

Editor-in-Chief Holden Thorp, hthorp@aaas.org

Executive Editor Monica M. Bradford

Editors, Research Valda Vinson, Jake S. Yeston Editor, Insights Lisa D. Chong

DEPUTY EDITORS Julia Fahrenkamp-Uppenbrink (UK), Stella M. Hurlley (UK), Phillip D. Szuromi, Sacha Vignieri **SR. EDITORIAL FELLOW** Andrew M. Sugden (UK) **SR. EDITORS** Gemma Alderton (UK), Caroline Ash (UK), Brent Grocholski, Pamela J. Hines, Di Jiang, Marc S. Lavine (Canada), Yevgeniya Nusinovich, Ian S. Osborne (UK), Beverly A. Purnell, L. Bryan Ray, H. Jesse Smith, Keith T. Smith (UK), Jelena Stajic, Peter Stern (UK), Valerie B. Thompson, Brad Wible, Laura M. Zahn **ASSOCIATE EDITORS** Michael A. Funk, Priscilla N. Kelly, Tage S. Rai, Seth Thomas Scanlon (UK), Yury V. Suleymanov **LETTERS EDITOR** Jennifer Silis **LEAD CONTENT PRODUCTION EDITORS** Harry Jach, Lauren Kmec **CONTENT PRODUCTION EDITORS** Amelia Beyna, Jeffrey E. Cook, Chris Filiatreau, Julia Katris, Nida Masiulis, Suzanne M. White **SR. EDITORIAL COORDINATORS** Carolyn Kyle, Beverly Shields **EDITORIAL COORDINATORS** Aneera Dobbins, Joi S. Granger, Jeffrey Hearn, Lisa Johnson, Maryrose Madrid, Ope Martins, Shannon McMahon, Jerry Richardson, Hilary Stewart (UK), Alana Warnke, Alice Whaley (UK), Anita Wynn **PUBLICATIONS ASSISTANTS** Jeremy Dow, Alexander Kief, Ronmel Navas, Brian White **EXECUTIVE ASSISTANT** Jessica Slater **ASI DIRECTOR, OPERATIONS** Janet Clements (UK) **ASI SR. OFFICE ADMINISTRATOR** Jessica Waldoock (UK)

News Editor Tim Appenzeller

NEWS MANAGING EDITOR John Travis **INTERNATIONAL EDITOR** Martin Enserink **DEPUTY NEWS EDITORS** Elizabeth Culotta, Lila Guterman, David Grimm, Eric Hand (Europe), David Malakoff **SR. CORRESPONDENTS** Daniel Clery (UK), Jon Cohen, Jeffrey Mervis, Elizabeth Pennisi **ASSOCIATE EDITORS** Jeffrey Brainard, Catherine Maticic **NEWS REPORTERS** Adrian Cho, Jennifer Couzin-Frankel, Jocelyn Kaiser, Kelly Servick, Robert F. Service, Erik Stokstad, Paul Voosen, Meredith Wadman **INTERNS** Lucy Hicks, Cathleen O'Grady **CONTRIBUTING CORRESPONDENTS** Warren Cornwall, Andrew Curry (Berlin), Ann Gibbons, Sam Kean, Eli Kintisch, Kai Kupferschmidt (Berlin), Andrew Lawler, Mitch Leslie, Eliot Marshall, Virginia Morell, Dennis Normile (Shanghai), Elisabeth Pain (Careers), Charles Pillar, Michael Price, Tania Rabesandratana (Barcelona), Joshua Sokol, Emily Underwood, Gretchen Vogel (Berlin), Lizzie Wade (Mexico City) **CAREERS** Donisha Adams, Rachel Bernstein (Editor), Katie Langin (Associate Editor) **COPY EDITORS** Julia Cole (Senior Copy Editor), Cyra Master (Copy Chief) **ADMINISTRATIVE SUPPORT** Meagan Weiland

Creative Director Beth Rakuskas

DESIGN MANAGING EDITOR Marcy Atarod **GRAPHICS MANAGING EDITOR** Alberto Cuadra **PHOTOGRAPHY MANAGING EDITOR** William Douthitt **WEB CONTENT STRATEGY MANAGER** Kara Estelle-Powers **DESIGN EDITOR** Chrystal Smith **DESIGNER** Christina Aycock **GRAPHICS EDITOR** Nirja Desai **INTERACTIVE GRAPHICS EDITOR** Kelly Franklin **SENIOR SCIENTIFIC ILLUSTRATORS** Valerie Altounian, Chris Bickel **SCIENTIFIC ILLUSTRATOR** Alice Kitterman **SENIOR GRAPHICS SPECIALISTS** Holly Bishop, Nathalie Cary **SENIOR PHOTO EDITOR** Emily Petersen **PHOTO EDITOR** Kaitlyn Dolan **WEB DESIGNER** Jennie Pajecowski

Chief Executive Officer and Executive Publisher Sudip Parikh

Publisher, Science Family of Journals Bill Moran

DIRECTOR, BUSINESS SYSTEMS AND FINANCIAL ANALYSIS Randy Yi **DIRECTOR, BUSINESS OPERATIONS & ANALYSIS** Eric Knott **DIRECTOR OF ANALYTICS** Enrique Gonzales **MANAGER, BUSINESS OPERATIONS** Jessica Tierney **SENIOR BUSINESS ANALYST** Cory Lipman, Meron Kebede **FINANCIAL ANALYST** Alexander Lee **ADVERTISING SYSTEM ADMINISTRATOR** Tina Burks **SENIOR SALES COORDINATOR** Shirley Young **DIGITAL/PRINT STRATEGY MANAGER** Jason Hillman **QUALITY TECHNICAL MANAGER** Marcus Spiegler **ASSISTANT MANAGER DIGITAL/PRINT** Rebecca Doshi **SENIOR CONTENT SPECIALISTS** Steve Forrester, Jacob Hedrick, Antoinette Hodal, Lori Murphy **PRODUCTION SPECIALIST** Kristin Wowk **DIGITAL PRODUCTION MANAGER** Lisa Stanford **CONTENT SPECIALIST** Kimberley Oster **ADVERTISING PRODUCTION OPERATIONS MANAGER** Deborah Tompkins **DESIGNER, CUSTOM PUBLISHING** Jeremy Huntsinger **SR. TRAFFIC ASSOCIATE** Christine Hall **SPECIAL PROJECTS ASSOCIATE** Sarah Dhare

ASSOCIATE DIRECTOR, BUSINESS DEVELOPMENT Justin Sawyers **GLOBAL MARKETING MANAGER** Allison Pritchard **DIGITAL MARKETING MANAGER** Aimee Aponte **JOURNALS MARKETING MANAGER** Shawana Arnold **MARKETING ASSOCIATES** Tori Velasquez, Mike Romano, Ashley Hylton **DIGITAL MARKETING SPECIALIST** Asleigh Rojanavongse **SENIOR DESIGNER** Kim Huynh

DIRECTOR AND SENIOR EDITOR, CUSTOM PUBLISHING Sean Sanders **ASSISTANT EDITOR, CUSTOM PUBLISHING** Jackie Oberst

DIRECTOR, PRODUCT & PUBLISHING DEVELOPMENT Chris Reid **DIRECTOR, BUSINESS STRATEGY AND PORTFOLIO MANAGEMENT** Sarah Whalen **ASSOCIATE DIRECTOR, PRODUCT MANAGEMENT** Kris Bishop **PRODUCT DEVELOPMENT MANAGER** Scott Chernoff **PUBLISHING TECHNOLOGY MANAGER** Michael Di Natale **SR. PRODUCT ASSOCIATE** Robert Koepke **SPJ ASSOCIATE** Samantha Bruno Fuller

DIRECTOR, INSTITUTIONAL LICENSING Iquo Edim **ASSOCIATE DIRECTOR, RESEARCH & DEVELOPMENT** Elisabeth Leonard **MARKETING MANAGER** Kess Knight **SENIOR INSTITUTIONAL LICENSING MANAGER** Ryan Rexroth **INSTITUTIONAL LICENSING MANAGER** Marco Castellani **MANAGER, AGENT RELATIONS & CUSTOMER SUCCESS** Judy Lillibridge **SENIOR OPERATIONS ANALYST** Lana Guz **FULFILLMENT COORDINATOR** Melody Stringer **SALES COORDINATOR** Josh Haverlock

DIRECTOR, GLOBAL SALES Tracy Holmes **US EAST COAST AND MID WEST SALES** Stephanie O'Connor **US WEST COAST SALES** Lynne Stickrod **US SALES MANAGER, SCIENCE CAREERS** Claudia Paulsen-Young **US SALES REP, SCIENCE CAREERS** Tracy Anderson **ASSOCIATE DIRECTOR, ROW ROW** Gonçalves **SALES REP, ROW** Sarah Lelarge **SALES ADMIN ASSISTANT, ROW** Bryony Cousins **DIRECTOR OF GLOBAL COLLABORATION AND ACADEMIC PUBLISHING RELATIONS, ASIA** Xiaoying Chu **ASSOCIATE DIRECTOR, INTERNATIONAL COLLABORATION** Grace Yao **SALES MANAGER** Danny Zhao **MARKETING MANAGER** Kilo Lan **ASCA CORPORATION, JAPAN** Kaoru Sasaki (Tokyo), Miyuki Tani (Osaka) **COLLABORATION/CUSTOM PUBLICATIONS/JAPAN** Adarsh Sandhu

DIRECTOR, COPYRIGHT, LICENSING AND SPECIAL PROJECTS Emilie David **RIGHTS AND LICENSING COORDINATOR** Jessica Adams **RIGHTS AND PERMISSIONS ASSOCIATE** Elizabeth Sandler **CONTRACTS AND LICENSING ASSOCIATE** Lili Catlett

MAIN HEADQUARTERS

Science/AAAS
1200 New York Ave. NW
Washington, DC 20005

SCIENCE INTERNATIONAL

Clarendon House
Clarendon Road
Cambridge, CB2 8FH, UK

SCIENCE CHINA

Room 1004, Culture Square
No. 59 Zhongguancun St.
Haidian District, Beijing, 100872

SCIENCE JAPAN

ASCA Corporation
Sibaura TY Bldg. 4F, 1-14-5
Shibaura Minato-ku
Tokyo, 108-0073 Japan

EDITORIAL

science_editors@aaas.org

NEWS

science_news@aaas.org

INFORMATION FOR AUTHORS

sciencemag.org/authors/

science-information-authors

REPRINTS AND PERMISSIONS

sciencemag.org/help/

reprints-and-permissions

MEDIA CONTACTS

scipak@aaas.org

scipodcast@aaas.org

sciencevideo@aaas.org

INSTITUTIONAL SALES

and SITE LICENSES

sciencemag.org/librarian

PRODUCT ADVERTISING

& CUSTOM PUBLISHING

advertising.sciencemag.org/

products-services

science_advertising@aaas.org

CLASSIFIED ADVERTISING

advertising.sciencemag.org/

science-careers

advertise@sciencecareers.org

JOB POSTING CUSTOMER SERVICE

employers.sciencecareers.org

support@sciencecareers.org

MEMBERSHIP AND INDIVIDUAL

SUBSCRIPTIONS

sciencemag.org/subscriptions

MEMBER BENEFITS

aaas.org/membercentral

AAAS BOARD OF DIRECTORS

CHAIR Steven Chu

PRESIDENT Claire M. Fraser

PRESIDENT-ELECT Susan G. Amara

TREASURER Carolyn N. Ainslie

CHIEF EXECUTIVE OFFICER

Sudip Parikh

BOARD Cynthia M. Beall

Rosina M. Bierbaum

Ann Bostrom

Stephen P.A. Fodor

S. James Gates, Jr.

Laura H. Greene

Kaye Husbands Fealing

Maria M. Klawe

Robert B. Millard

Alondra Nelson

William D. Provine

BOARD OF REVIEWING EDITORS

 (Statistics board members indicated with \$)

Takuzo Aida, U. of Tokyo

Leslie Aiello,

Wenner-Gren Foundation

Deji Akinwande, UT Austin

Judith Allen, U. of Manchester

Marcella Alsan, Harvard U.

Sebastian Amigorena,

Institut Curie

James Analytis, UC Berkeley

Trevor Archer, NIEHS, NIH

Paola Arlotta, Harvard U.

David Awschalom, U. of Chicago

Clare Baker, U. of Cambridge

Delia Baldassarri, NYU

Nenad Ban, ETH Zürich

Franz Bauer,

Pontificia U. Católica de Chile

Jian He, Clemson U.

Ray H. Baughman,

UT Dallas

Carlo Beenakker, Leiden U.

Yasmine Belkaid, NIAID, NIH

Philip Berney, Duke U.

Kiros T. Berhane, Columbia U.

Bradley Bernstein,

Mass. General Hospital

Joseph J. Berry, NREL

Alessandra Biffi,

Harvard Med.

Chris Bowler,

École Normale Supérieure

Ian Boyd, U. of St. Andrews

Emily Brodsky, UC Santa Cruz

Ron Brookmeyer, UCLA (\$)

Christian Büchel, UKE Hamburg

Dennis Burton, Scripps Res.

Carter Tribley Butts, UC Irvine

György Buzsáki,

NYU School of Med.

Mariana Byndloss,

Vanderbilt U. Med. Ctr

Annamarie Carlton, UC Irvine

Nick Chater, U. of Warwick

Ling-Ling Chen, SIBCB, CAS

M. Keith Chen, UCLA

Zhijian Chen,

UT Southwestern Med. Ctr.

Ib Chorkendorff, Denmark TU

James J. Collins, MIT

Robert Cook-Deegan,

Arizona State U.

Virginia Cornish, Columbia U.

Carolyn Coyne, U. of Pitt.

Roberta Croce, VU Amsterdam

Ismail Dabo, Penn State U.

Jeff L. Dangl, UNC

Chiara Daraio, Caltech

Nicolas Daughas, U. of Chicago

Christian Davenport,

U. of Michigan

Frans de Waal, Emory U.

Claude Desplan, NYU

Sandra Diaz,

U. Nacional de Córdoba

Ulrike Diebold, TU Wien

Stefanie Dimmeler,

Goethe-U. Frankfurt

Hong Ding, Inst. of Physics, CAS

Dennis Discher, UPenn

Jennifer A. Doudna,

UC Berkeley

Ruth Drlia-Schutting,

Med. U. Vienna

Raissa M. D'Souza, UC Davis

Bruce Dunn, UCLA

William Dunphy, Caltech

Scott Edwards, Harvard U.

Todd Ehlers, U. of Tübingen

Jennifer Eliseeff,

Johns Hopkins U.

Andrea Encalada,

U. San Francisco de Quito

Nader Engheta, U. of Penn.

Karen Ersche, U. of Cambridge

Beate Escher,

UFZ & U. of Tübingen

Barry Everitt, U. of Cambridge

Vanessa Ezenwa, U. of Georgia

Michael Feuer, GWU

Max Planck Inst. Potsdam

Elaine Fuchs, Rockefeller U.

Jay Gallagher, U. of Wisconsin

Daniel Geschwind, UCLA

Ramon Gonzalez,

U. of South Florida

Sandra González-Bailón,

UPenn

Elizabeth Grove, U. of Chicago

Nicolas Gruber, ETH Zürich

Hua Guo, U. of New Mexico

Taekjip Ha, Johns Hopkins U.

Sharon Hammes-Schiffer,

Yale U.

Wolf-Dietrich Hardt, ETH Zürich

Louise Harra, U. Coll. London

Jian He, Clemson U.

Carl-Philipp Heisenberg,

IST Austria

Ykä Helariutta, U. of Cambridge

Janet G. Hering, Eawag

Heather Hickman, NIAID, NIH

Hans Hilgenkamp, U. of Twente

Kai-Uwe Hinrichs, U. of Bremen

Deirdre Hollingsworth,

U. of Oxford

Randall Hulet, Rice U.

Auke Ijspeert, EPFL

Akiko Iwasaki, Yale U.

Stephen Jackson,

USGS & U. of Arizona

Erich Jarvis, Rockefeller U.

Peter Jonas, IST Austria

Matt Kaerberlein,

U. of Wash.

William Kaelin Jr.,

Dana-Farber Cancer Inst.

Daniel Kamm, UC Berkeley

V. Narry Kim, Seoul Nat. U.

Robert Kingston,

Harvard Med.

Nancy Knowlton,

Smithsonian Institution

Etienne Koechlin,

École Normale Supérieure

Alex L. Kolodkin,

Johns Hopkins U.

Julia Krupic, U. of Cambridge

Gabriel Langer, Scripps Res. (\$)

Mitchell A. Lazar, UPenn

Wendell Lim, UCSF

Luis Liz-Marzán, CIC biomaGUNE

Omar Lizarazo, UCLA

Jonathan Losos,

Wash. U. in St. Louis

Ke Lu, Inst. of Metal Res., CAS

Christian Lüscher, U. of Geneva

Jean Lynch-Stieglitz,

Georgia Inst. of Tech.

David Lyons, U. of Edinburgh

Fabienne Mackay,

Dartmouth

QIMR Berghofer

Anne Magurran, U. of St. Andrews

Asifa Majid, U. of York

Oscar Marin, King's Coll. London

Charles Marshall, UC Berkeley

Christopher Marx, U. of Idaho

David Masopust, U. of Minnesota

Geraldine Masson, CNRS

Jason Matheny, Georgetown U.

Heidi McBride, McGill U.

C. Robertson McClung,

Dartmouth

Rodrigo Medellín,

U. Nacional Autónoma de México

Jane Memmott, U. of Bristol

C. Jessica Metcalf, Princeton U.

Baoxia Mi, UC Berkeley

Tom Misteli, NCI, NIH

Alison Mouton-Rif,

NIEHS, NIH (\$)

Danielle Navarro,

U. of New South Wales

Daniel Nettle, Newcastle U.

Daniel Neuman, UC Berkeley

Beatrix Noheua, U. of Groningen

Helga Nowotny,

Vienna Sci., Res. & Tech. Fund

Rachel O'Reilly, U. of Birmingham