

## EDITORIAL

- 996 What Is STEM Education?  
*Rodger W. Bybee*

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- 1000 New XMRV Paper Looks Good, Skeptics Admit—Yet Doubts Linger
- 1001 Hard Summer for Corals Kindles Fears for Survival of Reefs
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- 1003 U.S. Physicists Eye Australia for New Site of Gravitational-Wave Detector
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- 1017 The Invisible Gorilla  
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## SCIENCE PRIZE ESSAY

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## BREVIA

- 1032 CoRoT Reveals a Magnetic Activity Cycle in a Sun-Like Star  
*R. A. García et al.*  
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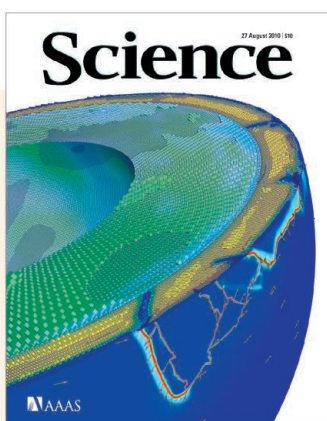


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## COVER

Dynamic interaction of tectonic plates in the southwest Pacific Ocean computed from a flow model of Earth's interior (arrows show predicted velocity). The computational mesh, for which color represents viscosity (yellow, softer; blue, stiffer), is refined to resolve the forces in the deep mantle that are coupled directly into the edges of plates through narrow slabs. Red lines indicate low-viscosity zones corresponding to plate boundaries. See page 1033.

*Image: Georg Stadler, The University of Texas at Austin*

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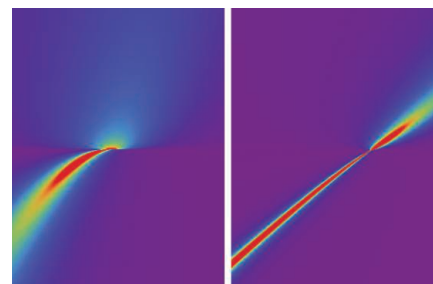
## RESEARCH ARTICLES

- 1033 **The Dynamics of Plate Tectonics and Mantle Flow: From Local to Global Scales**  
G. Stadler et al.  
Computational advances enable the modeling of global geophysical processes to the scale of a kilometer.  
>> *Perspective p. 1020*
- 1038 **Atomic Structure of Human Adenovirus by Cryo-EM Reveals Interactions Among Protein Networks**  
H. Liu et al.  
High-resolution structures provide a basis for optimizing adenovirus as a vaccine and gene-therapy vector.  
>> *Perspective p. 1026; Report p. 1071*

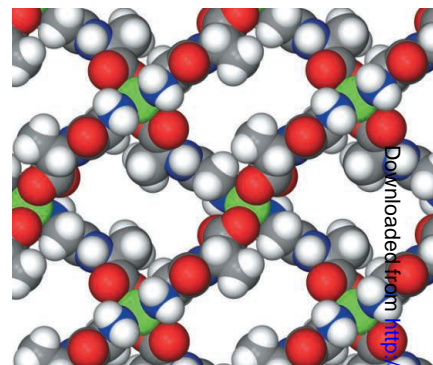
## REPORTS

- 1043 **Strange Metal Transport Realized by Gauge/Gravity Duality**  
T. Faulkner et al.  
Black hole theory is used to develop a mathematical description of a class of metals with unusual electronic properties.
- 1047 **Dynamical Instability Produces Transform Faults at Mid-Ocean Ridges**  
T. Gerya  
Transform faults on the sea floor are rotated and stretched sections of the mid-ocean ridge.
- 1050 **The Chlorine Isotope Composition of the Moon and Implications for an Anhydrous Mantle**  
Z. D. Sharp et al.  
The range of chlorine isotope values of the Moon is distinct from those of Earth and meteorites, indicating that the Moon is dry.
- 1053 **An Adaptable Peptide-Based Porous Material**  
J. Rabone et al.  
Conformational changes in a porous material during the sorption of small molecules lead to a dynamic increase in porosity.  
>> *Perspective p. 1025*
- 1057 **Trapping a Diradical Transition State by Mechanochemical Polymer Extension**  
J. M. Lenhardt et al.  
Strained carbon rings in the backbone of a polymer can be opened by external application of shear forces.
- 1060 **Induction of Broadly Neutralizing H1N1 Influenza Antibodies by Vaccination**  
C.-J. Wei et al.  
An influenza virus vaccine elicits a broadly neutralizing, cross-protective antibody response in mice, ferrets, and nonhuman primates.  
>> *Perspective p. 1021*
- 1065 **Secreted Peptide Signals Required for Maintenance of Root Stem Cell Niche in *Arabidopsis***  
Y. Matsuzaki et al.  
Short-range signaling by sulfated peptides maintains root stem cells.
- 1068 **Genomic Comparison of the Ants *Camponotus floridanus* and *Harpegnathos saltator***  
R. Bonasio et al.  
Comparison reveals the epigenetic controls on caste development in ants.  
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- 1071 **Crystal Structure of Human Adenovirus at 3.5 Å Resolution**  
V. S. Reddy et al.  
High-resolution structures provide a basis for optimizing adenovirus as a vaccine and gene-therapy vector.  
>> *Perspective p. 1026; Research Article p. 1038*
- 1075 **Insects Betray Themselves in Nature to Predators by Rapid Isomerization of Green Leaf Volatiles**  
S. Allmann and I. T. Baldwin  
Damage caused by a caterpillar releases compounds that are transformed by the pest's saliva into a predator attractant.
- 1078 **Substrate Elasticity Regulates Skeletal Muscle Stem Cell Self-Renewal in Culture**  
P. M. Gilbert et al.  
Muscle stem cells prefer a soft substrate.  
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- 1081 **Optimally Interacting Minds**  
B. Bahrami et al.  
Sharing choices and confidence in those choices can be an empowering experience.  
>> *Perspective p. 1022*
- 1085 **Phosphatidic Acid Is a pH Biosensor That Links Membrane Biogenesis to Metabolism**  
B. P. Young et al.  
Lipid signaling in yeast is regulated by intracellular pH.

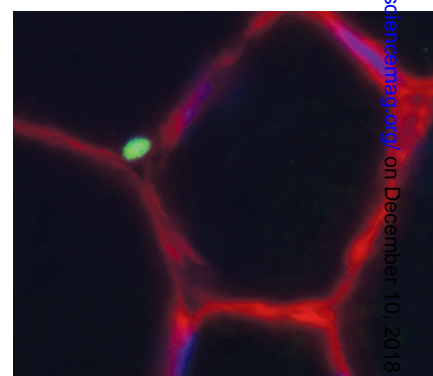
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## SCIENCEONLINE

## SCIENCEEXPRESS

[www.sciencexpress.org](http://www.sciencexpress.org)

**Mitotic Recombination in Patients with Ichthyosis Causes Reversion of Dominant Mutations in *KRT10***  
*K. A. Choate et al.*

Patches of normal skin in patients with a rare skin disorder are due to cells that have lost the disease-causing mutation.  
10.1126/science.1192280

**Freezing Tolerance in Plants Requires Lipid Remodeling at the Outer Chloroplast Membrane**  
*E. R. Moellering et al.*

An enzyme that remodels galactolipids protects chloroplasts against freeze damage in *Arabidopsis thaliana*.  
10.1126/science.1191803

**$\alpha$ -Synuclein Promotes SNARE-Complex Assembly in Vivo and in Vitro**  
*J. Burré et al.*

A protein implicated in neurodegeneration promotes the assembly of membrane fusion complexes.  
10.1126/science.1195227

**Kepler-9: A System of Multiple Planets Transiting a Sun-Like Star, Confirmed by Timing Variations**  
*M. J. Holman et al.*

Two Saturn-sized planets show variations in the times they take to transit their star due to gravitational interaction.  
10.1126/science.1195778

>> *Science Podcast*

**Deep-Sea Oil Plume Enriches Indigenous Oil-Degrading Bacteria**

*T. C. Hazen et al.*  
Cold-loving bacteria biodegrade hydrocarbons in the oil plume faster than expected.  
10.1126/science.1195979

## TECHNICALCOMMENTS

**Comment on "A Southern Tyrant Reptile"**  
*M. C. Herne et al.*  
Full text at [www.sciencemag.org/cgi/content/ful/329/5995/1013-c](http://www.sciencemag.org/cgi/content/ful/329/5995/1013-c)

**Response to Comment on "A Southern Tyrant Reptile"**  
*R. B. J. Benson et al.*

Full text at [www.sciencemag.org/cgi/content/ful/329/5995/1013-d](http://www.sciencemag.org/cgi/content/ful/329/5995/1013-d)

## SCIENCENOW

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Highlights From Our Daily News Coverage

**Hair Follicles Track the Body's Clock**  
Researchers follow sleep-wake cycles by plucking hairs from scalps and beards.

**Tapping Tesla to Save Trapped Miners**  
Century-old technology uses magnetic waves to communicate through rock.

**You Are Now Free to Move About the Insect**  
Researchers discover how flies settle on a comfortable cruising altitude.

## SCIENCE SIGNALING

[www.sciencesignaling.org](http://www.sciencesignaling.org)

The Signal Transduction Knowledge Environment

**RESEARCH ARTICLE: Self-Induced Patched Receptor Down-Regulation Modulates Cell Sensitivity to the Hedgehog Morphogen Gradient**  
*A. Casali*

A self-regulating receptor allows cells to maintain the appropriate balance of ligand-bound and unbound receptors.

**RESEARCH ARTICLE: Akt-RSK-S6-Kinase Signaling Networks Activated by Oncogenic Receptor Tyrosine Kinases**  
*A. Moritz et al.*

**PODCAST**  
*M. J. Comb and A. M. VanHook*  
A phosphoproteomic analysis of signaling pathways downstream of oncogenic receptor tyrosine kinases identifies potential therapeutic targets.

**RESEARCH ARTICLE: A Direct and Functional Interaction Between  $G_o$  and Rab5 During G Protein-Coupled Receptor Signaling**  
*V. Purvanov et al.*

Regulation of a small GTPase by a heterotrimeric G protein determines the outcome of signaling from the receptor Frizzled.

**PERSPECTIVE: Bridging the Synaptic Cleft—Lessons from Orphan Glutamate Receptors**  
*S. M. Schmid and M. Hollmann*

Three proteins act as a transsynaptic bridge at a major type of cerebellar synapse.

## SCIENCE CAREERS

[www.sciencereers.org/career\\_magazine](http://www.sciencereers.org/career_magazine)  
Free Career Resources for Scientists

**Making Team Science Work: Advice From a Team**  
*K. Hede*  
A long-term commitment and an ego-free workplace allow the Yale Melanoma Research Group to excel.

**Experimental Error: All That Glitters Is All We Remember**  
*A. Ruben*

Why are we most fascinated by the irrelevant aspects of science?

## SCIENCE TRANSLATIONAL MEDICINE

[www.sciencetranslationalmedicine.org](http://www.sciencetranslationalmedicine.org)  
Integrating Medicine and Science

**EDITORIAL: Advancing Science, Promoting Peace**  
*P. C. Agre and V. Turekian*  
Despite political differences, scientific diplomacy can help to bridge disparate cultures.

**PERSPECTIVE: Recommendations for Biomarker Identification and Qualification in Clinical Proteomics**  
*H. Mischak et al.*

Recommendations about structuring proteomic biomarker studies should increase the probability that such markers will be clinically useful.



SCIENCE SIGNALING  
Bridging the synaptic cleft.

**RESEARCH ARTICLE: A Biosynthetic Alternative to Human Donor Tissue for Inducing Corneal Regeneration: 24-Month Follow-Up of a Phase 1 Clinical Study**  
*P. Fagerholm et al.*

A biosynthetic cornea is stably integrated with host tissues for 2 years after implantation and produces nerve regeneration and vision improvement.

**RESEARCH ARTICLE: Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS): A Multiorgan Antiviral T Cell Response**  
*D. Picard et al.*

A dangerous drug reaction may be caused by a severe immune response to reactivated resident herpes viruses.

## SCIENCE PODCAST

[www.sciencemag.org/multimedia/podcast](http://www.sciencemag.org/multimedia/podcast)  
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Download the 27 August *Science* Podcast to hear about modeling the epigenetics of aging and behavior, multiple planets discovered around a Sun-like star, using satellite images for archaeological research, and more.

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