



## Sharper View Reveals Earth's Innards

By probing thousands of kilometers of solid rock with seismic waves, seismologists have found a new kind of deep-Earth feature. The hottest rock—such as the plume rising through the mantle beneath Hawaii—has been particularly hard to image, driving a decades-long debate over how deep the sources of such hot spot plumes actually are.

Thanks to powerful computers, however, seismologists can now spot new features using hot rock's effect on the wiggles of seismic waves—not just the waves' speed, as in earlier seismic imaging. Seismologist Scott French of the University of California, Berkeley, and colleagues report online in *Science* this week that by using this “full-waveform inversion” technique, they have traced the Hawaiian plume (yellow) to a depth of at least 1000 kilometers. That suggests plumes span the entire 2900-kilometer-thick mantle, not just its uppermost layer as many scientists have contended.

The new imaging also reveals long “fingers” streaked across the Pacific 250 kilometers to 400 kilometers down (red)—apparently hot rock from the plumes flowing perpendicular to midocean ridges, where new ocean tectonic plates form.

a special issue on human conflict (18 May 2012). The writers are **Eliot Marshall**, for “Parsing Terrorism”; **Elizabeth Culotta**, for “Roots of Racism”; **Ann Gibbons**, for “The Ultimate Sacrifice”; and **Greg Miller**, for “Drone Wars.” The awards committee described the collection of stories as “an articulate, wide-ranging examination of what social scientists have learned about human violence, conflict, and terrorism.”

The other 2013 winners are: David George Haskell, for his book, *The Forest Unseen*; Joanne Silberner, David Baron, and PRI's *The World*, for four radio pieces on “the hidden toll cancer takes in impoverished nations”; and an online series in *USA TODAY* on the toxic legacy of abandoned lead factories.

## UC Davis Neurosurgeons Resign

Two University of California, Davis, neurosurgeons who tried to treat three people with terminal brain cancer by inserting gas-

trointestinal bacteria into their brains have resigned after internal investigations found that they failed to follow ethical guidelines governing medical research.



Muizelaar

**Paul Muizelaar**, former head of the neurosurgery department, retired and left the university in June; colleague **Rudolph J. Schrot** announced his resignation this summer, effective 31 August.

In 2010 and 2011, Muizelaar and Schrot applied live bacteria to the patients' open head wounds, based on observations that postoperation infection can prolong life in patients with glioblastoma, the most common and deadly form of brain tumor. One individual survived for a year; the other two developed sepsis and died within weeks of surgery.

Although all three consented to the procedure, the investigations, which began in 2011, found that, among other infractions, the physicians violated university policy by taking steps to patent the treatment without proper approval—crossing a line between “innovative care,” which allows for untested treatments in dire circumstances, and more strictly regulated medical research. The surgeons maintain they were acting in the interests of the patients, expected to live no longer than 15 months without treatment.

## FINDINGS

### A Cap on Mammal Virus Numbers

There are at least 320,000 viruses in mammals still waiting to be discovered, report scientists who have studied flying foxes in Bangladesh. From 2006 to 2010, the researchers caught hundreds of the big bats and collected urine and fecal samples as well as throat swabs before letting them go again. They then fished out all the viral sequences they could find belonging to nine virus families, including coronaviruses, herpesviruses, and influenza A viruses.

They found 55 viruses in all, 50 of which had never been seen before. Using statistical methods, they found that three viruses were likely missed, for a total of 58. Extrapolating to the 5486 other mammal species, that means about 320,000 viruses in total, the team reports this week in *mBio*.

The research cost approximately \$1.2 million, the authors calculate, and identifying all 320,000 mammal viruses in the wild would cost about \$6.3 billion. Peter Daszak, president of EcoHealth Alliance and one of the authors, says that identifying all viruses would help in combating future outbreaks. “It would be the beginning of the end for pandemics.” <http://scim.ag/mammvir>

## NOTED

>The chairman of the U.S. House of Representatives science committee says that the Environmental Protection Agency (EPA) isn't giving him the health and air pollution data he demanded in a controversial 1 August subpoena (*Science*, 9 August, p. 604), and that **the agency now stands in default**. “You did not provide ... anything new,” Representative Lamar Smith (R-TX) wrote on 3 September to EPA chief Gina McCarthy. Smith set a new deadline of 30 September.