



COVER

A cotton bollworm larva (*Helicoverpa armigera*) feeds on a cotton boll. Transgenic Bt cotton was designed to resist this and other caterpillar pests. See page 1676.

Image: Nigel Cattlin/Visuals Unlimited Inc.

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- 1605 Science
by Norman R. Augustine

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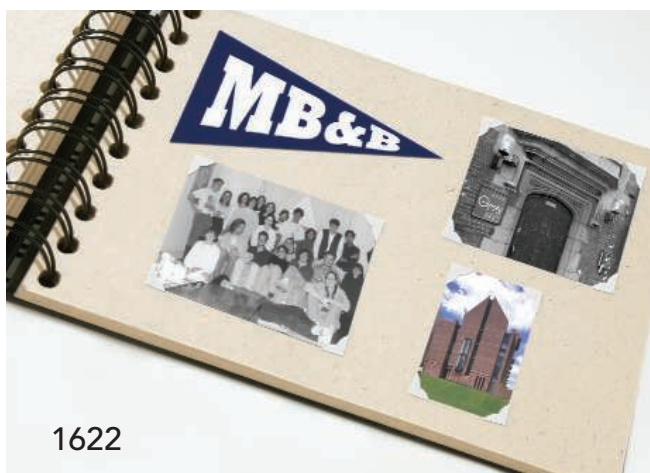
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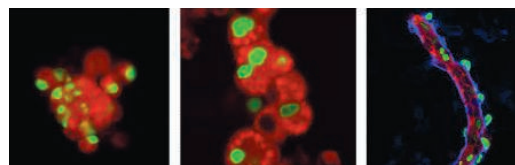
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D. P. Curran



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Downloaded from <http://science.scripps.edu/> on May 26, 2019



SCIENCE EXPRESS

www.scienceexpress.org

PHYSICS

A High Phase-Space-Density Gas of Polar Molecules

K.-K. Ni et al.

Raman laser irradiation can cool a cloud of KRb molecules to ultralow translational, vibrational, and rotational temperatures, a step toward forming molecular condensates.

10.1126/science.1163861

IMMUNOLOGY

Innate Immunity in *Caenorhabditis elegans* Is Regulated by Neurons Expressing NPR-1/GPCR

K. L. Styer et al.

In the nematode *Caenorhabditis elegans*, sensory neurons surprisingly can inhibit innate immune responses, in part through the mitogen-activated protein kinase signaling pathway.

10.1126/science.1163673

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.

10.1126/science.1156232

CHEMISTRY

Catalytic Conversion of Biomass to Monofunctional Hydrocarbons and Targeted Liquid-Fuel Classes

E. L. Kunkes et al.

A set of two reactors, one that breaks down biomass sugars and a second that directs chain formation, can synthesize various hydrocarbon fuels.

10.1126/science.1159210

TECHNICAL COMMENT ABSTRACTS

GEOLOGY

Comment on "Age and Evolution of the Grand Canyon Revealed by U-Pb Dating of Water Table-Type Speleothems"

1634

J. Pederson et al.

[full text at www.sciencemag.org/cgi/content/full/321/5896/1634b](http://www.sciencemag.org/cgi/content/full/321/5896/1634b)

Comment on "Age and Evolution of the Grand Canyon Revealed by U-Pb Dating of Water Table-Type Speleothems"

P. A. Pearthree, J. E. Spencer, J. E. Faulds, P. K. House

[full text at www.sciencemag.org/cgi/content/full/321/5896/1634c](http://www.sciencemag.org/cgi/content/full/321/5896/1634c)

Response to Comment on "Age and Evolution of the Grand Canyon Revealed by U-Pb Dating of Water Table-Type Speleothems"

V. Polyak, C. Hill, Y. Asmerom

[full text at www.sciencemag.org/cgi/content/full/321/5896/1634d](http://www.sciencemag.org/cgi/content/full/321/5896/1634d)

BREVIA

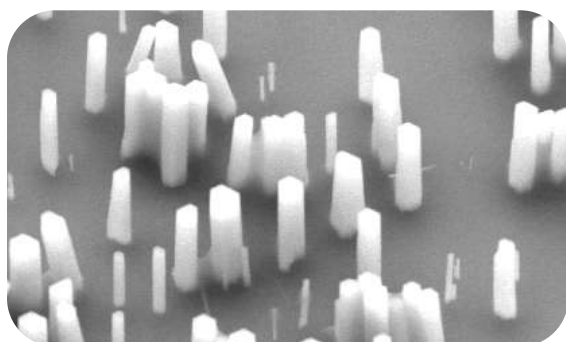
CLIMATE CHANGE

Ancient Permafrost and a Future, Warmer Arctic

1648

D. G. Froese et al.

The existence of a 700,000-year-old patch of permafrost in sub-Arctic Canada shows that ground ice far from the pole can resist melting during warm intervals.



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PHYSICS

Transient Electronic Structure and Melting of a Charge Density Wave in $TbTe_3$

1649

F. Schmitt et al.

Photoemission spectroscopy is extended to reveal the dynamics of correlated electronic phase transitions, showing how ordered electrons "melt" upon heating of $TbTe_3$.

PHYSICS

Coupled Superconducting and Magnetic Order in $CeCoIn_5$

1652

M. Kenzelmann et al.

Unlike other superconductors, magnetic ordering coexists with and is stabilized by superconductivity in the exotic superconductor $CeCoIn_5$.

CHEMISTRY

Shape Changes of Supported Rh Nanoparticles During Oxidation and Reduction Cycles

1654

P. Nolte et al.

Pyramidal rhodium nanoparticles flatten upon surface oxidation at high temperatures but revert upon reduction, allowing the study of how structure affects catalytic activity.

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Polymer Pen Lithography

1658

F. Huo et al.

An array that can support millions of thin, flexible polymer pens can be used to deposit tiny molecular ink dots of variable size over large areas.

MATERIALS SCIENCE

4D Electron Diffraction Reveals Correlated Unidirectional Behavior in Zinc Oxide Nanowires

1660

D.-S. Yang, C. Lao, A. H. Zewail

Ultrafast electron diffraction reveals that exciting the electrons of a zinc oxide nanowire causes a sudden extension, more than a hundred times longer than expected from heating.

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GEOCHEMISTRY

Chondrulelike Objects in Short-Period Comet 81P/Wild 2 1664

T. Nakamura et al.

Stardust samples from a comet, thought to be from the outer solar system, include grains like those in chondrules, primitive grains that formed in the inner solar system.

>> [Science Podcast](#)

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Political Attitudes Vary with Physiological Traits 1667

D. R. Oxley et al.

Individuals' views on political issues relate to their physiological reactions to threatening stimuli: Desire to protect their group's interests correlates with greater reactivity to threat.

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An Alternative Menaquinone Biosynthetic Pathway Operating in Microorganisms 1670

T. Hiratsuka et al.

Some pathogens synthesize the essential vitamin menaquinone by an unusual pathway, presenting a potential target for new antibiotics.

>> [Perspective p. 1644](#)

MICROBIOLOGY

An Inhibitor of FtsZ with Potent and Selective Anti-Staphylococcal Activity 1673

D. J. Haydon et al.

A small synthetic molecule directed against a microbial protein required for cell division protects mice infected with *Staphylococcus aureus* from death. >> [Perspective p. 1644](#)

ECOLOGY

Suppression of Cotton Bollworm in Multiple Crops in China in Areas with Bt Toxin-Containing Cotton 1676

K.-M. Wu, Y.-H. Lu, H.-Q. Feng, Y.-Y. Jiang, J.-Z. Zhao

Planting engineered cotton that expresses a natural toxin reduces pest damage to both the cotton itself and to other crops planted nearby, reducing the need for insecticidal spray.

ECOLOGY

Can Catch Shares Prevent Fisheries Collapse? 1678

C. Costello, S. D. Gaines, J. Lynham

Global catch statistics since 1950 suggest that fisheries will be half as likely to collapse if fisherman have a sustainability incentive through a guaranteed right of harvest. >> [News story p. 1619](#)

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Parasite Treatment Affects Maternal Investment in Sons 1681

T. E. Reed et al.

Mother seabirds that are infected by parasitic nematodes are less able to gather food and feed their fast-growing sons, shifting the sex ratio and affecting population viability.



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Apoptotic Force and Tissue Dynamics During *Drosophila* Embryogenesis 1683

Y. Toyama et al.

During development, programmed cellular death within sheets of cells can generate forces that accelerate tissue fusion; a similar process may apply to wound healing. >> [Perspective p. 1641](#)

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Clusters of Hyperactive Neurons Near Amyloid Plaques in a Mouse Model of Alzheimer's Disease 1686

M. A. Busche et al.

In a mouse model of Alzheimer's disease, neurons close to the characteristic deposits of amyloid show high activity, in contrast to the overall reduction in brain function.

NEUROSCIENCE

Reward-Predictive Cues Enhance Excitatory Synaptic Strength onto Midbrain Dopamine Neurons 1690

G. D. Stuber et al.

When a rat learns to associate a cue with a reward, dopamine-containing neurons in the midbrain acquire an enhanced response to that cue through the action of glutamate.

MOLECULAR BIOLOGY

Molecular Coupling of *Xist* Regulation and Pluripotency 1693

P. Navarro et al.

X chromosome inactivation in stem cells is reversed, a step in allowing them to become pluripotent, when three factors repress the inactivation RNA.



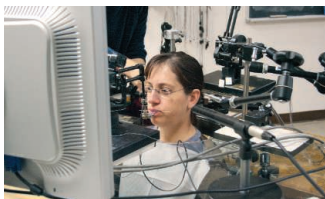
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Speaking Without Sound

Facial muscles tell us whether we are pronouncing words correctly.

No Glee for Grandma?

Brains of the young and old process rewards in different ways.

China Quake No Stress Reliever

Temblor last May could have activated adjoining fault lines.



Program officers get a panoramic view of science.

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K. Travis

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S. Carpenter

Scientific program officers take a big-picture view of science to determine research funding.

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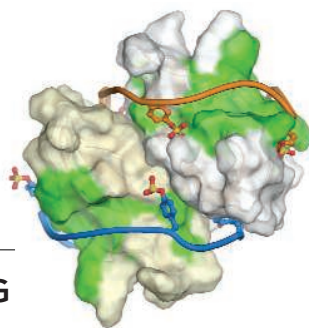
E. Pain

There is no typical way of becoming a program officer.

In Person: A European Career Tour From Research to Research Management

A. Di Trapani

A science officer at the European Science Foundation describes her journey.



SDF-1 bound to CXCR4.

SCIENCE SIGNALING

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RESEARCH ARTICLE: Structural Basis of CXCR4 Sulfotyrosine Recognition by the Chemokine SDF-1/CXCL12

C. T. Veldkamp, C. Seibert, F. C. Peterson, N. B. De la Cruz, J. C. Haugner III, H. Basnet, T. P. Sakmar, B. F. Volkman

The structure of SDF-1 bound to an extracellular domain of CXCR4 illustrates how chemokines recognize receptor sulfotyrosines and helps to identify an inhibitor of leukocyte chemotaxis.

PROTOCOL: Analysis of Signaling Events by Combining High-Throughput Screening Technology with Computer-Based Image Analysis

M. Kodiha, C. M. Brown, U. Stochaj

High-throughput screening and MetaXpress software modules can be adapted to quantify the subcellular localization of fluorescently labeled molecules.

PRESENTATION: Dynamic Visualization of Signaling Activities in Living Cells

M. D. Allen, L. M. DiPilato, B. Ananthanarayanan, R. H. Newman, Q. Ni, J. Zhang

Engineered fluorescent reporters allow researchers to follow subcellular activities of signaling components in real time in live cells.

SCIENCE PODCAST

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321 (5896)

Science **321** (5896), 1601-1699.

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