The surface of the Sun shows rapidly changing patterns due to convection, as well as global oscillations of very low amplitude. The CoRoT (Convection Rotation and Planetary Transits) satellite, launched in December 2006, has now measured both phenomena in other stars. See page 558.

Image: Thomas Berger; ISP/Royal Swedish Academy of Sciences
EVOLUTION
Variation in Evolutionary Patterns Across the Geographic Range of a Fossil Bivalve
M. Grey, J. W. Haggart, P. L. Smith
Within a fossil bivalve genus, evolution tended to occur as a random walk at the highest latitudes and to be in stasis mode in deep marine environments.
10.1126/science.1162046

CELL BIOLOGY
De Novo Formation of a Subnuclear Body
T. E. Kaiser, R. V. Intine, M. Dundr
The Cajal body, a nuclear structure for small ribonucleoprotein metabolism, can self-assemble from any one of its components immobilized on a substrate.
10.1126/science.1165216

PLANEY SCIENCE
Lack of Exposed Ice Inside Lunar South Pole Shackleton Crater
J. Haruyama et al.
A view into the permanently shaded Shackleton crater from the SELENE (KAGUYA) spacecraft now orbiting the Moon shows that it lacks large visible water-ice deposits.
10.1126/science.1164020

BREVIA
EVOLUTION
Genetic Compatibility Affects Queen and Worker Caste Determination
T. Schwander and L. Keller
Although environmental signals regulate whether female ants become sterile workers or queens, genetic interactions between their parental genomes also influence the phenotype.

RESEARCH ARTICLE
BIOCHEMISTRY
The Structure of a Transcribing T7 RNA Polymerase in Transition from Initiation to Elongation
K. J. Durniak, S. Bailey, T. A. Steitz
In order to accommodate the elongating RNA transcript, a viral RNA polymerase rotates on its DNA binding promoter to expand the active site.

REPORTS
ASTROPHYSICS
CoRoT Measures Solar-Like Oscillations and Granulation in Stars Hotter Than the Sun
E. Michel et al.
Satellite measurements of pulsations in three stars similar to but hotter than the Sun show that they are oscillating more vigorously and have a finer-scale granulation.
>> Perspective p. 536; Science Podcast

ASTROPHYSICS
A Large Excess in Apparent Solar Oblateness Due to Surface Magnetism
M. D. Fivian, H. S. Hudson, R. P. Lin, H. J. Zahid
Satellite measurements indicate that the Sun is more oblate than previous measurements suggested, a shape resulting from the combined effects of rotation and magnetism.
>> Perspective p. 535

PHYSICS
Complete Characterization of Quantum-Optical Processes
M. Lobino et al.
A method requiring only the light from a laser as an input yields a full characterization of quantum optical processes by probing its effect on classical states.

MATERIALS SCIENCE
Detection of First-Order Liquid/Liquid Phase Transitions in Yttrium Oxide–Aluminum Oxide Melts
G. N. Greaves et al.
Entropy changes induce a levitated oxide melt to undergo an unusual transition between two disordered liquid states in which atomic rearrangements reflect additional unmixing.

CHEMISTRY
Direct Imaging of Reconstructed Atoms on TiO$_2$ (110) Surfaces
N. Shibata et al.
Profile views of titania, a widely used material, with a transmission electron microscope show that interstitial sites with a lower oxygen stoichiometry produce its reduced surface.
CHEMISTRY
The Extent of Non–Born-Oppenheimer Coupling in the Reaction of Cl(2P) with para-H2
X. Wang et al.
The study of controlled collisions between chlorine atoms and molecular hydrogen clarifies that excited electronic states play only a minor role in the formation of hydrochloric acid.

BIOCHEMISTRY
MidBody Targeting of the ESCRT Machinery by a Noncanonical Coiled Coil in CEP55
H. H. Lee et al.
As daughter cells separate, final cleavage of the membranes requires a protein with a coiled coil built around an unusual charged core, which recruits other constituents.

ECOLOGY
Functional Traits and Niche-Based Tree Community Assembly in an Amazonian Forest
N. J. B. Kraft, R. Valencia, D. D. Ackerly
Even in a diverse Amazonian forest, trees show particular leaf characteristics that indicate that they are subtly specialized for habitat and growth strategy.

CELL BIOLOGY
White Fat Progenitor Cells Reside in the Adipose Vasculature
W. Tang et al.
Adipocytes (fat cells) originate from precursor cells that reside within the walls of the blood vessels that feed fat tissue.

MEDICINE
H2S as a Physiologic Vasorelaxant: Hypertension in Mice with Deletion of Cystathionine γ-Lyase
G. Yang et al.
Hydrogen sulfide gas regulates blood pressure and blood vessel function in mice.

CELL BIOLOGY
TMEM16A, A Membrane Protein Associated with Calcium-Dependent Chloride Channel Activity
A. Caputo et al.
A transmembrane protein induced in cytokine-treated bronchial epithelial cells seems to be a long-sought primary carrier of a voltage- and calcium-dependent chloride current.

PLANT SCIENCE
Receptor-Like Kinase ACR4 Restricts Formative Cell Divisions in the Arabidopsis Root
I. De Smet et al.
A membrane kinase regulates the number of stem cells in the main tip of the root, as well as the de novo generation of stem cells in new laterally projecting roots.

MOLECULAR BIOLOGY
Functional Targeting of DNA Damage to a Nuclear Pore–Associated SUMO-Dependent Ubiquitin Ligase
S. Nagai et al.
The damaged regions of DNA are recruited to the periphery of the nucleus by a complex of nuclear-pore and ubiquitin-modifying proteins, where they are repaired.

MOLECULAR BIOLOGY
Splicing Factors Facilitate RNAi-Directed Silencing in Fission Yeast
E. H. Bayne et al.
In fission yeast, RNA splicing factors unexpectedly participate in the silencing of centromeric DNA by RNA interference derived from centromeres.

PSYCHOLOGY
Experiencing Physical Warmth Promotes Interpersonal Warmth
L. E. Williams and J. A. Bargh
When people are given a warm rather than a cold drink, they are more likely to show generous behavior toward others.

>> Perspective p. 542

>> Science Podcast
Hallucinogenic Hand-Me-Downs
Ancient Caribbean families appeared to share drug paraphernalia across generations.

Monster Tag Team
Gigantic black holes threw their weight around in the early universe.

The Grunter Gets the Worm
Scientists think they have figured out why low-pitched sounds drive earthworms above.

Signaling networks as digital circuits.

THE SIGNAL TRANSDUCTION KNOWLEDGE ENVIRONMENT

EDITORIAL GUIDE: From Input to Output—Are All Paths Equal?
N. R. Gough
The consequences of various input signals must first be understood to gain a systems-level explanation of signaling networks.

PERSPECTIVE: Systems- and Molecular-Level Elucidation of Signaling Processes Through Chemistry
K. P. Chiang and T. W. Muir
New techniques take advantage of chemistry to investigate signal transduction mechanisms in the cell.

PERSPECTIVE: A Scaffold Makes the Switch
H. G. Dohlman
The location of a scaffolding protein determines whether activation of MAPK signaling in yeast will produce a graded or binary response.

PERSPECTIVE: Probing Pathways Periodically
T. C. Elston
Monitoring the response to periodic input signals reveals dynamic properties of a MAPK pathway.

RESEARCH ARTICLE: Fault Diagnosis Engineering of Digital Circuits Can Identify Vulnerable Molecules in Complex Cellular Pathways
A. Abdi, M. B. Tahoori, E. S. Emamian
An engineering approach reveals the weakest links in cellular signaling networks.