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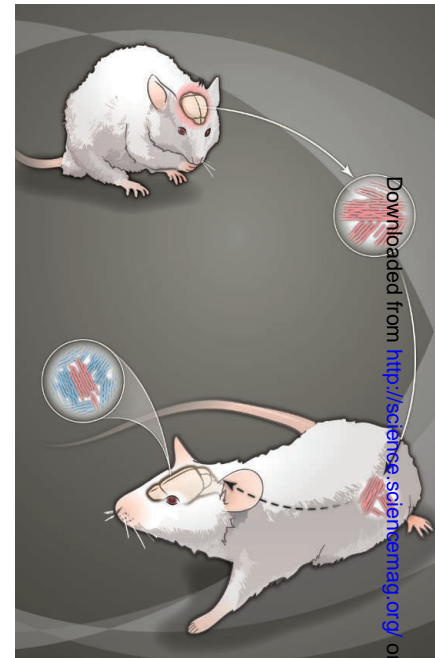
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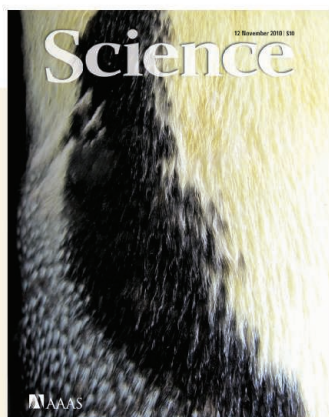


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## COVER

Neck region of an emperor penguin (*Aptenodytes forsteri*), the skin of which was collected in 1929 on Richard E. Byrd's first Antarctic expedition. The ~36-million-year-old feathers of a giant fossil penguin from Peru indicate that feather shape evolved early in the penguin lineage, but that adult penguin coloration has shifted from a color palette that included reddish-browns and grays. See page 954.

*Photo: Julia Clarke, University of Texas at Austin*

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*M. A. Killingsworth and D. T. Gilbert*  
 The iPhone Hap App reveals that wandering thoughts lead to unhappiness.  
 >> *Science Podcast*

## RESEARCH ARTICLES

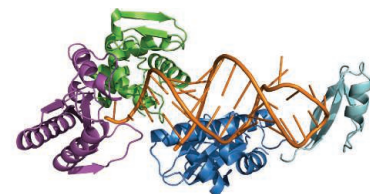
- 933 **Cytochrome P450 Compound I: Capture, Characterization, and C-H Bond Activation Kinetics**  
*J. Rittle and M. T. Green*  
 The iron-bound oxygen intermediate responsible for many challenging biochemical oxidations has been thoroughly characterized.  
 >> *Perspective p. 924*
- 937 **How the CCA-Adding Enzyme Selects Adenine over Cytosine at Position 76 of tRNA**  
*B. Pan et al.*  
 Crystal structures along the reaction pathway show that only adenine is correctly oriented for incorporation at transfer RNA position 76.

## REPORTS

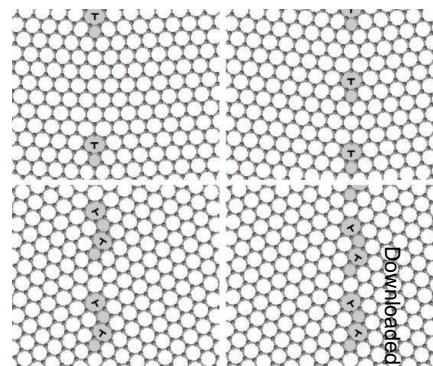
- 940 **Radio-Frequency Association of Efimov Trimers**  
*T. Lompe et al.*  
 A bound state of three fermionic atoms in different quantum states is formed directly by laser association.
- 944 **A Low-Magnetic-Field Soft Gamma Repeater**  
*N. Rea et al.*  
 A neutron star lacking a strong magnetic field can still emit short bursts of high-energy radiation.
- 946 **Anomalous Strength Characteristics of Tilt Grain Boundaries in Graphene**  
*R. Grantab et al.*  
 Simulations indicate that high-angle boundaries can better accommodate strain and prevent failure in graphene.
- 949 **Structure and Formation of the Lunar Farside Highlands**  
*I. Garrick-Bethell et al.*  
 A mathematical analysis of the lunar farside highlands implicates the role of tidal processes in building the lunar crust.
- 952 **Coupling of Nitrous Oxide and Methane by Global Atmospheric Chemistry**  
*M. J. Prather and J. Hsu*  
 Nitrous oxide emissions affect atmospheric methane concentrations on a time scale that is 10 times longer than the methane lifetime.
- 954 **Fossil Evidence for Evolution of the Shape and Color of Penguin Feathers**  
*J. A. Clarke et al.*  
 A fossil penguin shows that the wing and feather form evolved before distinctive microstructural changes in the feathers.

- 957 **Effects of Rapid Global Warming at the Paleocene-Eocene Boundary on Neotropical Vegetation**  
*C. Jaramillo et al.*  
 Palynology shows that tropical forests persisted under conditions of rapid climate warming 55 million years ago.
- 961 **Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management**  
*D. Rustagi et al.*  
 Social behaviors in lab experiments that result in long-term productivity are seen in a real-world forest management program.  
 >> *Perspective p. 923*
- 965 **The Role of Discharge Variation in Scaling of Drainage Area and Food Chain Length in Rivers**  
*J. L. Sabo et al.*  
 The lengths of river food chains are indirectly related to drainage area and directly affected by flow and discharge.
- 968 **Conserved Molecular Components for Pollen Tube Reception and Fungal Invasion**  
*S. A. Kessler et al.*  
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- 971 **Optogenetic Control of Cardiac Function**  
*A. B. Arrenberg et al.*  
 Optogenetics is applied to study development of the zebrafish pacemaker.
- 974 **Kinetic Scaffolding Mediated by a Phospholipase C- $\beta$  and G $_q$  Signaling Complex**  
*G. L. Waldo et al.*  
 A crystal structure shows how the two components of a central signaling complex regulate each other.
- 980 **Peripherally Applied A $\beta$ -Containing Inoculates Induce Cerebral  $\beta$ -Amyloidosis**  
*Y. S. Eisele et al.*  
 Amyloid-containing brain extracts can "infect" susceptible Alzheimer's disease model animals.  
 >> *Perspective p. 918*
- 982 **Contact Network Structure Explains the Changing Epidemiology of Pertussis**  
*P. Rohani et al.*  
 Age-specific social networks can influence transmission of infection and should be considered in health policy planning.
- 985 **Essential Regulation of CNS Angiogenesis by the Orphan G Protein-Coupled Receptor GPR124**  
*F. Kuhnert et al.*  
 A factor is identified that determines the amount of vasculature in the brain, and, in so doing, affects brain function.

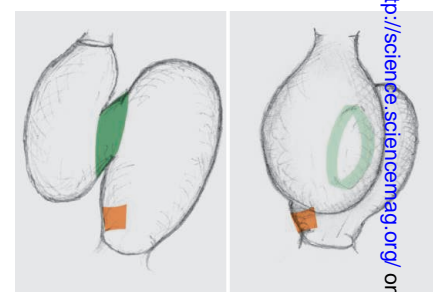
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## SCIENCEONLINE

**SPECIAL ANNOUNCEMENT: ELECTIONS**  
Additional Candidates for AAAS Annual Election

The following candidates have been added to the ballot for the 2010 election of AAAS officers. Members registered in more than one section will receive ballots for elections for each section they are enrolled in. For a list of other candidates, please see AAAS News & Notes in the 29 October 2010 issue of *Science*.

AAAS will be offering the opportunity to vote either by mail or via a Web balloting system for this year's election. Detailed instructions for using the online option will be provided to all members.

**General Election**

*Committee on Nominations:* Rosina M. Bierbaum, Univ. of Michigan; Francisco J. Ayala, Univ. of California, Irvine; John E. Burris, Burroughs Wellcome Fund; May R. Berenbaum, Univ. of Illinois, Urbana-Champaign; Thomas D. Pollard, Yale Univ.; Jo Handelsman, Yale Univ.; Roger N. Beachy, U.S. Department of Agriculture; Sandra M. Faber, Univ. of California, Santa Cruz

**Atmospheric and Hydrospheric Sciences**

*Council Delegate:* Lynne D. Talley, Scripps Institution of Oceanography

**Societal Impacts of Science and Engineering**

*Council Delegate:* C. K. Gunsalus, Univ. of Illinois, Urbana-Champaign

**SCIENCEEXPRESS**

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

**How Learning to Read Changes the Cortical Networks for Vision and Language**

S. Dehaene et al.

Reading changes the mind.

10.1126/science.1194140

>> *Science Podcast*

**Lynx1, a Cholinergic Brake, Limits Plasticity in Adult Visual Cortex**

H. Morishita et al.

A gene identified in the mouse may show the way to improved treatments for amblyopia, a condition of indistinct vision.

10.1126/science.1195320

**How Cats Lap: Water Uptake by *Felis catus***

P. M. Reis et al.

Cats use fluid inertia to generate a liquid column that they catch in their mouths before gravity destroys it.

10.1126/science.1195421

**Optomechanically Induced Transparency**

S. Weis et al.

Radiation pressure is used to manipulate the optical properties of an optomechanical system.

10.1126/science.1195596

**A Cryptic Sulfur Cycle in Oxygen-Minimum-Zone Waters off the Chilean Coast**

D. E. Canfield et al.

Bacterial sulfur reduction and oxidation accompanies nitrogen cycling where oxygen levels at depth are low.

10.1126/science.1196889

**SCIENCENOW**

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

Highlights From Our Daily News Coverage

**New Malaria Drug Could Save Tens of Thousands**

Artesunate bests quinine at saving African children from the disease.

**Rethinking Galactic Architecture:****Dark Matter Optional**

Clusters of thousands of stars may have formed in an unexpected way.

**Time for Your Skin Transfusion?**

Study suggests new route for making blood cells from skin.

**SCIENCE SIGNALING**

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

The Signal Transduction Knowledge Environment

**EDITORIAL GUIDE: Focus Issue—****Getting Excited About Glia**

E. M. Adler

Complementing the 5 November *Science* special issue, this issue highlights glial cell function, development, and disease.

**RESEARCH ARTICLE: Akt and Autophagy Cooperate to Promote Survival of Drug-Resistant Glioma**

Q.-W. Fan et al.

Combined inhibition of PI3K, mTOR, and autophagy promotes glioma cell death.

**PERSPECTIVE: Control of Breathing by "Nerve Glue"**

K. Ballanyi et al.

Astrocytes sense the need to breathe.

**PRESENTATION: Wnt5a Induces Simultaneous Cortical Axon Outgrowth and Repulsive Turning Through Distinct Signaling Mechanisms**

L. Li et al.

Chemorepulsion and growth stimulation may cooperate to guide cortical axons.

**JOURNAL CLUB: Grooming and Growing with Microglia**

J. M. Antony

Microglia modulate neurobehavior.

**TEACHING RESOURCE: Visualizing Calcium Signaling in Astrocytes**

R. D. Fields

Astrocyte signaling is apparent in movies of rat brain astrocytes cultured with fluorescent calcium indicator dyes.

**SCIENCE CAREERS**

[www.sciencereers.org/career\\_magazine](http://www.sciencereers.org/career_magazine)

Free Career Resources for Scientists

**SPECIAL FOCUS ON RESEARCH INTEGRITY Working With Industry Under a Microscope**

K. Hede

Regulations seem to discourage academic scientists from partnering with industry, but such collaboration is essential to translational research.

**Ghostwriters in the Medical Literature**

S. Gaidos

Despite new disclosure requirements, ghostwriters remain a threat to the integrity of the scientific literature, as well as careers.

**SCIENCE TRANSLATIONAL MEDICINE**

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

Integrating Medicine and Science

**COMMENTARY: Achieving a Nationwide Learning Health System**

C. P. Friedman et al.

The secure re-use of patient data will speed knowledge transfer from bench to bedside.

**RESEARCH ARTICLE: TLR9 Differentiates Rapidly from Slowly Progressing Forms of Idiopathic Pulmonary Fibrosis**

G. Trujillo et al.

Increased expression of Toll-like receptor 9 boosts fibrosis in patients with rapidly progressing lung disease.

**RESEARCH ARTICLE: Prevention of Muscle Aging by Myofiber-Associated Satellite Cell Transplantation**

J. K. Hall et al.

Transplanting myofiber satellite stem cells into mouse muscle protects against age-related muscle degeneration.

**SCIENCE PODCAST**

[www.sciencemag.org/multimedia/podcast](http://www.sciencemag.org/multimedia/podcast)

Free Weekly Show

Download the 12 November *Science* Podcast to hear about literacy's effects on brain function, U.S. election results, happiness by living in the moment, and more.

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[news.sciencemag.org/scienceinsider](http://news.sciencemag.org/scienceinsider)

Science Policy News and Analysis

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