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## COVER

Pulsars in our Galaxy newly discovered by the Fermi Gamma-ray Space Telescope, launched in June 2008. The objects emit broad gamma-ray beams that have enabled Fermi to locate a never-before-seen population. Fermi has also seen pulsars with millisecond periods and has detected at least one globular cluster (center left). See the Research Article and two Reports beginning on page 840.

*Image: NASA/U.S. Department of Energy/Fermi LAT Collaboration/Sonoma State University/Aurore Simonnet*

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A host-parasite system indicates how ecological and evolutionary mechanisms shape the distribution of microbes in soil.

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- 834** Lysine Acetylation Targets Protein Complexes and Co-Regulates Major Cellular Functions  
*C. Choudhary et al.*  
A proteomic-scale analysis of protein acetylation suggests that it is an important biological regulatory mechanism.
- 840** Detection of 16 Gamma-Ray Pulsars Through Blind Frequency Searches Using the Fermi LAT  
*A. A. Abdo et al.*  
Most of these identifications correspond to gamma-ray sources long suspected to be pulsars.  
>>Perspective p. 821; Reports pp. 845 & 848

## REPORTS

- 845** Detection of High-Energy Gamma-Ray Emission from the Globular Cluster 47 Tucanae with Fermi  
*A. A. Abdo et al.*  
The Fermi Large Area Telescope reveals up to 60 millisecond pulsars in this globular cluster, twice as many as predicted by radio observations.  
>>Perspective p. 821; Research Article p. 840; Report p. 848
- 848** A Population of Gamma-Ray Millisecond Pulsars Seen with the Fermi Large Area Telescope  
*A. A. Abdo et al.*  
These objects appear to share a common emission mechanism with standard gamma-ray pulsars.  
>>Perspective p. 821; Research Article p. 840; Report p. 845
- 852** Impact of Anode Microstructure on Solid Oxide Fuel Cells  
*T. Suzuki et al.*  
A porous form of the oxide anode of a fuel cell with a zirconia-based electrolyte reduces its operating temperature.
- 855** Docking in Metal-Organic Frameworks  
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Guest molecules bind site-specifically in macrocycles incorporated into the ligands of a metal organic framework solid.

- 859** Fire As an Engineering Tool of Early Modern Humans  
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>>Perspective p. 820; Science Podcast
- 862** Mesotocin and Nonapeptide Receptors Promote Estrildid Flocking Behavior  
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- 866** The Transcriptional Repressor DEC2 Regulates Sleep Length in Mammals  
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>>Perspective p. 825
- 870** Protein Friction Limits Diffusive and Directed Movements of Kinesin Motors on Microtubules  
*V. Bormuth et al.*  
Rupture of bonds between a molecular machine and its track creates friction, which constrains speed and efficiency.  
>>Perspective p. 826
- 874** Mechanistic Analysis of a Dynamin Effector  
*L. L. Lackner et al.*  
During mitochondrial division, a pair of proteins interacts to promote membrane scission.
- 877** ER Stress Controls Iron Metabolism Through Induction of Hecpudin  
*C. Vecchi et al.*  
Stress signals in the endoplasmic reticulum activate a transcription factor that induces expression of an iron-regulatory hormone.
- 880** Capuchin Monkeys Display Affiliation Toward Humans Who Imitate Them  
*A. Paukner et al.*  
The chameleon effect also operates in monkeys.  
>>Perspective p. 824; Science Podcast
- 883** Mindblind Eyes: An Absence of Spontaneous Theory of Mind in Asperger Syndrome  
*A. Senju et al.*  
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

### High-Detectivity Polymer Photodetectors with Spectral Response from 300 nm to 1450 nm

*X. Gong et al.*

Well-designed polymer photodetectors show performance comparable with the best inorganic devices.

10.1126/science.1176706

### An Acidic Matrix Protein, Pif, Is a Key Macromolecule for Nacre Formation

*M. Suzuki et al.*

A matrix protein is identified that regulates nacre formation in the Japanese pearl oyster.

10.1126/science.1173793

### The Molecular Basis of Nacre Formation

*N. Kröger*

A protein complex guides the intricate process of nacre formation in mollusk shells.

10.1126/science.1177055

### Formation of ArF from LPdAr(F): Catalytic Conversion of Aryl Triflates to Aryl Fluorides

*D. A. Watson et al.*

A catalyst enables versatile carbon-fluorine bond formation using simple fluoride salts.

10.1126/science.1178239

### Evidence for Obliquity Forcing of Glacial Termination II

*R. N. Drysdale et al.*

Marine records suggest that the early onset of the penultimate deglaciation was due to changes in Earth's obliquity.

10.1126/science.1170371

## SCIENCENOW

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

Highlights From Our Daily News Coverage

### Horses Get By With a Little Help From Their Friends

Mares that form close friendships have more and healthier offspring.

### Bird Flu Virus a Possible Trigger for Parkinson's

Loss of dopamine neurons is tied to H5N1 influenza virus infection in mice.

### Whale Stranding: Sonar or Lunar?

Researchers investigate mysterious incident off Hawaii 5 years ago.

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

### RESEARCH ARTICLE: Neuronal and Intestinal Protein Kinase D Isoforms Mediate Na<sup>+</sup> (Salt Taste)-Induced Learning

*Y. Fu et al.*

Protein kinase D signaling in the intestine and nervous system enables worms to learn to avoid salt.

### RESEARCH ARTICLE: Cooperativity Between T Cell Receptor Complexes Revealed by Conformational Mutants of CD3ε

*N. Martínez-Martín et al.*

A mutant CD3ε subunit that cannot change conformation in response to ligand binding exerts dominant-negative inhibition of T cell responses.

### PERSPECTIVE: Actin and Microtubule-Based Cytoskeletal Cues Direct Polarized Targeting of Proteins in Neurons

*D. B. Arnold*

Delivery of proteins to axons or dendrites depends on interactions between molecular motors and the cytoskeleton.

### PERSPECTIVE: New Complexity in Differentiating Stem Cells Toward Hepatic and Pancreatic Fates

*S. S. Huppert and M. A. Magnuson*

Programming of the liver and pancreas is controlled by a dynamic, temporally coordinated signaling network.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

### In Person: The Pursuit of Happiness

*H. Akil*

The joy of playing with her granddaughter tickles the neurons of a noted neuroscientist.

### Visa Delays Put Science Careers at Risk

*L. Chiu*

"Administrative review" is leaving some foreign scientists stranded overseas.

### Perspective: Top 10 Tips to Maximize Your Mentoring

*J. Lakoski*

Cultivating and nurturing mentoring relationships is an essential career skill.

## SCIENCEPODCAST

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

Free Weekly Show

Download the 14 August *Science* Podcast to hear about how imitation affects affiliation, early humans' use of fire as an engineering tool, improving energy efficiency, and more.



## SCIENCE NOW

Two Kaimanawa mares hang out.



## SCIENCE SIGNALING

Neuronal PKD in *C. elegans*.

## ORIGINSBLOG

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A History of Beginnings

## SCIENCEINSIDER

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Science Policy News and Analysis

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