spontaneously in a supercooled liquid. Keys and Glotzer report that a quasicrystal nucleus grows by incorporating ready-formed clusters of atoms with icosahedral shapes, which have five- and twelvefold symmetries and cannot themselves grow indefinitely. This creates packing mismatches. Reorganizing the atoms in the enlarging nucleus to correct for the mismatches is a slow process, and quasicrystal growth outpaces it, preventing the formation of a regularly ordered crystal.

CHEMICAL BIOLOGY

Platinum result

Nature Chem. Biol. doi:10.1038/nchembio.2007.58 (2007)

Common chemotherapy drugs based on platinum, such as cisplatin and oxaliplatin, target different combinations of DNA sequences when that DNA is bound to structures called nucleosomes compared with when it is not, according to Curt Davey and his colleagues at Nanyang Technological University in Singapore.

Nucleosomes comprise bundles of proteins and DNA, and package DNA into chromosomes. Although scientists knew where these drugs act on nucleosome-free DNA, they understood little about how the drugs work in living cells.

The additional details, elucidated with X-ray crystallography, may make the process of screening potential anticancer medicines with fewer side effects than cisplatin and oxaliplatin more efficient. The findings could also help in the design of more specific compounds — if drugs could home in on nucleosomes in certain positions, they could better target relevant genes.

FLUID DYNAMICS

What goes around

Phys. Rev. Lett. **99,** 234302 (2007)

Large-scale ocean flows are often mapped using buoys that broadcast signals to satellites. Yoann Gasteuil and his colleagues at the École Normale Supérieure in Lyon, France, have developed a miniature instrument that freely follows smaller-scale currents.

Their wireless sensor, which measures just over 2 centimetres in diameter, can record the temperature and velocity of its surrounding medium and transmit that information via radio waves. The sensor's density is matched to that of the fluid, so it neither sinks nor floats and is carried along by convection flows.

So far Gasteuil and his team have recorded the size and speed of rising hot plumes and cool sinking ones in a desktop water tank, and have taken measurements of heat transport, which varies considerably between circulation cycles.

ZOOLOGY

Face space

Brain Behav. Evol. doi:10.1159/000108607 (2008)

Certain types of paper wasp are the only insects known to be able to recognize individuals of their own species by the pattern of markings on their faces. A study comparing brain size and structure in wasps with and without this ability might aid zoologists trying to understand the evolution of facial processing in the brain.

E. A. TIBBETTS & J. DALE

Wulfila Gronenberg at the University of Arizona, Tucson, and his co-workers looked at the neural structures of four species of paper wasp, two of which can recognize the faces of wasps of their own species.

The face-recognizing wasps had neither bigger brains nor larger primary visual centres than the others. So telling contrasting facial markings apart may be no more taxing for these insects (such as *Polistes dominulus*, pictured above) than discriminating between different foods or predators, the researchers suggest. If this is the case, it may distinguish the wasps from other creatures capable of facial recognition, and could provide clues to how finely tuned facial processing evolved from primitive brains in 'higher' organisms.

JOURNAL CLUB

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A physicist enthuses about criticality in biological development.

Physicists often overestimate the impact of their work on biological research. A biologist recently joked to me that physicists are rather like consultants: they appear without being asked and don't tell you anything new. As a physicist studying the spread of infectious diseases, I reckon there is some truth in this.

But biologists can underestimate our insights, too. The joke turned my mind to a paper by three physicists who applied the theory around spontaneous symmetry breaking to the development of body axes (J. Soriano *et al. Phys. Rev. Lett.* **97,** 258102; 2006).

Spontaneous symmetry breaking occurs in, for example, a cooling magnetic material. At high temperatures, magnetic spins are randomly arranged, but as the material cools patches form in which the spins are aligned. At a critical temperature, the spins align throughout the material. A small, external magnetic field can then determine the system's fate, setting all the spins in a particular direction.

Soriano and his team studied symmetry breaking in developing hydra — multicellular organisms with clearly defined head and foot ends. Hydra can establish their body axis from a jumbled ball of cells, reminiscent of the way a magnetic material orders its spins as it cools. Patches of cells develop similar gene-expression profiles. This creates a system that is critically sensitive to tiny temperature gradients, which determine the direction of the body axis.

Impressively, Soriano and his team worked out the exponent in the size distribution of cell patches expressing a particular gene as a function of the age of the developing hydra. Through this, they related axis development to other self-organized critical systems physicists study, such as forest fires.

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