avoiding bias*

Discussion: 30 min

Moderators: **Theresa Sawi** (USGS), **Rob Skoumal** (USGS)

11:15-11:30 a.m. **Break**

11:30 a.m.-12:00 p.m. **What's happening? – News and events in northern California earthquake research**

Speakers [5 min each]:

Nicole Mendoza (SSC) *Earthquake and Climate Change Workshop*

Heidi Tremayne (EERI) *EERI update*

Tim Melbourne (CWU) *CRESCENT update*

Greg Beroza (Stanford) *SCEC update*

Discussion: 10 min

Moderator: **Anne Wein** (USGS)

12:00-1:00 p.m. **Break**

1:00-2:15 p.m. **The fault not in our stars but over here or maybe there: fault geometry and uncertainty in northern California**

Speakers [15 min each]:

Scott Marshall (Appalachian State University) *The SCEC Statewide Community Fault Model (CFM 7.0)*

Vera Schulte-Pelkum (University of Colorado) + **Debi Kilb** (SIO) *Imaging northern California faults across the brittle-ductile transition using receiver function anisotropy, seismicity, and focal mechanisms*

Scott Callaghan (SCEC) *CyberShake results for Northern California*

Discussion: 30 min

Moderators: **Evan Hirakawa** (USGS), **Artie Rodgers** (LLNL)

2:15-2:30 p.m. **Break**

2:30-3:15 p.m. **A month before NCEHW? Time for a MTJ earthquake! – The 2024 M7.0 Offshore Cape Mendocino earthquake Part I** [5 min each]

Moderator: **Sarah Minson** (USGS)

Lori Dengler (Cal Poly Humboldt), **Volkan Sevilgen** (Temblor), **Bo Rong** (UC Berkeley), **Clara Yoon** (USGS), **David Shelly** (USGS GHSC), **Hao Guo** (University of Wisconsin-Madison), **Robert McPherson** (Cal Poly Humboldt)

3:15-3:30 p.m. **Break**

3:30-4:20 p.m. **A month before NCEHW? Time for a MTJ earthquake! – The 2024 M7.0 Offshore Cape Mendocino earthquake Part II** [5 min each]

Welcome to the U.S. Geological Survey. We serve the Nation by providing reliable scientific information. The USGS strives to provide a diverse, inclusive, and respectful environment because it is essential to the integrity of our organization and our science. If anything fails to exemplify these ideals, please alert an organizer for immediate assistance.

Moderator: **Sarah Minson** (USGS)

Greg Crawford (Ontario Tech University, Canada), **Rufus Catchings** (USGS), **Annemarie Baltay** (USGS), **Alan Poulos** (USGS), **Angie Lux** (Berkeley Seismological Lab), **Fabia Terra** (Berkeley Seismological Lab), **Amy Williamson** (UC Berkeley), **Megan Stanton** (Pacific Gas and Electric Company), **Maggie Ortiz-Millan** (EERI)

4:20 p.m. **Adjourn day 1**

Day 2, Wednesday, January 29

9:30-11:00 a.m. Power to the people: restoration following an earthquake

Speakers [15 min each]:

Mikel Gordon (Jacksonville State University) *Disaster Fairness: Different People, Different Contexts, Different Needs?*

Melanie Gall (Arizona State University) *Disasters and Education: School closures disrupt more than learning*

Judanne Lennox-Morrison (Texas A&M University at College Station) *A Grassroots Approach to Food Insecurity & Seismic Resilience: Filling the Gaps*

Brian Low (Pacific Gas and Electric Company) *Earthquake Resilient Energy for All*

Discussion: 30 min

Moderators: **Alessandra Jerolleman** (Loyola University New Orleans College of Law), **Monika Stoeffl** (California Resiliency Alliance)

11:00-11:15 a.m. Break

11:15 a.m.-12:15 p.m. Thunder Talks I [5 min each]

Moderator: **Grace Parker** (USGS)

Max Schneider (USGS), **Tara Nye** (USGS), **John Louie** (UNR), **Susan Hough** (USGS), **Lori Dengler** (Cal Poly Humboldt), **Alex Parsons** (Brit Insurance), **Theresa Sawi** (USGS), **Yihe Huang** (University of Michigan), **Chris Milliner** (Caltech), **Rob Skoumal** (USGS), **John Rundle** (UC Davis), **Lei Li** (Central South University & Stanford University), **Mark Benthien** (SEEC)

12:15-1:15 p.m. Break

1:15-2:45 p.m. I think that I shall never see a geochronometer as lovely as a tree: high resolution earthquake chronology

Speakers [15 min each]:

Bryan Black (University of Arizona) *A new generation of dendrochronology techniques to date Cascadia-killed trees on the northern California coast*

Allyson Carroll (Cal Poly Humboldt) *Dendroseismological investigation of coast redwood along the North Coast segment of the San Andreas Fault*

Jessie Pearl (Nature Conservancy) *Debris Avalanches in the Northern California Coast Range triggered by Plate-Boundary Earthquakes*

Kate Scharer (USGS) *Quantifying bias in paleoearthquake dates from charcoal ages*

Discussion: 30 min

Moderators: **Ozgur Kozaci** (PG&E), **Belle Philibosian** (USGS)

2:45-3:00 p.m. Break

3:00-4:30 p.m. Ferndale revisited: what we know about the M6.4 Ferndale earthquake and regional faulting 2+ years later

Speakers [15 min each]:

Jay Patton (CGS) *Gorda Redux: 1975, 2022, and you*

James Atterholt (USGS) *Structural Variability in the Gorda Slab with Converted Phases Measured by a Fiber-Optic Array*

Clara Yoon (USGS) *Distinct Yet Adjacent Earthquake Sequences near the Mendocino Triple Junction: 2021 Petrolia and 2022 Ferndale*

Peggy Hellweg (UC Berkeley) *Revisiting an Enigma in the Mendocino Triple Junction: the M6.5 Fickle Hill Earthquake of December 1954*

Discussion: 30 min

Moderators: **Bob McPherson** (Cal Poly Humboldt), **Judy Zachariassen** (CGS)

4:30 p.m. Adjourn day 2

Day 3, Thursday, January 30

9:30-11:00 a.m. Edge of the Bay Area: earthquake hazards across the Bay Area megaregion

Speakers [15 min each]:

Dena Belzer (Strategic Economics) + **Andy Kosinski** (Fehr & Peers) *Post-COVID Place-Based Implications of Bay Area Seismic Vulnerability: Travel Behavior and Economic Development*

Vicki Langenheim (USGS) *Basin structure in the Concord-Walnut Creek-Livermore region, northern California, from gravity studies*

Chad Trexler (USGS) *Quaternary-Active Faults and the Role of Inherited Structures in the Sacramento-San Joaquin Delta*

Don Hoirup (DWR) *Seismic Hazard Risks to the California State Water Project in and around the Bay Area*

Discussion: 30 min

Moderators: **Jeff Bellasario** (Bay Area Council), **Taka'aki Taira** (UC Berkeley)

11:00-11:15 a.m. Break

11:15 a.m.-12:15 p.m. Thunder Talks II [5 min each]

Moderator: **Grace Parker** (USGS)

Michael Blanpied (USGS), **Michael Barall** (USGS), **Ruth Harris** (USGS), **Julian Lozos** (CSUN), **Christie Rowe** (Nevada Seismological Laboratory), **Travis Alongi** (USGS), **Clara Yoon** (USGS), **Janet Watt** (USGS), **Keene Karlsson** (Sonoma State University)

12:15-1:15 p.m. Break

1:15-2:45 p.m. What geodesy can do for you in northern California

Speakers [15 min each]:

Mike Floyd (MIT) *GNSS observations for active faulting, geothermal and hydrological studies in northern California*

Catherine (Cassie) Hanagan (USGS) *Creeping through a stepover: a top-down view from geomorphology, seismology, and geodesy*

Danielle Lindsay (UC Berkeley) *Annual to Decadal Creep Rates along the Maacama Fault*

Katia Tymofyeyeva (NASA/JPL) *NISAR and beyond: the promise of new space geodetic measurements in Northern California*

Discussion: 30 min

Moderators: **Katherine Guns** (USGS), **Chelsea Scott** (ASU)

2:45-3:00 p.m. Break

3:00-4:30 p.m. Failure is not an option: keeping hospitals and fire stations operational

Speakers [15 min each]:

Kathryn Austin Scott (CHA) *Status of seismic retrofits for hospitals in the Bay Area and northern California in light of the 2030 State deadline*

Gordy Wray (Degenkolb Engineers) *Nonstructural Performance of California Hospitals*

Luis Ceferino (UC Berkeley) *The seismic resilience of hospital systems: field observations in Turkey and risk modeling in the San Francisco Bay Area*

Jia Wang-Connelly (CalOES) *Fire station Seismic risk Assessment and Retrofit Benefit-Cost Analysis*

Discussion: 30 min

Moderators: **Ayse Hortacsu** (ATC), **Chiara McKenney** (Estructure)

4:30 p.m. Concluding Remarks

4:45 p.m. Adjourn

The 2024 M7.0 Offshore Cape Mendocino earthquake – Part I

Lori Dengler (Cal Poly Humboldt) *The December 5 M7.0 tsunami warning*

Volkan Sevilgen (Temblor) *Did the 2024 magnitude 7.0 Cape Mendocino earthquake trigger aftershocks on the San Andreas?*

Bo Rong (UC Berkeley) *A Deformed and Fluid-Rich Subducting Plate Revealed by Complex Decadal Seismicity in Mendocino Triple Junction*

Clara Yoon (USGS) *2024 M7.0 Offshore Cape Mendocino: Rapid enhanced aftershock catalog*

David Shelly (USGS GHSC) *Low frequency Earthquakes Illuminate the Southern Edge of Cascadia Subduction at the Mendocino Triple Junction*

Hao Guo (University of Wisconsin-Madison) *Evidence for Low Effective Stress Within the Crust of the Subducted Gorda Plate from the 2022 December Mw 6.4 Ferndale Earthquake Sequence*

Robert McPherson (Cal Poly Humboldt) *Complicated Kinematics: MTJ*

The 2024 M7.0 Offshore Cape Mendocino earthquake – Part II

Greg Crawford (Ontario Tech University, Canada) *Observed water levels at North Spit and Chevron Pier, Humboldt Bay after the December 5, 2024 Cape Mendocino event*

Rufus Catchings (USGS) *Nodal Seismometer Recordings of Aftershocks of the 5 December 2024 M 7.0 Offshore Cape Mendocino Earthquake*

Annemarie Baltay (USGS) *Aftershock Kit Deployment and Ground Motion Analysis for the 2024 M7.0 Mendocino Earthquake*

Alan Poulos (USGS) *Ground motion directionality in the 2024 M7.0 Cape Mendocino earthquake*

Angie Lux (Berkeley Seismological Lab) *ShakeAlert Performance for the M7.0 Cape Mendocino Earthquake*

Fabia Terra (Berkeley Seismological Lab) *Latency Performance During M7.0 Cape Mendocino Earthquake*

Amy Williamson (UC Berkeley) *Performance of bEPIC through the 2024 M7.0 Mendocino earthquake and aftershock sequence*

Megan Stanton (Pacific Gas and Electric Company) *From Exercise to Reality - PG&E's Response to the 2024 M7.0 Cape Mendocino Earthquake*

Maggie Ortiz-Millan (EERI) *California Post-Earthquake Clearinghouse*

Thunder Talks I

Max Schneider (USGS) *What Makes a Good Aftershock Forecast? Tracking the Performance of Different Components of the USGS Forecasting System*

Tara Nye (USGS) *Regional faulting and path effects in the San Francisco Bay Area*

John Louie (UNR) *New measurements of Z1.0 and Z2.5 in Reno's industrial areas*

Susan Hough (USGS) *Did They Feel It? The 1954 Fickle Hill earthquake illustrates the value of legacy macroseismic data*

Lori Dengler (Cal Poly Humboldt) *Recalling the December 1954 M6.5 Korbelt earthquake - human memories 70 years later*

Alex Parsons (Brit Insurance) *Evaluation of Residential Wood-Frame Vulnerability: An Insurance Perspective*

Theresa Sawi (USGS) *Rapid magnitude estimation from P-wave strains; comparing boreholes and DAS*

Yihe Huang (University of Michigan) *Is b-value drop a good indicator of mainshocks in California?*

Chris Milliner (Caltech) *Localization of Inelastic Strain with Fault Maturity: Implications for Earthquake Characteristics*

Rob Skoumal (USGS) *pySATS: A Python package for computing stress tensor inversions*

John Rundle (UC Davis) *Nowcasting Earthquakes with Machine Learning*

Lei Li (Central South University & Stanford University) *Dynamic triggering in The Geysers geothermal field by two recent large earthquakes*

Mark Benthien (SCEC) *Earthquake Country Alliance Bay Area - Opportunities to Share Your Research and Encourage Resilience*

Thunder Talks II

Michael Blanpied (USGS) *NEHRP post-earthquake investigation coordination - updated plan*

Michael Barall (USGS) *The 2024 SCEC/USGS Dynamic Earthquake Rupture Simulation Benchmark Exercise*

Ruth Harris (USGS) *Strong Ground Motions from Large Earthquakes on the Creeping Hayward, Rodgers Creek, and Calaveras Faults, California*

Julian Lozos (CSUN) *Where and when does aseismic creep stop rupture propagation? From dynamic rupture simulations to passing probabilities*

Christie Rowe (Nevada Seismological Laboratory) *A quick summary of the Dec 9 Parker Butte M5.7 earthquake*

Travis Alongi (USGS) *Using Hypocentral Patterns to Model 3D Faults at the San Andreas - Calaveras Fault Junction*

Clara Yoon (USGS) *Fault Geometry under Lake Almanor, Northern California, from a 2023 nodal seismometer deployment*

Janet Watt (USGS) *New shoreline-crossing aeromagnetic data reveals northern CA faulting secrets*

Keene Karlsson (Sonoma State University) *Remapping the Green Valley fault AP zone*