

**Editor-in-Chief** Jeremy Berg

**Executive Editor** Monica M. Bradford **News Editor** Tim Appenzeller

**Deputy Editors** Lisa D. Chong, Andrew M. Sugden(UK), Valda J. Vinson, Jake S. Yeston

## Research and Insights

**DEPUTY EDITOR, EMERITUS** Barbara R. Jasný **SR. EDITORS** Caroline Ash(UK), Gilbert J. Chin, Julia Fahrenkamp-Uppenbrink(UK), Pamela J. Hines, Stella M. Hurlley(UK), Paula A. Kiberstis, Marc S. Lavine(Canada), Kristen L. Mueller, Ian S. Osborne(UK), Beverly A. Purnell, L. Bryan Ray, Guy Riddihough, H. Jesse Smith, Jelena Stajic, Peter Stern(UK), Phillip D. Szuroomi, Sacha Vignieri, Brad Wible, Nicholas S. Wigginton, Laura M. Zahn **ASSOCIATE EDITORS** Brent Grocholski, Keith T. Smith **ASSOCIATE BOOK REVIEW EDITOR** Valerie B. Thompson **LETTERS EDITOR** Jennifer Sills **LEAD CONTENT PRODUCTION EDITORS** Harry Jach, Lauren Kmec **CONTENT PRODUCTION EDITORS** Jeffrey E. Cook, Chris Filiatreau, Cynthia Howe, Barbara P. Ordway, Catherine Wolner **SR. EDITORIAL COORDINATORS** Carolyn Kyle, Beverly Shields **EDITORIAL COORDINATORS** Aneera Dobbins, Joi S. Granger, Jeffrey Hearn, Lisa Johnson, Maryrose Madrid, Anita Wynn **PUBLICATIONS ASSISTANTS** Nida Masulis, Dona Mathieu, Le-Toya Mayne Flood, Shannon McMahon, Scott Miller, Jerry Richardson, Alice Whaley(UK), Brian White **EXECUTIVE ASSISTANT** Anna Bashkirova **ADMINISTRATIVE SUPPORT** Janet Clements(UK), Lizanne Newton(UK)

## News

**NEWS MANAGING EDITOR** John Travis **INTERNATIONAL EDITOR** Richard Stone **DEPUTY NEWS EDITORS** Elizabeth Culotta, David Grimm, Eric Hand David Malakoff, Leslie Roberts **CONTRIBUTING EDITOR** Martin Enserink(Europe) **SR. CORRESPONDENTS** Daniel Clery(UK), Jeffrey Mervis, Elizabeth Pennisi **NEWS WRITERS** Adrian Cho, Jon Cohen, Jennifer Couzin-Frankel, Carolyn Gramling, Jocelyn Kaiser, Catherine Maticic, Kelly Service, Robert F. Service, Erik Stokstad(Cambridge, UK) **INTERNS** Jessica Boddy, Ben Panko **CONTRIBUTING CORRESPONDENTS** John Bohannon, Warren Cornwall, Ann Gibbons, Mara Hvistendahl, Sam Keam, Eli Kintisch, Kai Kupferschmidt(Berlin), Andrew Lawler, Mitch Leslie, Charles C. Mann, Eliot Marshall, Virginia Morell, Dennis Normile(Shanghai), Heather Pringle, Tania Rabesandratana(London), Emily Underwood, Gretchen Vogel(Berlin), Lizzie Wade(Mexico City) **CAREERS** Donisha Adams, Rachel Bernstein(Editor), Maggie Kuo **COPY EDITORS** Julia Cole, Dorie Chevlen, Jennifer Levin (Chief) **ADMINISTRATIVE SUPPORT** Jessica Adams

## Executive Publisher

**Rush D. Holt**  
**Publisher** Bill Moran **Chief Digital Media Officer** Rob Covey

**BUSINESS OPERATIONS AND PORTFOLIO MANAGEMENT DIRECTOR** Sarah Whalen **PRODUCT DEVELOPMENT DIRECTOR** Will Schweitzer **PRODUCT DEVELOPMENT ASSOCIATE** Hannah Heckner **BUSINESS SYSTEMS AND FINANCIAL ANALYSIS DIRECTOR** Randy Yi **SENIOR SYSTEMS ANALYST** Nicole Mehmedovich **DIRECTOR, BUSINESS OPERATIONS & ANALYSIS** Eric Knott **MANAGER, BUSINESS OPERATIONS** Jessica Tierney **SENIOR BUSINESS ANALYST** Cory Lipman **SENIOR BUSINESS ANALYSTS** David Garrison, Michael Hardesty Meron Kebede, Sandy Kim **FINANCIAL ANALYST** Drew Sher **DIRECTOR, COPYRIGHTS LICENSING SPECIAL PROJECTS** Emilie David **PERMISSIONS ASSOCIATE** Elizabeth Sandler **RIGHTS, CONTRACTS, AND LICENSING ASSOCIATE** Lili Kiser **RIGHTS & PERMISSIONS ASSISTANT** Alexander Lee

**MARKETING DIRECTOR** Elise Swinehart **ASSOCIATE MARKETING DIRECTOR** Stacey Burke Bowers **MARKETING ASSOCIATE** Steven Goodman **CREATIVE DIRECTOR** Scott Rodgerson **SENIOR ART ASSOCIATES** Paula Fry **ART ASSOCIATE** Kim Huynh

**FULFILLMENT SYSTEMS AND OPERATIONS** membership@aaas.org **MANAGER, MEMBER SERVICES** Pat Butler **SPECIALISTS** Terrance Morrison, Latasha Russell **MANAGER, DATA ENTRY** Mickie Napoleoni **DATA ENTRY SPECIALISTS** Brenden Aquilino, Fiona Giblin **MARKETING ASSOCIATE** Isa Sesay-Bah

**PUBLISHER RELATIONS, EASTERN REGION** Keith Layson **PUBLISHER RELATIONS, WESTERN REGION** Ryan Rexroth **SALES RESEARCH COORDINATOR** Aiesha Marshall **ASSOCIATE DIRECTOR, INSTITUTIONAL LICENSING OPERATIONS** Iquo Edim **SENIOR OPERATIONS ANALYST** Lana Guz **MANAGER, AGENT RELATIONS & CUSTOMER SUCCESS** Judy Lillbridge

**WEB TECHNOLOGIES PORTFOLIO MANAGER** Trista Smith **TECHNICAL MANAGER** Chris Coleman **PROJECT MANAGER** Nick Fletcher **DEVELOPERS** Ryan Jensen, Jimmy Marks, Brandon Morrison **BUSINESS ANALYST** Christina Wofford

**DIGITAL MEDIA DIRECTOR OF ANALYTICS** Enrique Gonzales **DIGITAL REPORTING ANALYST** Eric Hossinger **SR. MULTIMEDIA PRODUCER** Sarah Crespi **MANAGING DIGITAL PRODUCER** Alison Crawford **PRODUCER** Liana Birke **VIDEO PRODUCER** Chris Burns, Nguyễn Hoài Nguyễn **DIGITAL SOCIAL MEDIA PRODUCER** Brice Russ

**DIRECTOR OF OPERATIONS PRINT AND ONLINE** Lizabeth Harman **DIGITAL/PRINT STRATEGY MANAGER** Jason Hillman **QUALITY TECHNICAL MANAGER** Marcus Spiegler **PROJECT ACCOUNT MANAGER** Tara Kelly **DIGITAL PRODUCTION MANAGER** Lisa Stanford **ASSISTANT MANAGER DIGITAL/PRINT** Rebecca Doshi **SENIOR CONTENT SPECIALISTS** Steve Forrester, Antoinette Hodal, Lori Murphy, Anthony Rosen **CONTENT SPECIALISTS** Jacob Hedrick, Kimberley Oster **ADVERTISING OPERATIONS SPECIALIST** Ashley Jeter

**DESIGN DIRECTOR** Beth Rakouskas **DESIGN EDITOR** Marcy Atarod **SENIOR DESIGNERS** Garvin Grullón, Chrystal Smith **GRAPHICS MANAGING EDITOR** Alberto Cuadra **SENIOR SCIENTIFIC ILLUSTRATORS** Chris Bickel, Katharine Sutliff **SCIENTIFIC ILLUSTRATOR** Valerie Altonian **INTERACTIVE GRAPHICS EDITOR** Jia Yu **SENIOR GRAPHICS SPECIALISTS** Holly Bishop, Nathalie Cary **PHOTOGRAPHY MANAGING EDITOR** William Douthitt **SENIOR PHOTO EDITOR** Christy Steele **PHOTO EDITOR** Emily Petersen

**DIRECTOR, GLOBAL COLLABORATION, CUSTOM PUBLICATIONS, ADVERTISING** Bill Moran **EDITOR, CUSTOM PUBLISHING** Sean Sanders: 202-326-6430 **ADVERTISING MARKETING MANAGER** Justin Sawyers: 202-326-7061 **science\_advertising@aaas.org** **ADVERTISING SUPPORT MANAGER** Karen Foote: 202-326-6740 **ADVERTISING PRODUCTION OPERATIONS MANAGER** Deborah Tompkins **SR. PRODUCTION SPECIALIST/GRAPHIC DESIGNER** Amy Hardcastle **SR. TRAFFIC ASSOCIATE** Christine Hall **SALES COORDINATOR** Shirley Young **ASSOCIATE DIRECTOR, COLLABORATION, CUSTOM PUBLICATIONS/CHINA/TAIWAN/KOREA/SINGAPORE** Ruolei Wu: +86-186 0082 9345, [rwu@aaas.org](mailto:rwu@aaas.org) **COLLABORATION/CUSTOM PUBLICATIONS/JAPAN** Adarsh Sandhu + 81532-81-5142 [asandhu@aaas.org](mailto:asandhu@aaas.org) **EAST COAST/E. CANADA** Laurie Faraday: 508-747-9395, FAX 617-507-8189 **WEST COAST/W. CANADA** Lynne Stickrod: 415-931-9782, FAX 415-520-6940 **MIDWEST** Jeffrey Dembski: 847-498-4520 x3005, Steven Loerch: 847-498-4520 x3006 **UK EUROPE/ASIA** Roger Goncalves: TEL/FAX +41 43 243 1358 **JAPAN** Katsuyoshi Fukamizu(Tokyo): +81-3-3219-5777 [kfukamizu@aaas.org](mailto:kfukamizu@aaas.org) **CHINA/TAIWAN** Ruolei Wu: +86-186 0082 9345, [rwu@aaas.org](mailto:rwu@aaas.org)

**WORLDWIDE ASSOCIATE DIRECTOR OF SCIENCE CAREERS** Tracy Holmes: +44 (0) 1223 326525, FAX +44 (0) 1223 326532 [tholmes@science-int.co.uk](mailto:tholmes@science-int.co.uk) **CLASSIFIED** [advertise@sciencecareers.org](mailto:advertise@sciencecareers.org) **U.S. SALES** Tina Burks: 202-326-6577, Nancy Toema: 202-326-6578 **EUROPE/ROW SALES** Sarah Lelarge **SALES ASSISTANT** Kelly Grace **JAPAN** Hiroyuki Mashiki(Kyoto): +81-75-823-1109 [hmashiki@aaas.org](mailto:hmashiki@aaas.org) **CHINA/TAIWAN** Ruolei Wu: +86-186 0082 9345 [rwu@aaas.org](mailto:rwu@aaas.org) **MARKETING MANAGER** Allison Pritchard **MARKETING ASSOCIATE** Aimee Aponte

**AAAS BOARD OF DIRECTORS, CHAIR** Geraldine L. Richmond **PRESIDENT** Barbara A. Schaal **PRESIDENT-ELECT** Susan Hockfield **TREASURER** David Evans **SHAW CHIEF EXECUTIVE OFFICER** Rush D. Holt **BOARD** Cynthia M. Beall, May R. Berenbaum, Carlos J. Bustamante, Stephen P.A. Fodor, Claire M. Fraser, Michael S. Gazzaniga, Laura H. Greene, Elizabeth Loftus, Mercedes Pascual

**SUBSCRIPTION SERVICES** For change of address, missing issues, new orders and renewals, and payment questions: 866-434-AAAS (2227) or 202-326-6417, FAX 202-842-1065. Mailing addresses: AAAS, P.O. Box 96178, Washington, DC 20090-6178 or AAAS Member Services, 1200 New York Avenue, NW, Washington, DC 20005

**INSTITUTIONAL SITE LICENSES** 202-326-6730 **REPRINTS:** Author Inquiries 800-635-7181 **COMMERCIAL INQUIRIES** 803-359-4578 **PERMISSIONS** 202-326-6765, [permissions@aaas.org](mailto:permissions@aaas.org) **AAAS Member Services** 202-326-6417 or <http://membercentral.aaas.org/discouints>

Science serves as a forum for discussion of important issues related to the advancement of science by publishing material on which a consensus has been reached as well as including the presentation of minority or conflicting points of view. Accordingly, all articles published in Science—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by AAAS or the institutions with which the authors are affiliated.

**INFORMATION FOR AUTHORS** See pages 624 and 625 of the 5 February 2016 issue or access [www.sciencemag.org/authors/science-information-authors](http://www.sciencemag.org/authors/science-information-authors)

## SENIOR EDITORIAL BOARD

Gary King, *Harvard University*, Susan M. Rosenberg, *Baylor College of Medicine*, Ali Shihatafard, *Northwestern University Feinberg School of Medicine*

## BOARD OF REVIEWING EDITORS

 (Statistics board members indicated with \$)

Adriano Aguzzi, *U. Hospital Zurich*  
Takuzo Aida, *U. of Tokyo*  
Leslie Aiello, *Wenner-Gren Foundation*  
Judith Allen, *U. of Edinburgh*  
Sonia Altizer, *U. of Georgia*  
Sebastian Amigorena, *Institut Curie*  
Kathryn Anderson, *Memorial Sloan-Kettering Cancer Center*  
Meinrat O. Andreae, *Max-Planck Inst. Mainz*  
Paola Arlotta, *Harvard U.*  
Johan Auwerx, *EPFL*  
David Awschalom, *U. of Chicago*  
Clare Baker, *University of Cambridge*  
Nenad Ban, *ETH Zurich*  
Jordi Bascompte, *University of Zurich*  
Franz Bauer, *Pontificia Universidad Católica de Chile*  
Ray H. Baughman, *U. of Texas, Dallas*  
David Baum, *U. of Wisconsin*  
Carlo Beenakker, *Leiden U.*  
Kamran Behnia, *ESPCI-ParisTech*  
Yasmine Belkaid, *NIAID, NIH*  
Philip Benfey, *Duke U.*  
May Berenbaum, *U. of Illinois*  
Gabriele Bergers, *U. of California, San Francisco*  
Bradley Bernstein, *Massachusetts General Hospital*  
Peer Bork, *EMBL*  
Bernard Bourdon, *Ecole Normale Supérieure de Lyon*  
Chris Bowler, *Ecole Normale Supérieure*  
Ian Boyd, *U. of St. Andrews*  
Emily Brodsky, *U. of California, Santa Cruz*  
Ron Brookmeyer, *U. of California Los Angeles (\$)*  
Christian Büchel, *U. Hamburg-Eppendorf*  
Joseph A. Burns, *Cornell U.*  
Carter Tribley Butts, *U. of California, Irvine*  
György Buzsáki, *New York U. School of Medicine*  
Blanche Capel, *Duke U.*  
Mats Carlsson, *U. of Oslo*  
Ib Chorkendorff, *U. of Denmark*  
David Clapham, *Children's Hospital Boston*  
Joel Cohen, *Rockefeller U., Columbia U.*  
James J. Collins, *MIT*  
Robert Cook-Deegan, *Duke U.*  
Lisa Coussens, *Oregon Health & Science U.*  
Alan Cowman, *Walter & Eliza Hall Inst.*  
Robert H. Crabtree, *Yale U.*  
Roberta Croce, *Vrije Universiteit*  
Janet Currie, *Princeton U.*  
Jeff L. Dangl, *U. of North Carolina*  
Tom Daniel, *U. of Washington*  
Frans de Waal, *Emory U.*  
Stanislas Dehaene, *Collège de France*  
Robert Desimone, *MIT*  
Claude Desplan, *New York U.*  
Dennis Discher, *U. of Pennsylvania*  
Gerald W. Dorn II, *Washington U. School of Medicine*  
Jennifer A. Doudna, *U. of California, Berkeley*  
Bruce Dunn, *U. of California, Los Angeles*  
William Dunphy, *Caltch*  
Christopher Dye, *WHO*  
Todd Ehlers, *U. of Tuebingen*  
David Ehrhardt, *Carnegie Inst. of Washington*  
Tim Elston, *U. of North Carolina at Chapel Hill*  
Jennifer Elisseeff, *U. of N*  
Gerhard Ertl, *Fritz-Haber-Institut, Berlin*  
Barry Everitt, *U. of Cambridge*  
Ernst Fehr, *Johns Hopkins U.*  
Anne C. Ferguson-Smith, *U. of Cambridge*  
Michael Feuer, *The George Washington U.*  
Toren Finkel, *NHLBI, NIH*  
Kate Fitzgerald, *U. of Massachusetts*  
Peter Fratzl, *Max-Planck Inst.*  
Elaine Fuchs, *Rockefeller U.*  
Daniel Geschwind, *UCLA*  
Karl-Heinz Glassmeier, *TU Braunschweig*  
Ramon Gonzalez, *Cice U.*  
Julia R. Greer, *Caltch*  
Elizabeth Grove, *U. of Chicago*  
Nicolas Gruber, *ETH Zurich*  
Kip Guy, *St. Jude's Children's Research Hospital*  
Taekjip Ha, *U. of Illinois at Urbana-Champaign*  
Wolfgang Haas, *ETH Zurich*  
Christian Haass, *Ludwig Maximilians U.*  
Sharon Hammes-Schiffer, *U. of Illinois at Urbana-Champaign*  
Michael Hasselmo, *Boston U.*  
Martin Heimann, *Max-Planck Inst. Jena*  
Yka Helariutta, *U. of Cambridge*  
James A. Hendler, *Rensselaer Polytechnic Inst.*  
Janet G. Hering, *Swiss Fed. Inst. of Aquatic Science & Technology*  
Kai-Uwe Hinrichs, *U. of Bremen*  
David Hodell, *U. of Cambridge*  
Lora Hooper, *UT Southwestern Medical Ctr. at Dallas*  
Tamas Horvath, *Yale University*  
Raymond Huey, *U. of Washington*  
Fred Hughson, *Princeton U.*  
Auke Ijspeert, *EPFL Lausanne*  
Stephen Jackson, *USGS and U. of Arizona*  
Steven Jacobsen, *U. of California, Los Angeles*  
Kai Johnson, *EPFL Lausanne*  
Peter Jonas, *Inst. of Science & Technology (IST) Austria*  
Matt Kaebberlein, *U. of Washington*  
William Kaelin Jr., *Dana-Farber Cancer Inst.*  
Daniel Kahne, *Harvard U.*  
Daniel Kammen, *U. of California, Berkeley*  
Abby Kavner, *U. of California, Los Angeles*  
Hitoshi Kawakatsu, *U. of Tokyo*  
Masashi Kawasaki, *U. of Tokyo*  
V. Narry Kim, *Seoul National U.*  
Robert Kingston, *Harvard Medical School*  
Etienne Kochkin, *Ecole Normale Supérieure*  
Alexander Kolodkin, *Johns Hopkins U.*  
Thomas Langer, *U. of Cologne*  
Mitchell A. Lazar, *U. of Pennsylvania*  
David Lazer, *Harvard U.*  
Thomas Lecuit, *IBDM*  
Virginia Lee, *U. of Pennsylvania*  
Stanley Lemon, *U. of North Carolina at Chapel Hill*  
Ottoline Leyser, *Cambridge U.*  
Wendell Lim, *U.C. San Francisco*  
Marcia C. Linn, *U. of California, Berkeley*  
Jianguo Liu, *Michigan State U.*  
Luis Liz-Marzan, *CIC biomAGUNE*  
Jonathan Losos, *Harvard U.*  
Ke Lu, *Chinese Acad. of Sciences*  
Christian Lüscher, *U. of Geneva*  
Laura Machesky, *CRUK Beatson Inst. for Cancer Research*  
Anne Magurran, *U. of St. Andrews*  
Oscar Marin, *CSIC & U. Miguel Hernández*  
Charles Marshall, *U. of California, Berkeley*  
C. Robertson McClung, *Dartmouth College*  
Rodrigo Medley, *U. of Mexico*  
Graham Medlyn, *U. of Warwick*  
Tom Misteli, *NCI*  
Yasushi Miyashita, *U. of Tokyo*  
Mary Ann Moran, *U. of Georgia*  
Richard Morris, *U. of Edinburgh*  
Alison Murray-Reif, *NC State U. (\$)*  
Thomas Murray, *The Hastings Center*  
Daniel Neumar, *U. of California, Berkeley*  
Katie Nijmeijer, *U. of Twente*  
Heiga Novotny, *European Research Advisory Board*  
Ben Olken, *MIT*  
Rachel O'Reilly, *Warwick U.*  
Joe Orenstein, *U. of California Berkeley & Lawrence Berkeley National Lab*  
Harry Orr, *U. of Minnesota*  
Pilar Ossorio, *U. of Wisconsin*  
Andrew Oswald, *U. of Warwick*  
Isabella Pagano, *Istituto Nazionale di Astrofisica*  
Robert Palmer, *U. of Maryland*  
Steve Palumbi, *Stanford U.*  
Jane Parker, *Max-Planck Inst. of Plant Breeding Research*  
Giovanni Parmigiani, *Dana-Farber Cancer Inst. (\$)*  
John H. J. Petrini, *Memorial Sloan-Kettering Cancer Center*  
Samuel Pfaff, *Salk Institute for Biological Studies*  
Joshua Plotkin, *U. of Pennsylvania*  
Albert Polman, *FOM Institute AMOLF*  
Philippe Poulin, *CNRS*  
Jonathan Pritchard, *Stanford U.*  
Wim van der Putten, *Netherlands Institute of Ecology*  
David Randall, *Colorado State U.*  
Felix Rey, *Institut Pasteur*  
Trevor Robbins, *U. of Cambridge*  
Jim Roberts, *Fred Hutchinson Cancer Research Ctr.*  
Amy Rosenzweig, *Northwestern University*  
Mike Ryan, *U. of Texas, Austin*  
Mitsuru Saitou, *Kyoto U.*  
Shimon Sakaguchi, *Kyoto U.*  
Miquel Salmeron, *Lawrence Berkeley National Lab*  
Jürgen Sandkühler, *Medical U. of Vienna*  
Alexander Schier, *Harvard U.*  
Vladimir Shalvaev, *Purdue U.*  
Robert Siliciano, *Johns Hopkins School of Medicine*  
Denis Simon, *Arizona State U.*  
Uri Simonsohn, *U. of Pennsylvania*  
Alison Smith, *John Innes Centre*  
Richard Smith, *U. of North Carolina (\$)*  
John Speakman, *U. of Aberdeen*  
Allan C. Spradling, *Carnegie Institution of Washington*  
Jonathan Sprent, *Garvan Inst. of Medical Research*  
Eric Steig, *U. of Washington*  
Paula Stephan, *Georgia State U. and National Bureau of Economic Research*  
Molly Stevens, *Imperial College London*  
V. S. Subrahmanian, *U. of Maryland*  
Ira Tabas, *Columbia U.*  
Sarah Teichmann, *Cambridge U.*  
John Thomas, *North Carolina State U.*  
Shubha Tole, *Tata Institute of Fundamental Research*  
Christopher Tyler-Smith, *The Wellcome Trust Sanger Inst.*  
Herbert Virgin, *Washington U.*  
Bert Vogelstein, *Johns Hopkins U.*  
Cynthia Volkert, *U. of Göttingen*  
David Wallace, *Weizmann Inst. of Science*  
Ian Walsmsley, *U. of Oxford*  
Jane-Ling Wang, *U. of California, Davis (\$)*  
David Waxman, *Fudan U.*  
Jonathan Weissman, *U. of California, San Francisco*  
Chris Wikle, *U. of Missouri (\$)*  
Ian A. Wilson, *The Scripps Res. Inst. (\$)*  
Timothy D. Wilson, *U. of Virginia*  
Rosemary Wyse, *Johns Hopkins U.*  
Jan Zaenen, *Leiden U.*  
Kenneth Zaret, *U. of Pennsylvania School of Medicine*  
Jonathan Zehr, *U. of California, Santa Cruz*  
Len Zon, *Children's Hospital Boston*  
Maria Zuber, *MIT*

## BOOK REVIEW BOARD

David Bloom, *Harvard U.*, Samuel Bowring, *MIT*, Angela Creager, *Princeton U.*, Richard Sweder, *U. of Chicago*, Ed Wasserman, *DuPont*