

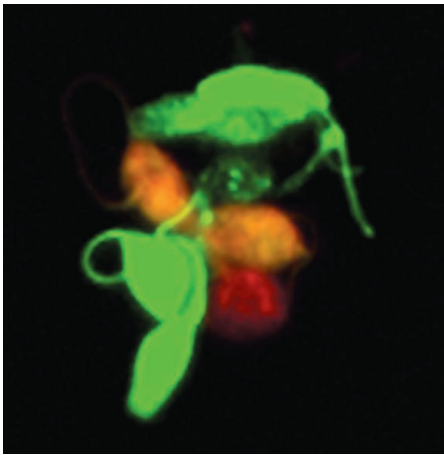
seedling's primary root (a well-functioning root gets the plant off to a good start) as their end point, the authors compared parental metabolite profiles to those of the hybrid offspring. A subset of the metabolites was identified as predictive of hybrid outcomes not only for that same metabolite but also for several other metabolites. The most effective predictions of hybrid root biomass were achieved by looking at only 5, but any 5, of the most predictive 10 to 20 metabolites. — PJH

PLOS One 9, e85435 (2014).

MICROBIOLOGY

Ancestor Intercourse

Trypanosomes (notably including the sleeping sickness parasites) have long been thought to be



primitive protist oddities with strange biochemistries. Recent evidence from Peacock *et al.* shows that, just like the majority of eukaryotes, trypanosomes have sex. Starting from observations on the expression of meiosis-specific genes in trypanosomes within the salivary glands of the tsetse fly vector, distinctively shaped cells—putative gametes—were found. Subsequently, the cells were observed to intertwine flagella, squirm, and form intimate pairs. Labeling with different-colored fluorescent proteins revealed that membrane and cytoplasmic fusion occurred (although formal proof is still required for nuclear and kinetoplast DNA exchange), hence confirming that even the most ancestral eukaryotes indulge in sexual reproduction. — CA

Curr. Biol. 24, 181 (2014).

PHYSICS

A Semisynthetic Lattice

Atomic vapors at very low temperatures are useful for the quantum simulation of solid-state systems, because their properties can be finely controlled

and tuned. These neutral atoms are not, however, completely analogous to the charged carriers in solids; for instance, an external magnetic field causes electrons to move in circular orbits but has no such effects on neutral atoms. Celi *et al.* propose a simple method for creating a uniform magnetic flux in a one-dimensional (1D) optical lattice that, if realized, might be used to observe exotic phenomena such as Hofstadter-butterfly-like fractal spectra or the dynamics of topological edge states. The method is based on synthetically extending the 1D lattice into the second dimension of internal atomic states (spin) by coupling those states using a pair of Raman laser beams that are directed at an angle with respect to the optical lattice; the required amount of the Raman laser light is substantially smaller than in existing schemes. The resulting band structure supports edge states in the spin variable whose dynamics should be observable through spin-sensitive density measurements. — JS

Phys. Rev. Lett. 112, 043001 (2014).

POLICY

Cooperating on Climate

We've come to expect lack of progress at the annual United Nations climate talks. A key obstacle to agreement is the wealth inequality among the countries around the negotiating table. Such public-goods negotiations, and the exploitation of common resources, are tricky enough on their own, but addressing the gap between "haves" and "have nots" adds another level of difficulty. Building on laboratory experiments and earlier theoretical work, Vasconcelos *et al.* use Evolutionary Game Theory models to explore how wealth inequality and risk perception affect such negotiations, and address another key element, the homophily of parties; i.e., their tendency to align with others from the same wealth level. They found that if parties were willing to cooperate regardless of wealth levels, then some inequality among parties could actually lead to better cooperation, as the rich tend to contribute more and compensate for lower contributions from the poor. Contributions from the poor are still critical, though, and increased homophily, with limited cooperation across the wealth gap, can lead to collapse. Obstinate cooperative behavior, with a few poor countries cooperating with wealthier countries, can compensate for broader homophily. In addition to minimizing homophilic biases, the authors suggest that negotiations be portioned into smaller groups focused on local short-term targets for which uncertainty is relatively limited. — BW

Proc. Natl. Acad. Sci. U.S.A. 10.1073/pnas.1323479111 (2014).