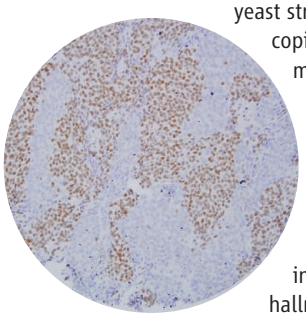
EDITED BY STELLA HURTLEY

Propagating Pictures of Malaria

Malaria infection may originate from just one infective mosquito, and so to be able to out-run the host's defenses, the parasite has to ramp up its numbers rapidly. The range of checks and balances acting during infection cannot be measured by simply taking blood samples. **Metcalf *et al.*** (p. 984; see the Perspective by **Day and Fowkes**) used several large data sets to mathematically model the ecology of mouse malaria and developed an important measure of the infection, the effective propagation number (P_e). P_e varies through time, depending on the strength of the host's immune responses and the depletion of mature red blood cells.

Aneuploidy and Cancer

Cancer cells often show aneuploidy—a state in which cells have an abnormal number of chromosomes (see the Perspective by **Kolodner *et al.***). **Sheltzer *et al.*** (p. 1026) constructed yeast strains containing extra copies of a single chromosome to analyze the effects of aneuploidy in cells. Aneuploidy led to other genetic abnormalities in the cells similar to the sort of "genomic instability" that is a hallmark of cancer cells.



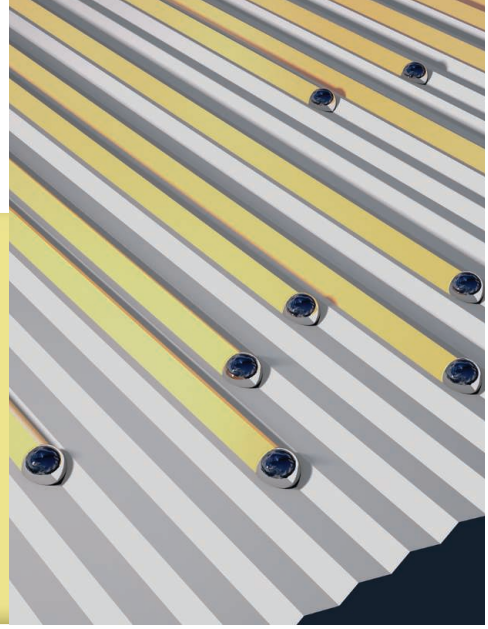
Cancer genome analysis by **Solomon *et al.*** (p. 1039) revealed how aneuploidy may arise in a subset of tumors. A broad range of human tumors harbor inactivating mutations in *STAG2*, an X-linked gene that encodes a subunit of cohesin, a protein complex that controls the separation of sister chromatids during cell division. In cultured tumor cells, targeted replacement of the defective copy of *STAG2* with the wild-type gene partially reversed the cells' chromosomal instability, which supports the hypothesis that *STAG2* is a tumor suppressor gene that helps to prevent mishaps in chromatid separation.

Sunspot Forecasting

Sunspots are manifestations of solar magnetism on the surface of the Sun, associated with major eruptive events that can cause power outages on Earth and damage satellites and spacecraft. **Ilonidis *et al.*** (p. 993) developed a technique that allows sunspots to be detected 1 to 2 days before they appear at the surface, promising to improve space weather forecasts. Application of this technique to four emerging sunspot regions shows that the magnetic fields that form sunspots in the deep solar interior are stronger than previously predicted and are generated at least 65,000 kilometers below the surface.

Wires on Sapphire >>

Long, aligned semiconductor nanowires are needed for their eventual incorporation into electronic devices. **Tsivion *et al.*** (p. 1003) show a route to grow GaN nanowires with specific growth directions on different planes of sapphire and show how the different sapphire planes affect the wire quality and growth. The wires produced were successfully incorporated into a functional electroluminescent device.



Cold-Atom Frustration

The interaction between the charge- and spin-degrees of freedom of condensed-matter systems can often give rise to a vast suite of complex electronic and magnetic phases. **Struck *et al.*** (p. 996, published online 21 July) show that the ability to tune the sign and strength of the interaction between atoms of a Bose-Einstein condensate trapped in a triangular optical lattice can be used to study magnetic ordering and the complex phases associated with magnetic frustration. The cold-atom approach offers the possibility of experimentally tunable system that can be used to simulate the complex interactions that occur in condensed matter systems.

Circle of Five

Lithium ion batteries operate by storing negative charge in a layered carbon lattice and compensating it with lithium ions (Li^+) inserted between the layers. **Zabula *et al.*** (p. 1008) performed careful crystallographic and spectroscopic characterization of the polycyclic aromatic hydrocarbon corannulene ($C_{20}H_{20}$). Reduction with four charge equivalents produced a dimeric sandwich motif, in which two carbon sheets encase a ring of five Li^+ ions, with several external ions compensating the rest of the charge. The findings revise a widely accepted proposed structure positing a less dense arrangement of four internal Li^+ ions.

Equal Opportunity?

Workforce diversity has been considered central to the U.S. NIH objective of improving the nation's health through research. **Ginther *et al.*** (p. 1015; see the Policy Forum by **Tabak and Collins**) estimate the association between the self-identified race or ethnicity of an applicant for an NIH R01 research grant and the probability of receiving an award from 2000 to 2006. After controlling for demographics, educational background, training, prior research, and employer the authors found that black applicants were significantly less likely to receive research funding than white applicants.

Making a Move

The distributions of many terrestrial organisms are shifting in latitude and/or elevation in response to changing climate. In a meta-analysis of data from studies in both hemispheres, **Chen *et al.*** (p. 1024) show that distributions of a wide range of plant and animal species are shifting faster than previously realized. A clear association was identified between magnitude of distribution change and magnitude of warming. These estimates of rate of change may now be used with greater confidence to parameterize models of the impact of climate change on biodiversity.

Do Teaching and Research Mix?

Graduate students in the sciences put a lot of focus on research. **Feldon *et al.*** (p. 1037) analyzed whether time that graduate students spent teaching helped their research programs. An analysis of the quality of research proposals submitted by graduate students suggested that students involved in teaching developed greater skills than those who spent their time only on research.

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