

EDITORIAL

- 511 Lessons from Genomics
Bruce Alberts
>> *News Focus* section;
Genome Anniversary Essays p. 546

NEWS OF THE WEEK

- 516 A roundup of the week's top stories

NEWS & ANALYSIS

- 520 Can Obama Strike a Deal With House Republicans?
522 With Reforms Under Way, International Centers Ask: Where Is the Money?
523 USDA Decides Against New Regulation of GM Crops
524 Obama Shifts Focus From Emissions to 'Clean' Energy
525 NIH Report Urges Greater Emphasis on Training for All Graduate Students

NEWS FOCUS

- 526 **HUMAN GENOME 10TH ANNIVERSARY**
Waiting for the Revolution
Human Genetics in the Clinic, One Click Away
530 **The Human Genome (Patent) Project**
>> *Editorial* p. 511; *Genome Anniversary Essays* p. 546; *Science Podcast*

LETTERS

- 532 **Benefits of Intertwining Teaching and Research**
L. A. Gregg-Jolly et al.
Healthcare Venture Capital for Africa
J. Chakma and S. M. Sammut
Response
K. Simiyu et al.
534 **CORRECTIONS AND CLARIFICATIONS**

BOOKS ET AL.

- 535 **Galileo**
J. L. Heilbron, reviewed by R. J. Raphael
536 **Seeking Refuge**
R. M. Wilson, reviewed by F. R. Davis

POLICY FORUM

- 537 **Better Science Needed for Restoration in the Gulf of Mexico**
K. A. Bjorndal et al.

PERSPECTIVES

- 539 **A Genome for the Environment**
D. Ebert
>> *Research Article* p. 555
540 **Climate and Human Evolution**
P. B. deMenocal
542 **Happy People Live Longer**
B. S. Frey
543 **A Translational Pause to Localize**
D. Ron and K. Ito
>> *Report* p. 586
544 **Exciton Quenching and Migration in Single Conjugated Polymers**
C. Bardeen
>> *Report* p. 565

ESSAYS

- 546 **Genome-Sequencing Anniversary: A Celebration of the Genome, Part I**
Faces of the Genome
F. S. Collins
The Human Genome at 10: Successes and Challenges
J. C. Venter
The Golden Age of Human Population Genetics
M. Przeworski
Genomics and Clinical Relevance
T. Hudson
What Defines Us?
R. Cole-Turner
Painting the Genome for the Public
X. Cortada



page 526



page 536

Bringing Genomics and Genetics Back Together
R. A. Gibbs
>> *Editorial* p. 511; *News Focus* section;
Science Podcast

CONTENTS continued >>



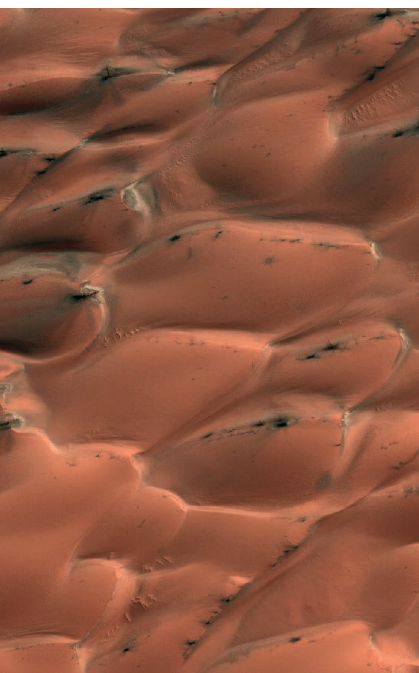
COVER

False-colored scanning electron micrograph of aligned zinc oxide nanowires. Nanowires, each 10 to 50 nanometers in diameter and 0.5 to 1 micrometers long, have a variety of potential applications from medical diagnostics to miniature electronics. The Gordon Research Conference on Cancer Nanotechnology will be held 17 to 22 July 2011 at Colby College in Waterville, Maine. See page 602 for the conference schedule and preliminary programs.

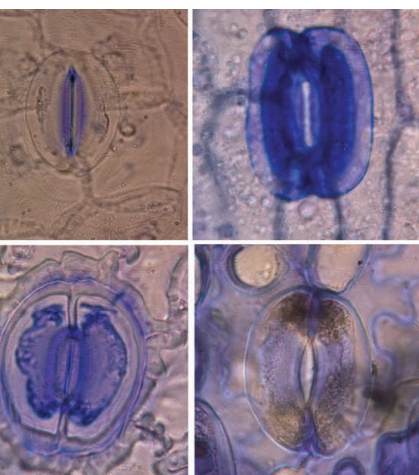
Image: Z. L. Wang, School of Materials Science and Engineering, Georgia Institute of Technology

DEPARTMENTS

- 507 **This Week in Science**
512 **Editors' Choice**
514 **Science Staff**
602 **Gordon Research Conferences**
625 **New Products**
626 **Science Careers**



page 575



page 582

REVIEW

- 550 A Parsimonious Model for Gene Regulation by miRNAs
S. Djuranovic et al.

BREVIA

- 554 The 2010 Amazon Drought
S. L. Lewis et al.
Amazonia experienced lower rainfall and higher calculated carbon emissions from tree deaths than in the 2005 drought.

RESEARCH ARTICLE

- 555 The Ecoresponsive Genome of *Daphnia pulex*
J. K. Colbourne et al.
The *Daphnia* genome reveals a multitude of genes and shows adaptation through gene family expansions.
>> *Perspective p. 539; Science Podcast*

REPORTS

- 562 KOI-126: A Triply Eclipsing Hierarchical Triple with Two Low-Mass Stars
J. A. Carter et al.
The Kepler telescope detected a triple stellar system and reveals details of the structure of low-mass stars.
- 565 Ultralong-Range Polaron-Induced Quenching of Excitons in Isolated Conjugated Polymers
J. C. Bolinger et al.
Visualization of the fluorescence of a single-conducting-polymer chain provides insight into energy-relaxation mechanisms.
>> *Perspective p. 544*
- 568 Two-Dimensional Nanosheets Produced by Liquid Exfoliation of Layered Materials
J. N. Coleman et al.
Layered transition metal dichalcogenides, such as tungsten disulfide, are exfoliated into atomically thin flakes.
- 571 Protein Native-State Stabilization by Placing Aromatic Side Chains in N-Glycosylated Reverse Turns
E. K. Culyba et al.
Protein reverse turns that interact with a phenylalanine group allow stable introduction of glycan groups at asparagine residues.

- 575 Seasonal Erosion and Restoration of Mars' Northern Polar Dunes
C. J. Hansen et al.
High-resolution images of Mars show active sand transport on northern polar dunes.
- 578 2500 Years of European Climate Variability and Human Susceptibility
U. Büntgen et al.
Variability of central European temperature and precipitation shows correlations with some major historical changes.
- 582 Passive Origins of Stomatal Control in Vascular Plants
T. J. Brodribb and S. A. M. McAdam
The transition from passive to active metabolic control of stomata and plant water balance occurred about 360 million years ago.
- 586 Translational Pausing Ensures Membrane Targeting and Cytoplasmic Splicing of *XBP1u* mRNA
K. Yanagitani et al.
A peptide-mediated translational pause facilitates the unconventional splicing of a messenger RNA on the endoplasmic reticulum.
>> *Perspective p. 543*
- 589 Directed Evolution of a Protein Container
B. Wörsdörfer et al.
An engineered protein container protects its bacterial host by efficient and selective encapsulation of a toxic protease.
>> *Science Podcast*
- 593 Aberrant Overexpression of Satellite Repeats in Pancreatic and Other Epithelial Cancers
D. T. Ting et al.
Noncoding RNAs transcribed from DNA repeats in heterochromatin are expressed at surprisingly high levels in tumors.
- 596 A Cryptic Subgroup of *Anopheles gambiae* Is Highly Susceptible to Human Malaria Parasites
M. M. Riehle
Collecting mosquito larvae from West African ponds has revealed a previously unknown but highly abundant genotype.
- 599 Action-Potential Modulation During Axonal Conduction
T. Sasaki et al.
The waveform of an action potential can be physiologically modified while it travels along the axon.



SPECIAL SERIES

A special month-long series explores the impacts of the genomics revolution on science and society.

<http://scim.ag/genome10>

SCIENCEEXPRESS

www.scienceexpress.org

Suppression of Collisional Shifts in a Strongly Interacting Lattice Clock

M. D. Swallows et al.

Increasing atomic interactions improved the accuracy and precision of a clock formed from atoms trapped in an optical lattice.

10.1126/science.1196442

The Formation and Fragmentation of Disks Around Primordial Protostars

P. C. Clark et al.

Numerical simulations show that disks around the first stars in the universe were gravitationally unstable and fragmented.

10.1126/science.1198027

Vibrationally Quantum-State-Specific Reaction Dynamics of H Atom Abstraction by CN Radical in Solution

S. J. Greaves et al.

Molecular vibrations in a solution-phase reaction are detected at a level of detail rivaling that of gas-phase studies.

10.1126/science.1197796

Cascading Effects of Bird Functional Extinction Reduce Pollination and Plant Density

S. H. Anderson et al.

Loss of pollinator services is reducing the population density of a New Zealand shrub.

10.1126/science.1199092

A Sorting Platform Determines the Order of Protein Secretion in Bacterial Type III Systems

M. Lara-Tejero et al.

The bacterial enteropathogen *Salmonella* sorts its effector protein substrates prior to secretion.

10.1126/science.1201476

SCIENCENOW

www.sciencenow.org

Highlights From Our Daily News Coverage

An Army of Ant Genomes

Newly revealed DNA from four species may help control pests.

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

Hugs Follow a 3-Second Rule

Timing Olympic athletes' embraces sheds light on how we perceive the present.

<http://scim.ag/3-sec>

How Giants Conquered Earth

A new fossil helps explain how sauropod dinosaurs got so big.

<http://scim.ag/sauropod>

SCIENCE SIGNALING

www.sciencesignaling.org

The Signal Transduction Knowledge Environment

1 February issue: <http://scim.ag/ss020111>

RESEARCH ARTICLE: Wnt Signaling

Regulates Hepatic Metabolism

H. Liu et al.

Nutrient deprivation triggers β -catenin-dependent expression of genes encoding gluconeogenic enzymes.

RESEARCH ARTICLE: Mitochondrial Membrane

Potential Is Required for MAVS-Mediated

Antiviral Signaling

T. Koshihara et al.

The contribution of mitochondria to antiviral immune responses extends beyond their role as a platform for antiviral signaling molecules.

PERSPECTIVE: To Be or Not to Be a T_{reg} Cell—

Lineage Decisions Controlled by

Epigenetic Mechanisms

A. Toker and J. Huehn

Differentiation of natural regulatory T cells is restricted by the SUMO ligase PIAS1.

NETWATCH: ModuLand

Identify overlapping modules within networks with a set of Linux-based programs; in Modeling Tools.

NETWATCH: Hierarchical Network Organisation (HiNO)

Visualize network hierarchies with this online data analysis tool; in Modeling Tools.

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org

Integrating Medicine and Science

2 February issue: <http://scim.ag/stm020211>

RESEARCH ARTICLE: Human CD3 Transgenic

Mice—Preclinical Testing of Antibodies Promoting Immune Tolerance

C. Kuhn et al.

PERSPECTIVE: Humanizing Animal Models—

A Key to Autoimmune Diabetes Treatment

D. Bressan and M. von Herrath

A new humanized mouse model can be used to predict the clinical behavior of therapeutic antibodies for the treatment of Type 1 diabetes.

RESEARCH ARTICLE: Readily Available

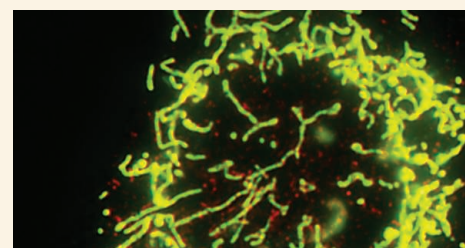
Tissue-Engineered Vascular Grafts

S. L. M. Dahl et al.

PODCAST

S. L. M. Dahl and O. M. Smith

Nonimmunogenic, tissue-engineered vascular grafts stored long-term maintain their patency, strength, and function after transplant in large-animal models.



SCIENCE SIGNALING

Mitochondria and antiviral signaling.

SCIENCE CAREERS

www.sciencereers.org/career_magazine

Free Career Resources for Scientists

Taken for Granted: Doing Something Different With Your Science

B. L. Benderly

The first postdoctoral professional master's degree graduates are very positive about the program.

<http://scim.ag/hsdRVI>

In Person: How Not to Succeed in Academia

K. Weston

A once-promising academic scientist tells how she ended up jumping out a window of the ivory tower before she was pushed.

<http://scim.ag/dHzTts>

SCIENCE PODCAST

www.sciencemag.org/multimedia/podcast

Free Weekly Show

Download the 4 February Science Podcast to hear about the human genome sequence 10 years on, evolving a protein container, the ecoresponsive water flea genome, and more.

SCIENCE INSIDER

news.sciencemag.org/scienceinsider

Science Policy News and Analysis

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 © 2011 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): \$149 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$990; 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 #R1254 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 \$25.00 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

331 (6017)

Science **331** (6017), 507-625.

ARTICLE TOOLS

<http://science.sciencemag.org/content/331/6017>

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. The title *Science* is a registered trademark of AAAS.

Copyright © 2011 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.