

EDITORIAL

- 9 Climate Change Conversations
Bassam Z. Shakhshiri and Jerry A. Bell

NEWS OF THE WEEK

- 14 A roundup of the week's top stories

NEWS & ANALYSIS

- 17 New Coronavirus Reveals Some of Its Secrets
>> Policy Forum p. 32
- 19 Fluttering From the Ashes?
>> Science Express Report by T. Horikawa et al.

NEWS FOCUS

- 22 The Deep Earth Machine Is Coming Together
>> Science Podcast
- 25 'Dead' Enzymes Show Signs of Life Dead or Alive?

LETTERS

- 28 NextGenVOICES

BOOKS ET AL.

- 31 Naked Statistics
C. Wheelan, reviewed by E. J. Lamb
- 31 Browsings

POLICY FORUM

- 32 What If Extinction Is Not Forever?
J. S. Sherkow and H. T. Greely
>> News story p. 19; Science Podcast

PERSPECTIVES

- 34 Dynamics of Coral Reef Recovery
B. Polidoro and K. Carpenter
>> Report p. 69
- 35 A Trace of Your Place
B. Poucet and F. Sargolini
>> Research Article p. 44
- 36 The Perfect Hypnotic?
E. Mignot
- 38 Breathing Perchlorate
R. Nerenberg
>> Report p. 85
- 39 Programmed Cell Death in Neuronal Development
M. P. J. Dekkers and Y.-A. Barde
- 41 Revealing the Positive Side of Fluorine
U. Henneke
>> Report p. 57
- 42 Modeling the Solar Dynamo
P. Charbonneau and P. K. Smolarkiewicz

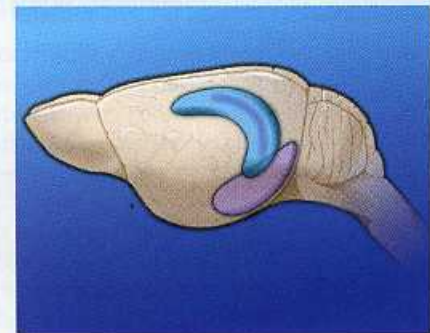
RESEARCH ARTICLE

- 44 Optogenetic Dissection of Entorhinal-Hippocampal Functional Connectivity
S.-J. Zhang et al.
The place-cell population of the hippocampus receives direct input from a variety of medial entorhinal neurons.
Research Article summary; for full text: <http://dx.doi.org/10.1126/science.1232627>
>> Perspective p. 35

CONTENTS continued >>



page 25

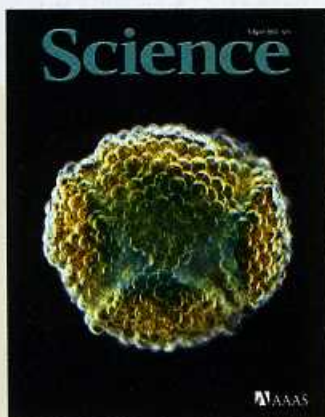


pages 35 & 44

ON THE WEB THIS WEEK

>> Science Podcast
Listen to stories on de-extinction, decoding dreams, Earth's inner movements, and more.

>> Find More Online
Check out Science Express, our podcast, videos, daily news, our research journals, and Science Careers at www.sciencemag.org.



COVER

A network of picoliter aqueous droplets generated by 3D printing. After printing, the droplet network folded into a hollow sphere (diameter: 0.4 millimeters). In these designed tissue-like materials, adjacent compartments are separated by lipid bilayers and can communicate with each other and the environment. Such printed materials might be used to deliver drugs or, in the long term, to augment failing organs. See page 48.

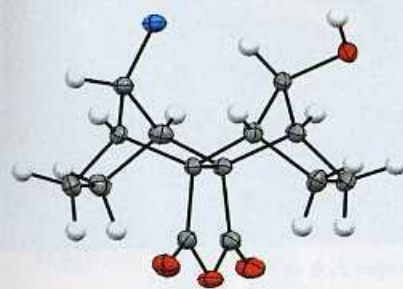
Photo: Gabriel Villar

DEPARTMENTS

- 7 This Week in *Science*
10 Editors' Choice
12 *Science* Staff
99 New Products
100 *Science* Careers



page 36



pages 41 & 57

REPORTS

- 45 **An Integral View of Fast Shocks Around Supernova 1006**
S. Nikolić et al.
Spatially resolved spectroscopy of a supernova remnant reveals its high-velocity shocks in great detail.
- 48 **A Tissue-Like Printed Material**
G. Villar et al.
A tissue-like printed material with communicating microcompartments employs membrane proteins and can be programmed to fold.
- 52 **Broadband 2D Electronic Spectroscopy Reveals a Carotenoid Dark State in Purple Bacteria**
E. E. Ostroumov et al.
A sophisticated spectroscopic technique pinpoints an intermediate electronic state in light-harvesting pigments.
- 57 **Evidence for a Symmetrical Fluoronium Ion in Solution**
M. D. Struble et al.
Fluoride appears to form a dicoordinate carbon-bridging intermediate previously seen only for the heavier halogens.
>> *Perspective p. 41*
- 60 **Photochemical Route for Accessing Amorphous Metal Oxide Materials for Water Oxidation Catalysis**
R. D. L. Smith et al.
Amorphous oxides of earth-abundant metals catalyze water oxidation with performance approaching that of noble metal catalysts.
- 63 **Europe-Wide Dampening of Population Cycles in Keystone Herbivores**
T. Cornulier et al.
Synchronicity in vole population fluctuation across Europe suggests a common climatic driver.
- 66 **Detection and Learning of Floral Electric Fields by Bumblebees**
D. Clarke et al.
Flower-specific electric fields are used by bumblebees to enhance discrimination and memory of floral rewards.
- 69 **Recovery of an Isolated Coral Reef System Following Severe Disturbance**
J. P. Gilmour et al.
Isolated reefs with thriving herbivorous fish populations can recover rapidly after major bleaching events.
>> *Perspective p. 34*
- 71 **Mechanism-Based Covalent Neuraminidase Inhibitors with Broad-Spectrum Influenza Antiviral Activity**
J.-H. Kim et al.
Looking deeply into the mechanism of enzyme inhibition provides a clue for the development of new drugs to fight flu.
- 75 **Decameric SelA•tRNA^{Sec} Ring Structure Reveals Mechanism of Bacterial Selenocysteine Formation**
Y. Itoh et al.
Structural and biochemical data reveal how selenocysteine is produced from serine on transfer RNA.
- 78 ***Drosophila* H1 Regulates the Genetic Activity of Heterochromatin by Recruitment of Su(var)3-9**
X. Lu et al.
The "fifth" histone, H1, acts to recruit a histone-methylating enzyme to silence specific regions of the genome.
- 82 **Translational Repression and eIF4A2 Activity Are Critical for MicroRNA-Mediated Gene Regulation**
H. A. Meijer et al.
MicroRNAs repress target messenger RNAs with structured 5' ends through a protein translation initiation factor.
- 85 **Archaeal (Per)Chlorate Reduction at High Temperature: An Interplay of Biotic and Abiotic Reactions**
M. G. Liebensteiner et al.
Reduction of perchlorate by a hyperthermophilic archaeon suggests early evolution of enzymes using chlorine oxyanions.
>> *Perspective p. 38*
- 87 **Influence of HLA-C Expression Level on HIV Control**
R. Apps et al.
Increased levels of human leukocyte antigen C are associated with control of HIV infection but increased susceptibility to Crohn's disease.
- 91 **Transposon-Driven Genomic Heterogeneity in the *Drosophila* Brain**
P. N. Perrat et al.
Transposon movement in memory-relevant neurons in fruit flies increases neuronal diversity within and between animals.
- 95 **Rats and Humans Can Optimally Accumulate Evidence for Decision-Making**
B. W. Brunton et al.
A model of decision-making that is based on the accumulative processing of noisy information is described.

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 © 2013 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): \$149 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$990; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. 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: \$10.00 current issue, \$15.00 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 \$30.00 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.