

**EDITORIAL**

- 895 Measuring Student Development  
*David J. Asai*

**NEWS OF THE WEEK**

- 900 A roundup of the week's top stories

**NEWS & ANALYSIS**

- 904 Chinese Academy Takes Space Under Its Wing
- 905 Pioneering Center Ponders Future as NSF Pulls Out
- 907 Spain's 'Lonely Fighter' Steps Down Amid a Highly Public Spat

**NEWS FOCUS**

- 908 TOHOKU-OKI EARTHQUAKE  
Fukushima Revives the Low-Dose Debate  
Schoolyard Radiation Policy Brings a Backlash  
Crippled Reactors to Get Cooled and Wrapped
- 911 New Work Reinforces Megaquake's Harsh Lessons in Geoscience  
>> *Science Express* articles by *M. Simons et al.*, *S. Ide et al.*, and *M. Sato et al.*
- 912 Seismic Crystal Ball Proving Mostly Cloudy Around the World
- 914 The Alchemical Revolution  
>> *Science Podcast*

**LETTERS**

- 916 Unexamined Bodies of Evidence  
*M. J. Schoeninger et al.*

Primary Prevention of Cancer

*J. Huff*

Rights for Sentient Animals

*H. Würbel*

- 917 TECHNICAL COMMENT ABSTRACTS

**BOOKS ET AL.**

- 918 Cave of Forgotten Dreams  
*W. Herzog, Director*

**EDUCATION FORUM**

- 919 Inquiry-Based Writing in the Laboratory Course  
*C. Moskovitz and D. Kellogg*  
>> *Science Podcast*

**PERSPECTIVES**

- 921 High-Power Fiber Lasers  
*J. Nilsson and D. N. Payne*
- 922 Shedding Light on Oxide Interfaces  
*G. Hammerl and N. Spaldin*  
>> *Report p. 937*
- 923 The TASC of Secretion  
*R. Zoncu and D. M. Sabatini*  
>> *Report p. 966*
- 925 Subtropical Rainfall and the Antarctic Ozone Hole  
*S. B. Feldstein*  
>> *Report p. 951*
- 926 Evolving Large and Complex Brains  
*R. G. Northcutt*  
>> *Report p. 955*
- 928 Retrospective: Lewis R. Binford (1931–2011)  
*R. L. Kelly*

**BREVIA**

- 929 A Diiron Protein Autogenerates a Valine-Phenylalanine Cross-Link  
*R. B. Cooley et al.*  
An enzyme creates its own cofactor by linking two nonfunctionalized amino acid side chains.

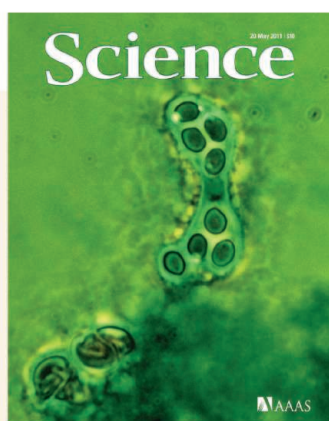
**CONTENTS** continued >>



page 908



page 918

**COVER**

Phase contrast photomicrograph of a *Schizosaccharomyces octosporus* ascus, a sac-like cell that typically contains eight spores (each ~2 micrometers across). *S. octosporus* and other fission yeasts are important models of eukaryote biology and have evolved a single-celled lifestyle independently from their budding yeast cousins. On page 930, Rhind *et al.* present a comparative genomic analysis of fission yeasts that sheds light on their genome structure and gene regulation.

Image: *Dr. George Wilder/Visuals Unlimited, Inc.*

**DEPARTMENTS**

- 891 This Week in *Science*
- 896 Editors' Choice
- 898 *Science* Staff
- 985 New Products
- 986 *Science* Careers

## RESEARCH ARTICLE

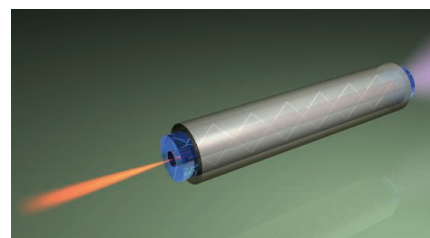
- 930 **Comparative Functional Genomics of the Fission Yeasts**  
N. Rhind et al.  
A combined analysis of genome sequence, structure, and expression gives insights into fission yeast biology.

## REPORTS

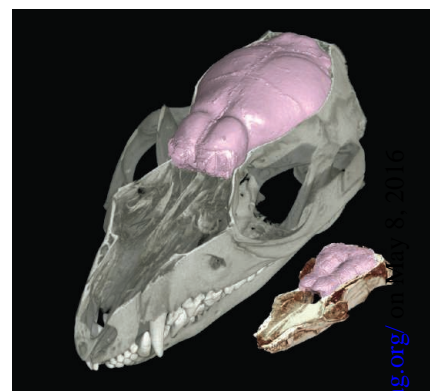
- 937 **Dimensionality Control of Electronic Phase Transitions in Nickel-Oxide Superlattices**  
A. V. Boris et al.  
The structure of metal-oxide superlattices is used to control the electronic order of the system.  
>> *Perspective p. 922*
- 940 **Competition of Superconducting Phenomena and Kondo Screening at the Nanoscale**  
K. J. Franke et al.  
A manganese complex adsorbed on a superconducting lead surface creates a mosaic of two magnetic ground states.
- 944 **Chlorinated Indium Tin Oxide Electrodes with High Work Function for Organic Device Compatibility**  
M. G. Helander et al.  
Closer matching of the energy levels of transparent electrodes and active materials in organic light-emitting diodes improves efficiency.
- 947 **Probing Asthenospheric Density, Temperature, and Elastic Moduli Below the Western United States**  
T. Ito and M. Simons  
Monitoring the response to ocean tidal loads reveals detailed variations in Earth's internal structure.
- 951 **Impact of Polar Ozone Depletion on Subtropical Precipitation**  
S. M. Kang et al.  
The Antarctic ozone hole has led to increased summertime precipitation in the subtropics of the Southern Hemisphere.  
>> *Perspective p. 925*
- 955 **Fossil Evidence on Origin of the Mammalian Brain**  
T. B. Rowe et al.  
Evidence from two early fossils suggests that brain enlargement and specialization proceeded in three pulses.  
>> *Perspective p. 926*

- 958 **Industrial Melanism in British Peppered Moths Has a Singular and Recent Mutational Origin**  
A. E. van't Hof et al.  
The locus responsible for the dark form of the peppered moth is identified.
- 960 **The Selaginella Genome Identifies Genetic Changes Associated with the Evolution of Vascular Plants**  
J. A. Banks et al.  
The genome sequence of a lycophyte hints at ancient evolutionary transitions.
- 963 **Chromatin "Prepattern" and Histone Modifiers in a Fate Choice for Liver and Pancreas**  
C.-R. Xu et al.  
Screening histone modifications reveals distinctive patterns of chromatin marks for liver and pancreas development.
- 966 **Spatial Coupling of mTOR and Autophagy Augments Secretory Phenotypes**  
M. Narita et al.  
A cellular compartment allows simultaneous protein synthesis and degradation.  
>> *Perspective p. 923*
- 970 **Diet Drives Convergence in Gut Microbiome Functions Across Mammalian Phylogeny and Within Humans**  
B. D. Muegge et al.  
The normal range of physiological and metabolic phenotypes has been shaped by coevolution with microbial symbionts.  
>> *Science Podcast*
- 974 **The Toll-Like Receptor 2 Pathway Establishes Colonization by a Commensal of the Human Microbiota**  
J. L. Round et al.  
Signaling through innate immune receptors promotes commensal bacteria colonization of the gut.
- 977 **A Packing Mechanism for Nucleosome Organization Reconstituted Across a Eukaryotic Genome**  
Z. Zhang et al.  
Genome-wide nucleosome positioning is a self-organizing system amenable to in vitro reconstitution.
- 981 **Structures of the Bacterial Ribosome in Classical and Hybrid States of tRNA Binding**  
J. A. Dunkle et al.  
Two crystal structures indicate how conformational changes in the ribosome assist protein synthesis.

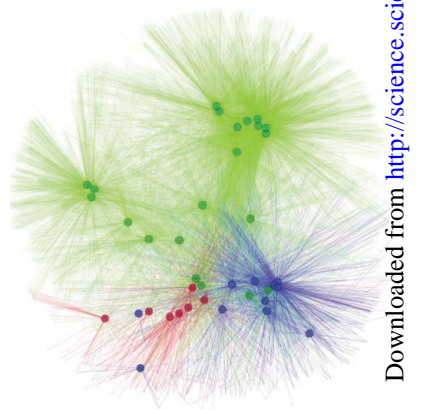
CONTENTS continued &gt;&gt;



page 921



pages 926 &amp; 955



page 970

## SCIENCEONLINE

## SCIENCEEXPRESS

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

## The Visual Impact of Gossip

*E. Anderson et al.*

Negative gossip about a person renders that person's face more visible to the onlooker.

10.1126/science.1201574

## Predicting a Human Gut Microbiota's Response to Diet in Gnotobiotic Mice

*J. J. Faith et al.*

Model microbial communities in mouse guts respond quickly and predictably to dietary shifts.

10.1126/science.1206025

## Widespread RNA and DNA Sequence Differences in the Human Transcriptome

*M. Li et al.*

All 12 categories of discordances can be observed where the RNA sequence does not match that of the DNA.

10.1126/science.1207018

## Thermal Structure and Dynamics of Saturn's Northern Springtime Disturbance

*L. N. Fletcher et al.*

Satellite and ground-based observations characterize a massive storm on Saturn and its effects on the atmosphere.

10.1126/science.1204774

## Endotoxin-Induced Structural Transformations in Liquid Crystalline Droplets

*I.-H. Lin et al.*

Bacterial lipid A was detected by its interactions with defects in droplet-confined liquid crystals.

10.1126/science.1195639

## The 2011 Magnitude 9.0 Tohoku-Oki Earthquake: Mosaicking the Megathrust from Seconds to Centuries

*M. Simons et al.*

10.1126/science.1206731

Shallow Dynamic Overshoot and Energetic Deep Rupture in the 2011  $M_w$  9.0 Tohoku-Oki Earthquake

*S. Ide et al.*

10.1126/science.1207020

## Displacement Above the Hypocenter of the 2011 Tohoku-Oki Earthquake

*M. Sato et al.*

Detailed geophysical measurements reveal features of the 2011 Tohoku-Oki megathrust earthquake.

10.1126/science.1207401

>> *News story p. 911*

## TECHNICALCOMMENTS

## Comment on "Positive Selection of Tyrosine Loss in Metazoan Evolution"

*Z. Su et al.*

Full text at [www.sciencemag.org/cgi/content/full/332/6032/917-a](http://www.sciencemag.org/cgi/content/full/332/6032/917-a)

## Response to Comment on "Positive Selection of Tyrosine Loss in Metazoan Evolution"

*C. S. H. Tan et al.*

Full text at [www.sciencemag.org/cgi/content/full/332/6032/917-b](http://www.sciencemag.org/cgi/content/full/332/6032/917-b)

## SCIENCENOW

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

Highlights From Our Daily News Coverage

## Bright Lights, Rich Cities

Satellite images of nighttime lights could help economists model GDP in regions where it is poorly reported.

<http://scim.ag/bright-lights>

## Controversial Computer Is at Least a Little Quantum Mechanical

Skepticism of the system remains, however.

<http://scim.ag/quantum-computer>

## Mice Reject Reprogrammed Cells

Finding underscores challenges of using iPS cells as a potential therapy for humans.

<http://scim.ag/ips-rejection>

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

17 May issue: <http://scim.ag/ss051711>

RESEARCH ARTICLE: Ca<sup>2+</sup> Signaling Tools

Acquired from Prostatomes Are Required for Progesterone-Induced Sperm Motility

*K.-H. Park et al.*

## PERSPECTIVE: Calcium Signaling in Sperm—Help from Prostatomes

*D. Ren*

Proteins involved in calcium signaling are delivered to sperm through fusion with prostate-derived vesicles.

## RESEARCH ARTICLE: Stomatal Closure by Fast Abscisic Acid Signaling Is Mediated by the Guard Cell Anion Channel SLAH3 and the Receptor RCAR1

*D. Geiger et al.*

Plant survival during periods of drought may involve SLAH3, a nitrate-conducting anion channel activated by abscisic acid.

## PRESENTATION: Network-Based Tools for the Identification of Novel Drug Targets

*I. J. Farkas et al.*

Analysis of network topology and dynamics holds promise for identifying new sets of potential drug targets.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

## Focus on Aging: Engineering Safer Drivers

*L. Chiu*

MIT engineer Bryan Reimer designs systems to monitor and improve drivers' performance behind the wheel.

<http://scim.ag/aging-engineering>

## Tooling Up: I've Got a Great Idea

*D. Jensen*

Two recent entrepreneurs offer advice on starting a new company.

[http://scim.ag/startup\\_success](http://scim.ag/startup_success)

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

18 May issue: <http://scim.ag/stm051811>

## EDITORIAL: NCATS Purrs—Emerging Signs of Form and Function

*G. A. FitzGerald*

Derisking and repurposing therapeutics will be among the aims of the National Center for Advancing Translational Science.

## RESEARCH ARTICLE: Functional Regulatory T Cells Produced by Inhibiting Cyclic Nucleotide Phosphodiesterase Type 3 Prevent

Allograft Rejection

*G. Feng et al.*

RESEARCH ARTICLE: Massive ex Vivo Expansion of Human Natural Regulatory T Cells (T<sub>regs</sub>) with Minimal Loss of in Vivo Functional Activity

*K. L. Hippen et al.*

## RESEARCH ARTICLE: Human Regulatory T Cells with Alloantigen Specificity Are More Potent Inhibitors of Alloimmune Skin Graft Damage than Polyclonal Regulatory T Cells

*P. Sagoo et al.*

## PERSPECTIVE: Regulatory T Cells—Customizing for the Clinic

*X. Wang et al.*

A collection of new data provides a platform for clinical use of regulatory T cells as personalized therapeutic agents.

## SCIENCEPODCAST

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

Free Weekly Show

On the 20 May *Science* Podcast: diet and mammalian gut microbiomes, the science of alchemists, inquiry-based writing, and more.

## SCIENCEINSIDER

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

Science Policy News and Analysis

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Editor's Summary

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