URBAN PLANNING
Loud Enough?

There's a lot to think about when you try to plan an urban expansion. Is there enough water, and infrastructure to pump it around? What about electricity? What traffic patterns work best? What will the balance be between housing and commercial real estate? Amid all of these considerations, one critical factor may fall by the wayside—how loud will it be? Noise pollution is a rather complicated function of the surroundings, and as a result it can be hard to model and mitigate. Of course, that's little consolation to the residents. In an effort to better forecast the noise implications of urban growth, Xie *et al.* adapt a land-use regression framework previously applied to modeling air pollution. Their geographical focus is Dalian Municipality in Northwest China, which currently hosts two million people. The model fits measured sound pressure levels as a function of different land-use allocations (such as industrial or residential) within successive buffer perimeters (from 20 m radius outward). Given promising overall results, the authors note that buffer sizes could potentially be optimized further and that future models could hone the time scale over which the forecasting is valid. — JSY

Environ. Sci. Technol. **45**, 10.1021/es200785x (2011).

CLIMATE SCIENCE
A Reason to Surge

Heinrich events—massive, episodic iceberg discharges from the Laurentide Ice Sheet into the north Atlantic Ocean during the last glacial period—once were thought to be the consequence of internal ice sheet stability: the inability of the ice sheet to remain intact after having grown to a particularly large size. Support for this view has eroded over the past decade, however, and the suggestion that the events are instead the consequence of external causes, such as solar variability or the addition of glacial meltwater into the adjacent surface ocean, have gained favor. Marcott *et al.* add to that line of thought, with a combination of data from benthic foraminifera and results from a climate-model simulation, which suggest that basin-wide subsurface warming occurred at the same time as large reductions in Atlantic deep circulation, with subsurface temperature increasing by approximately 2° C during the 1000- to 2000-year interval before a Heinrich event. Such a temperature rise would erode the floating ice shelves that buttress terrestrial ice streams, and produce massive iceberg discharges. This finding could have important implications about how these ice sheets might behave in the future in our warming climate. — HJS

Proc. Natl. Acad. Sci. U.S.A. **108**, 10.1073/pnas.1104772108 (2011).

ECOLOGY
A Little Knowledge Could Go a Long Way

The hunting of wild animals for meat is a threat to many species. Hunting of large fruit bats occurs throughout the Paleotropics, with some estimated harvest rates nearing 75% in a single season. Tropical bat populations are especially vulnerable to high harvest levels because of their low reproductive rates. Fruit bats are the primary pollinators and seed dispersers for many tropical forest trees, including several with high economic importance; thus, their loss could have substantial ecosystem effects. Harrison *et al.* estimated the influence of hunting on fruit bats within a large area of Indonesia, by interviewing bat hunters and sellers about hunting

PHYSICS
Breaking the Law

Conduction of heat in solids is often achieved through the same means as electrical conduction—via charge carriers—and materials that are good electrical conductors (such as metals) also tend to conduct heat efficiently. For metals, the ratio between the thermal and electrical conductivities is determined by the Wiedemann-Franz (WF) law. However, in one-dimensional systems, a distinct state known as the Tomonaga-Luttinger (TL) liquid is predicted to occur, wherein the spin and charge degrees of freedom of an electron separate into spinons and holons; because heat is conducted by both but electricity only by holons, a violation of the WF law may occur. Wakeham *et al.* report such a violation in the purple bronze $Li_{0.9}Mo_6O_{17}$, which is a conductor consisting of weakly interacting one-dimensional chains. The violation they find is as large as a factor of 100,000 at the lowest temperatures accessed and consistent with the scenario of spin-charge separation in a TL liquid, even though the material is only approximately one-dimensional. If, as the authors speculate, its TL liquid nature is a result of strong correlations within the chains, it may be possible to tune the dimensionality of the system, and thus effectively recombine spinons and holons, by appropriate chemical substitution. — JS

Nat. Commun. **2**, 10.1038/ncomms1406 (2011).

practices and consumer demand. They found evidence that bat populations are declining in the face of unregulated and aseasonal harvest and that hunting and demand are not abating, despite the apparent declines. Moreover, responses indicated that the practice may endanger the lives of humans involved in the bat trade: both hunters and vendors reported being bitten but were largely unaware that fruit bats can carry Nipah viruses. The authors suggest that educating local people about both the risks of fruit bat consumption and the ecological importance of bats, in addition to more formalized protections, could benefit not only the bats and the forest but the people of the region as well. — SNV

Biol Conserv. **144**, 10.1016/
j.biocon.2011.06.021 (2011).

BIOMEDICINE

A Foothold on Renal Disease

Focal segmental glomerulosclerosis (FSGS) is a common kidney disorder in which many patients progress to end-stage renal disease that requires dialysis treatment. FSGS is characterized by the abnormal loss of serum proteins through the urine, caused by malfunction of the kidney's glomerular filtration barrier. Podocytes, specialized epithelial cells with foot-like processes, are key structural constituents of this filter, but how these cells help maintain the integrity of the filter is incompletely understood.

Data from two studies support the growing view that the podocyte cytoskeleton is crucial
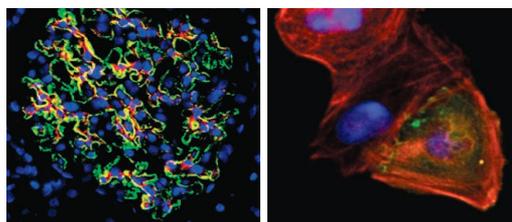
to the proper functioning of the glomerular filtration barrier and that its destabilization can cause FSGS. Mele *et al.* find that two families with a hereditary form of FSGS carry mutations in *MYO1E*, a gene coding for a nonmuscle, membrane-associated myosin in podocytes that normally colocalizes with a protein implicated in cytoskeletal remodeling; this colocalization is disrupted by the disease-causing mutations. Fornoni *et al.* study a drug that has shown therapeutic efficacy in FSGS and show that its beneficial activity is due to an off-target effect: stabilization of the actin cytoskeleton in podocytes. — PAK

N. Engl. J. Med. **365**, 295 (2011);

DEVELOPMENT

Don't Stress Out

During pregnancy, increases in maternal stress, whether physical or psychological, can affect fetal growth. In a stressful situation, steroid hormones called glucocorticoids often increase, and this elevation is known to affect offspring birth weight and organ development. Glucocorticoids can also alter gene expression and protein transport in the placenta, but how this affects fetal development and whether there are differential affects depending on the sex of the offspring is not as well understood. O'Connell *et al.* examined this by treating mice with a synthetic glucocorticoid, dexamethasone, mid-gestation. Early responses to glucocorticoid exposure were similar between the sexes; however, at later time points, sex-dependent effects on the placental structure and in gene expression were observed. These differential effects of glucocorticoids on the placenta may explain how maternal responses to environmental and hormonal challenges during pregnancy may contribute to differences among the sexes later in life. — BAP

Biol. Reprod. **85**, 10.1095/
biolreprod.111.093369 (2011).

PLANT SCIENCES

Heading Toward the Light

Bioengineering of eukaryotic algae might soon be a means to provide biofuel sources that may supplement petroleum products. One potential biofuel source is the algae *Chlamydomonas reinhardtii*. The full genome of *C. reinhardtii* is available, but a systems-level understanding of its growth and development, including its response to light, warrants further investigation. Chang *et al.* present a genome-scale metabolic network reconstruction of *C. reinhardtii* that includes a genome-wide functional annotation of metabolic genes, an experimental verification of transcripts across the genome, and a quantitative accounting of its response to multiple light conditions and photosynthesis in metabolism. This work details light usage under different conditions and could be used to design and evaluate the production of target biological products as a function of light-source efficiencies. The additional understanding of the light response by *C. reinhardtii* could affect biofuel and other metabolic engineering applications in addition to adding to fundamental quantitative insights into how photosynthesis drives cellular metabolism. — LMZ

Mol. Syst. Biol. 7, 518 (2011).

Science

A Foothold on Renal Disease

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