



GEOPHYSICS

To Catch a Quake

Large earthquakes leave affected populations disoriented and emergency responders scrambling. Having fast, reliable estimates of the location and magnitude of the mainshock and its aftershocks is vital to an effective rapid response plan. In developing countries with the potential for large earthquakes, installing and maintaining seismic networks to collect such data can be expensive. The Quake-Catcher Network is a volunteer-based seismic network that employs personal computers as low-cost seismic stations by sending seismic data collected with a small USB accelerometer through the user's Internet connection. Although this network had yet to be installed in Chile before the 2010 *M* 8.8 Maule earthquake, volunteers rapidly installed nearly 100 accelerometers within weeks in and around the mainshock area, including stations set up in local government buildings, health stations, and homes. Chung *et al.* describe the network's ability to accurately collect and discriminate aftershock data and shaking intensity estimates—most within 30 s of an individual event. Improvements in accelerometer technology and data processing will probably improve data quality to the point that future networks of hundreds or thousands of stations installed in high-seismicity regions will aid first responders in determining where most help is needed after a large earthquake strikes. — NW

Seismol. Res. Lett. **82**, 526 (2011).

SOCIOLOGY

Not Contagious After All?

Studies of social influences on behavior have led to the idea that a range of characteristics from loneliness to obesity might be contagious. A significant problem for the field has been to distinguish effects due to similarities between people (homophily) from social influence. One strategy for doing this has been to look at changes that occur over time. However, such studies have been the subject of considerable debate, and Noel and Nyhan now add a cautionary note. Their analyses of a model used in past social contagion studies suggest that previous investigations have not fully controlled for the possibility that friendship formation and termination are dynamic processes, and friendships between people who are more similar may tend to be more stable over time. Or to put it in Facebook terms, friendships that are between people who are less similar may be less stable, and therefore may result in “unfriending.” Homophily might thus be having a larger effect than appreciated, and under certain conditions could account for most of the contagion effects observed. They conclude that this unfriending

problem renders a determination of causality much more complicated in longitudinal social network data. — BJ

Soc. Networks **33**, 211 (2011).

POLICY

The Value of State Parks

State parks in the United States can be a refuge for wildlife, a reservoir of plant diversity, or a source of untamed water. They are also a popular destination for recreation. But recent economic belt-tightening means that budgets for state parks are going under the knife. By analyz-

ing data from five national surveys conducted between 1975 and 2007, Siikamäki attempted to assess the value of one aspect of state parks: recreation. About a third of the time people currently spend on nature recreation in the United States is accounted for in state parks. Although use of state parks has declined over the time period covered in the surveys, the cost of running the parks remains easily outdistanced by the recreation value derived from the parks. Following the conventional approach of valuing recreation time at one-third of paid wage time, the value of nature recreation in state parks reaches about \$14 billion annually, whereas annual operation costs total about \$2.3 billion. Thus, these sometimes unassuming parks build a network that delivers ecosystem and economic value, as well as just giving us a nice day. — PJH

Proc. Natl. Acad. Sci. U.S.A. **108**, 10.1073/pnas.1108688108 (2011).

CHEMISTRY

Stuffing Your Struts

The potential for using metal-organic frameworks (MOFs) as catalysts is often frustrated by a fundamental tradeoff. The synthetic routes for



making MOFs tend to saturate all of the coordination sites of metals, even ones contained within the linkers or struts, but catalysis by metals is usually enabled by the presence of unsaturated sites. Shultz *et al.* developed a strategy that addresses this dilemma for metallosalen struts to use as catalysts within MOFs. Although Mn(salen) can be incorporated into MOFs for asymmetric epoxidations, other metals, such as Co(salen) for asymmetric ring opening, are unsaturated and do not form MOFs directly. The authors describe how Mn(salen) MOFs (in which zinc ions link the struts in a paddlewheel arrangement) can be demetalated with H₂O₂ and replaced isostructurally with a wide variety of dicationic transition-metal ions, including Co, Cr, Cu, Zn, and reduced Mn (which recovered its catalytic activity after reoxidation). — PDS

J. Am. Chem. Soc. **133**, 10.1021/ja204820d (2011).

CELL BIOLOGY

Small Changes Have Big Consequences

Protein folding and the maintenance of a healthy proteome often involve molecular chaperones of the heat shock protein 70 (Hsp70) family. The basis of functional distinctions of highly homologous and functionally redundant Hsp70s is unknown. Nearly identical yeast cytosolic Hsp70s, Ssa1p and Ssa2p, function differently in the propagation of yeast prions and in a vacuole-import and protein-degradation pathway involved in regulating levels of gluconeogenesis enzymes. By swapping amino acids, Sharma and Masison show that a single amino acid difference in the nucleotide-binding regulatory domain of the Ssa proteins is the basis for the functional distinction in both processes. It seems that this small structural difference affects regulation of Hsp70 by cofactors rather than by altering intrinsic Hsp70 activity. Thus, subtle changes in Hsp70 structure may have evolved to confer functional specificity without affecting overall Hsp70 function. — SMH

Proc. Natl. Acad. Sci. U.S.A. **10**.1073/pnas.11074211108 (2011).

POLICY

Basic Implications

In 1980, the United States adopted the Bayh-Dole Act, which allowed researchers to retain intellectual property rights to federally funded research, as a way to encourage the development of technologies that might otherwise languish in labs. Since then, the number of university technology transfer offices has boomed, along

with patent applications and licensing income. Despite this apparent success, some argue that the act has co-opted universities and undermined the overall scientific and economic enterprise, with long-term academic pursuit of knowledge through basic research abandoned in favor of nearer-term profits. Thursby and Thursby examined whether basic research has indeed suffered relative to applied research since Bayh-Dole.

They analyzed data on thousands of science and engineering faculty from eight major U.S. research universities spanning the years 1983 to 1999. The “basicness” of faculty research was explored via publication analysis, on the reasoning that “basic” journals are cited more heavily by “applied” journals than vice versa. They assessed faculty interest in commercializing research by tracking the history of formally disclosing potential inventions. Their model also accounted for research funding, age, tenure, and other influences. They found no evidence that interest in commercialization detracted from basic research, and in fact saw that basic research effort increased in light of the incentive of potential commercialization profits. — BW

Res. Policy **40**, 1077 (2011).

PSYCHOLOGY

Human Justice

Are decisions made by judges, which are supposed to be made on the basis of facts and legal reasoning, also influenced by outside variables such as ethnicity or even how recently the judge had a meal? Shayo and Zussman examined 1750 small claims court rulings handed down by more than 100 judges in Israel from 2000 to 2004; these court cases were fender-bender traffic accidents in which the plaintiff and defendant were of different ethnicities. They found a pattern of ingroup bias: Jewish judges favored Jewish plaintiffs, and Arab judges favored Arab plaintiffs. By considering the times and locations of civilian fatalities during this period, the authors decompose these decisions into half that were arguably ethnicity-neutral and a more biased half associated with spatial-temporal proximity to terrorism, highlighting that a person's ability to favor their own social group may affect seemingly rational judgments. Danziger *et al.* analyzed 1100 parole board decisions made by eight judges in Israel in a 10-month period. They document a bias toward retaining the status quo (that is, denying parole) in successive cases adjudicated in a single day. This tendency was eliminated after each of two food breaks, suggesting that cognitive balance can be restored after resource depletion. — GJC

Q. J. Econ. **126**, 10.1093/qje/qjr022 (2011);
Proc. Natl. Acad. Sci. U.S.A. **108**, 6889 (2011).

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Science

Human Justice

Gilbert Chin

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