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False-colored atomic force microscopy image of three carbon nanotubes on a silicon dioxide substrate (composite of scans on three devices). The middle nanotube is disconnected by a ~40-nanometer gap; the outer nanotubes have similar nanogaps bridged by a phase-change material (PCM) bit. Such small bits can be switched by voltage pulses with energy consumption that is one hundred times lower than that of modern PCM data storage. See page 568.

Image: Alex Jerez, Feng Xiong, and Eric Pop, University of Illinois Urbana-Champaign

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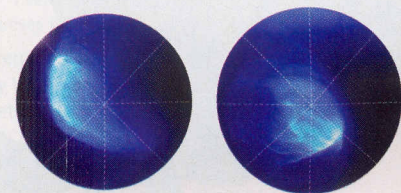
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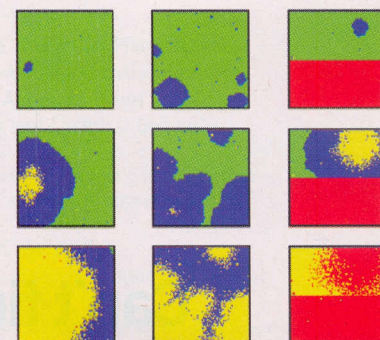
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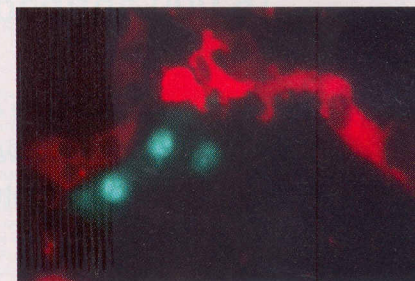
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Structural Basis for Methyl Transfer by a Radical SAM Enzyme

A. K. Boal et al.

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10.1126/science.1205358

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Human Cytomegalovirus Directly Induces the Antiviral Protein Viperin to Enhance Infectivity

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Human cytomegalovirus uses a host-encoded antiviral protein to its own advantage.

10.1126/science.1202007

Early Warnings of Regime Shifts: A Whole-Ecosystem Experiment

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10.1126/science.1203672

Spin-Liquid Ground State of the $S = 1/2$ Kagome Heisenberg Antiferromagnet

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Numerical calculations reveal that the true ground state of a frustrated two-dimensional system is a gapped spin liquid.

10.1126/science.1201080

Imaging Doped Holes in a Cuprate Superconductor with High-Resolution Compton Scattering

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Inelastic x-ray scattering probed the doping dependence of the electronic environment within a cuprate superconductor.

10.1126/science.1199391

The 2010 M_w 8.8 Maule Mega-Thrust Earthquake of Central Chile, Monitored by GPS

C. Vigny et al.

Rupture kinematics of this very large earthquake were obtained from high-resolution global positioning system data.

10.1126/science.1204132

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Replication of "The Perception of Rational, Goal-Directed Action in Nonhuman Primates"

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10.1126/science.1202596

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Full text at www.sciencemag.org/cgi/content/full/332/6029/537-a

Response to Comment on "Erosion of Lizard Diversity by Climate Change and Altered Thermal Niches"

B. Sinervo et al.

Full text at www.sciencemag.org/cgi/content/full/332/6029/537-b

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Highlights From Our Daily News Coverage

Expert Panel: Central U.S. Faces Real Threat of Quake

Millions in the American heartland face a genuine, if uncertain, seismic risk.

<http://scim.ag/new-madrid>

2010's Volcano-Induced Air Travel Shutdown Was Justified

Study finds that Eyjafjallajökull ash could have harmed aircraft.

<http://scim.ag/air-shutdown>

Fire Ants Surf Floods on Rafts of Their Own Bodies

Thousands of ants link together to trap air and repel water.

<http://scim.ag/ant-rafts>

SCIENCE SIGNALING

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The Signal Transduction Knowledge Environment

26 April issue: <http://scim.ag/ss042611>

EDITORIAL GUIDE: Focus Issue—Moving in the Right Direction

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Various signaling pathways enable cells to sense environmental cues and direct their migration accordingly.

RESEARCH ARTICLE: Thioredoxin Mediates Oxidation-Dependent Phosphorylation of CRMP2 and Growth Cone Collapse

A. Morinaka et al.

Repulsive guidance signaling triggers the collapse of neuronal growth cones through a mechanism involving oxidation and phosphorylation.

PERSPECTIVE: PI3K and Chemotaxis—A Priming Issue?

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The differentiation status of cells may explain contradictory findings for the role of PI3K in chemotaxis.

PERSPECTIVE: Sorting the Signals from the Signals in the Noisy Environment of Inflammation

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Neutrophils follow specific cues to migrate through inflamed tissue into necrotic tissue.

JOURNAL CLUB: Analyzing the Anatomy of Integrin Adhesions

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The spatial organization of integrin adhesions provides insight into their molecular functions.

SCIENCE CAREERS

www.sciencereers.org/career_magazine

Free Career Resources for Scientists

A Twin Career Story

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Identical twin brothers Alan and Steven Davy are pursuing similar research interests while also seeking to differentiate themselves.

<http://scim.ag/twinstory>

Q&A: Taking Mathematics to Heart

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Mathematician John Wesley Cain works with clinicians, physicists, and engineers in a field called cardiac electrophysiology.

<http://scim.ag/math2heart>

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Integrating Medicine and Science

27 April issue: <http://scim.ag/stm042711>

RESEARCH ARTICLE: Establishment of Antitumor Memory in Humans Using In Vitro-Educated CD8⁺ T Cells

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Antitumor CD8⁺ T cells educated in vitro can induce antitumor responses in humans.

REPORT: Differential Metabolic Impact of Gastric Bypass Surgery Versus Dietary Intervention in Obese Diabetic Subjects Despite Identical Weight Loss

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PERSPECTIVE: Two Roads Diverge—Weight Loss Interventions and Circulating Amino Acids

R. E. Gerszten and T. J. Wang

Gastric bypass surgery decreases serum amino acids independent of weight loss.

PERSPECTIVE: The NCGC Pharmaceutical Collection—A Comprehensive Resource of Clinically Approved Drugs Enabling Repurposing and Chemical Genomics

R. Huang et al.

The NIH Chemical Genomics Center houses a database and a library of approved drugs.

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Science Policy News and Analysis

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