

### SPECIAL SECTION

## Oceans and climate change

#### INTRODUCTION

750 Oceans of change

#### NEWS

752 Ghosts of oceans past *By W. Cornwall*

756 Breaking the waves *By G. Popkin*

760 Moveable feast *By M. Lavelle*

#### PERSPECTIVES

764 The silent services of the world ocean  
*T. F. Stocker*

766 The deep ocean under climate change  
*L. A. Levin and N. Le Bris*

769 Warm-water coral reefs and climate change  
*M. D. Spalding and B. E. Brown*

#### REVIEWS

772 Climate change and marine vertebrates  
*W. J. Sydeman et al.*

778 Climate change in the oceans: Human impacts and responses  
*E. H. Allison and H. R. Bassett*

#### ON THE COVER



Melting water streams from an iceberg in Disko Bay on the western coast of Greenland. The iceberg calved from the Ilulissat Glacier

(also known as Sermeq Kujalleq or Jakobshavn Glacier), one the world's fastest-moving and most-studied glaciers. Melting polar ice sheets are one consequence of human-induced global warming and could contribute to a substantial increase in global sea levels in the future. See page 750.  
*Photo: © Paul Souder/Corbis*

SEE ALSO ► EDITORIAL P. 721 ► NEWS STORY P. 728 ► REPORT P. 809 ► REPORT BY J. MOUGINOT ET AL. 10.1126/science.aac7111

## NEWS

### IN BRIEF

722 Roundup of the week's news

### IN DEPTH

#### 725 FIRE DOWN BELOW

New study shows that Mount St. Helens may share magma with other volcanoes nearby *By E. Hand*

#### 726 THORIUM SEEN AS NUCLEAR'S NEW FRONTIER

Unsung reactor fuel is more abundant than uranium and, proponents say, safer *By P. Bagla*

#### 728 HOW WARMING OCEANS UNLEASHED AN ICE STREAM

Accelerating retreat of a Greenland glacier could raise sea level for decades to come *By C. Gramling*

► OCEANS AND CLIMATE CHANGE SECTION P. 750; J. MOUGINOT ET AL. 10.1126/science.aac7111

#### 729 FOSSILS, CELLS POINT TO EARLY APPEARANCE OF THE BRAIN

Nervous systems were well developed by the Cambrian explosion, having evolved in earlier organisms  
*By E. Pennisi*

#### 730 CANCER RESEARCH CENTERS POOL TUMOR GENOME DATA

DNA registry could lead to new treatments  
*By J. Kaiser*

#### 731 BABY'S LEUKEMIA RECEDES AFTER NOVEL CELL THERAPY

Gene editing used to create "off-the-shelf" T cells *By J. Couzin-Frankel*

### FEATURE

#### 732 NOT GUILTY AS CHARGED

Several cases have unraveled lately against Chinese-born scientists accused of stealing industrial secrets. Critics smell a witch-hunt  
*By M. Hristendahl*

## INSIGHTS

### PERSPECTIVES

#### 736 ONE ERA YOU ARE IN—THE NEXT YOU ARE OUT

Evolutionary trends in body size changed during a past mass extinction event *By P. J. Wagner*  
► REPORT P. 812

#### 738 MORE EFFICIENT TOGETHER

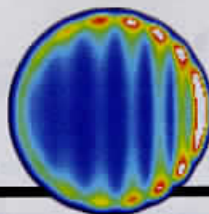
Hybrid bioinorganic photosynthesis yields a wide range of chemicals *By T. Zhang*

#### 739 FLOW CYTOMETRY STRIKES GOLD

Flow cytometry remains unparalleled as a high-throughput, high-content single-cell analysis technology  
*By J. P. Robinson and M. Roederer*

#### 740 TO CATCH AND SMASH CHARGE ON THE HOP

High-harmonic spectroscopy can probe charge migration controlled by a laser field *By K. Ueda*  
► REPORT P. 790



**742 BREACHING THE GUT-VASCULAR BARRIER**

A vascular barrier in the intestinal tract controls pathogen dissemination

By R. Bouziat and B. Jabri

► REPORT P. 830

**743 STAKEHOLDERS IN CLIMATE SCIENCE: BEYOND LIP SERVICE?**

Local knowledge coproduction must be rewarded

By N. L. Klenk et al.

**BOOKS ET AL.**

**745 THE PLANET REMADE**

By O. Morton, reviewed by E. Oelkers

**746 THE BRAIN ELECTRIC**

By M. Gay, reviewed by A. A. Faisal

**LETTERS**

**747 PUTTING RUSSIA ON THE GENOME MAP**

By T. K. Oleksyk et al.

**747 TEMPERING THREATS TO TEMPERATE FORESTS**

By D. Waller et al.

**748 HOW TO MEASURE SUSTAINABLE PROGRESS**

By P. Dasgupta et al.

## RESEARCH

**IN BRIEF**

783 From *Science* and other journals

**RESEARCH ARTICLE**

**786 GROWTH CONTROL**

A brain circuit that synchronizes growth and maturation revealed through Dilp8 binding to Lgr3

D. M. Vallejo et al.

RESEARCH ARTICLE SUMMARY; FOR FULL TEXT:

[dx.doi.org/10.1126/science.aac6767](http://dx.doi.org/10.1126/science.aac6767)

**REPORTS**

**787 SCATTERING DYNAMICS**

Imaging resonances in low-energy NO-He inelastic collisions

S. N. Vogels et al.

**790 ATTOSECOND DYNAMICS**

Measurement and laser control of attosecond charge migration in ionized iodoacetylene

P. M. Kraus et al.

► PERSPECTIVE P. 740

**795 GEOCHEMISTRY**

Evidence for primordial water in Earth's deep mantle

L. J. Hallis et al.

**798 MAGNETIC RESONANCE**

Torque-mixing magnetic resonance spectroscopy

J. E. Losby et al.

**801 GAMMA-RAY ASTRONOMY**

An extremely bright gamma-ray pulsar in the Large Magellanic Cloud

The Fermi LAT Collaboration



**805 MAMMALIAN EVOLUTION**

Evolution and dispersal of mammoths across the Northern Hemisphere

A. M. Lister and A. V. Sher

**809 CLIMATE CHANGE**

Slow adaptation in the face of rapid warming leads to collapse of the Gulf of Maine cod fishery

A. J. Pershing et al.

► OCEANS AND CLIMATE CHANGE SECTION P. 750

**812 EXTINCTION EVENTS**

Body-size reduction in vertebrates following the end-Devonian mass extinction

L. Sallan and A. K. Galimberti

► PERSPECTIVE P. 736; PODCAST

**815 SMALL RNAs**

MicroRNA-encoded behavior in *Drosophila*

J. Picao-Osorio et al.

**820 HUMAN EVOLUTION**

Ancient Ethiopian genome reveals extensive Eurasian admixture throughout the African continent

M. Gallego Llorente et al.

**823 GENOME EDITING**

Dynamics of CRISPR-Cas9 genome interrogation in living cells

S. C. Knight et al.

**826 ANTIVIRAL IMMUNITY**

Nlrp6 regulates intestinal antiviral innate immunity

P. Wang et al.

**830 MUCOSAL IMMUNITY**

A gut-vascular barrier controls the systemic dissemination of bacteria

I. Spadoni et al.

► PERSPECTIVE P. 742

**DEPARTMENTS**

**721 EDITORIAL**

Climate warning, 50 years later

By Marcia McNutt

► OCEANS AND CLIMATE CHANGE

SECTION P. 750

**882 WORKING LIFE**

Leaping into the unknown

By Jeremy C. Borniger

Science Staff .....	718
New Products .....	871
Science Careers .....	872

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 © 2015 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): \$153 (\$74 allocated to subscription). Domestic institutional subscription (21 issues): \$1282. 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 \$30.00 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.