buried beneath the sea floor. A squishy layer of fossilized diatoms — microscopic algae — was the weak link that gave way to cause the slide, the authors say. Such diatom layers are common on continental slopes and could have played a part in other massive underwater landslides.

Geology http://doi.org/ckng (2018)

DNA looper caught on film

Long strands of genetic material are packaged into cells with help from a molecule that pulls DNA into loops.

The protein complex condensin has a key role in organizing DNA's 3D structure, but researchers have disagreed on how the complex works. Now, Christian Haering at the European Molecular Biology Laboratory in Heidelberg, Germany; Cees Dekker at the Delft University of Technology in the Netherlands; and their colleagues have captured real-time video of condensin in action for the first time. To do so, the team tethered both ends of a piece of DNA to a surface and marked it with fluorescent dye.

The condensin molecule anchored itself to the DNA and then started reeling the DNA strand towards the anchor point, forming a loop. The loop grew at an average rate of 600 base pairs — the building blocks of DNA — per second.

Science http://doi.org/cksq (2018)

An AI tool for eye health

A new artificial-intelligence tool deploys a highly efficient form of deep learning to diagnose eye disease from medical images.

Convolutional neural networks are deep-learning algorithms adept at processing images, but researchers typically need to train them on more than one million medical images before testing how well the algorithms work. Kang Zhang at the University of California, San Diego, and his colleagues created a kind of convolutional neural network capable of learning with many fewer images.

The team trained the model on 108,000 images of retinas. All had been classified by experts as either healthy or showing signs of a leading cause of blindness: macular degeneration or diabetic macular oedema, a build-up of fluid in the retina. The algorithm identified critical cases of these conditions as accurately as six experts in ophthalmology.

The model also identified paediatric pneumonia from chest X-rays, suggesting that the technique could be broadly applied across medicine.

Cell 172, 1122–1131 (2018)

The physics of wrinkled brains

Miniature ‘brains’ in a dish have provided a guidebook to the physical forces that give the human cerebral cortex its distinctive wrinkled appearance.

Previous experiments used polymer gels to model the formation of the brain’s folds, a process crucial to the organ’s development. To move such studies into living cells, Orly Reiner and her colleagues at the Weizmann Institute of Science in Rehovot, Israel, grew ‘organoids’ — 3D clumps of cells (pictured) — that mimicked the developing brain.

The team confined the organoids, which were grown from human cells, to small compartments. Wrinkling developed during the second week of maturation, and was triggered, in part, by the organoid’s outer regions growing faster than its inner regions. Treatment with a drug that inhibits the action of a key component of the cell skeleton led to smoother organoids.

The results suggest that organoids can offer a useful model for early brain development.

Nature Phys. http://doi.org/cksr (2018)

A gene blots out butterflies’ spots

Many butterflies have two wing patterns: one each for the upper and lower sides of the wing. Now researchers have singled out a gene that helps to create this double-sided design.

Anupama Prakash and Antónia Monteiro at the National University of Singapore found that a gene called apterus A triggers the variation from one side of the wing to the other. The gene was already known to contribute to wing development in other insects, such as beetles. The authors discovered that in a butterfly called the African squinting bush brown (Bicyclus anynana), the gene is active only on upper-wing surfaces (pictured, top). When the team mutated the gene in larvae, the resulting butterflies had upper-wing surfaces similar to the lower ones (pictured, bottom).

The gene quashes the appearance of some wing patterns, such as eyespots, the authors say. This suggests that mutations in the gene may have had an important role in butterfly evolution.

Proc. R. Soc. B 285, 20172685 (2018)

The quashing of quantum states

A single iron atom has been observed in unprecedented detail as it sheds the ‘fuzziness’ of its quantum states.

Quantum computers perform calculations on the basis of quantum properties that allow atoms to be ‘fuzzy’ — that is, to exist in multiple states at once. But as an atom interacts with its environment over time, it loses this quantum feature and occupies only one state. This loss of fuzziness limits the capabilities of quantum computers.

To better understand this process, a team led by Andreas Heinrich of the IBS Center for Quantum Nanoscience in Seoul and Christopher Lutz of the IBM Almaden Research Center in San Jose, California, used a scanning tunnelling microscope to study single iron atoms. After delivering a stream of electrons through the microscope’s tip, the team saw that, in most cases, interaction with an individual electron was enough to shift the atom to only one quantum state.

Changes to the magnetic properties of the microscope’s tip also affected how long the atom remained in multiple quantum states. Such techniques could be used to design and build nanostructures atom by atom to improve the performance of quantum devices, the authors write.

Sci. Adv. 4, eaaq1543 (2018)