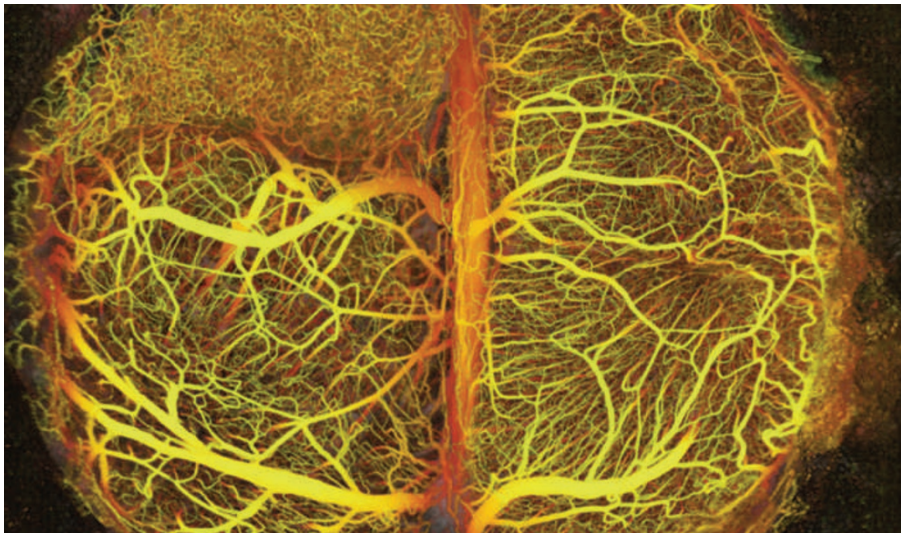
RESEARCH HIGHLIGHTS

Now you see it

Nature Med. doi:10.1038/nm.1971 (2009)
A technique for imaging tissues in three dimensions can be used to visualize the tumour microenvironment in greater detail than previous methods. Brett Bouma, Rakesh Jain and their colleagues at Harvard Medical School and Massachusetts General Hospital in Boston imaged various tumour types using a system called optical frequency domain imaging. It involves scanning a laser beam with shifting wavelengths over a tissue sample, measuring the properties of the reflected light across depths, and processing the signals to reveal three-dimensional perspectives. The image shows the system of blood vessels in a mouse brain with a tumour at a depth of 2 millimetres.



TECHNOLOGY

Lightning-fast memory

Phys. Rev. Lett. **103,** 117201 (2009)
The speed at which information can be recorded on a magnetic disc is limited by the time it takes to 'flip' the magnetic bits on the surface. Like a spinning top, these bits have momentum, and it takes them time to reverse their magnetism from one orientation to another using traditional means.

Now Kadir Vahaplar of Radboud University Nijmegen in the Netherlands, and his colleagues have found a faster way to flip the bits. The team used a powerful pulse of laser light to temporarily destroy and reorient the bits. A second pulse allowed them to read back the data. The entire process took just 30 picoseconds — ten times faster than today's technology.

GENETICS

Yeast joins the club at last

Science doi:10.1126/science.1176945 (2009)
It seemed a stubborn exception. One of the most useful research tools, gene silencing by RNA interference (RNAi), can't be used in a laboratory workhorse organism, the yeast *Saccharomyces cerevisiae*. Indeed, it was thought that the ability to do RNAi had been lost from all budding yeast species at some point in evolution.

But David Bartel of the Massachusetts Institute of Technology in Cambridge and his colleagues took a closer look at some related yeast species. They found all the necessary components of the RNAi pathway, including a previously unknown version of the Dicer protein, which is essential to the process.

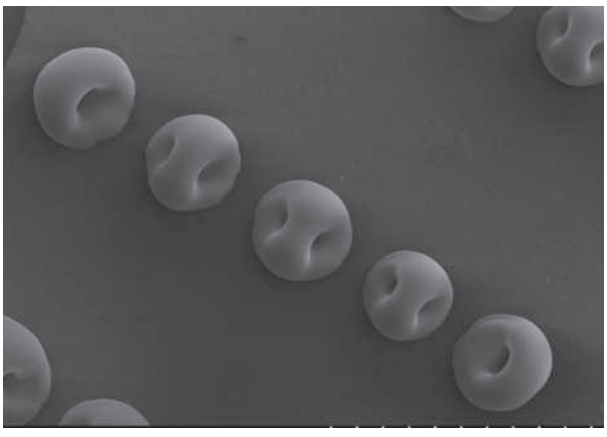
By putting the components into *S. cerevisiae*, they were able to kick-start the pathway, potentially opening up new research directions for both the organism and the nature of gene silencing.

CHEMISTRY

Aluminium arches

Langmuir doi:10.1021/la902918m (2009)
How can the miniature arched structures pictured below be created? When droplets of dissolved or suspended matter dry on a surface, material often spreads to the edges of the droplet forming a 'coffee ring' stain. These rings can pile up into ridges that form cups or hollow domes.

Julian Evans and Lifeng Chen at University College London placed droplets containing an aluminium powder onto circular platforms about 1 millimetre apart. Powder ridges on adjacent edges of the platforms grew slowly owing to high local humidity, and ridges on the far edges grew faster in the lower relative humidity. The drops eventually bumped into one another and connected, forming arches.



AM. CHEM. SOC.

ACOUSTIC SCIENCE

A sonic one-way street

Phys. Rev. Lett. **103,** 104301 (2009)
Diodes act as one-way filters for electric current, protecting delicate devices from sudden reversals in flow. Sound waves can also travel easily in both directions along a given path, like electricity does, so acoustic devices could block wrong-way reflections. Alas, acoustic diodes do not yet exist.

Jian-chun Cheng of Nanjing University in China and his colleagues have now described a possible way to build one consisting of a sandwich of acoustic layers. Key to the structure would be a layer of nonlinear material that, by changing the frequency spectrum of incoming sound waves, could act as a filter. The researchers suggest that acoustic diodes could be useful in improving ultrasound devices such as those used to break up kidney stones.

ATMOSPHERIC SCIENCE

Alien sprites

J. Geophys. Res. **114,** E09002 (2009)
Sprites — ghostly flashes of light that occur above some thunderstorms on Earth — may also illuminate other planets' atmospheres.

Calculations suggest that sprites could occur on both Venus and