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## COVER

The Phoenix spacecraft on the martian polar plains (68°N latitude). The footpad at the bottom is about 1 meter below the spacecraft deck seen at the lower left. Overlaid images are trenches dug to either nearly pure water ice or ice-cemented soil. Analyses of samples taken from these trenches give clues to the history of the region. Results from the Phoenix mission are discussed in four Reports beginning on page 58.

Image: NASA/JPL-Caltech/University of Arizona/Texas A&M/  
M. T. Lemmon

## DEPARTMENTS

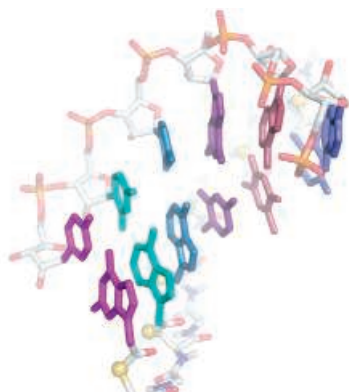
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A water ice layer was found 5 to 15 centimeters beneath the soil of the north polar region of Mars.  
>> *Science Podcast*
- 61 Evidence for Calcium Carbonate at the Mars Phoenix Landing Site  
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- 64 Detection of Perchlorate and the Soluble Chemistry of Martian Soil at the Phoenix Lander Site  
*M. H. Hecht et al.*  
Most of the chlorine at the Phoenix landing site is in the form of perchlorate, a salt that is highly soluble in water.
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- 70 A Coherent Single-Hole Spin in a Semiconductor  
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- 87 Role of Layer 6 of V2 Visual Cortex in Object-Recognition Memory  
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>> *Perspective p. 40*
- 90 Jmjd6 Catalyses Lysyl-Hydroxylation of U2AF65, a Protein Associated with RNA Splicing  
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An oxygenase with an important role in vertebrate development hydroxylates a messenger RNA splicing factor.
- 93 Essential Role of the Glycosyltransferase Sxc/Ogt in Polycomb Repression  
*M. C. Gambetta et al.*  
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An expanded family of receptor channels that bind neurotransmitters in worms might help to explain behavioral effects in humans.
- 100 LXR Regulates Cholesterol Uptake Through Idol-Dependent Ubiquitination of the LDL Receptor  
*N. Zelcer et al.*  
Cholesterol metabolism is regulated by a signaling pathway that targets the LDL receptor for degradation.

## SCIENCEONLINE

## SCIENCEEXPRESS

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

### Transmission and Pathogenesis of Swine-Origin 2009 A(H1N1) Influenza Viruses in Ferrets and Mice

T. R. Maines et al.  
10.1126/science.1177238

### Pathogenesis and Transmission of Swine-Origin 2009 A(H1N1) Influenza Virus in Ferrets

V. J. Munster et al.  
Animal experiments compare the dynamics and effects of the virus causing the 2009 flu outbreak to those of seasonal H1N1 flu.  
10.1126/science.1177127  
>> *News story p. 17*

### The Dynamics of Phenotypic Change and the Shrinking Sheep of St. Kilda

A. Ozgul et al.  
Environmental change has led to decreasing body size in a sheep population over 20 years, despite selection for increased size.  
10.1126/science.1173668

### Radio Imaging of the Very-High-Energy $\gamma$ -Ray Emission Region in the Central Engine of a Radio Galaxy

The VERITAS Collaboration et al.  
Particles are accelerated to very high energies in close proximity to a super-massive black hole.  
10.1126/science.1175406

### 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.  
10.1126/science.1175558

### 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.  
10.1126/science.1176113

## SCIENCENOW

[www.sciencenow.org](http://www.sciencenow.org)  
Highlights From Our Daily News Coverage

### Brain Recordings Take Flight

A new lightweight device measures brain activity in homing pigeons in midflight.

### Evolution Heats Up in the Tropics

Warmer climates accelerate evolution rate in mammals, a new study says.

### Ancient Flutes Suggest Rich Life in Stone-Age Europe

New discoveries indicate that cave-dwellers played music 35,000 years ago.

## SCIENCE SIGNALING

[www.sciencesignaling.org](http://www.sciencesignaling.org)  
The Signal Transduction Knowledge Environment

## EDITORIAL GUIDE: Challenging Times

M. B. Yaffe  
The deluge of NIH "challenge grants" promises to strain the reviewer pool.

### RESEARCH ARTICLE: Therapeutically Targeting ErbB3—A Key Node in Ligand-Induced Activation of the ErbB Receptor-PI3K Axis

B. Schoeberl et al.  
Computational modeling of the ErbB signaling network affirms ErbB3 as a therapeutic target.

### RESEARCH ARTICLE: PKC $\epsilon$ Regulation of an $\alpha_5$ Integrin-ZO-1 Complex Controls Lamellae Formation in Migrating Cancer Cells

S. Tuomi et al.  
Phosphorylated ZO-1 relocates from tight junctions to lamellae to associate with  $\alpha_5$  integrin and control migration.

## PERSPECTIVE: AIMing 2 Detect Foreign DNA

A. M. Krieg  
AIM2 is a receptor for cytoplasmic double-stranded DNA and induces the formation of an IL-1 $\beta$ -secreting inflammasome.

## PODCAST

U. B. Nielsen and A. M. VanHook  
Mathematical modeling of signaling pathways can be used to identify candidate targets for cancer therapies.

## GLOSSARY

Find out what ERM, FMN, and LH mean in the world of cell signaling.

## SCIENCE CAREERS

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

### Taken for Granted: An Alternative to the Ph.D. Track

B. L. Benderly  
Employment prospects for professional science master's degree program graduates seem strong.

### Fun with Fungi: Mycology Careers

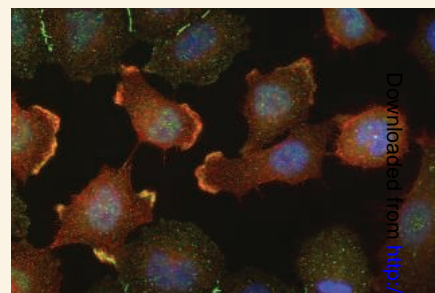
S. Coelho  
Mycologists can find career opportunities in areas from academic research to applied agriculture.

## Funding News

GrantsNet Staff  
The Funding News, now published weekly, provides the latest index of research funding and student support.



SCIENCENOW  
Homing phone.



SCIENCE SIGNALING  
Adhesion proteins in lamellae.

## SCIENCEPODCAST

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

Download the 3 July *Science* Podcast to hear about evidence of water at the Mars Phoenix landing site, how Serengeti birds maintain forests, the origins of nervous systems, and more.

## ORIGINSBLOG

[blogs.sciencemag.org/origins](http://blogs.sciencemag.org/origins)  
A History of Beginnings

## SCIENCEINSIDER

[blogs.sciencemag.org/scienceinsider](http://blogs.sciencemag.org/scienceinsider)  
Science Policy News and Analysis

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