

EDITORIAL

- 983 Beyond the Stimulus
Elias A. Zerhouni

NEWS OF THE WEEK

- 992 Science Wins \$21 Billion Boost as Stimulus Package Becomes Law
- 993 LHC Delays Give Tevatron a Shot at Higgs Boson
- 995 No News Is Good News for Holdren, Lubchenco at Confirmation Hearing
- 996 HIV/AIDS Researchers Reach for High-Hanging Fruit
- 997 From the *Science* Policy Blog
- 998 AAAS Annual Meeting
Al Gore to Scientists: 'We Need You'
Will Many Endangered Species Recover?
Findings: Time Traveling at AAAS
First Globetrotters Had Primitive Toolkits
- 999 Tree Rings Tell of Angkor's Dying Days

NEWS FOCUS

- 1000 Is Silicon's Reign Nearing Its End?
>> Science Podcast
- 1003 New Facility Propels Korea to the Fusion Forefront
- 1004 Richard Richards: Making Every Drop Count in the Buildup to a Blue Revolution
- 1006 Rooting Around the Truffle Genome
>> Science Online Feature, see p. 977

LETTERS

- 1009 For Teachers, All the Classroom's a Stage
M. Hadjiargyrou
Earlier Treatment May Explain Diabetes Data
D. M. Abbey
The Vital Role of ORWH
S. Hultgren et al.
The Nonscientist Science Advisor
R. A. Pielke

The Enduring Spoken Word
M. Dingemans
Response
D. W. Oard

1011 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.

- 1012 The Collectors of Lost Souls
W. Anderson, reviewed by M. S. Lindee
- 1013 The Future of Education
K. Egan, reviewed by J. V. Wertsch

POLICY FORUM

- 1014 Controlling Eutrophication: Nitrogen and Phosphorus
D. J. Conley et al.

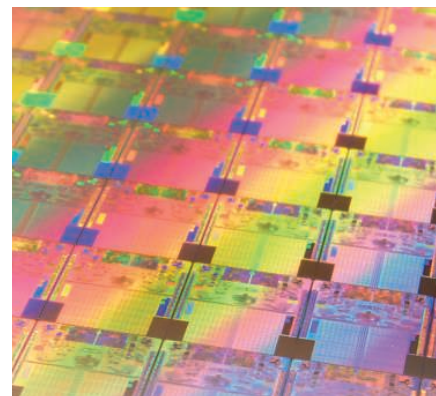
PERSPECTIVES

- 1016 Attractors and Democratic Dynamics
Y. Bar-Yam et al.
- 1017 Making a Crust
P. J. Michael and M. J. Cheadle
>> Report p. 1048
- 1018 Atomically Engineered Oxide Interfaces
J. W. Reiner et al.
>> Research Article p. 1026
- 1020 A Matter of Humidity
A. E. Dessler and S. C. Sherwood
- 1021 Stress Response and Aging
L. R. Saunders and E. Verdin
>> Report p. 1063
- 1022 Peter Principle Packs a Peck of Phytoplankton
D. Grünbaum
>> Report p. 1067

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.

CONTENTS continued >>



page 1000



page 1012

Downloaded from <http://science.sciencemag.org/> on February 23, 2019



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*

DEPARTMENTS

- 979 This Week in *Science*
- 984 Editors' Choice
- 986 *Science* Staff
- 989 Random Samples
- 991 Newsmakers
- 1083 New Products
- 1084 Gordon Research Conferences
- 1110 *Science* Careers

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.

>> *Perspective p. 1017*

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.

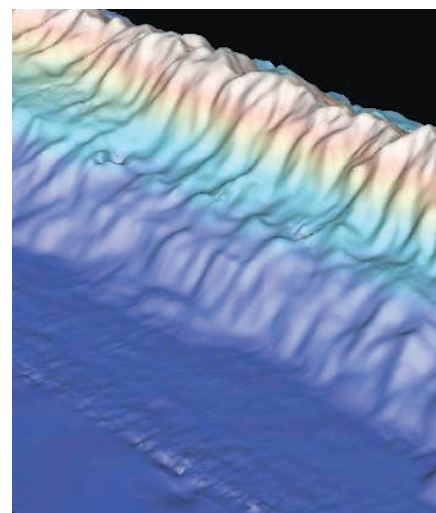
Neural activity induces an immediate early gene that triggers epigenetic modifications needed for neurogenesis.

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.

CONTENTS continued >>



pages 1017 & 1048



page 1077

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

www.sciencesignaling.org

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

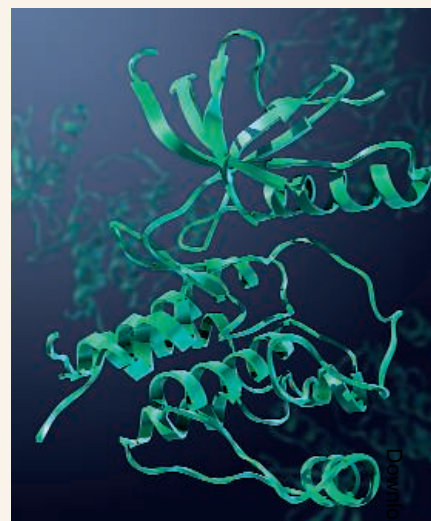
blogs.sciencemag.org/origins

A History of Beginnings

SCIENCEINSIDER

blogs.sciencemag.org/scienceinsider

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*

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2009 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$146 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$835; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. Publications Mail Agreement Number 1069624. **Printed in the U.S.A.**

Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. **Postmaster:** Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-6178. **Single-copy sales:** \$10.00 current issue, \$15.00 back issue prepaid includes surface postage; bulk rates on request. **Authorization to photocopy** material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$20.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for *Science* is 0036-8075. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.



ADVANCING SCIENCE. SERVING SOCIETY

Science

323 (5917)

Science **323** (5917), 979-1109.

ARTICLE TOOLS

<http://science.sciencemag.org/content/323/5917>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.