

advertisement | your ad here



Keynote & Exhibit Hall Pass **FREE**

INSPIRATIONAL KEYNOTE:



Hear John Crowley's remarkable story being released in a film  
Harrison Ford Brendan Fraser  
**Extraordinary Measures**

home of the

Subscribe to the weekend Chronicle

SEARCH



Web Search by

YAHOO!

Advanced Search

Sign In | Register

Technology Markets Small Business Chron 200 Real Estate

**Willie's World: No one knows The City's politics better** Find out **Sunday, only in The Chronicle** PRINT & E-EDITION EXCLUSIVE

### Scientists close on earthquake warning system

David Perلمان, Chronicle Science Editor  
Wednesday, January 20, 2010

PRINT E-MAIL SHARE COMMENTS (44)

FONT | SIZE: - +

After five years of research and experiments, scientists working on an earthquake early warning system say they should soon be able to alert Bay Area residents as much as a minute before a distant quake reaches them.

#### MORE TECHNOLOGY

Google books opponents propose public guardian 01.19.10

Explore how to find, get and keep work / Silicon Valley tech salaries down 1% 01.20.10

A daily dose of postings from The Chronicle's technology blog (sfgate.com... 01.20.10

A major quake on the northern end of the San Andreas Fault could be detected in time to sound an alarm in San Francisco a full 60 seconds before the shaking starts. A closer quake might mean only a few seconds of warning, but could still be enough for people to take shelter - possibly saving lives, the UC Berkeley scientists say.

Whether such a system might have helped in Haiti, where an estimated 200,000 people have died and 1.5 million are homeless, is doubtful because the 7.0 temblor's epicenter was very close to the capital and population center of Port-au-Prince.

But the potential of such warnings is so great that the U.S. Geological Survey plans to funnel \$10 million in federal stimulus funds into the work, said Richard Allen, associate director of the Berkeley Seismological Laboratory and leader of the project.

"Early warning networks are already operating in other countries where earthquakes are common, and we know that in a densely populated region like the Bay Area, even a few seconds of warning could save many lives when a big one hits," Allen said.

In the Bay Area, the system was recently tested in conjunction with BART, whose engineers were instantly able to stop all trains when a warning was transmitted based on simulated quakes.

The system also detected the 5.6 magnitude Alum Rock quake that hit the Calaveras fault two years ago. A signal reached San Francisco several seconds before the city started shaking.

#### Advanced system

The highly advanced warning system is based on complicated computer algorithms known as ElarmS, short for Earthquake Alarms Systems.

Whenever an earthquake happens, the sudden jolt sends several types of seismic waves coursing through the Earth for thousands of miles at various speeds.

By detecting and analyzing the slower but most damaging shock waves known as shear waves, seismometers equipped with the ElarmS computer program would instantly

advertisement | your ad here

SHAPING FUTURE MEDICINE

Keynote & Exhibit Hall Pass **FREE**

INSPIRATIONAL KEYNOTE:



Hear John Crowley's remarkable story being released in a film  
Harrison Ford Brendan Fraser  
**Extraordinary Measures**

MOST COMMENTED MOST READ MOST E-MAILED

1. Dems' Massachusetts loss clouds Pelosi's future
2. Brown arrives on Capitol Hill, meets with senators
3. Please lick my hot Fiat 500
4. Gunman killed in Oakland drugstore shootout
5. Cindy McCain comes out -- against Prop. 8
6. Senate loss sends shock waves through Dems
7. Newsom tells N.Y. Times he's done with politics

TopHomes

From Decker Bullock Sotheby's Inter

**BELVEDERE TIBURON**

5 BR / 5.3 BA  
\$8,800,000.00

**SAUSALITO**

6 BR / 4.1 BA  
\$12,000.00

**GREENBRAE**

5 BR / 3.1 BA  
\$8,900.00

**BELVEDERE TIBURON**

4 BR / 2.1 BA  
\$2,400,000.00

**NOVATO**

4 BR / 3.0 BA  
\$895,000.00

**BELVEDERE**

7 BR / 6.1 BA  
\$28,850,000.00

**MILL VALLEY**

4 BR / 2.0 BA  
\$1,650,000.00

**BELVEDERE TIBURON**

SHAPING FUTURE MEDICINE

Keynote & Exhibit Hall Pass

**FREE**

INSPIRATIONAL KEYNOTE:

John Crowley, Founder, Novazyme Pharmaceutical, Inc



Hear John Crowley's remarkable story being released in a film

detect the earthquake's magnitude and location, predict where its ground-shaking shock waves would be strongest, and immediately transmit warnings to areas in danger.

Eventually the alarm system could tell dispatchers to halt trains, alert fire stations and ambulances, send warnings to home computers and trigger warning tones to every individual mobile phone in the area, Allen said.

Scientists at the Berkeley laboratory, together with colleagues at the Geological Survey in Menlo Park, have been developing and testing two networks of an early warning system for five years, and the new phase is being greatly helped by the stimulus funds, Allen said.

The ElarmS system now connects about 300 seismometers in Northern California. The \$10 million in stimulus funds will help the Berkeley group to upgrade those seismometers and push other work expanding the system and testing it. Other funds will soon add 100 more seismic detectors and the entire array will eventually number 500 throughout Northern California.

The entire system could be in place and ready to operate in about three years, Allen said.

### 'Banker's bonus'

The California Seismic Safety Commission has asked him for a cost estimate of a full statewide early warning system covering every known active fault with upgraded seismographs. The total would come to \$80 million, Allen said - "about the cost of a banker's bonus."

"Only a couple of seconds warning," Allen said, "could give everyone time to duck and cover under protection like a sturdy table."

The worst earthquakes being tested with the early warning systems are similar to the 1906 quake that hit San Francisco with an estimated 7.9 magnitude. In Southern California, if a similar quake were to strike at the southern end of the San Andreas fault just east of the Salton Sea, Los Angeles would also have a full minute's warning, Allen said.

Japan already has a fully effective warning system that can alert every school in the country, where pupils are regularly trained to sit under their desks when the alert sounds, Allen said.

The United States, including quake-prone California, is lagging behind many other nations where early warning systems are already operating. In addition to Japan, those countries include Mexico, Italy, Greece, Turkey, India, Romania, Switzerland, Iceland, Egypt, India and Taiwan.

E-mail David Perlman at [dperlman@sfgchronicle.com](mailto:dperlman@sfgchronicle.com).

This article appeared on page **A - 1** of the San Francisco Chronicle



Subscribe to the San Francisco Chronicle and get a gift:

- Sunday + a \$15 gift card
- Fri-Sun + a \$15 gift card
- Mon-Sun + a \$25 gift card

Select an offer

PRINT E-MAIL SHARE

(44) View Comments »

Share your thoughts on this story.

Add Your Comment

4 BR / 5.0 BA  
\$3,900,000.00

**BELVEDERE TIBURON**  
2 BR / 2.0 BA  
\$650,000.00

**LARKSPUR**  
2 BR / 2.0 BA  
\$699,000.00

[See more from this broker](#)



[About Top Homes](#)

Harrison Ford  
Brendan Fraser  
**Extraordinary Measures**

#### REAL ESTATE



#### Most unsexy house porn, Vol 2

Last time this blog highlighted unsexy real estate porn, the writer was accused of various perversions. This did not bother us. However...

The intentional renters  
Hillsborough home is right out of a fairy tale  
Homebuilding forecast: Modest growth in 2010

#### Featured Property



3 Bellevue Ave  
BELVEDERE TIBURON  
\$3,199,000  
3 Beds, 4 Bath  
Pacific Union  
[More Properties](#)

[Search Real Estate »](#)

#### CARS



#### Well-traveled Harvester Travelall is still a "tank"

I first spotted this beast around 1973 at the old Alameda Flea Market. It was a 1965...

Chrysler recalls vehicles over brakes  
Automakers begin hiring  
[Video: Highly modified cars](#)

#### Featured Vehicle



2006 Cadillac CTS  
\$19,992  
Stewart Chevrolet Cadillac  
[Details | Similar Cars](#)

[Search Cars »](#)

#### JOBS



#### 'How would you move Mount Fuji?' and other odd interview questions

Imagine you're at a job interview. You are smiling. Your handshake is firm. You feel confident and...

Could online job scams lure you?  
Stalled upgrade delays unemployment checks  
Extra duty for unemployment office workers

[Search Jobs »](#)

#### KAANGO CLASSIFIEDS



Beautiful Catahoula Brindle Pit Mix Needs Home



ENGLISH BULL DOG PUPPIES FOR ADOPTION

AKC Champion English

You must be signed in to add a comment. [Sign In](#) | [Register](#)

Submit

**Most Recommended Comments**



**peterjc** 1/20/2010 6:34:34 AM  
"In addition to Japan, those countries include Mexico, Italy, Greece, Turkey, India, Romania, Switzerland, Iceland, Egypt, India and Taiwan." This is not the only thing the US is behind other countries on. But, on the other hand, we're damned good at populating prisons, starting wars, and screwing our own citizens. How did we ever get started down this path? And how do we get off of it?

Recommend: (90) (8) [Permalink](#) [\[Report Abuse\]](#)



**nezumi** 1/19/2010 11:59:59 PM  
If Japan already has a fully functional warning system, why are we re-inventing it here? Could we not purchase the technology from them?

Recommend: (82) (11) [Permalink](#) [\[Report Abuse\]](#)



**cal\_voter1** 1/20/2010 4:33:54 AM  
A minute's warning.....

Recommend: (38) (7) [Permalink](#) [\[Report Abuse\]](#)

[View Comments \(44\)](#)



**Osha Thai sisters build an empire**



**Cindy McCain is against Prop. 8**



**Kink up your Kindle. Violet Blue**



**Mark Fiore: Haiti aid quake**



**Old favorite Rivoli is still thriving**

Ads by Yahoo!

**Obama Urges Homeowners to Refinance**

(\$90,000 Refinance \$489/mo) See Rates - No Credit Check Req. (www.SeeRefinanceRates.com)

**Refinance Now at 4.2% Fixed**

No hidden fees, 4.4% APR. No obligation. Get 4 free quotes. No SSN req. (MortgageRefinance.LendGo.com)

**Affordable Auto Insurance**

Average Customer Saves \$303. Get a Rate in Under 8 Minutes. (www.UnitrinDirect.com)

[Home](#) [News](#) [Sports](#) [Business](#) [Entertainment](#) [Food](#) [Living](#) [Travel](#) [Columns](#) [Buy & Sell](#) [Jobs](#) [Real Estate](#) [Cars](#) [Site Index](#) [\[return to top\]](#)

**Advertising Services:** [Place a Classified](#) [Advertise in Print](#) [Advertise Online](#) [About Our Ads](#) [Public Notices](#)

**Reader Services:** [Home Delivery](#) [Subscribers](#) [E-Edition](#) [Mobile](#) [RSS Feeds](#) [Newsletters](#) [Feedback](#) [Buy Photos](#) [FAQ](#) [Corrections](#) [Get Us](#)

**Company Info:** [Contact Us](#) [Hearst Corp.](#) [Privacy Policy](#) [Terms and Conditions](#) [Work for Us](#) [Chronicle in Education](#) [Events & Promotions](#) [Submissions](#)

© 2010 Hearst Communications Inc.



**Bulldog Puppy For Adoption**



**Boston Terrier Female**

[Browse ads](#) | [Place an ad >](#)

**ADVERTISERS**

Get the power to free yourself from debt faster

Hawaii Trips \$335+ 3 Nights w/Air. Pleasant Holidays.

Caribbean -65% Off Sandals Resorts. Luxury Included.

Cancun Trips -\$500 Off Palace Resorts. All-Inclusive.