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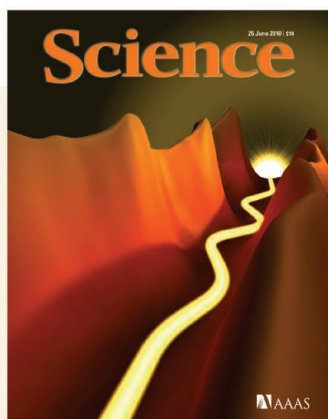


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## COVER

Three-dimensional representation of the emission of electrons from a neon atom upon absorption of a photon from an attosecond extreme ultraviolet pulse. The orange surface plot represents the resulting electron energy distribution, which, when probed by an ultrashort light wave (yellow line), reveals an unexpected time delay between the emission of electrons from different atomic orbitals. See page 1658.

*Image: Christian Hackenberger/Ludwig-Maximilians-Universität, Munich, Germany*

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- 1657** Plants Integrate Information About Nutrients and Neighbors  
*J. F. Cahill Jr. et al.*  
Plant root growth is modified in the presence of within-species competition and uneven local resource distributions.

## RESEARCH ARTICLES

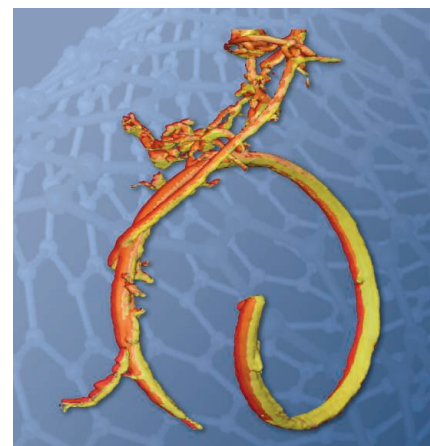
- 1658** Delay in Photoemission  
*M. Schultze et al.*  
Ultrafast metrology reveals a 20-attosecond delay between photoemission from different electronic orbitals in neon atoms.  
>> *Perspective p. 1645*
- 1662** Reconstituting Organ-Level Lung Functions on a Chip  
*D. Huh et al.*  
Endothelial and epithelial cells grown in a microfluidics apparatus mimic the alveolar-capillary interface of the lung.

## REPORTS

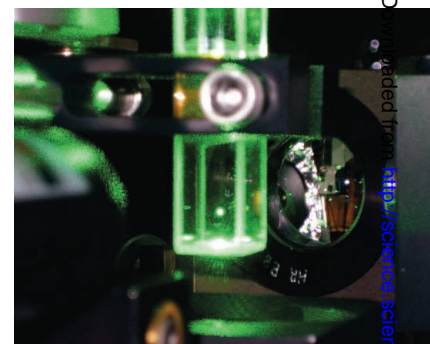
- 1668** 4D Electron Tomography  
*O.-H. Kwon and A. H. Zewail*  
Nanotube vibrations are visualized in three dimensions by varying the incident angle of an ultrashort electron probe burst.
- 1673** Measurement of the Instantaneous Velocity of a Brownian Particle  
*T. Li et al.*  
An optically trapped silica bead in solution is used to probe assumptions underlying statistical theories of Brownian motion.
- 1676** Glass Transition Dynamics and Surface Layer Mobility in Unentangled Polystyrene Films  
*Z. Yang et al.*  
Thin films of short, unentangled polystyrene chains possess a highly mobile surface layer.
- 1679** The Palladium-Catalyzed Trifluoromethylation of Aryl Chlorides  
*E. J. Cho et al.*  
Careful catalyst tuning enables addition of trifluoromethyl groups to many intermediates in pharmaceutical and agrochemical synthesis.
- 1682** Detection of Hydrated Silicates in Crustal Outcrops in the Northern Plains of Mars  
*J. Carter et al.*  
The extent of the alteration of the crust of Mars by liquid water is greater than previously estimated.
- 1686** Hydrogen Isotopes Preclude Marine Hydrate CH<sub>4</sub> Emissions at the Onset of Dansgaard-Oeschger Events  
*M. Bock et al.*  
Catastrophic destabilization of marine methane clathrates did not trigger rapid warming episodes 39,000 and 35,000 years ago.

- 1689** ATP-Binding Cassette Transporters and HDL Suppress Hematopoietic Stem Cell Proliferation  
*L. Yan-Charvet et al.*  
Pathways that reduce cholesterol in atherosclerosis also suppress increased immune cell numbers associated with the disease.  
>> *Perspective p. 1641*
- 1694** A Novel miRNA Processing Pathway Independent of Dicer Requires Argonaute2 Catalytic Activity  
*D. Cifuentes et al.*  
The unusual secondary structure of a precursor microRNA determines its noncanonical processing.
- 1698** Control of Membrane Protein Topology by a Single C-Terminal Residue  
*S. Seppälä et al.*  
The orientation of a multispinning inner membrane protein can be engineered by a single positively charged residue.  
>> *Perspective p. 1644*
- 1700** A Generalization of Hamilton's Rule for the Evolution of Microbial Cooperation  
*j. smith et al.*  
A rule for the evolution of cooperation in microbes shows how bacteria resist cheaters.
- 1703** c-di-AMP Secreted by Intracellular *Listeria monocytogenes* Activates a Host Type I Interferon Response  
*J. J. Woodward et al.*  
Within the host cell, a small secondary signaling molecule from a pathogen triggers a pathway of innate immunity.
- 1705** Reversible Microbial Colonization of Germ-Free Mice Reveals the Dynamics of IgA Immune Responses  
*S. Hapfelmeier et al.*  
Immunoglobulin responses against nonpathogenic bacteria in the gut are specific for the resident microbial flora.  
>> *Perspective p. 1646*
- 1709** Transition to Addiction Is Associated with a Persistent Impairment in Synaptic Plasticity  
*F. Kasanetz et al.*  
Loss of glutamate receptor-dependent synaptic plasticity in the brain is associated with the transition to cocaine addiction.
- 1712** Incidental Haptic Sensations Influence Social Judgments and Decisions  
*J. M. Ackerman et al.*  
A seat-of-the-pants impression (tactile sensation influencing decisions) is a reality and not just a metaphor.

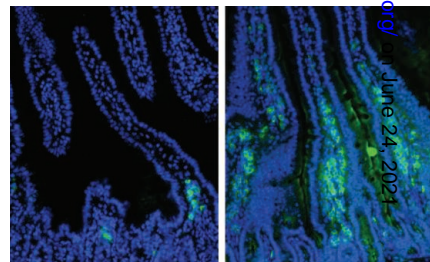
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

## Tissue-Engineered Lungs for in Vivo Implantation

*T. H. Petersen et al.*

Decellularized rat lungs rebuilt with new cells in vitro can function at a rudimentary level when implanted back into a rat.

10.1126/science.1189345

>> [Science Podcast](#)

## Genetic Reactivation of Cone Photoreceptors

## Restores Visual Responses in Retinitis Pigmentosa

*V. Buschkamp et al.*

A bacterial ion pump rescues visual function in damaged cone-photoreceptor cells in mouse models of retinitis pigmentosa.

10.1126/science.1190897

The Structure of *ccb<sub>3</sub>* Cytochrome Oxidase

## Provides Insights into Proton Pumping

*S. Buschmann et al.*

The third class of heme-copper oxidases reveals new structural solutions to achieve redox-driven proton translocation.

10.1126/science.1187303

## Asymmetric Density Dependence Shapes Species

## Abundances in a Tropical Tree Community

*L. S. Comita et al.*

Seedling survival in a tropical forest shows that species abundance is related to a species' sensitivity to conspecific neighbors.

10.1126/science.1190772

## Switched Magnetospheric Regulation

## of Pulsar Spin-Down

*A. Lyne et al.*

Irregularities in pulsar rotation rates can be explained by quasi-periodic, abrupt changes in the pulsar magnetosphere.

10.1126/science.1186683

## Simulated Rapid Warming of Abyssal

## North Pacific Waters

*S. Masuda et al.*

Computer simulations suggest a possible reason for the warming of North Pacific bottom water during the past four decades.

10.1126/science.1188703

## TECHNICALCOMMENTS

## Comment on "30,000-Year-Old Wild Flax Fibers"

*C. Bergffjord et al.*

Full text at [www.sciencemag.org/cgi/content/full/328/5986/1634-b](http://www.sciencemag.org/cgi/content/full/328/5986/1634-b)

## Response to Comment on "30,000-Year-Old Wild Flax Fibers"

*E. Kivvadze et al.*

Full text at [www.sciencemag.org/cgi/content/full/328/5986/1634-c](http://www.sciencemag.org/cgi/content/full/328/5986/1634-c)

## SCIENCENOW

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

## Highlights From Our Daily News Coverage

## Genes for Height Hiding in Plain Sight

Team argues that genes have been invisible because of their tiny effects.

## Romanian Cave May Boast Central Europe's Oldest Cave Art

Bison, bear, and other drawings extend early artists' reach to Central Europe up to 35,000 years ago.

## Chimpanzees Kill for Land

Like humans, chimp males kill their neighbors to grab territory.

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

## EVOLUTION OF SIGNALING SYSTEMS

## EDITORIAL GUIDE: (R)evolution of Complex Regulatory Systems

*R. Linding*

Understanding the implications of the changes in signaling systems requires analysis in both cellular and evolutionary time scales.

## PERSPECTIVE: Wnt Signaling in Axial Patterning and Regeneration—Lessons from Planaria

*E. M. De Robertis*

Positional information generated by Wnt signaling determines whether heads or tails will form in wounded flatworms.

## PERSPECTIVE: Infrared Snake Eyes—TRPA1 and the Thermal Sensitivity of the Snake Pit Organ

*V. C. Panzano et al.*

Many vertebrates and invertebrates rely on the ion channel TRPA1 to detect both warmth and chemicals.

## RESEARCH ARTICLE : Nodal Signaling Recruits the Histone Demethylase Jmjd3 to Counteract Polycomb-Mediated Repression at Target Genes

*Ø. Dahle et al.*

Developmental signaling integrates with epigenetic processes to control the expression of Nodal target genes.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

## SCIENTISTS WORKING WITH VOLUNTEERS

## Trusting the Public

*S. Gaidos*

Scientists are figuring out how to tap the experiences and observations of nonscientists.

## Collaborating With Citizen Scientists

*L. Laursen*

Scientists who rely on volunteers for data collection need to learn about management and marketing.

## Science Careers Blog

*Science Careers Staff*

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## SCIENCE TRANSLATIONAL MEDICINE

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

## Integrating Medicine and Science

## COMMENTARY: Patient-Centered Outcomes Research Institute—The Intersection of Science and Health Care

*C. Clancy and F. S. Collins*

Robust scientific evidence can assist the nation in making informed decisions about health care.

## COMMENTARY: Multidimensional Results Reporting to Participants in Genomic Studies—Getting It Right

*I. S. Kohane and P. L. Taylor*

Understanding participants better can help guide the reporting of individual research results.

RESEARCH ARTICLE: Nuclear Role of WASp in the Pathogenesis of Dysregulated T<sub>H</sub>1 Immunity in Human Wiskott-Aldrich Syndrome

*M. D. Taylor et al.*

## PERSPECTIVE: Alternative Control—What's WASp Doing in the Nucleus?

*M. A. Teitell*

Aberrant histone modification is implicated in the pathogenesis of a rare genetic disorder.

## RESEARCH ARTICLE: Safety and Antithrombotic Efficacy of Moderate Platelet Count Reduction by Thrombopoietin Inhibition in Primates

*E. I. Tucker et al.*

Inhibition of platelet production minimizes clot formation without increasing bleeding in baboons.

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