



**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. Szuromi, Sacha Vignieri, Brad Wible, Nicholas S. Wigginton, Laura M. Zahn **ASSOCIATE EDITORS** Brent Grocholski, Priscilla Kelly, 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 Masiulis, Dona Mathieu, Le-Toya Mayne Flood, Shannon McMahon, Scott Miller, Jerry Richardson, Alice Whaley(UK), Gwen Grant(UK), Brian White **EXECUTIVE ASSISTANT** Anna Bashkirova **ADMINISTRATIVE SUPPORT** Janet Clements(UK), Lizanne Newton(UK), Sarah Harrison(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 Servick, Robert F. Service, Erik Stokstad(Cambridge, UK), Paul Voosen, Meredith Wadman **INTERNS** Jessica Boddy, Ben Panko **CONTRIBUTING CORRESPONDENTS** John Bohannon, Warren Cornwall, Ann Gibbons, Mara Hvistendahl, Sam Kean, 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 **COEDITORS** Julia Cole, Dorie Chevien, 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 Mehmedovic **DIRECTOR, BUSINESS OPERATIONS & ANALYSIS** Eric Knott **MANAGER, BUSINESS OPERATIONS** Jessica Tierney **SENIOR BUSINESS ANALYST** Cory Lipman **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 ASSOCIATE** 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** Alesha Marshall **ASSOCIATE DIRECTOR, INSTITUTIONAL LICENSING OPERATIONS** Iquo Edim **SENIOR OPERATIONS ANALYST** Lana Guz **MANAGER, AGENT RELATIONS & CUSTOMER SUCCESS** Judy Lillibrige

**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 Khôi 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 DESIGNER** Chrystal Smith **GRAPHICS MANAGING EDITOR** Alberto Cuadra **GRAPHICS EDITOR** Garvin Grullón **SENIOR SCIENTIFIC ILLUSTRATORS** Chris Bickel, Katharine Suttiff **SCIENTIFIC ILLUSTRATOR** Valerie Altounian **INTERACTIVE GRAPHICS EDITOR** Jia You **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 **ASSISTANT EDITOR, CUSTOM PUBLISHING** Jackie Oberst: 202-326-6463 **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 **COLLABORATION/CUSTOM PUBLICATIONS/JAPAN** Adarsh Sandhu + 81532-81-5142 asandhu@aaas.org **EAST COAST/FE. 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 **CHINA/TAIWAN** Ruolei Wu: +86-186 0082 9345, 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 **CLASSIFIED** advertise@sciencecareers.org **U.S. SALES** Tina Burks: 202-326-6577, Nancy Toarna: 202-326-6578 **EUROPE/ROW SALES** Sarah Lelarge **SALES ASSISTANT** Kelly Grace **JAPAN** Hiroyuki Mashiki(Kyoto): +81-75-823-1109 hmashiki@aaas.org **CHINA/TAIWAN/ROU** Wu: +86-186 0082 9345 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 **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  
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  
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, NIAH  
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**, Hamburg-Eppendorf  
Joseph A. Burns, Cornell U.  
Carter Tribley Butts, U. of California, Irvine  
Gyorgy 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.  
Sandra Diaz, Universidad Nacional de Córdoba  
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, Caltech  
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, Johns Hopkins U.  
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, Rice U.  
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  
Wolf-Dietrich Hardt, 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  
Seema Jayachandran, Northwestern U.  
Kai Jonsson, EPFL Lausanne  
Peter Jonas, Inst. of Science & Technology (IST) Austria  
Matt Kaerberlein, 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. Naray Kim, Seoul National U.  
Robert Kingston, Harvard Medical School

Etienne Kochlin, 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 biomGUNE  
Jonathan Losos, Harvard U.  
Ke Lu, Chinese Acad. of Sciences  
Christian Lüscher, U. of Geneva  
Laura Machesky, CRUK Beaton 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 Medellín, U. of Mexico  
Graham Medley, U. of Warwick  
Jane Memmott, U. of Bristol  
Tom Misteli, NCI  
Yasushi Miyashita, U. of Tokyo  
Mary Ann Moran, U. of Georgia  
Richard Morris, U. of Edinburgh  
Alison Moutter-Reif, NC State U. (\$) **Thomas Murray**, The Hastings Center  
Daniel Neuman, U. of California, Berkeley  
Kitty Nijmeijer, U. of Twente  
Helga Nowotny, European Research Advisory Board  
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  
Margaret Palmer, U. of Maryland  
Steve Palumbi, Stanford U.  
Jane Parker, Max-Planck Inst.  
U. 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  
Kathrin Plath, U. of California, Los Angeles  
Joshua Plotkin, U. of Pennsylvania  
Albert Polman, FOM Institute AMOLF  
Phillippe Poulin, CNRS  
Jonathan Pritchard, Stanford U.  
Win van der Putten, Netherlands Institute of Ecology  
David Randall, Colorado State U.  
Sarah Reisman, Caltech  
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  
Mitsunori Sakata, Kyoto U.  
Shimon Saitouchi, Kyoto U.  
Miguel Salmeron, Lawrence Berkeley National Lab  
Jürgen Sandkühler, Medical U. of Vienna  
Alexander Schier, Harvard U.  
Vladimir Shalabaev, Purdue U.  
Robert Siliciano, Johns Hopkins School of Medicine  
Dennis Simon, Arizona State U.  
Uli 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. Subramanian, 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 Virsik, Washington U.  
Bert Vogelstein, Johns Hopkins U.  
David Wallach, Weizmann Inst. of Science  
Ian Walmsey, 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 Zehr, U. of Pennsylvania School of Medicine  
Jonathan Zehr, U. of California, Santa Cruz  
Len Zou, Children's Hospital Boston  
Maria Zuber, MIT

## BOOK REVIEW BOARD

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