

EDITORIAL

- 1801 Turkey and Science Academies
Bruce Alberts

NEWS OF THE WEEK

- 1806 A roundup of the week's top stories

NEWS & ANALYSIS

- 1809 From Geneva to Italy Faster Than a Speeding Photon?
- 1810 The Waning Conflict Over XMRV and Chronic Fatigue Syndrome
- 1811 NSF Touts Family-Friendly Policies as Boon to Women
- 1812 Mercury Looking Less Exotic, More a Member of the Family
>> Reports pp. 1847, 1850, 1853, 1856, 1859, 1862, and 1865
- 1813 Experts Debate Polypill: A Single Pill for Global Health
- 1814 Social Scientists Waded Into the Tweet Stream
>> Report p. 1878

NEWS FOCUS

- 1816 Playing by Ear
>> Science Podcast
- 1818 Outbreak Detectives Embrace the Genome Era
- 1820 First Global Telescope Opens an Eye on the Cold Universe

LETTERS

- 1824 Retraction
Z. Liu et al.
- Editor's Note
M. Bradford
- Tiger Conservation: Trust Tradition
A. Rabinowitz et al.
- The Ant Who Learned to Be an Elephant
F. Ntoumi

- 1825 CORRECTIONS AND CLARIFICATIONS

- 1825 TECHNICAL COMMENT ABSTRACTS

BOOKS ET AL.

- 1826 The Information
J. Gleick, reviewed by A. Robinson
- 1827 The Book of Ice
P. D. Miller, reviewed by C. Bohannon

POLICY FORUM

- 1828 Rescuing Wolves from Politics: Wildlife as a Public Trust Resource
J. T. Bruskotter et al.

PERSPECTIVES

- 1830 Sensing ER Stress
S. Kawaguchi and D. T. W. Ng
>> Report p. 1891
- 1831 Striking a Balance to Control Stereochemistry
O. Wiest and P. Helquist
>> Report p. 1875
- 1832 Sunshine on a Cloudy Forecast
N. G. Heavens
>> Report p. 1868
- 1833 A New Histone Code for Clocks?
S. A. Brown
>> Report p. 1881
- 1834 Predicting the Flow of Real Polymers
R. G. Larson
>> Report p. 1871
- 1836 Retrospective: Bernadine Healy (1944–2011)
D. E. Shalala

SCIENCE PRIZE ESSAY

- 1838 Making Earth Science Data Accessible and Usable in Education
T. S. Ledley et al.

REVIEW

- 1843 TAL Effectors: Customizable Proteins for DNA Targeting
A. J. Bogdanove and D. F. Voytas

CONTENTS continued >>



page 1816



page 1826

Downloaded from <http://science.sciencemag.org/> on March 22, 2019



COVER

Enhanced-color image of Mercury's surface showing a close-up of shallow, rimless depressions, or hollows (blue), inside the Raditladi impact basin (foreground ~12 kilometers across). These landforms were likely formed by the loss of volatile-containing material exposed by impacts and support the inference that Mercury's interior contains more volatile materials than predicted. Results from MESSENGER's orbital observations appear in a series of Reports beginning on page 1847.

Image: NASA/The Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington

DEPARTMENTS

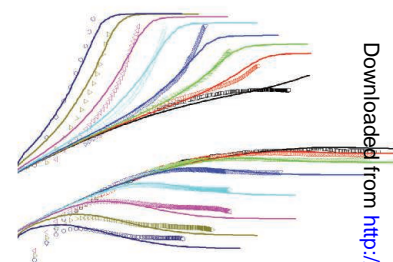
- 1797 This Week in *Science*
1802 Editors' Choice
1804 *Science* Staff
1840 AAAS News & Notes
1908 New Products
1909 *Science* Careers

REPORTS

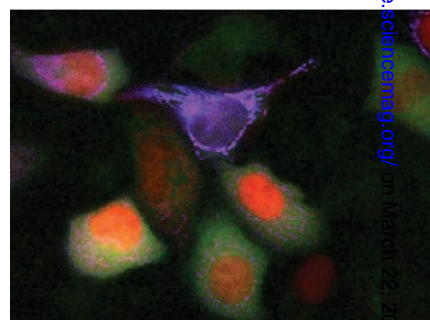
- 1847** The Major-Element Composition of Mercury's Surface from MESSENGER X-ray Spectrometry
L. R. Nittler et al.
Geochemical data show that the major rock-forming components of Mercury are characterized by high sulfur content.
- 1850** Radioactive Elements on Mercury's Surface from MESSENGER: Implications for the Planet's Formation and Evolution
P. N. Peplowski et al.
Gamma-ray emission from the surface of Mercury indicates that the planet accreted from relatively volatile-enriched material.
- 1853** Flood Volcanism in the Northern High Latitudes of Mercury Revealed by MESSENGER
J. W. Head et al.
Mercury's high northern latitudes have a contiguous area of smooth plains created by lava flows.
- 1856** Hollows on Mercury: MESSENGER Evidence for Geologically Recent Volatile-Related Activity
D. T. Blewett et al.
Rimless shallow depressions on Mercury may still be forming by outgassing, volcanism, sublimation, or space weathering.
- 1859** The Global Magnetic Field of Mercury from MESSENGER Orbital Observations
B. J. Anderson et al.
Displacement of Mercury's magnetic dipole implies that the surface field has a north-south asymmetry.
- 1862** MESSENGER Observations of the Spatial Distribution of Planetary Ions Near Mercury
T. H. Zurbuchen et al.
The polar regions of Mercury are important sources of material for its ionized exosphere.
- 1865** MESSENGER Observations of Transient Bursts of Energetic Electrons in Mercury's Magnetosphere
G. C. Ho et al.
Despite having an internal magnetic field, Mercury does not have a Van Allen-type radiation belt.
>> *News story p. 1812; Science Podcast*
- 1868** Evidence of Water Vapor in Excess of Saturation in the Atmosphere of Mars
L. Maltagliati et al.
An upper layer of the martian atmosphere is supersaturated with water vapor, probably because of inefficient condensation.
>> *Perspective p. 1832*
- 1871** Linking Models of Polymerization and Dynamics to Predict Branched Polymer Structure and Flow
D. J. Read et al.
The complex flow behavior of a branched polymer can be predicted from its chemical structure.
>> *Perspective p. 1834*
- 1875** Three-Dimensional Correlation of Steric and Electronic Free Energy Relationships Guides Asymmetric Propargylation
K. C. Harper and M. S. Sigman
An unexpected synergy between a ligand's steric bulk and its electronic structure improves a stereoselective catalyst.
>> *Perspective p. 1831*
- 1878** Diurnal and Seasonal Mood Vary with Work, Sleep, and Daylength Across Diverse Cultures
S. A. Golder and M. W. Macy
Across the world the collective mood heightens at breakfast time and during the weekend.
>> *News story p. 1814; Science Podcast*
- 1881** Histone Lysine Demethylase JARID1a Activates CLOCK-BMAL1 and Influences the Circadian Clock
L. DiTacchio et al.
Rhythmic chromatin modifications are aided by two proteins belonging to the JumonjiC family of regulators.
>> *Perspective p. 1833*
- 1885** Superfast Muscles Set Maximum Call Rate in Echolocating Bats
C. P. H. Elemans et al.
How bats can produce calls quickly and accurately process the returning echoes.
- 1888** An Expanded Palette of Genetically Encoded Ca²⁺ Indicators
Y. Zhao et al.
Directed protein evolution provides a series of fluorescent protein-based indicators for multicolor Ca²⁺ imaging.
- 1891** Unfolded Proteins Are Ire1-Activating Ligands That Directly Induce the Unfolded Protein Response
B. M. Gardner and P. Walter
Misfolded secretory proteins activate a quality control pathway by binding a sensor in the endoplasmic reticulum.
>> *Perspective p. 1830*
- 1895** Chromosome Segregation Errors as a Cause of DNA Damage and Structural Chromosome Aberrations
A. Janssen et al.
Changes in whole-chromosome number in cancer cells increase structural damage to chromatin.
- 1898** GRK2-Dependent S1PR1 Desensitization Is Required for Lymphocytes to Overcome Their Attraction to Blood
T. I. Arnon et al.
Desensitization to a chemoattractant is essential for lymphocyte migration from blood into lymph nodes.
- 1903** Glutamatergic and Dopaminergic Neurons Mediate Anxiogenic and Anxiolytic Effects of CRHR1
D. Refojo et al.
Imbalance in the bidirectional role of corticotropin-releasing hormone receptor 1 in anxiety might lead to emotional disorders.



page 1828



page 1871



page 1888

CONTENTS continued >>

SCIENCEONLINE

SCIENCEEXPRESS

www.scienceexpress.org

Bidirectional Control of Social Hierarchy by Synaptic Efficacy in Medial Prefrontal Cortex

F. Wang et al.

Manipulation of the neural circuit determining social status allows subordinate mice to move up the hierarchy and dominant mice to go down.

10.1126/science.1208951

Late Interleukin-6 Escalates T Follicular Helper Cell Responses and Controls a Chronic Viral Infection

J. A. Harker et al.

A persisting wave of the cytokine interleukin-6 allows control of chronic viral infections.

10.1126/science.1208421

Ionic Liquid-Mediated Selective Conversion of CO₂ to CO at Low Overpotentials

B. A. Rosen et al.

CO₂ reduction reactions, a key step in creating fuels from this gas, can be achieved in an ionic liquid.

10.1126/science.1209786

Wireless Solar Water Splitting Using Silicon-Based Semiconductors and Earth-Abundant Catalysts

S. Y. Reece et al.

An artificial water-splitting system was built using abundant materials and sunlight.

10.1126/science.1209816

Anthropogenic Aerosols and the Weakening of the South Asian Summer Monsoon

M. A. Bollasina et al.

Changes in monsoon rainfall are caused by human-produced aerosols slowing the tropical atmospheric circulation.

10.1126/science.1204994

TECHNICALCOMMENTS

Comment on "The Response of Vegetation on the Andean Flank in Western Amazonia to Pleistocene Climate Change"

S. W. Punyasena et al.

Full text at www.sciencemag.org/cgi/content/full/333/6051/1825-b

Response to Comment on "The Response of Vegetation on the Andean Flank in Western Amazonia to Pleistocene Climate Change"

M. L. Cárdenas et al.

Full text at www.sciencemag.org/cgi/content/full/333/6051/1825-c

SCIENCENOW

www.sciencenow.org

Highlights From Our Daily News Coverage

A Different Kind of Secret Code

Glowing bacteria encode messages that only the intended receiver can decipher.

<http://scim.ag/coliccode>

Tick Tock, Modeling Emissions From Trees Around the Clock

A circadian clock controls isoprene emissions by trees and could lead to better ozone modeling.

<http://scim.ag/emissionsclock>

Calculating the Language of Babel

Researchers teach "alien languages" to discover the origins of our own.

<http://scim.ag/babellanguage>

SCIENCE SIGNALING

www.sciencesignaling.org

The Signal Transduction Knowledge Environment
27 September issue: <http://scim.ag/ss092711>

RESEARCH ARTICLE: Akt Determines Cell Fate Through Inhibition of the PERK-eIF2 α Phosphorylation Pathway

Z. Mounir et al.

Inhibition of a stress-response pathway increases the chances of tumor cell death.

RESEARCH ARTICLE: Time-Dependent Quantitative Multicomponent Control of the G₁-S Network by the Stress-Activated Protein Kinase Hog1 upon Osmostress

M. Adrover et al.

The kinase Hog1 delays the cell cycle through two mechanisms.

RESEARCH ARTICLE: Tyrosine Phosphorylation of the G α -Interacting Protein GIV Promotes Activation of Phosphoinositide 3-Kinase During Cell Migration

C. Lin et al.

GIV links ligand stimulation of various receptors to downstream activation of a kinase involved in cell migration.

TEACHING RESOURCES: Six Lectures for a Systems Biology Course

K. D. Costa et al.; E. A. Sobie; S. R. Neves; F. Hayot; and L. Sirovich

Lecture notes and problem sets provide materials for teaching systems biology.

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org

Integrating Medicine and Science

28 September issue: <http://scim.ag/stm092811>

FOCUS: Creating the Future Biomedical Research Workforce

F. J. Meyers and C. Pomeroy

Translational scientists in the U.S. can contribute vital views on training, mentorship, and new career paths.

COMMENTARY: Disclosure of Clinical Trial Results When Product Development Is Abandoned

M. A. Rogawski and H. J. Federoff

Researchers have an ethical obligation to publicly report clinical trial results for all products.

MEETING REPORTS

D. C. Javitt et al. and M. J. Kas et al.

Two meetings—on the role of glutamate in psychiatric diseases and on mouse models of schizophrenia—are summarized.

RESEARCH ARTICLE: Dendritic Cells Regulate Natural Killer Cell Activation and Epithelial Injury in Experimental Biliary Atresia

V. Saxena et al.

Elucidation of the cellular triggers of bile duct injury has implications for blocking liver disease progression.

RESEARCH ARTICLE: Computationally Generated Cardiac Biomarkers for Risk Stratification After Acute Coronary Syndrome

Z. Syed et al.

Biomarkers extracted from electrocardiograms help identify high-risk patients after coronary events.

RESEARCH ARTICLE: Reversible Cardiac Conduction Block and Defibrillation with High-Frequency Electric Field

H. Tandri et al.

PODCAST

R. Berger and M. Frisk

High-frequency alternating current can be used to stop life-threatening ventricular fibrillation.

SCIENCE CAREERS

www.sciencereers.org/career_magazine
Free Career Resources for Scientists

Are African Americans Surging in Computer Science?

M. Price

A report suggests a big jump in black/African-American enrollment in computer science graduate programs.

http://scim.ag/AA_in_CS

Modern Sherlock Holmes With a Business Twist

S. Louët

Scientists working in business intelligence analyze large data sets for business clients.

http://scim.ag/Data_Specialists

In Person: On Shaky Ground

Y. Alamri

In the aftermath of an earthquake, a scientist ruminates on the uncertainties of working in science.

http://scim.ag/Shaky_Ground

SCIENCEPODCAST

www.sciencemag.org/multimedia/podcast
Free Weekly Show

On the 30 September *Science* Podcast: MESSENGER's orbit of Mercury, tracking mood patterns through social media, computer games aiding the blind, and more.

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 #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 \$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

333 (6051)

Science **333** (6051), 1797-1908.

ARTICLE TOOLS

<http://science.sciencemag.org/content/333/6051>

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.