

changes occur in both the electronic and lattice structure of the material. Ishikawa *et al.* used ultrafast optical and electron diffraction probes to monitor both types of change simultaneously during a photo-induced phase transition in a molecular crystal. The resulting molecular movies showed expansion of the intermolecular distance, flattening of the molecules, and tilting of molecular dimers. — JS

*Science*, this issue p. 1501

## GENOMIC EVOLUTION

### Cichlids diverge within a crater lake

It is not clear how populations diversify and new species form at the genomic level, especially when they coexist in the same location. Malinsky *et al.* investigated how two ecomorphs of cichlid fish in a small lake in Tanzania are diversifying relative to each other. Although there is gene flow between the two forms, major regions of genetic divergence, known as genomic islands, separate the populations. Within these islands, the authors found genes likely to be associated with mate choice, supporting the idea that genetic changes related to breeding preferences are the first to diverge during speciation. — LMZ

*Science*, this issue p. 1493



*Astatotilapia calliptera* – a cichlid fish

## NEURODEVELOPMENT

### The makings of motor neuron disease

Developing motor neurons link the muscles to the central nervous system. Amin *et al.* found that microRNA-218 (miR-218) was expressed in developing motor neurons and repressed

a wide network of genes whose expression typifies other sorts of neurons. Mice lacking miR-218 died at birth with symptoms characteristic of human motor neuron diseases. — PJH

*Science*, this issue p. 1525

## ECOTOXICOLOGY

### Red tides make dinner hard to find

Domoic acid (DA) is a neurotoxin produced by marine algae. When present in large amounts, it is harmful to marine organisms and to humans. Cook *et al.* tested California sea lions being treated at a marine mammal rescue facility. Animals that had evidence of exposure to DA had lesions in their hippocampus and displayed reduced performance on spatial memory tasks. Because such tasks are essential to foraging in a marine environment, increasing exposure to DA may be contributing to increasing sea lion strandings. — SNV

*Science*, this issue p. 1545

## MEMBRANE REMODELING

### ESCRTs work in two very different ways

The so-called ESCRT proteins are involved in the budding of vesicles into the lumen of endosomes and in virus

budding. These reactions involve the formation of a cytoplasm-filled neck that spirals of the ESCRTs help to seal. McCullough *et al.* now show that ESCRTs can also promote the scission of membrane tubules with the completely opposite

topology. ESCRT-III and IST1 ESCRT subunits form spirals on the outside of membrane tubules and so can mediate the budding of tubules and vesicles into the cytosol. Relatively minor structural rearrangements were required to turn ESCRT function on its head. — SMH

*Science*, this issue p. 1548

## IN OTHER JOURNALS

Edited by **Sacha Vignieri** and **Jesse Smith**

A 2011 tornado in Nebraska

## CELL MIGRATION

### Moving forward by localized translation

Proper development and morphogenesis requires many cells to coordinate movements that are influenced by local forces, or from the migration of cells under their own power. In mesenchymal cell migration, actin filaments at the front push the cell forward while the back portion is retracted. By comparing mRNA localization and translation rate in the forward-located protrusions relative to trailing section, Mardakheh *et al.* identify the mechanism by which front-back cell asymmetry is maintained. Protein translation in the front of the cell is critical to stabilize the protrusion and produce the cell's polarized morphology. Analyses reveal specific cis-regulatory mRNA UTR motifs and RNA-binding proteins, such as the exosome core complex, as important for cell migration asymmetry. — BAP

*Dev. Cell.* **35**, 344 (2015).

## PLANETARY SCIENCE

### What counts as a planet?

In 2006, the International Astronomical Union formally defined the term "planet" in such a way that bodies such as Pluto, Ceres, and Eris do not qualify. The definition was controversial, partly because the criteria are somewhat subjective and cannot be directly applied to planets around other stars (exoplanets). Margot has proposed an alternative objective mathematical definition of a planet. Within our solar system, the calculation clearly separates the eight planets from all other bodies. It can also be calculated from data that are already available for 99% of known exoplanets. It remains to be seen whether the new metric will catch on. — KTS

*Astron. J.* arXiv:1507.06300 (2015).

## POLITICAL SCIENCE

### Predicting protests via tweets

Although many investigations have attempted to link the use



## TORNADO FORECASTING

### Gaining momentum for anticipating storms

**T**ornados cause many deaths and costly damage to property every year, so being able to predict them farther in advance could save both human lives and money. Gensini and Marinaro show that that tornadoes are more likely to occur when the base state of atmospheric angular momentum is low and less likely to occur when it is high. Differences in atmospheric angular momentum, expressed as the global wind oscillation, can explain nearly an order of magnitude of variability in boreal spring tornado occurrence in the United States during the period from 1994 to 2013. This observation thereby suggests a pathway to better springtime tornado forecasting. — HJS

*Mon. Weather Rev.* 10.1175/MWR-D-15-0289.1 (2015).

## PSYCHOLOGY

### Reading minds across the ocean

Natives of different cultures often have trouble figuring out what the other believes—a sought-after experience for the traveler visiting faraway lands, yet a hindrance for the immigrant adjusting to her new environment. Perez-Zapata *et al.* identify a high-level contributory factor by presenting social and cognitive scenarios to Australians (in English) and to Chileans (in Spanish). The cognitive scenarios depicting activities involving either Australians or Chileans were understood equally well by natives of both countries. In contrast, Australians more accurately inferred what one Australian believed about another Australian in comparison to a conversation between two Chileans; likewise, Chileans found it easier to read the minds of other Chileans. — GJC

*Cognition* 146, 410 (2016).

## POLICY EXPERIMENT

### Cashing in on clean air

Exposure to air pollution early in life could undermine earnings as an adult. Isen *et al.* studied 5.7 million people born in hundreds of counties across the United States, within a few years before and after those counties reduced ambient levels of total suspended particulates (TSPs) under the Clean Air Act (CAA) in the early 1970s. U.S. Census Bureau data were used to link date and location of birth with labor market outcomes decades later. Although those born 1 to 3 years before the CAA improvements still enjoyed cleaner air beginning at ages one to three, they were exposed to more pollutants from conception until age one. Compared to them, those born after the CAA induced a 10% decline in TSP levels earned roughly 1% more at age 30, possibly due to improved cognitive ability and health. — BW

*J. Polit. Econ.*, <http://faculty.haas.berkeley.edu/rwalker/research/caalongtermhealth.pdf> (2015).

of social media with protests, they have usually been based on events occurring in one country. Steinert-Threlkeld *et al.* collected nearly 14 million tweets and protest records from 16 countries in the Middle East and North Africa from 1 November 2010, through 31 December 2011, which includes the period of the Arab Spring protests. They studied the coordination of tweets (i.e., the progressive use of smaller numbers of protest-related hashtags by multiple users) and found that increased coordination was strongly associated with increased protests the next day. This was not the result of a few highly tweeted events or a few digital activists or international attempts to draw attention to the events. — BJ

*EPJ Data Sci.* 10.1140/epjds/s13688-015-0056-y (2015).

## LIPID BIOCHEMISTRY

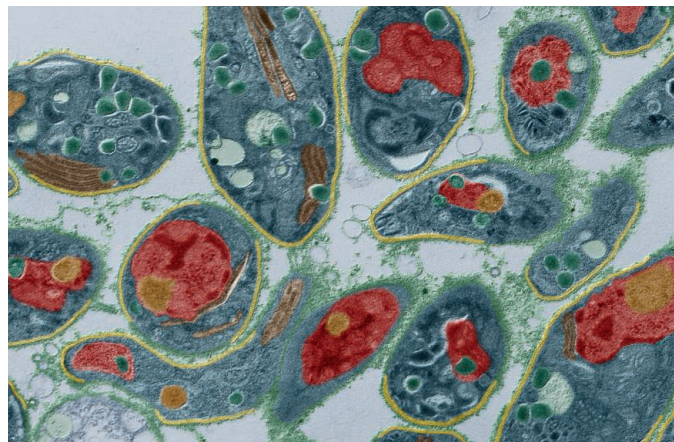
### A parasite's phospholipid

The phospholipid repertoire used in animal cell membranes is surprisingly limited, but

another candidate has emerged. During investigations on virulence in the ubiquitous animal and human protist parasite *Toxoplasma gondii*, Arroyo-Olarte *et al.* identified phosphatidylthreonine (PtdThr) as an abundant constituent. A small evolutionary accident seems to have allowed *T. gondii* to become parasitic by shifting from phosphatidylserine- to phosphatidylthreonine-based membranes. Although mutant

parasites lacking PtdThr can replicate, they are paralyzed and neither able to enter nor exit host cells. PtdThr mutants provoke strong immune responses and look promising as vaccine candidates. Because the synthetic enzyme PtdThr synthase was also characterized, there is scope for drug interventions too. — CA

*PLoS Biol.* 10.1371/journal.pbio.1002288 (2015).



Evolution of a new phospholipid led *Toxoplasma gondii* to parasitism

# Science

## Gaining momentum for anticipating storms

H. Jesse Smith

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