

# 113

Not far from downtown Rio de Janeiro, ecologists plot a forest comeback.

## NEWS

### IN BRIEF

**104** News at a glance

### IN DEPTH

**106** PANEL SLAMS PLAN FOR HUMAN RESEARCH RULES

National Academies report urges creation of new national commission on ethical studies *By D. Malakoff*

**107** LONG-DELAYED NUCLEAR CENTER LOOKS SET FOR CONSTRUCTION

FAIR moves ahead despite remaining budget shortfalls *By E. Carlidge*

**108** TITANIC BALLOON SETS RECORD AND TANTALIZES SCIENTISTS

Curtailed flight highlights remaining challenges of “superpressure” balloon technology *By P. Monahan*

**109** MASSIVE HELIUM FIELDS FOUND IN RIFT ZONE OF TANZANIA

Commercial development could struggle in a stabilizing market for the world’s best coolant *By E. Hand*

**110** HEARTMAKER’S NEXT STEP: A RAY ‘BIOHYBRID’

Light-controlled cardiac muscle cells guide swimming of raybot *By E. Pennisi*

► REPORT P. 158

**112** IN CANADA, PEER-REVIEW CHANGES STIR OUTRAGE

Reforms by nation’s lead biomedical funder result in shoddy reviews, critics say *By W. Kondro*

### FEATURES

**113** REWILDING RIO

A team of ecologists is recreating a living rainforest in the heart of the Olympic city *By H. Escobar*

**116** HURDLING OBSTACLES

Meet Marcia McNutt, scientist, administrator, editor, and now National Academy of Sciences president *By E. Ruppel Shell*

## INSIGHTS

### PERSPECTIVES

**120** LEARNING TO MOVE ON LAND

Interdisciplinary research suggests that early four-limbed vertebrates relied on their tails *By J. A. Nyakatura*

► REPORT P. 154

**121** MOLECULAR SIEVES FOR GAS SEPARATION

Metal-organic framework materials enable efficient separation of similar gases *By J. Y. S. Lin*

► REPORTS PP. 137 & 141

**123** NETWORK ANALYTICS IN THE AGE OF BIG DATA

How can we holistically mine big data?

*By N. Pržulj and N. Malod-Dognin*

► REPORT P. 163

**124** SOLAR-POWERING THE INTERNET OF THINGS

Photovoltaics can help to power remote sensors and controllers at the edge of the Internet

*By R. Haight et al.*

### POLICY FORUM

**126** THE GENOME PROJECT—WRITE

We need technology and an ethical framework for genome-scale engineering *By J. D. Boeke et al.*

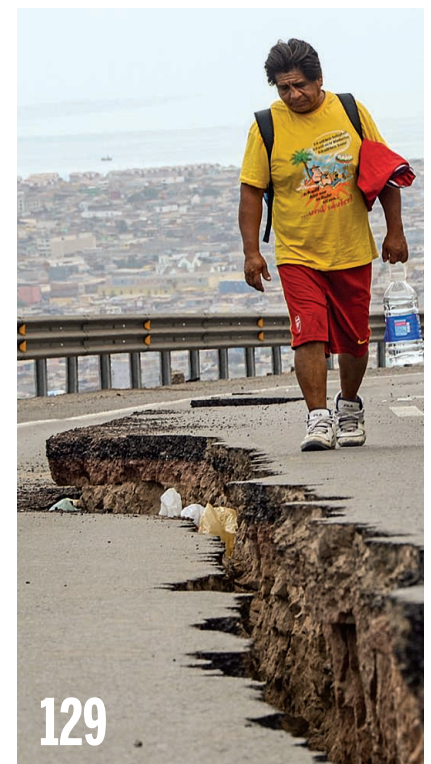
### BOOKS ET AL.

**128** THIS IS YOUR BRAIN ON PARASITES

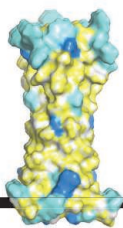
*By K. McAuliffe, reviewed by S. Adamo*

**129** EARTH-SHATTERING EVENTS

*By A. Robinson, reviewed by S. D’Amico*

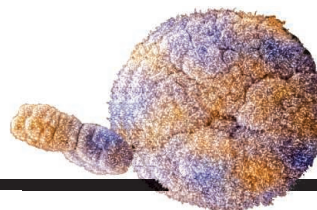


# 129



172

The transmembrane domain of the HIV-1 Env protein



126

Building human chromosomes

LETTERS

131 SCIENCE STANDS BY 2009 FISHERIES STUDY

By M. McNutt

131 INSUFFICIENT RESEARCH ON LAND GRABBING

By C. Liao et al.

131 MEXICO STRUGGLES TO KEEP FOREIGN GRANTS

By C. E. Ormsby et al.

132 TECHNICAL COMMENT ABSTRACTS

132 ERRATA

RESEARCH

IN BRIEF

133 From Science and other journals

RESEARCH ARTICLE

136 REGENERATION

Asymmetric division of clonal muscle stem cells coordinates muscle regeneration in vivo

D. B. Gurevich et al.

RESEARCH ARTICLE SUMMARY; FOR FULL TEXT: dx.doi.org/10.1126/science.aad9969

REPORTS

MICROPOROUS NETWORKS

137 A metal-organic framework-based splitter for separating propylene from propane A. Cadiou et al.

141 Pore chemistry and size control in hybrid porous materials for acetylene capture from ethylene X. Cui et al.

▶ PERSPECTIVE P. 121

144 ORGANIC CHEMISTRY

Copper-catalyzed asymmetric addition of olefin-derived nucleophiles to ketones Y. Yang et al.



150 CATALYSIS

Thermally stable single-atom platinum-on-ceria catalysts via atom trapping J. Jones et al.

154 ANIMAL ROBOTICS

Tail use improves performance on soft substrates in models of early vertebrate land locomotors B. McInroe et al.

▶ PERSPECTIVE P. 120

158 ROBOTICS

Phototactic guidance of a tissue-engineered soft-robotic ray S.-J. Park et al.

▶ NEWS STORY P. 110; VIDEO

163 NETWORK SCIENCE

Higher-order organization of complex networks A. R. Benson et al.

▶ PERSPECTIVE P. 123

166 PLANT SCIENCE

S-Acylation of the cellulose synthase complex is essential for its plasma membrane localization M. Kumar et al.

169 CLIMATE CHANGE

Climate-driven regime shift of a temperate marine ecosystem T. Wernberg et al.

172 STRUCTURAL BIOLOGY

Structural basis for membrane anchoring of HIV-1 envelope spike J. Dev et al.

176 NEUROPHYSIOLOGY

Cilia-based flow network in the brain ventricles R. Faubel et al.

179 IMMUNOTHERAPY

Reengineering chimeric antigen receptor T cells for targeted therapy of autoimmune disease C. T. Ellebrecht et al.

DEPARTMENTS

103 EDITORIAL

The communities of Science By Jeremy Berg

190 WORKING LIFE

The questions that opened doors By Carlos A. Aguilar-Trigueros

ON THE COVER



A robotic stingray made up of rat heart cells, gold, and a polymer commonly used in breast implants. The robot ray mimics the form and function of a swimming stingray, but with a

twist: Genetically altered rat cells allow the "creature" to sense and swim toward light. See pages 110 and 158. For more on the process behind the cover image, see http://scim.ag/29lf15O.

Photo: Ken Richardson

Science Staff ..... 102
New Products ..... 185
Science Careers ..... 186

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2016 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$165 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$1522; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$89. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #R125488122. Publications Mail Agreement Number 1069624. Printed in the U.S.A. Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-6178. Single-copy sales: \$15.00 current issue, \$20.00 back issue prepaid includes surface postage; bulk rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$35.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for Science is 0036-8075. Science is indexed in the Reader's Guide to Periodical Literature and in several specialized indexes.

# Science

**353 (6295)**

*Science* **353** (6295), 103-190.

**ARTICLE TOOLS**

<http://science.sciencemag.org/content/353/6295>

**PERMISSIONS**

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

---

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2016 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.