

Editor-in-Chief **Jeremy Berg**, [jberg@aaas.org](mailto:jberg@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. Szuroimi, Sacha Vignieri **SR. EDITORIAL FELLOW** Andrew M. Sugden (UK) **SR. EDITORS** Gemma Alderton (UK), Caroline Ash (UK), Brent Grocholski, Pamela J. Hines, Paula A. Kiberstis, Marc S. Lavine (Canada), Steve Mao, Ian S. Osborne (UK), Beverly A. Purnell, L. Bryan Ray, H. Jesse Smith, 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), Keith T. Smith (UK), Yury V. Suleymanov **LETTERS EDITOR** Jennifer Sills **LEAD CONTENT PRODUCTION EDITORS** Harry Jach, Lauren Kmec **CONTENT PRODUCTION EDITORS** Amelia Beyna, Jeffrey E. Cook, Chris Filiatreau, 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, Alana Warnke, Alice Whaley (UK), Anita Wynn **PUBLICATIONS ASSISTANTS** Jeremy Dow, Alexander Kief, Ronnel Navas, Hilary Stewart (UK), 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 (Cambridge, UK), Paul Voosen, Meredith Wadman **INTERN** Alex Fox **CONTRIBUTING CORRESPONDENTS** Warren Cornwall, Ann Gibbons, Mara Hvistendahl, Sam Kean, Eli Kintisch, Kai Kupferschmidt (Berlin), Andrew Lawler, Mitch Leslie, Eliot Marshall, Virginia Morell, Dennis Normile (Shanghai), Elisabeth Pain (Careers), Charles Piller, Michael Price, Tania Rabesandratana (Barcelona), Emily Underwood, Gretchen Vogel (Berlin), Lizzie Wade (Mexico City) **CAREERS** Donisha Adams, Rachel Bernstein (Editor), Katie Langin **COPY EDITORS** Julia Cole (Senior Copy Editor), Cyra Master (Copy Chief) **ADMINISTRATIVE SUPPORT** Meagan Weiland

Creative Director **Beth Rakouskas**

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

## Interim Chief Executive Officer and Executive Publisher **Alan Leshner**

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 **DIGITAL PRODUCTION MANAGER** Lisa Stanford **SENIOR SPECIALIST** Kimberley Oster **DIGITAL AD-OPS SPECIALIST** Patrick Gerrits **ADVERTISING PRODUCTION OPERATIONS MANAGER** Deborah Tompkins **DESIGNER, CUSTOM PUBLISHING** Jeremy Huntsinger **SR. TRAFFIC ASSOCIATE** Christine Hall **SPECIAL PROJECTS ASSOCIATE** Sarah Dhore

**ASSOCIATE DIRECTOR, BUSINESS DEVELOPMENT** Justin Sawyers **GLOBAL MARKETING MANAGER** Allison Pritchard **DIGITAL MARKETING MANAGER** Aimee Aponte **MARKETING MANAGER** Shawana Arnold **MARKETING ASSOCIATES** Tori Velasquez, Mike Romano, Ashley Hylton **SENIOR DESIGNER** Kim Huynh **TRADE SHOW AND MEETINGS ASSOCIATE** Andrew Clamp

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

**DIRECTOR, BUSINESS STRATEGY AND PORTFOLIO MANAGEMENT** Sarah Whalen **ASSOCIATE DIRECTOR, PRODUCT MANAGEMENT** Kris Bishop **ASSOCIATE DIRECTOR, PRODUCT DEVELOPMENT AND SPJ** Hannah Heckner **SR. PRODUCT ASSOCIATE** Robert Koepeke **DIGITAL PRODUCT STRATEGIST** Michael Hardesty **SPJ ASSOCIATE** Samantha Bruno Fuller

**DIRECTOR, INSTITUTIONAL LICENSING** Iquo Edim **ASSOCIATE DIRECTOR, RESEARCH & DEVELOPMENT** Elisabeth Leonard **SENIOR INSTITUTIONAL LICENSING MANAGER** Ryan Rexroth **INSTITUTIONAL LICENSING MANAGERS** Marco Castellani, Christos Skoutas **MANAGER, SYSTEMS AND OPERATIONS** Brian Holiahn **MANAGER, AGENT RELATIONS & CUSTOMER SUCCESS** Judy Lillibridge **SENIOR OPERATIONS ANALYST** Lana Guz **FULFILLMENT COORDINATOR** Melody Stringer

**DIRECTOR, GLOBAL SALES** Tracy Holmes **ASSOCIATE DIRECTOR, ADVERTISING SALES, US** Laurie Faraday **US EAST COAST AND MID WEST SALES** Glen Cox **US WEST COAST SALES** Lynne Stickrod **US SALES MANAGER, SCIENCE CAREERS** Claudia Paulsen-Young **US SALES REP, SCIENCE CAREERS** Tracy Anderson **ASSOCIATE DIRECTOR, ROW** Roger Goncalves **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 **PROJECT 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](mailto:science_editors@aaas.org)

### NEWS

[science\\_news@aaas.org](mailto:science_news@aaas.org)

### INFORMATION FOR AUTHORS

[sciencemag.org/authors/](http://sciencemag.org/authors/)  
[science-information-authors.org](http://science-information-authors.org)

### REPRINTS AND PERMISSIONS

[sciencemag.org/help/reprints-and-permissions](http://sciencemag.org/help/reprints-and-permissions)

### MEDIA CONTACTS

[scipak@aaas.org](mailto:scipak@aaas.org)

### MULTIMEDIA CONTACTS

[SciencePodcast@aaas.org](http://SciencePodcast@aaas.org)  
[ScienceVideo@aaas.org](http://ScienceVideo@aaas.org)

### INSTITUTIONAL SALES

[and-site/licenses](http://and-site/licenses)  
[sciencemag.org/librarian](http://sciencemag.org/librarian)

### PRODUCT ADVERTISING & CUSTOM PUBLISHING

[advertising.sciencemag.org/products-services](http://advertising.sciencemag.org/products-services)  
[science\\_advertising@aaas.org](http://science_advertising@aaas.org)

### CLASSIFIED ADVERTISING

[advertising.sciencemag.org/science-careers](http://advertising.sciencemag.org/science-careers)

### REPRINTS AND PERMISSIONS

[sciencemag.org/help/reprints-and-permissions](http://sciencemag.org/help/reprints-and-permissions)

### MEDIA CONTACTS

[scipak@aaas.org](mailto:scipak@aaas.org)

### MULTIMEDIA CONTACTS

[SciencePodcast@aaas.org](http://SciencePodcast@aaas.org)  
[ScienceVideo@aaas.org](http://ScienceVideo@aaas.org)

### INSTITUTIONAL SALES

[and-site/licenses](http://and-site/licenses)  
[sciencemag.org/librarian](http://sciencemag.org/librarian)

### MEMBERSHIP AND INDIVIDUAL SUBSCRIPTIONS

[sciencemag.org/subscriptions](http://sciencemag.org/subscriptions)

### MEMBER BENEFITS

[aaas.org/membercentral](http://aaas.org/membercentral)

### AAAS BOARD OF DIRECTORS

CHAIR **Margaret A. Hamburg**

PRESIDENT **Steven Chu**

PRESIDENT-ELECT **Claire M. Fraser**

TREASURER **Carolyn N. Ainslie**

INTERIM CHIEF EXECUTIVE OFFICER **Alan Leshner**

BOARD **Cynthia M. Beall**

**May R. Berenbaum**

**Rosina M. Bierbaum**

**Ann Bostrom**

**Stephen P. A. Fodor**

**S. James Gates, Jr.**

**Laura H. Greene**

**Kaye Husbands Fealing**

**Maria Klawe**

**Robert B. Millard**

**William D. Provine**

### BOARD OF REVIEWING EDITORS (Statistics board members indicated with \$)

**Adriano Aguzzi**, *U. Hospital Zürich*

**Takuzo Aida**, *U. of Tokyo*

**Leslie Aiello**, *Wenner-Gren Foundation*

**Judith Allen**, *U. of Manchester*

**Sebastian Amigorena**, *Institut Curie*

**James Analytis**, *U. of California, Berkeley*

**Paola Ariotta**, *Harvard U.*

**Johan Auwerx**, *EPFL*

**David Awschalom**, *U. of Chicago*

**Clare Baker**, *U. of Cambridge*

**Nenad Ban**, *ETH Zürich*

**Franz Bauer**, *Pontificia Universidad Católica de Chile*

**Ray H. Baughman**, *U. of Texas at Dallas*

**Peter Bearman**, *Columbia U.*

**Carlo Beenakker**, *Leiden U.*

**Yasmine Belkaid**, *NIH*

**Philip Benfey**, *Duke U.*

**Gabriele Bergers**, *ViB*

**Bradley Bernstein**, *Mass. General Hospital*

**Alessandra Biffi**, *Harvard Med. School*

**Peer Bork**, *EMBL*

**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 (S)*

**Christian Büchel**, *UKE Hamburg*

**Dennis Burton**, *Scipos Research*

**Carter Tribble Butts**, *U. of California, Irvine*

**György Buzsáki**, *New York U. School of Med.*

**Blanche Capel**, *Duke U.*

**Anmarie Carlton**, *U. of California, Irvine*

**Lars-Erik Cederman**, *ETH Zürich*

**Nick Chater**, *U. of Warwick*

**Zhijian Chen**, *UT Southwestern Med. Ctr.*

**Ib Chorkendorff**, *Denmark TU*

**James J. Collins**, *MIT*

**Robert Cook-Deegan**, *Arizona State U.*

**Alan Cowman**, *Walter & Eliza Hall Inst.*

**Carolyn Coyne**, *U. of Pittsburgh*

**Roberta Croce**, *VU Amsterdam*

**Jeff L. Dangl**, *U. of North Carolina*

**Tom Daniel**, *U. of Washington*

**Chiara Darai**, *Caltech*

**Nicolas Dauphas**, *U. of Chicago*

**Frans de Waal**, *Emory U.*

**Claude Desplan**, *New York U.*

**Sandra Diaz**, *Universidad Nacional de Córdoba*

**Hong Ding**, *Inst. of Physics, CAS*

**Jennifer Dionne**, *Stanford U.*

**Dennis Discher**, *U. of Penn.*

**Jennifer A. Doudna**, *U. of California, Berkeley*

**Bruce Dunn**, *U. of California, Los Angeles*

**William Dunphy**, *Caltech*

**Christopher Dye**, *U. of Oxford*

**Todd Ehlers**, *U. of Tübingen*

**Jennifer Eliseff**, *Johns Hopkins U.*

**Tim Elston**, *U. of North Carolina*

**Andrea Encalada**, *U. San Francisco de Quito*

**Nader Engheta**, *U. of Penn.*

**Karen Ersche**, *U. of Cambridge*

**Barry Everitt**, *U. of Cambridge*

**Vanessa Ezenwa**, *U. of Georgia*

**Michael Feuer**, *The George Washington U.*

**Toren Finkel**, *U. of Pittsburgh Med. Ctr.*

**Gwenn Flowers**, *Simon Fraser U.*

**Peter Fratzl**, *Max Planck Inst. Potsdam*

**Elaine Fuchs**, *Rockefeller U.*

**Eileen Furlong**, *EMBL*

**Jay Gallagher**, *U. of Wisconsin*

**Susan Gelman**, *U. of Michigan*

**Daniel Geschwind**, *U. of California, Los Angeles*

**Karl-Heinz Glassmeier**, *TU Braunschweig*

**Ramon Gonzalez**, *U. of South Florida*

**Elizabeth Grove**, *U. of Chicago*

**Nicolas Gruber**, *ETH Zürich*

**Kip Guy**, *U. of Kentucky College of Pharmacy*

**Taekjip Ha**, *Johns Hopkins U.*

**Christian Haass**, *Ludwig Maximilians U.*

**Sharon Hammes-Schiffer**, *Yale U.*

**Wolf-Dietrich Hardt**, *ETH Zürich*

**Louise Harra**, *U. College London*

**Jian He**, *Clemson U.*

**Carl-Philipp Heisenberg**, *IST Austria*

**Ykä Helariutta**, *U. of Cambridge*

**Janet G. Hering**, *Eawag*

**Hans Hilgenkamp**, *U. of Twente*

**Kai-Uwe Hinrichs**, *U. of Bremen*

**David Hodell**, *U. of Cambridge*

**Lora Hooper**, *UT Southwestern Med. Ctr.*

**Fred Hughson**, *Princeton U.*

**Randall Hulet**, *Rice U.*

**Auke Ijspeert**, *EPFL*

**Akiko Iwasaki**, *Yale U.*

**Stephen Jackson**, *USGS and U. of Arizona*

**Kai Johnson**, *EPFL*

**Peter Jonas**, *IST Austria*

**Matt Kaerberlein**, *U. of Washington*

**William Kaelin Jr.**, *Dana-Farber Cancer Inst.*

**Daniel Kammen**, *U. of California, Berkeley*

**V. Narry Kim**, *Seoul Nat. U.*

**Robert Kingston**, *Harvard Med. School*

**Nancy Knowlton**, *Smithsonian Institution*

**Etienne Koechlin**, *Ecole Normale Supérieure*

**Alexander Kolodkin**, *Johns Hopkins U.*

**Thomas Langer**, *U. of Cologne*

**Mitchell A. Lazar**, *U. of Penn.*

**Ottoline Leyser**, *U. of Cambridge*

**Wendell Lim**, *U. of California, San Francisco*

**Marcia C. Linn**, *U. of California, Berkeley*

**Jianguo Liu**, *Michigan State U.*

**Luis Liz-Marzán**, *CIC biomaGUNE*

**Jonathan Losos**, *Washington U. in St. Louis*

**Ke Lu**, *Chinese Acad. of Sciences*

**Christian Lüscher**, *U. of Geneva*

**Fabienne Mackay**, *U. of Melbourne*

**Anne Magurran**, *U. of St. Andrews*

**Oscar Marin**, *King's College London*