accumulation in the Amazon's forests.

Storms often topple trees in the region, and now Robinson Negrón-Juárez at Tulane University in New Orleans, Louisiana, and his co-workers have quantified the effect. Using field and satellite data, they found that the storms killed up to half a million trees in the Manaus region of northwest Brazil. They used these figures to model basin-wide destruction.

The team warns that climate change could increase storm intensity and so forest mortality, releasing more carbon into the atmosphere and further warming the planet.

NEUROSCIENCE

Electrical cell tuning

J. Neurosci. **30,** 11476–11485 (2010)

People with psychiatric conditions could one day have the activity of their brain cells modified by low-level electrical stimulation, applied through electrodes on the scalp.

According to György Buzsáki at Rutgers University in Newark, New Jersey, and his colleagues, this transcranial electric stimulation (TES) might offer an alternative to transcranial magnetic stimulation. This is widely used to study the human brain, but is impractical for outpatients because it involves bulky electrical coils.

Buzsáki's team showed that the weak electrical fields generated by TES electrodes placed on the skulls of rats reliably changed the electrical activity of neurons — for example, by enhancing or suppressing firing — in many important brain areas, when the animals were anaesthetized or asleep.

MATERIALS SCIENCE

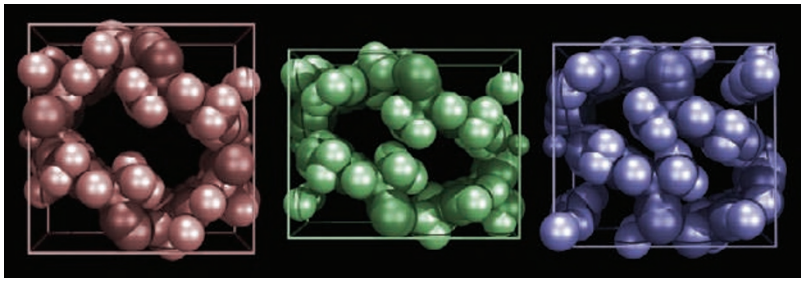
Adjustable pore size

Science **329,** 1053–1057 (2010)

A porous material that increases its pore size as it adsorbs certain molecules is the latest creation from researchers at the University of Liverpool, UK.

Matthew Rosseinsky and his colleagues made the material by linking zinc ions with peptide molecules. Using nuclear magnetic resonance imaging and X-ray scattering, combined with simulations, the scientists show that the peptides twist and shift to increase the pore size as small molecules, such as carbon dioxide, are taken up (pictured). This peptide twisting is similar to that which allows proteins to change shape during folding.

Such a material could have applications in storage and separation technologies.



SCIENCE/AAAS

ZOOLOGY

Insulin drops, so does sex

Proc. R. Soc. B doi:10.1098/rspb.2010.1390 (2010)

Female fruitflies are known to shun repeated sexual encounters when nutrients are scarce, a probable adaptation to a meagre environment in which offspring are less likely to survive. Signalling in the nutrient-sensing insulin pathway may underlie this behaviour, say Stuart Wigby, now at the University of Oxford, UK, and his colleagues.

The researchers deleted key genes in this pathway in virgin fruitflies and noted that, initially, the flies did not hesitate to mate with normal males. A day later, however, they displayed much less interest in a second round of mating than did normal flies of similar body size and fertility.

MICROBIOLOGY

Bacterial resettlement

Genome Res. doi:10.1101/gr.107987.110 (2010)

In bowel diseases, the balance of the gut's microbial species, which number more than 1,000, can be thrown off. Researchers have speculated that transplanting a collection of microbes from the guts of healthy individuals into those of patients could be therapeutic.

Chaysavanh Manichanh at the University Hospital Vall d'Hebron Research Institute in Barcelona, Spain, and her colleagues transplanted gut microbes between rat strains. Genetic analysis of the rats' intestinal microbial populations revealed that the bacterial composition in recipient animals closely resembled that of the donors. The effect persisted three months after transplantation.

First treating the recipient animals with antibiotics, however — a step widely thought to make way in the gut for the incoming microbes — did not improve how well the donor colony took root.

JOURNAL CLUB

John A. Rogers
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A materials scientist comments on two methods for three-dimensional nanofabrication.

Methods for nanofabrication are crucially important to research in all areas of nanoscience and nanotechnology because they allow for the creation of functional structures — a key step towards useful applications and devices. Many techniques are available, but all have significant shortcomings and few are compatible with true, high-volume manufacturing modes. As the director of a centre for nanomanufacturing funded by the US National Science Foundation, I am deeply interested in emerging developments in this area.

Two papers on nanofabrication caught my attention. Both use sharp, scanning tips to form three-dimensional (3D) nanostructures. This 3D capability is important because it is unavailable in established techniques such as those used in the semiconductor industry.

In one paper, Jie Hu and Min-Feng Yu at the University of Illinois at Urbana-Champaign use nanometre-scale glass nozzles with engineered shapes to electroplate metal onto solid surfaces (J. Hu and M.-F. Yu *Science* **329,** 313–316; 2010). The positions of the nozzle and substrate are precisely controlled, enabling directed 'writing' of nanometre-scale conducting wires in freely suspended 3D arrangements.

In the second paper, Armin Knoll at IBM Research in Zurich and his colleagues use sharp tips as sources of heat to locally strip material from thin films of molecular glasses and thereby sculpt 3D shapes with nanometre-scale accuracy (D. Pires *et al. Science* **328,** 732–735; 2010). The authors fabricate diverse structures, including a 25-nanometre-high replica of the Matterhorn, one of the Alps' highest peaks.

Both techniques offer valuable capabilities in nanofabrication that seem to be scalable for practical use. Successful outcomes of efforts such as these will have central roles in the translation of new knowledge in nanoscience into meaningful forms of nanotechnology.

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