



**Editor-in-Chief** Marcia McNutt

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

**Managing Editor, Research Journals** Katrina L. Kelner

**Deputy Editors** Barbara R. Jasny, Andrew M. Sugden(UK), Valda J. Vinson, Jake S. Yeston

## Research and Insights

**SR. EDITORS** Caroline Ash(UK), Gilbert J. Chin, Lisa D. Chong, 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 Riddiough, 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, Keith T. Smith **ASSOCIATE BOOK REVIEW EDITOR** Valerie B. Thompson **ASSOCIATE LETTERS EDITOR** Jennifer Silks **CHIEF CONTENT PRODUCTION EDITOR** Cara Tate **SR. CONTENT PRODUCTION EDITORS** Harry Jach, Lauren Kmeck **CONTENT PRODUCTION EDITORS** Jeffrey E. Cook, Chris Filiateau, Cynthia Howe, Barbara P. Ordway, Catherine Wolner **SR. EDITORIAL COORDINATORS** Carolyn Kyle, Beverly Shields **EDITORIAL COORDINATORS** Joi S. Granger, Lisa Johnson, Anita Wynn **PUBLICATIONS ASSISTANTS** Aneera Dobbins, Jeffrey Hearn, Dona Mathieu, Le-Toya Mayne Flood, Shannon McMahon, Scott Miller, Caitlyn Phillips, Jerry Richardson, Rachel Roberts(UK), Alice Whaley(UK), Brian White **EXECUTIVE ASSISTANT** Anna Bashkirova **ADMINISTRATIVE SUPPORT** Janet Clements(UK), Lizanne Newton(UK), Maryrose Madrid, John Wood(UK)

## News

**NEWS MANAGING EDITOR** John Travis **INTERNATIONAL EDITOR** Richard Stone **DEPUTY NEWS EDITORS** Daniel Clery(UK), Robert Coontz, Elizabeth Culotta, David Grimm, David Malakoff, Leslie Roberts **CONTRIBUTING EDITOR** Martin Enserink(Europe) **SR. CORRESPONDENTS** Jeffrey Mervis, Elizabeth Pennisi **NEWS WRITERS** Adrian Cho, Jon Cohen, Jennifer Couzin-Frankel, Carolyn Gramling, Eric Hand, Jocelyn Kaiser, Catherine Matacic, Keith Servick, Robert F. Service, Erik Stokstad(Cambridge, UK), Emily Underwood **INTERNS** Hanae Armitage, Nala Rogers **CONTRIBUTING CORRESPONDENTS** Michael Balter(Paris), John Bohannon, Ann Gibbons, Mara Hvistendahl, Sam Kean, Eli Kintisch, Kai Kupferschmidt(Berlin), Andrew Lawler, Christina Larson(Beijing), Mitch Leslie, Charles C. Mann, Eliot Marshall, Virginia Morell, Dennis Normile(Shanghai), Heather Pringle, Tania Rabesandratana(London), Gretchen Vogel(Berlin), Lizzie Wade(Mexico City) **CAREERS** Donisha Adams, Rachel Bernstein(Editor) **COPY EDITORS** Julia Cole, Dorie Chevien, Jennifer Levin (Chief) **ADMINISTRATIVE SUPPORT** Jessica Williams

## Executive Publisher

**Interim 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** Hal Moore **BUSINESS SYSTEMS AND FINANCIAL ANALYSIS DIRECTOR** Randy Yi **MANAGER OF FULFILLMENT SYSTEMS** Neal Hawkins **SYSTEMS ANALYST** Nicole Mehmedovich **ASSISTANT DIRECTOR, BUSINESS OPERATIONS** Eric Knott **MANAGER, BUSINESS OPERATIONS** Jessica Tierney **BUSINESS ANALYST** Cory Lipman **FINANCIAL ANALYST** Robert Clark **RIGHTS AND PERMISSIONS ASSISTANT DIRECTOR** Emilie David **PERMISSIONS ASSOCIATE** Elizabeth Sandler **RIGHTS, CONTRACTS, AND LICENSING ASSOCIATE** Lili Kiser

**MARKETING DIRECTOR** Elise Swinehart **ASSOCIATE DIRECTOR OF ACQUISITION AND RETENTION** Julianne Wielga **MARKETING ASSOCIATE** Elizabeth Sattler **SR. MARKETING EXECUTIVE** Jennifer Reeves **ASSOCIATE DIRECTOR, CREATIVE SERVICES** Tzeitel Sorrosa **ART ASSOCIATE** Seil Lee **JR. ART ASSOCIATE** Kim Huynh **ASSISTANT COMMERCIAL EDITOR** Selby Frame **MARKETING PROJECT MANAGER** Angelissa McArthur **PROGRAM DIRECTOR, AAAS MEMBER CENTRAL** Peggy Mihelich **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

**INTERIM DIRECTOR, SITE LICENSING** Will Schweitzer **PUBLISHER RELATIONS MANAGER** Catherine Holland **PUBLISHER RELATIONS, EASTERN REGION** Keith Layson **PUBLISHER RELATIONS, WESTERN REGION** Ryan Rexroth **SALES RESEARCH COORDINATOR** Aiesha Marshall **MANAGER, SITE LICENSE OPERATIONS** Iqo Edim **SENIOR PRODUCTION SPECIALIST** Robert Koepke **SENIOR OPERATIONS ANALYST** Lana Guz **FULFILLMENT ANALYST** Judy Lillibridge **ASSOCIATE DIRECTOR, MARKETING** Christina Schlecht **MARKETING ASSOCIATES** Thomas Landreth, Isa Sesay-Bah

**WEB TECHNOLOGIES SR. DEVELOPER** Chris Coleman **DEVELOPERS** Dan Berger, Jimmy Marks, Ryan Jensen **SR. PROJECT MANAGER** Trista Smith **PROJECT MANAGER** Nick Fletcher

**DIGITAL MEDIA DIRECTOR OF ANALYTICS** Enrique Gonzales **DIGITAL REPORTING ANALYST** Eric Hossinger **SR. WEB PRODUCER** Sarah Crespi **WEB PRODUCER** Alison Crawford **VIDEO PRODUCER** Nguyen Nguyen **SOCIAL MEDIA PRODUCER** Brice Russ

**DIRECTOR OF OPERATIONS PRINT AND ONLINE** Elizabeth 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

**DESIGN DIRECTOR** Beth Rakouskas **DESIGN EDITOR** Marcy Atarod **SENIOR DESIGNER** Garvin Grullón **DESIGNER** Chrystal Smith **GRAPHICS MANAGING EDITOR** Alberto Cuadra **SENIOR SCIENTIFIC ILLUSTRATORS** Chris Bueckl, Katharine Sutliff **SCIENTIFIC ILLUSTRATOR** Valerie Altounian **SENIOR ART ASSOCIATES** Holly Bishop, Nathalie Cary, Preston Huey **PHOTOGRAPHY MANAGING EDITOR** William Douthitt **PHOTO EDITORS** Leslie Blizard, Christy Steele

**DIRECTOR, GLOBAL COLLABORATION, CUSTOM PUBLICATIONS, ADVERTISING** Bill Moran **EDITOR, CUSTOM PUBLISHING** Sean Sanders: 202-326-6430 **ASSISTANT EDITOR, CUSTOM PUBLISHING** Tianna Hicklin: 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/E. CANADA** Laurie Faraday: 508-747-9395, FAX 617-907-8189 **WEST COAST/W. CANADA** Lynne Stickrod: 415-931-9782, FAX 415-520-6940 **MIDWEST** Jeffrey Dembski: 847-498-4520 x3005, Steven Loerich: 847-498-4520 x3006 **UK EUROPE/ASIA** Roger Goncalves: TEL/FAX +41 43 243 1358 **JAPAN** Katsuyoshi Fukumizu(Tokyo): +81-3-3219-5777 kfukumizu@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 Toema**: 202-326-6578 **EUROPE/ROW SALES** Sarah Lelarge **SALES ASSISTANT** Kelly Grace **Japan** Hiruyuki Mashiki(Kyoto): +81-75-823-1109 hmashiki@aaas.org **CHINA/TAIWAN** Ruolei Wu: +86-186 0082 9345 rwu@aaas.org **MARKETING MANAGER** Allison Pritchard **MARKETING ASSOCIATE** Aimee Aponte

**AAAS BOARD OF DIRECTORS** **RETIRING PRESIDENT, CHAIR** Gerald R. Fink **PRESIDENT** Geraldine (Geri) Richmond **PRESIDENT-ELECT** Barbara A. Schaal **TREASURER** David Evans Shaw **CHIEF EXECUTIVE OFFICER** Rush D. Holt **BOARD** Bonnie L. Bassler, May R. Berenbaum, Carlos J. Bustamante, Stephen P.A. Forde, 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 202-326-1065. 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/discussions

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 books 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 678 and 679 of the 6 February 2015 issue or access [www.sciencemag.org/about/authors](http://www.sciencemag.org/about/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 S)

Adriano Aguzzi, *U. Hospital Zürich*  
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 A. Aschbach, *U. of Chicago*  
Clare Baker, *University of Cambridge*  
Jordi Bascompte, *University of Zurich*  
Facundo Batista, *London Research Inst.*  
Ray H. Baughman, *U. of Texas, Dallas*  
David Baum, *U. of Wisconsin*  
Carlo Beenakker, *Leiden U.*  
Kamran Behnia, *ESPCI-ParisTech*  
Yasmine Belkaid, *NIAD, 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, *École Normale Supérieure de Lyon*  
Chris Bowler, *École Normale Supérieure*  
Ian Boyd, *U. of St. Andrews*  
Emily Brodsky, *U. of California, Santa Cruz*  
Ron Brookmeyer, *U. of California, Los Angeles (S)*  
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*  
Bianche 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, *Caltech*  
Christopher Dye, *WHO*  
Todd Ehlers, *U. of Tuebingen*  
David Ehrhardt, *Carnegie Inst. of Washington*  
Tim Elston, *U. of North Carolina at Chapel Hill*  
Gerhard Ertl, *Fritz-Haber-Institut, Berlin*  
Barry Everitt, *U. of Cambridge*  
Ernst Fehr, *U. of Zurich*  
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*  
Roman Gonzalez, *Rice U.*  
Julia R. Greer, *Caltech*  
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*  
Christian Haass, *Ludwig Maximilians U.*  
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*  
David Holden, *Imperial College*  
Lora Hooper, *UT Southwestern Medical Ctr. at Dallas*  
Tamas Horvath, *Yale University*  
Raymond Huey, *U. of Washington*  
Auke Ijpeert, *EPFL Lausanne*  
Steven Jacobsen, *U. of California, Los Angeles*  
Stephen Jackson, *U. of Arizona*  
Kai Johnsson, *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*  
Masashi Kawasaki, *U. of Tokyo*  
Yi-Nary Kim, *Seoul National U.*  
Joel Kingsolver, *U. of North Carolina at Chapel Hill*  
Robert Kingston, *Harvard Medical School*  
Etienne Kochkin, *École 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 bioGUNE*  
Jonathan Losos, *Harvard U.*  
Ke Lu, *Chinese Acad. of Sciences*  
Christian Lüscher, *U. of Geneva*  
Laura Machesky, *CRUK Bealson 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*  
Graham Medley, *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. (S)*  
Thomas Murray, *The Hastings Center*  
Daniel Neumarck, *U. of California, Berkeley*  
Kitty Nijmeijer, *U. of Twente*  
Pär Nordlund, *Karolinska Inst.*  
Hela Nowotny, *European Research Advisory Board*  
Ben Oken, *MIT*  
Joe Orenstein, *U. of California Berkeley & Lawrence Berkeley National Lab*  
Harry Orr, *U. of Minnesota*  
Andrew Oswald, *U. of Warwick*  
Steve Palumbi, *Stanford U.*  
Jane Parker, *Max-Planck Inst. of Plant Breeding Research*  
Giovanni Parmigiani, *Dana-Farber Cancer Inst. (S)*  
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.*  
David Randall, *Colorado State U.*  
Felix Rey, *Institut Pasteur*  
Trevor Robbins, *U. of Cambridge*  
Jim Roberts, *Fred Hutchinson Cancer Research Ctr.*  
Barbara A. Romanowicz, *U. of California, Berkeley*  
Amy Rosenzweig, *Northwestern University*  
Mike Ryan, *U. of Texas, Austin*  
Mitsunori Saitou, *Kyoto U.*  
Shimon Sakaguchi, *Kyoto U.*  
Miquel Salmeron, *Lawrence Berkeley National Lab*  
Jürgen Sandkühner, *Medical U. of Vienna*  
Alexander Schier, *Harvard U.*  
Vladimir Shaltov, *Purdue U.*  
Robert Siliciano, *Johns Hopkins School of Medicine*  
Denis Simon, *Arizona State U.*  
Uri Simonson, *U. of Pennsylvania*  
Alison Smith, *John Innes Centre*  
Richard Smith, *U. of North Carolina (S)*  
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, *George 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*  
Douglas Wallace, *Dalhousie U.*  
David Wallace, *Weizmann Inst. of Science*  
Ian Walmsey, *U. of Oxford*  
Jane-Ling Wang, *U. of California, Davis (S)*  
David A. Wardle, *Swedish U. of Agric. Sciences*  
David Waxman, *Fudan U.*  
Jonathan Weissman, *U. of California, San Francisco*  
Chris Wikle, *U. of Missouri (S)*  
Ian A. Wilson, *The Scripps Res. Inst. (S)*  
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 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*