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Elias A. Zerhouni

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- 1013 The Future of Education
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- 1014 Controlling Eutrophication: Nitrogen and Phosphorus
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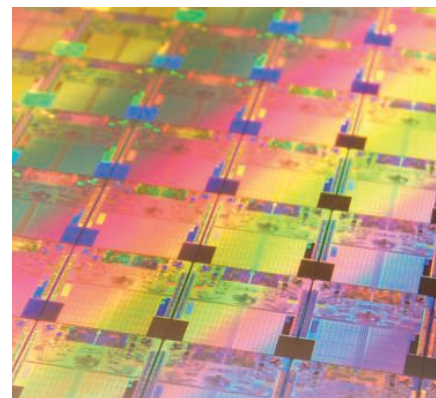
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- 1017 Making a Crust
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>> Research Article p. 1026
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BREVIA

- 1025 Open Access and Global Participation in Science
J. A. Evans and J. Reimer
Making articles available free online increases the rate at which they are cited, especially by authors in poorer countries.

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COVER

Maltose binding protein (translucent), shown suspended in its molten globule state with chaperone protein SecB (yellow), destined for transport across the cellular membrane. The Gordon Research Conference on Visualization in Science & Education will be held 26 to 31 July 2009 at Magdalen College, Oxford, UK. The schedules for the 2009 Gordon Research Conferences begin on page 1084.

Image: Graham Johnson/www.fivth.com and Scripps Research Institute; Sander Tans/AMOLF Institute

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RESEARCH ARTICLE

1026 Oxide Nanoelectronics on Demand

C. Cen et al.

An atomic force microscope is used to pattern and fabricate devices created at the interface between different oxides.

>> *Perspective p. 1018*

REPORTS

1030 Macroscopic 10-Terabit-per-Square-Inch Arrays from Block Copolymers with Lateral Order

S. Park et al.

The sawtooth topography of annealed sapphire wafers guides the phase separation of a block copolymer to create a nearly defect-free patterned film.

1033 The Formation of Warm Dense Matter: Experimental Evidence for Electronic Bond Hardening in Gold

R. Ernstorfer et al.

Injecting energy into a gold film can create a transient excited state with stronger bonds prior to melting.

1037 Switching Off Hydrogen Peroxide Hydrogenation in the Direct Synthesis Process

J. K. Edwards et al.

Unwanted product hydrogenation was avoided by using a modified catalyst that had smaller gold-palladium nanoparticles.

1041 Strong Release of Methane on Mars in Northern Summer 2003

M. J. Mumma et al.

Earth-based spectrometers have detected seasonal variations of methane emissions from certain locations on Mars in 2003.

1045 Isotopic Evidence for an Aerobic Nitrogen Cycle in the Latest Archean

J. Garvin et al.

A modern nitrogen cycle developed and microbial metabolisms evolved as soon as some free oxygen was present.

1048 Zircon Dating of Oceanic Crustal Accretion

C. J. Lissenberg et al.

Zircon dates from the slow-spreading mid-Atlantic Ridge show that magmatic intrusions formed new oceanic crust regularly and evenly, thereby providing cooling times.

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1050 A Self-Regulatory System of Interlinked Signaling Feedback Loops Controls Mouse Limb Patterning

J.-D. Bénazet et al.

Interactions between three signaling pathways allow robust regulation of vertebrate limb development.

1053 Trifurcate Feed-Forward Regulation of Age-Dependent Cell Death Involving *miR164* in *Arabidopsis*

J. H. Kim et al.

A logic circuit involving microRNA and transcription factors ensures the timely demise of plant leaves.

1057 HIN-200 Proteins Regulate Caspase Activation in Response to Foreign Cytoplasmic DNA

T. L. Roberts et al.

A family of proteins is identified that binds to foreign cytoplasmic DNA in mammalian cells and regulates the immune response.

1060 A Genetic Defect Caused by a Triplet Repeat Expansion in *Arabidopsis thaliana*

S. Sureshkumar et al.

A strain of *Arabidopsis* provides a plant model for the harmful effects of repeat nucleotide expansions in populations.

1063 Stress-Inducible Regulation of Heat Shock Factor 1 by the Deacetylase SIRT1

S. D. Westerheide et al.

The longevity factor SIRT1 influences protein stability by keeping heat shock factor 1 in its active state.

>> *Perspective p. 1021*

1067 Disruption of Vertical Motility by Shear Triggers Formation of Thin Phytoplankton Layers

W. M. Durham et al.

Extensive sheets of photosynthetic algae accumulate in coastal waters when their upward swimming is disrupted by counter currents in lateral water flow.

>> *Perspective p. 1022*

1070 Cytosolic Viral Sensor RIG-I Is a 5'-Triphosphate-Dependent Translocase on Double-Stranded RNA

S. Myong et al.

A host protein that recognizes invading viruses activates innate immunity defenses only when it senses both double-stranded RNA and a 5' triphosphate.

1074 Neuronal Activity-Induced Gadd45b Promotes Epigenetic DNA Demethylation and Adult Neurogenesis

D. K. Ma et al.

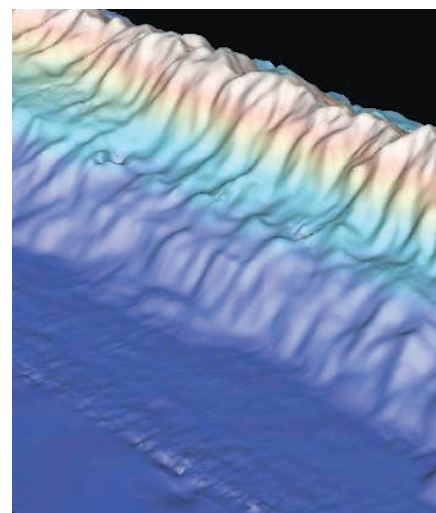
Neural activity induces an immediate early gene that triggers epigenetic modifications needed for neurogenesis.

1077 Harmonic Convergence in the Love Songs of the Dengue Vector Mosquito

L. J. Cator et al.

Male and female mosquitoes change their wing beat frequencies to match each other as a prelude to mating.

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SCIENCEONLINE

SCIENCEEXPRESS

www.sciencexpress.org

A Putative ABC Transporter Confers Durable Resistance to Multiple Fungal Pathogens in Wheat
S. G. Krattinger et al.

10.1126/science.1166453

A Kinase-START Gene Confers Temperature-Dependent Resistance to Wheat Stripe Rust
D. Fu et al.

10.1126/science.1166289

Several specific genes in wheat confer resistance to common fungal diseases.

Fermi Observations of High-Energy Gamma-Ray Emission from GRB 080916C

The Fermi LAT and Fermi GBM Collaborations

This highly luminous gamma-ray burst had the largest apparent energy release yet measured.

10.1126/science.1169101

Switchable Ferroelectric Diode and Photovoltaic Effect in BiFeO₃

T. Choi et al.

Single crystals of bismuth iron oxide contain a single ferroelectric domain that can be switched with an electric field.

10.1126/science.1168636

SCIENCENOW

www.sciencenow.org

Highlights From Our Daily News Coverage

The Whole Migration and Nothing But

Tiny geolocator backpacks let researchers follow every step of songbirds' journeys.

Ancient Virus Gave Wasps Their Sting

Find solves decades-old debate about mysterious toxins.

Horseshoes, Hand Grenades—and Slot Machines?

A near miss is almost as good as a win to gamblers' brains, keeping them playing.

SCIENCE SIGNALING

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The Signal Transduction Knowledge Environment

RESEARCH ARTICLE: The Precise Sequence of FGF Receptor Autophosphorylation Is Kinetically Driven and Is Disrupted by Oncogenic Mutations
E. D. Lew et al.

The order of FGFR1 tyrosine autophosphorylation is kinetically controlled and determined by primary and tertiary structures.

PERSPECTIVE: Von Gierke's Disease Adopts an Orphan (and Its Partner)

A. Cheng and A. R. Saltiel

The transcription of *glucose-6-phosphatase* is positively regulated by a nuclear receptor and coactivator.

PODCAST

T. Kino and A. M. VanHook

The guanine nucleotide exchange factor Brx is required in lymphocytes for the expression of *nfat5* in response to osmotic stress.

NETWATCH: The Cancer Genome Atlas

Clinical, cell biological, and genomic data from human tumors are available from the National Cancer Institute; in Bioinformatics Resources.

NETWATCH: CellBASE

Find online research and education resources for cell biologists at this site from the American Society for Cell Biology; in Technical Information.

SCIENCE CAREERS

www.sciencereers.org/career_magazine

Free Career Resources for Scientists

Perspective: Problem Finding and the Multidisciplinary Mind

L. Austin

Your choice of research problem may determine the course of your career as a physician-scientist.

Tooling Up: The Cold, Hard Truth About Finding a Job in 2009

D. Jensen

Finding a job now takes a plan, perseverance, and a positive attitude.

Faith and Science in Balance

E. Pain

Ph.D. student Imre Szilágyi strives to succeed in order to glorify God.

SCIENCEPODCAST

www.sciencemag.org/multimedia/podcast

Free Weekly Show

Download the 20 February *Science* Podcast to hear about open access and global participation in science, the role of water vapor in global warming, microchips sans silicon, and more.

ORIGINSBLOG

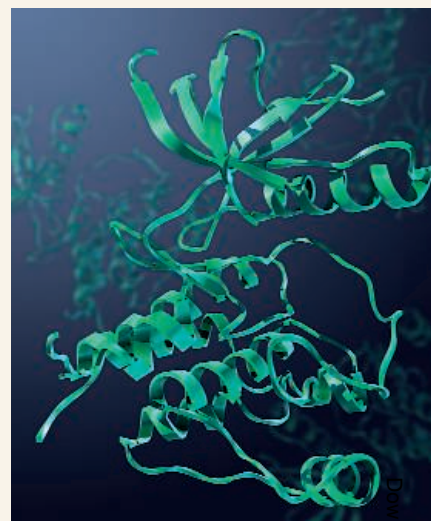
blogs.sciencemag.org/origins

A History of Beginnings

SCIENCEINSIDER

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Science Policy News and Analysis



SCIENCE SIGNALING

Tyrosine kinase domain of FGFR1.



SCIENCEONLINE FEATURE

www.sciencemag.org/sciext/gonzoscientist/

THE GONZO SCIENTIST:

Gourmet Food, Served by Dogs

Starting with a dog-led truffle hunt and ending with a dog-food taste test, our reporter takes a real-world tour of hedonics (with audio slideshow).

>> *News story p. 1006*

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