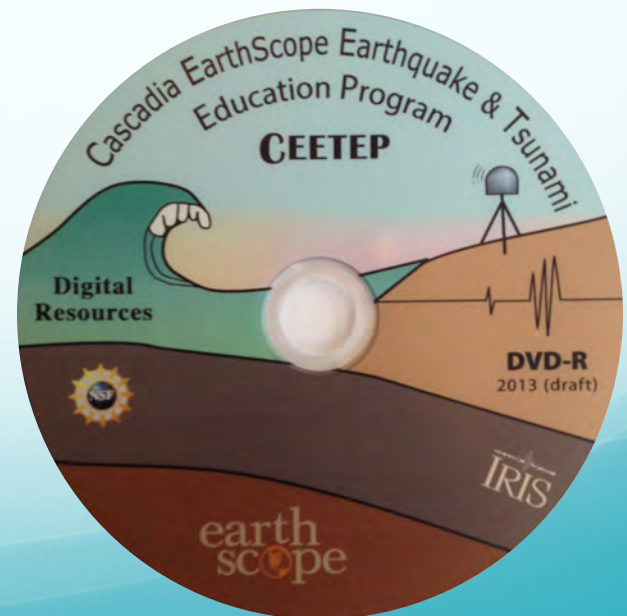
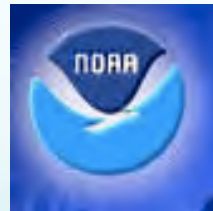
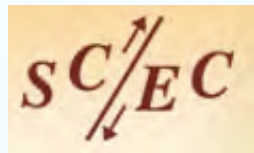


Digital Resources Related to CEETEP Topics

Beth Pratt-Sitaula
CEETEP Workshop

Teachers on the Leading Edge





EarthScope is a ~15 year long geophysics initiative to study the crust of North America – what it is made of, how it was assembled, and the geohazards it has. Funded by National Science Foundation



EarthScope also funds science and education projects like CEETEP

EarthScope Facility has 3 Parts

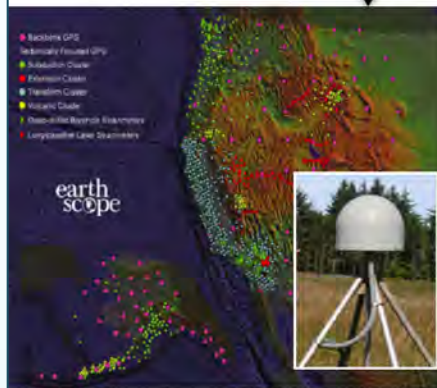
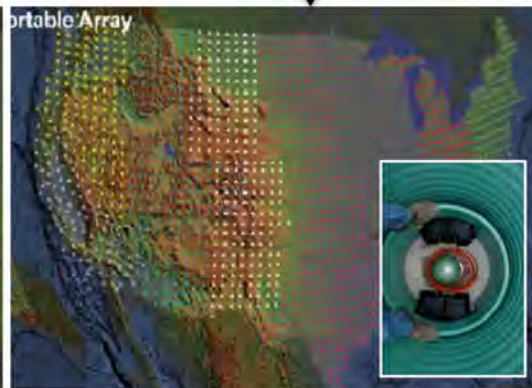


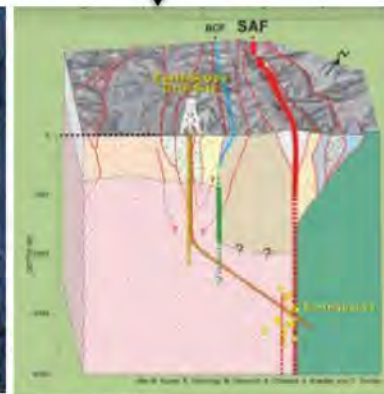
Plate Boundary Observatory (PBO) – >1100 GPS stations and strainmeters to measure crustal movements

UNAVCO
(NSF's Geodetic Facility)
runs PBO



USArray – 400 Transportable Array seismic stations that have been stepping across lower-48 and now Alaska for last 10 years.

IRIS
(NSF's Seismic Facility)
runs USArray



San Andreas Fault Observatory at Depth (SAFOD) – drilling to San Andreas fault at 3-4 km



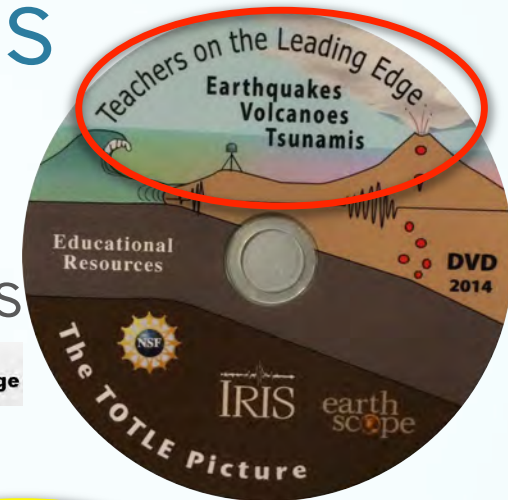
Cascadia EarthScope Earthquake and Tsunami Education Program has 3 collaborating universities

- Oregon State Univ.
- Univ. of Portland
- Central WA Univ.

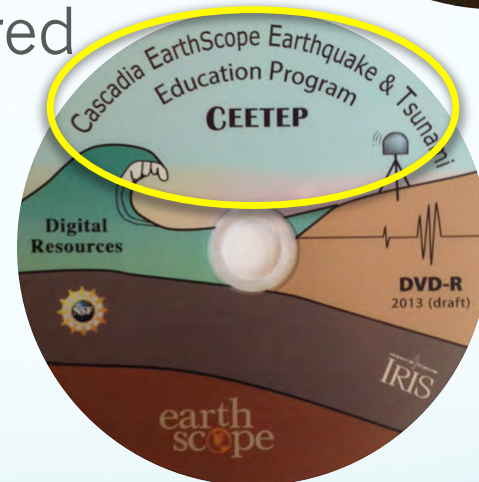
CEETEP Resources

- TOTLE-Earthquake, Tsunami, Volcanoes
-- Topic-ordered

Teachers on the Leading Edge



- CEETEP DVD – Workshop-ordered



- CEETEP Website
 - Topic-ordered
 - AND
 - Workshop-ordered




















TOTLE DVD – Topic-driven

- 📄 0. About This DVD.pdf
- 📄 1. CEETEP_Activities_eBinder.pdf
- ▶ 📁 1. Earth & Plate Tectonics
- ▶ 📁 2. Earthquakes & Tsunamis
- ▶ 📁 3. Cascadia Earthquakes & Tsunamis
- ▶ 📁 4. Cascadia Volcanoes & Volcanic Hazards
- ▶ 📁 5. Maps & Posters
- ▶ 📁 6. TOTLE VFE and Field Trips

- 📄 0. About This DVD.pdf
- 📄 1. CEETEP_Activities_eBinder.pdf
- ▶ 📁 1. Earth & Plate Tectonics
- ▼ 📁 2. Earthquakes & Tsunamis
 - ▶ 📄 1A. Earthquakes.ppt
 - ▶ 📄 1B. Tsunami.ppt
 - ▶ 📁 2. ANIMATIONS_Earthquake & Tsunami
 - ▶ 📁 3. VIDEOS_Earthquake & Tsunami
 - ▶ 📁 4. ACTIVITIES_Earthquake & Tsunami
 - ▶ 📁 5. OTHER
- ▶ 📁 3. Cascadia Earthquakes & Tsunamis
- ▶ 📁 4. Cascadia Volcanoes & Volcanic Hazards
- ▶ 📁 5. Maps & Posters
- ▶ 📁 6. TOTLE VFE and Field Trips

CEETEP DVD – Workshop-ordered

- ▶  1. CEETEP Workshop Organization
- ▶  2. CEETEP Workshop Presentations
- ▶  3. CEETEP Lesson Plans
- ▶  4. CEETEP Posters & Maps
- ▶  5. CEETEP Field Trips
- ▶  6. GPS Station Records
- ▶  7. Earthquake&TsunamiEducationResources
- ▶  8. EarthScope
- ▶  9. EarthquakeScenarios
- ▶  10. OR EmergencyPreparedness
- ▶  11. OR Tsunami Evacuation Maps
- ▶  12. WA EmergencyPreparedness
- ▶  13. WA County Preparedness Guides
- ▶  14. WA Earthquake & Tsunami School Resource Guide
- ▶  15. WA Tsunami Evacuation Maps
- ▶  16. WA Tsunami Fact Sheets
- ▶  17. WA Tsunami Vertical Evacuation Reports



Resources from the Southern California Earthquake Center

Robert de Groot

**Director for Education, Experiential Learning, and Career Advancement
Southern California Earthquake Center (SCEC)**

Cascadia EarthScope Earthquake and Tsunami Education Program

9 – 12 August 2015 – Charleston, OR

degroot@usc.edu

What is the Southern California Earthquake Center (SCEC)?

- A Multidisciplinary Research and Education Community
- Supported by the National Science Foundation and the U.S. Geological Survey
- Coordinates the efforts of over 60 institutions (e.g. USC, Columbia, Caltech, MIT, Harvard, Univ of New Hampshire, ASU, Cornell, Penn State)

Mission: To gather new information about earthquakes in Southern California, combine knowledge into a comprehensive understanding of earthquake phenomena, and communicate this understanding to increase earthquake awareness, reduce economic losses, and save lives.

www.scec.org



Experiential Learning and Career Advancement

"What you do not see,
do not hear,
do not experience
you will never really know."

"Esghallghilnguq
Nagaqullghilnguq,
Nalluksaghqag"

- St. Lawrence Island Yupik
Anchorage Museum, AK
Aug 2014



Earthquake Country Alliance

The ECA is a public-private partnership of people, organizations, and regional alliances, founded in 2003 in Southern California and expanded in 2009.

Each regional alliance conducts its own activities and collaborates with the others

Statewide committees determine long-range plans, sector-based needs, and develop resources

<http://earthquakecountry.org/>

The screenshot displays the website for the Great Oregon ShakeOut. The top navigation bar includes links for Home, Other ShakeOuts, Other Languages, Contact Us, Search, and Login. Below the navigation bar is a large banner image of a mountain landscape with the text "The Great Oregon ShakeOut".

The main content area is divided into several sections:

- Register Here!** Why Participate? Who is Participating? How to Participate Partners & Sponsors
- GET READY TO SHAKEOUT!** Millions of people worldwide will practice how to [Drop, Cover, and Hold On](#) at 10:15 a.m. on October 15* during [Great ShakeOut Earthquake Drills!](#) Oregonians can join them today by [registering](#) for the **2015 Great Oregon ShakeOut**. Participating is a great way for [your family or organization](#) to be prepared to survive and recover quickly from big earthquakes— wherever you live, work, or travel. ShakeOut is also a major activity of [America's PrepareAthon!](#)
- LEARN THE LATEST** [How to Participate](#) Information for individuals, schools and many types of organizations [Who is Participating?](#) Lists by county, area & category [ShakeOut Resources](#) Manuals, posters, & much more [Share your ShakeOut](#) Your photos, videos, and stories [ShakeOut Participant Updates](#) [Frequently Asked Questions](#)

A central video player shows a 3D animation of buildings shaking with the text "When the Earth Shakes". Below the video is a button that says "Start here to be included in the 2015 ShakeOut!".

A status bar at the bottom of the main content area shows "Over 200,000 participants registered" and "66 days until the 2015 Oregon ShakeOut".

The bottom section of the website is divided into three columns:

- PLAN YOUR DRILL** How to plan your drill & get prepared... Select your categ [dropdown] Go [button] [ShakeOut Shop](#) [Countdown to ShakeOut for Organizations](#) (PDF) Recommended Earthquake Safety Actions (PDF | RTE) Earthquake Guide for People with Disabilities (PDF | RTE)
- CHECK THE STATS** Over 200,000 participants and counting! (Over 16.2 million worldwide) Click the map for details about each area [Map of Oregon] 2014 Participants: Over 390,000 Click Map for Area Total:
- PLAY AND SHARE** [PLAY BEAT THE QUAKE](#) [Earthquake by the American Red Cross](#) Download the FREE app today! [QUAKE QUIZ](#)

ShakeOut.org/resources

Get Ready to Shake Out.

10.20.11
Register Now at
www.shakeout.org

The Great California
Shake Out



Shake Out The Great California ShakeOut
Annual Disaster Earthquake Drill

Individuals and Families
Get Ready to ShakeOut

Register today at ShakeOut.org

At 10:15 a.m. on October 16, 2011, millions of Californians will "Drop, Cover, and Hold On" to The Great California ShakeOut, the largest earthquake drill ever. Everyone is encouraged to participate in the drill whenever you are at 10:15 a.m. on 10/16/11.

Major earthquakes may happen anytime you work, live, or travel in California. The ShakeOut is an exercise to practice how to protect ourselves, and for everyone to become prepared. The goal is to prevent disasters from becoming catastrophes.

Why is "Drop, Cover, and Hold On" drill important? As with anything, it is not quickly you must practice often. You may only have seconds to protect yourself in an earthquake before strong shaking sends you down, or something falls on you.



Nearly 5.5 million businesses participate in the 2011 ShakeOut. Now California's largest business drill ever. All businesses are encouraged to participate in the drill for plan a more earthquake event.

Major earthquakes may happen anytime you work, live, or travel in California. The ShakeOut is an exercise to practice how to protect ourselves, and for everyone to become prepared. The goal is to prevent disasters from becoming catastrophes.

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Everyone can participate! Individuals, families, businesses, schools, colleges, government agencies and organizations are all invited to register.



As a registered ShakeOut participant you will:

- Learn what you can do to get prepared
- Be connected to the largest free disaster drill ever
- Receive ShakeOut news and other earthquake information
- Not an example that influences others to act irresponsibly



Shake Out The Great California ShakeOut
Annual Disaster Earthquake Drill

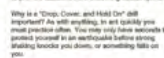
Businesses
Get Ready to ShakeOut

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- Receive ShakeOut news and other earthquake information
- Not an example that influences others to act irresponsibly



The Great Shake Out
Are You Ready to ShakeOut?

We're all in this together...

- On the third Thursday of October each year, you can join the millions of Californians who will "Drop, Cover, and Hold On" to The Great California ShakeOut, the largest earthquake drill ever.
- As described below, major earthquakes may happen where you work, live, or travel in California. The ShakeOut is our chance to practice how to protect ourselves, and for everyone to become prepared. The goal is to prevent disasters from becoming catastrophes.
- Why is a "Drop, Cover, and Hold On" drill important? As with anything, it is not quickly you must practice often. You may only have seconds to protect yourself in an earthquake before strong shaking sends you down, or something falls on you.
- Other preparatory information is on the back of this flyer and is online at www.shakeout.org.
- Everyone can participate! Individuals, families, businesses, schools, government agencies, community groups, and other organizations are all invited to register.
- Register now! www.ShakeOut.org

California is earthquake country!

- California experienced earthquakes no larger than the 1861 Northridge or 1994 Loma Prieta quakes for largest recent quake, on average.
- All areas of California have experienced earthquakes in the past and will go on again in the future. There are hundreds of faults throughout the state that have been active recently.
- There is a 30% chance of a magnitude 7.5 or greater earthquake somewhere in California in the next 30 years (www.usgs.gov).
- While some major and minor faults have a higher chance of earthquakes than others, the risk anywhere in California is high when compared to most areas of the country.
- While some major and minor faults have a higher chance of earthquakes than others, the risk anywhere in California is high when compared to most areas of the country.

The annual Great California ShakeOut is a national earthquake drill. It is a chance for everyone to practice how to protect themselves in an earthquake. The drill is held on the third Thursday of October each year. The drill is held on the third Thursday of October each year. The drill is held on the third Thursday of October each year.

CALIFORNIA'S ANNUAL EARTHQUAKE DRILL

Shake Out

www.ShakeOut.org

HOW TO PARTICIPATE

Here are a few suggestions for what businesses can do to participate in the ShakeOut. More information and resources can be found at ShakeOut.org.

Plan Your Drill

- Register or agree to participate to be included in the ShakeOut drill, get email updates, and more.
- Have a "Drop, Cover, and Hold On" drill on 10/16/11.
- You can also exercise other aspects of your emergency plan.
- Practice what you learned and make improvements.

Get Prepared for Earthquakes

- Check your emergency supplies and equipment.
- Check your fire escape route and fire extinguishers.
- Ask department to inspect facilities for items that might fall and make them safe.
- Check your emergency supplies and equipment.
- Check your fire escape route and fire extinguishers.
- Ask department to inspect facilities for items that might fall and make them safe.

Share the ShakeOut

- Encourage employees to take their homes, families and neighbors to register.
- Not infrequently at other businesses to participate.
- Phases, items, and other related for providing the ShakeOut drill at www.ShakeOut.org.
- Share your experience at www.ShakeOut.org.

Drop! Cover! Hold On!

Shake Out. October 20, 2011

Don't Freak Out.

The Great California
Shake Out

www.shakeout.org

Official Participant

Join Us
for the Largest
Earthquake Drill
in U.S. History.

Drop! Cover! Hold On!

October 20, 10:20 a.m.

Register at www.ShakeOut.org

Shake Out "Countdown to ShakeOut" for Businesses

Use the following countdown to ensure everyone in your business takes part in The Great California ShakeOut drill on October 20, 2011, to prepare for the next big earthquake. All businesses are invited to participate at work, and at home!

- Register your business as an official participant in the 2011 ShakeOut drill at www.ShakeOut.org.**
 - Register the number of people participating business-wide
 - Encourage employees to also participate if at home and register as an individual or as a family, invite friends and neighbors to register as individuals or organizations
- Meet with department heads to review plan and obtain their buy-in, if necessary, and determine what level of drill your business will conduct and who will participate.** Consider drilling at a higher level to engage staff to be more effective during a disaster. (Drill manuals are available at www.ShakeOut.org/resources/index.html#manuals)
 - Level 1 - Simple: Drop, Cover and Hold On
 - Level 2 - Basic: Life Safety Drill
 - Level 3 - Intermediate: Decision-Making Drill
 - Level 4 - Advanced: Business Operations Simulation Drill
- Create a drill/exercise plan that includes overview of what your drill will consist of (even if just Drop, Cover and Hold On) what you expect to happen during the drill, and a feedback session after the drill to identify strengths and weaknesses.**
 - Inform employees/staff participants of date and time of drill, your expectations for their participation, and the benefits of the drill
- Encourage suppliers, vendors, contractors, partnering businesses, and others in your business network to participate - as a means of protecting your business - and share ShakeOut resources with them.** (Consider other tasks that can protect your business, such as having Service Level Agreements in place to ensure that the services or products you rely on will be available after disaster.)
- Create employee awareness campaign:**
 - Hang ShakeOut banners and signs throughout your business to encourage and remind employees, vendors, and customers to participate
 - Initiate an email campaign to employees, staff, and customers with information and tips on how to prepare at home and work. (See <http://www.shakeout.org/resources/> for examples)
 - Encourage employees to post a ShakeOut-related safety message on outgoing email messages, such as "Participate in the 2011 Great California ShakeOut on 10/20 at 10:20am!"
- Review and use ShakeOut resources for drills at www.ShakeOut.org/resources/index.html**
 - Drill manuals, Drill broadcast, banners, signs, triangle of life rebuttal, PowerPoint presentations, 7 Steps to an Earthquake Resilient Business booklet, ShakeOut Shop, etc.
- Hold your drill at 10:20 a.m. on October 20th (or an alternative time, if necessary)**
 - Hold post-drill discussions to hear what people learned and plan next steps

Earthquake Country Alliance

Shake Out Shop

Shirts, hats, mugs, and other merchandise.

Earthquake Education and Public Information Center (EPIcenter) Network

- **EPIcenters** include a variety of public venues such as museums, science centers, libraries, aquaria, park visitor centers, and universities
- Share a commitment to demonstrating and encouraging earthquake and tsunami preparedness
- Help coordinate activities in their region (including the ShakeOut), lead presentations or organize events in their communities, or in other ways demonstrate leadership in earthquake and tsunami education and risk reduction.



“Native California is Earthquake Country!” Project

- Partnership with Sherman Indian High School (Riverside, CA)
- Turtle Tale Video: Earthquake story of Gabrielino-Tongva Tribe (filmed by SCEC)
- <http://www.earthquakecountry.org/EPIcenter/turtletale.html>
- Two posters: one with tribal languages of students at the school (national), one for distribution throughout California (only California languages)



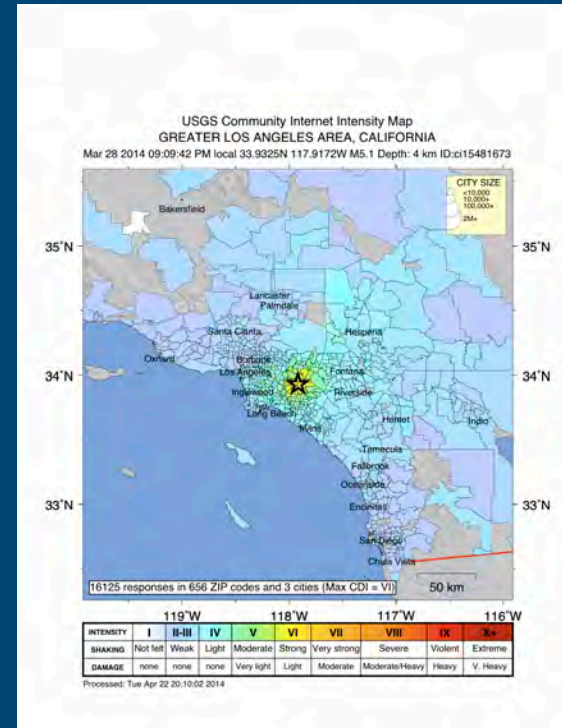
Citizen Scientist!

Quake Catcher Network: Increase the density of seismic observations to better detect earthquakes and mitigate hazard:

- New sensor technology
- Distributed sensing techniques
- Community participation

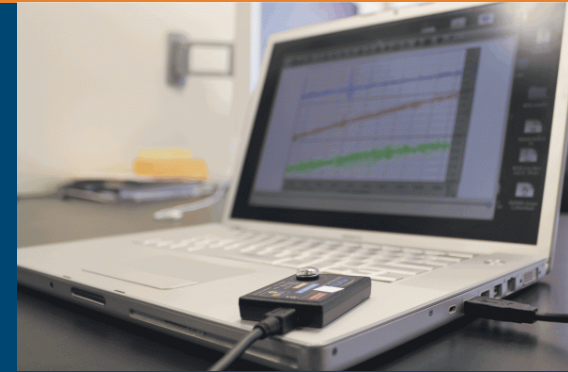
Did You Feel It?

Tap the abundant information available about earthquakes from the people who actually experience them.

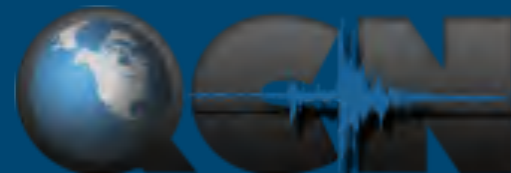


Quake Catcher Network (QCN)

- Largest, low-cost strong motion seismic network utilizes sensors in and attached to Internet-connected computers.
- Collaborative initiative of IRIS, SCEC, USGS, and Caltech
- Provides educational software that uses the sensors to teach about earthquakes and their hazards
- QCN and the SCEC/ECA EPIcenter Network are initiating a campaign to bring sensors and educational programming to free-choice learning environments. Partners include SCEC, NEES, IRIS, USGS, CA Geological Survey, UNAVCO, and EarthScope
- The QCN-EPIcenter Team has over 120 sensors installed in locations in AK, AR, CA, ME, MO, MS, OR, TN, and WA



<http://qcn.caltech.edu>

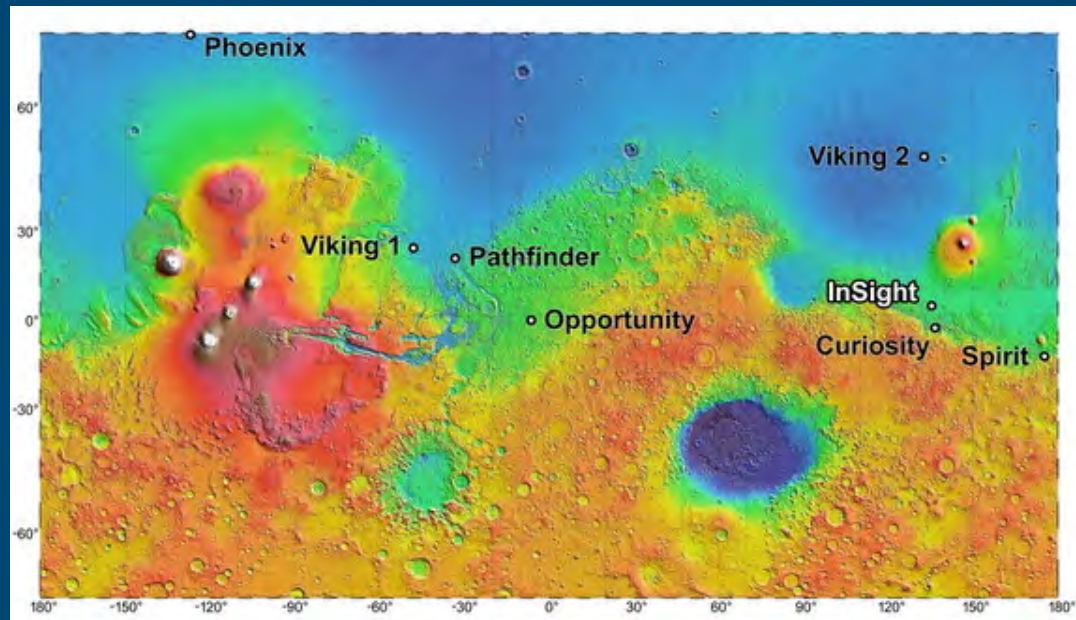


Shake
Out

NASA InSight



Interior Exploration using
Seismic Investigations,
Geodesy and Heat
Transport



NASA/JPL

<http://insight.jpl.nasa.gov>

Shake
Out

InSight 2015 Activities

In 2015, twelve *Vital Signs of the Planet*

Educator Fellows:

- Were immersed in the science of
- Caltech, JPL, QCN, USGS, and SCEC
- Conducted 5 days of survey-mode GPS research
- Developed and will test teach 4 lessons and kits
- Install a QCN seismometer at their school
- Hosted SCEC Annual Meeting workshop
- Participate in 2015 Great ShakeOut



California Science Center Live Earthquake Program

- Developed by SCEC SURE interns and Science Center staff
- 15-minute program performed on the Creative World *Tech Review* Stage at the California Science Center in Los Angeles
- Debuted in 2012 as a *Science Spectacular!™* Program and is offered weekly to school groups, families, and other visitors
- Program will be shared with and performed by other members of the EPIcenter Network
- Covers earthquake science and preparedness basics



SCEC Plate Tectonics Puzzle Map

- Large, two-sided version of the USGS *This Dynamic Planet* poster map along with an accompanying lesson plan with a map legend, instructions, most commonly lost plates template, and suggested discussion questions.
- Back is printed with plate outlines to guide cutting
- Provides educators with a tool to teach students about Earth science topics through interaction and visualization.
- Map includes volcanoes, mountains, earthquakes, and meteorite impacts as well as vector arrows that show direction and speed of plate movement.
- Email degroot@usc.edu for ordering information (\$15)





Thank You!

Robert de Groot

**Director for Education, Experiential Learning, and Career Advancement
Southern California Earthquake Center (SCEC)**

degroot@usc.edu



Earthquake Country Alliance
We're all in this together.

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- Two posters: one with tribal languages of students at the school (national), one for distribution throughout California (only California languages)



Temporary and/or Event-Based Displays

Recruited two new EPIcenters and Quake Catcher Network Sensor Installations at: HSU Natural History Museum, Arcata and HSU Founders Hall (Geological Sciences).

Visited Humboldt County Fair to see award-winning earthquake and tsunami room.



ShakeOut Scenario for Southern California

M7.8 Scenario Earthquake
Time = 000.0 s



Source: USGS - <http://earthquake.usgs.gov/regional/nca/simulations/shakeout>

Shake
Out



Thank You!

Robert de Groot
Manager – Office of Experiential Learning & Career Advancement
Southern California Earthquake Center (SCEC)
degroot@usc.edu



Earthquake Country Alliance
We're all in this together.