at the University of Aarhus in Denmark propose encoding lots of qubits in clouds of polar molecules.

Their theoretical set-up would use a laser to 'write' qubits as a pattern across an entire molecular cloud — an easier task than controlling individual molecules. Radio waves would then transmit the data to a tiny patch of superconducting material where calculations could be performed. However, aligning the cloud with the radio antenna will be tricky, Mølmer warns.

MOLECULAR BIOLOGY

## Senior signals

*Cell* **134,** 291–303 (2008)

By comparing the long list of messenger RNAs produced in young and old roundworms, biologists have identified three proteins that control ageing independently of environmental insults and the cellular wear and tear that accumulates over time. The proteins, ELT-3, ELT-5 and ELT-6, participate in the senescence process of *Caenorhabditis elegans* as a part of the animal's own developmental program.

Stuart Kim of Stanford University Medical Center in California and his team silenced the genes encoding ELT-5 and ELT-6 in some of their worms. This showed that these proteins lower ELT-3 expression in adult worms. ELT-3, the researchers found, regulates a host of downstream genes involved in turning transparent and spritely young worms into pigmented and more flaccid oldsters.

PHOTONICS

## Telescopic TV

*Nature Photon.* doi:10.1038/nphoton.2008.133 (2008)

Telescopes often have a ring-shaped primary mirror to concentrate light onto a secondary mirror, which, in turn, reflects it through the hole in the primary. The same principle informs a new design for backlit screens.

In the 'telescopic pixels' described by Anna Pyayt of the University of Washington in Seattle and her team, the shape of the primary mirrors is under electronic control. When their shape is near-parabolic, they bounce light onto the secondaries, illuminating the holes in the primaries. When they are flat, no light hits the secondaries and the holes remain dark.

The prototype pixels transmit more than three times as much light as comparable liquid crystal displays. At present, the contrast they achieve is low, but models suggest that this can be improved. The technology may be suited to large, energy-efficient flat panels.

IMMUNOLOGY

## Green vaccines

*Proc. Natl Acad. Sci. USA* **105,** 10131–10136 (2008)

Ronald Levy of Stanford University Medical Center in California and his colleagues have carried out the first clinical trial of plant-produced therapeutic vaccines against non-Hodgkin's lymphoma. The vaccines were grown in tobacco plants by infecting the plants with a tobacco mosaic virus containing DNA fragments cloned from each patient's cancer cells, thus matching each vaccine to its potential beneficiary.

Eleven of the 16 participants with the cancer had developed a cellular immune response 28 days after vaccination; six of these made antibodies specific to certain proteins found on the surface of their cancerous white blood cells.

T. YAMANAKA/AFP/GETTY

ZOOLOGY

## Bigmouth strikes again

*J. Fish Biol.* **73,** 17–34 (2008)

An examination of a one-tonne megamouth shark (*Megachasma pelagios*; pictured above) caught off the coast of Japan indicates that the species has a feeding method previously seen in whales, but never before in sharks.

Fellow plankton-feeding sharks — the whale shark and the basking shark — typically feed by swimming through clouds of their quarry with their mouths continuously open. But the highly elastic skin and loose connective tissue around the jaws of the megamouth point to it relying on an 'engulfment' technique like that used by humpback whales, say Kazuhiro Nakaya and his colleagues at Hokkaido University in Japan.

This would involve the fish swimming towards a shoal of plankton with its mouth slightly open, sucking, and then gradually expanding the mouth and throat cavity to fit more and more in. When its mouth is full, the shark 'gulps' — sieving and swallowing prey while expelling seawater through its gills.

## JOURNAL CLUB

**Robin Rogers**
**The University of Alabama, Tuscaloosa; Queen's University Belfast, Northern Ireland**

**A chemist believes that an ionic liquid is the place for a noxious gas.**

As a 'green chemist', I worry about the potential dangers of moving toxic and flammable gases around. Most nasty gases are transported in pressurized canisters to save space, posing the risk of hazardous compounds being expressed over people and pleasant greenery on the rare occasions that a container breaks.

Recently, some scientists at Air Products and Chemicals, a chemicals supplier in Allentown, Pennsylvania, found a way to store phosphine ($PH_3$) and boron trifluoride ($BF_3$) — both toxic gases — in ionic liquids, and then recover the gases without introducing impurities (D. J. Tempel *et al. J. Am. Chem. Soc.* **130,** 400–401; 2008).

The advantage of transporting gases in ionic liquids is that many such liquids have no measurable vapour pressure. So were a container to burst, the gases inside it would remain as chemical complexes in a liquid state, making them much easier to mop up. Furthermore, ionic liquids can be recycled in subsequent shipments.

Dan Tempel and his team used a computer model to consider two ionic liquids — the cation 1-butyl-3-methylimidazolium paired with either $Al_2Cl_7^-$ and $Cu_2Cl_3^-$ — for phosphine transport. They then tested the latter in the lab; the positively charged copper atoms bound the lone electron pair on phosphine. Similarly, the electron-deficient boron atom in boron trifluoride facilitated the formation of a covalent bond with a fluorine atom in another ionic liquid, in which the same cation is paired with $BF_4^-$.

In both cases, more than 90% of the ionic liquid's reactive sites formed complexes at room temperatures. This means that relatively small volumes of ionic liquids could move a lot of toxic gas around. I think this could revolutionize the industry.

Discuss this paper at **http://blogs.nature.com/nature/journalclub**