

SPECIAL SECTION

Emerging Infectious Diseases

INTRODUCTION

144 Outbreak

REVIEWS

146 Driving improvements in emerging disease surveillance through locally relevant capacity strengthening
J. E. B. Halliday et al.

149 Opportunities and challenges in modeling emerging infectious diseases
C. J. E. Metcalf and J. Lessler

153 Improving vaccine trials in infectious disease emergencies
M. Lipsitch and N. Eyal

156 When an emerging disease becomes endemic
G. F. Medley and A. Vassall

SEE ALSO ► EDITORIAL P. 111

ON THE COVER



A groundskeeper sprays pesticide to control mosquitoes in Miami, Florida, in 2016. Zika virus is spread by the ubiquitous *Aedes aegypti* mosquito. This flavivirus has caused a huge outbreak

of infection across South America, where it has been associated with neurological abnormalities in newborn children. The virus has spread north, and cases of infection have been detected in the United States. For more on anticipating infectious disease outbreaks, see page 144. Photo: © Gaston De Cardenas/ Miami Herald/TNS via Getty Images

NEWS

IN BRIEF

112 News at a glance

IN DEPTH

115 LABMADE SMALLPOX IS POSSIBLE, STUDY SHOWS

Reconstitution of horsepox virus from mail-order DNA reignites synthetic biology debate *By K. Kupferschmidt*

117 TRUMP'S SCIENCE SHOP IS SMALL AND WAITING FOR LEADERSHIP

White House office has so far played little role in policy *By J. Mervis*

118 CUBESAT NETWORKS HASTEN SHIFT TO COMMERCIAL WEATHER DATA

Two companies hope to sell atmospheric data to NOAA
By E. Hand

119 A TRANS-ATLANTIC TRANSPARENCY GAP ON ANIMAL EXPERIMENTS

As institutions in the United Kingdom and elsewhere publicize their research, many U.S. universities stay quiet
By M. Wadman

120 A PUSH FOR LOW-CARBON FUELS PAYS OFF IN CALIFORNIA

But new EPA rule would cut federal support for advanced biofuels like biodiesel *By R. F. Service*

FEATURE

122 SURVIVING THE CURE

A stem cell transplant helped beat back a young doctor's cancer. Now, it's assaulting his body *By J. Cohen*

INSIGHTS

PERSPECTIVES

126 A RAVEN'S MEMORIES ARE FOR THE FUTURE

Ravens can plan for expected future events based on past experiences
By M. Boeckle and N. S. Clayton
► REPORT P. 202

128 THE IMPORTANCE OF BEING MODULAR

An experiment proves the value of modularity in complex systems under perturbation *By M. Sales-Pardo*
► REPORT P. 199

129 IMMUNOLOGY TAUGHT BY RATS

A rodent model of hepatitis C virus infection should guide therapeutics and vaccines *By P. Klenerman and E. J. Barnes*
► REPORT P. 204

130 OF SIZZLING STEAKS AND DNA REPAIR

A pathway protects cells from mutations caused by sugar-derived aldehydes
By F. A. Dingler and K. J. Patel
► REPORT P. 208

132 PLASMONIC IMAGING IS GAINING MOMENTUM

Terahertz nanospectroscopy reveals many-body interactions in graphene
By D. N. Basov and M. M. Fogler
► REPORT P. 187

133 HOW DO MINIPROTEINS FOLD?

A high-throughput study yields libraries of miniproteins that help to explain how proteins are stabilized
By D. N. Woolfson et al.
► RESEARCH ARTICLE P. 168

POLICY FORUM

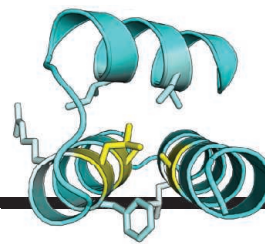
135 WHEN EARLY ADOPTERS DON'T ADOPT

How do bitcoin early adopters seed the adoption S curve?
By C. Catalini and C. Tucker
► PODCAST



126 & 202

CONTENTS



133 & 168

The determinants of
miniprotein stability

14 JULY 2017 • VOLUME 357 • ISSUE 6347

BOOKS ET AL.

137 THE SUN SPOTTERS

An 1878 eclipse offered American scientists the chance to prove their scientific chops. Did they deliver?
By J. Carson

138 THE ELEGANT LAW THAT GOVERNS US ALL

A physicist probes a phenomenon seen in cells, cities, and almost everything in between
By A.-L. Barabási

LETTERS

141 PUBLISH OPENLY BUT RESPONSIBLY

By A. J. Lowe et al.

142 RESPONSE

By D. Lindenmayer et al.

142 INDIGENOUS PEOPLES: CONSERVATION PARADOX

By P. O'B. Lyver and J. M. Tylmanakis

143 TECHNICAL COMMENT ABSTRACTS

143 ERRATA

RESEARCH

IN BRIEF

159 From *Science* and other journals

RESEARCH ARTICLES

162 NEUROSCIENCE

History of winning remodels thalamo-PFC circuit to reinforce social dominance
T. Zhou et al.

168 PROTEIN FOLDING

Global analysis of protein folding using massively parallel design, synthesis, and testing
G. J. Rocklin et al.

► PERSPECTIVE P. 133

175 CHEMISTRY

Snap deconvolution: An informatics approach to high-throughput discovery of catalytic reactions
K. Troshin and J. F. Hartwig

REPORTS

181 GRAPHENE

High-temperature quantum oscillations caused by recurring Bloch states in graphene superlattices
R. Krishna Kumar et al.

185 STELLAR ACTIVITY

Reconciling solar and stellar magnetic cycles with nonlinear dynamo simulations
A. Strugarek et al.

► VIDEO

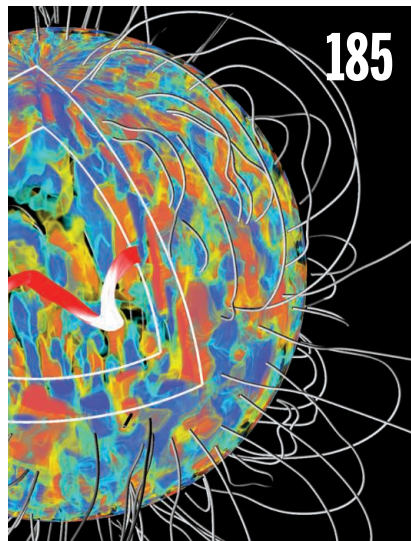
187 GRAPHENE ELECTRONICS

Tuning quantum nonlocal effects in graphene plasmonics
M. B. Lundberg et al.

► PERSPECTIVE P. 132

191 MAGNETISM

All-oxide-based synthetic antiferromagnets exhibiting layer-resolved magnetization reversal
B. Chen et al.



195 SPINTRONICS

Control and local measurement of the spin chemical potential in a magnetic insulator
C. Du et al.

199 ECOLOGICAL NETWORKS

Effects of network modularity on the spread of perturbation impact in experimental metapopulations
L. J. Gilarranz et al.

► PERSPECTIVE P. 128

202 COGNITION

Ravens parallel great apes in flexible planning for tool-use and bartering
C. Kabadayi and M. Osvath

► PERSPECTIVE P. 126, VIDEO

204 HEPATITIS C VIRUS

Mouse models of acute and chronic hepatitis C infection
E. Billerbeck et al.

► PERSPECTIVE P. 129

208 DNA REPAIR

Guanine glycation repair by DJ-1/Park7 and its bacterial homologs
G. Richarme et al.

► PERSPECTIVE P. 130

212 DEVELOPMENTAL BIOLOGY

Germ line-inherited H3K27me3 restricts enhancer function during maternal-to-zygotic transition
F. Zenk et al.

DEPARTMENTS

111 EDITORIAL

Can we beat influenza?
By W. Zhang and R. G. Webster

222 WORKING LIFE

Academia needs to confront sexism
By a postdoc who persisted

Science Staff	110
New Products	217
Science Careers	219

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 © 2017 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): \$1659. 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 #R1254 88122. 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: \$23.00 current issue, \$28.00 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

357 (6347)

Science **357** (6347), 111-222.

ARTICLE TOOLS

<http://science.sciencemag.org/content/357/6347>

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. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.