

NEWS

IN BRIEF

614 News at a glance

IN DEPTH

617 DESIGN FOR U.S. EXASCALE COMPUTER TAKES SHAPE

Competition with China accelerates plans for next great leap in supercomputing power *By R. F. Service*

618 China's planned exascale computer threatens Summit's position at the top

By R. F. Service

619 PSYCHIATRISTS BEGIN TO MAP GENETIC ARCHITECTURE OF MENTAL DISORDERS

Gene expression findings from study of hundreds of human brains could lead to diagnostic tests, therapies *By R. Dengler*

► REPORT P. 693

620 USE OF CHOLERA VACCINES EXPANDS, RAISING HOPES

Swelling supplies and a better formulation bolster response to widespread outbreaks *By K. Kupferschmidt*

621 GENE THERAPY FIELD HIT BY FRESH SAFETY CONCERN

Animal studies show dangerous side effects from virus increasingly used to deliver DNA to treat diseases

By J. Kaiser

622 TOBACCO GIANT'S RESEARCH LARGESSE IGNITES CONTROVERSY

Philip Morris's \$1 billion effort to promote studies of "harm reduction" prompts some researchers to call for a boycott *By M. Enserink*

623 AS POLAR OZONE MENDS, UV SHIELD CLOSER TO EQUATOR THINS

Short-lived chemicals may be the culprit *By A. Reese*

FEATURES

624 THE HAPPINESS PROJECT

Advocates are pushing to enrich the lives of rodents and fish in the lab, but critics worry about the impact on research

By D. Grimm

► VIDEO



624

628 CHINA'S AI IMPERATIVE

The country's massive investments in artificial intelligence are disrupting the industry—and strengthening control of the populace

By C. Larson

INSIGHTS

PERSPECTIVES

632 AN INDOOR CHEMICAL COCKTAIL

The chemistry that determines human exposure to indoor pollutants is incompletely understood

By S. Gligorovski and J. P. D. Abbatt

► PODCAST

633 TOWARD AN OPTICALLY CONTROLLED BRAIN

Noninvasive deep brain stimulation can be achieved by optical triggers

By N. Feliu et al.

► REPORT P. 679

635 CHOLESTEROL CRYSTALS IMPEDE NERVE REPAIR

Cholesterol deposits in phagocytic cells disrupt the repair of demyelinated axons *By Y. Chen and B. Popko*

► REPORT P. 684

636 HOW HUMMINGBIRDS STAY NIMBLE ON THE WING

Videos of more than 200 hummingbirds reveal the evolutionary basis of their maneuvering skills *By P. C. Wainwright*

► RESEARCH ARTICLE P. 653

638 WHEN QUANTUM OPTICS MEETS TOPOLOGY

Single photons are routed around bends in photonic crystals with little backscattering *By A. Amo*

► REPORT P. 666

639 REVISING CONCEPTS ABOUT ADULT STEM CELLS

Imaging adult neurogenesis reveals surprising behavior of progenitor cells

By M. Götz

► RESEARCH ARTICLE P. 658

641 SUPERRADIATORS CREATED ATOM BY ATOM

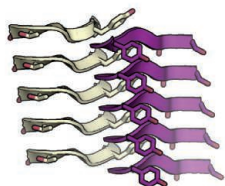
Collective emission is observed from atoms dropping singly through a resonator field *By D. Meschede*

► REPORT P. 662

POLICY FORUM

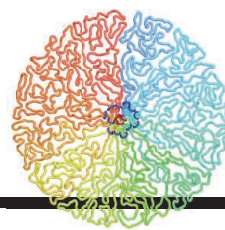
642 OPEN DATA SHARING AND THE GLOBAL SOUTH—WHO BENEFITS?

Limited capacity, deep mistrust pose challenges to sharing *By D. Serwadda et al.*



698

Kinked β sheets stack together



652

Folding mitotic chromosomes

BOOKS ET AL.

644 DATA RICH

If liberal democracies can resist the urge to micromanage the economy, big data could catalyze a new capitalism

By A. W. Lo

645 BETTER TOGETHER

A pair of policy experts highlights tension in team science and, inadvertently, in the study of scientific teams

By S. M. Fiore

LETTERS

646 BIAŁOWIEŻA FOREST: POLITICAL STANDS

By M. Blicharska and R. J. Smithers

646 BIAŁOWIEŻA FOREST: LOGGING DATA LACKING

By M. Konarzewski et al.

646 TRANSPORT EXPANSION THREATENS THE ARCTIC

By H. Yang et al.

RESEARCH

IN BRIEF

648 From *Science* and other journals

REVIEW

651 SYNTHETIC BIOLOGY

Programming gene and engineered-cell therapies with synthetic biology

T. Kitada et al.

REVIEW SUMMARY; FOR FULL TEXT:

[dx.doi.org/10.1126/science.aad1067](https://doi.org/10.1126/science.aad1067)

RESEARCH ARTICLES

652 MOLECULAR BIOLOGY

A pathway for mitotic chromosome formation

J. H. Gibcus et al.

RESEARCH ARTICLE SUMMARY; FOR FULL TEXT:

[dx.doi.org/10.1126/science.aao6135](https://doi.org/10.1126/science.aao6135)

653 BIOMECHANICS

Morphology, muscle capacity, skill, and maneuvering ability in hummingbirds

R. Dakin et al.

► PERSPECTIVE P. 636; VIDEO

658 NEURODEVELOPMENT

Live imaging of neurogenesis in the adult mouse hippocampus

G.-A. Pilz et al.

► PERSPECTIVE P. 639

REPORTS

662 QUANTUM OPTICS

Coherent single-atom superradiance

J. Kim et al.

► PERSPECTIVE P. 641

666 QUANTUM OPTICS

A topological quantum optics interface

S. Barik et al.

► PERSPECTIVE P. 638

669 NANOMATERIALS

Building superlattices from individual nanoparticles via template-confined DNA-mediated assembly

Q.-Y. Lin et al.

673 OPTICS

Light amplification by seeded Kerr instability

G. Vampa et al.

675 MATERIALS SCIENCE

Atomic-resolution transmission electron microscopy of electron beam-sensitive crystalline materials

D. Zhang et al.

679 NEUROSCIENCE

Near-infrared deep brain stimulation via upconversion nanoparticle-mediated optogenetics

S. Chen et al.

► PERSPECTIVE P. 633

684 TISSUE REGENERATION

Defective cholesterol clearance limits remyelination in the aged central nervous system

L. Cantuti-Castelvetri et al.

► PERSPECTIVE P. 635

689 PROTEIN TARGETING

Defining the physiological role of SRP in protein-targeting efficiency and specificity

E. A. Costa et al.

693 PSYCHIATRIC GENOMICS

Shared molecular neuropathology across major psychiatric disorders parallels polygenic overlap

M. J. Gandal et al.

► NEWS STORY P. 619

698 PROTEIN BIOCHEMISTRY

Atomic structures of low-complexity protein segments reveal kinked β sheets that assemble networks

M. P. Hughes et al.

DEPARTMENTS

613 EDITORIAL

War and peace in the nuclear age

By E. William Colglazier

706 WORKING LIFE

My climate change crisis

By Paul C. Rogge

ON THE COVER



A violet-crowned woodnymph (*Thalurania colombica colombica*) maneuvers in flight. Hummingbirds are known for their ability to rapidly

accelerate, decelerate, and turn on a dime. Species vary in aerial maneuvering performance, and different aspects of maneuverability evolve as a result of various biomechanical traits. This framework may apply to other organisms and to the design of more maneuverable aircraft. See pages 636 and 653.

Photo: Glenn Bartley/BLA/Minden Pictures

Science Staff	610
New Products	702
Science Careers	703

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except 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 © 2018 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership, including subscription (12 months): \$165 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$1808. Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery): \$89. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request. GST #R125488122. 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: \$15 each plus shipping and handling; bulk rate on request. Authorization to reproduce 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 others who use Copyright Clearance Center (CCC) Pay-Per-Use services provided that \$35.00 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.

Science

359 (6376)

Science **359** (6376), 613-706.

ARTICLE TOOLS

<http://science.sciencemag.org/content/359/6376>

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.