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Opening Japan Up to the World by Kiyoshi Kurokawa

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Published by AAAS
**SOCIOLOGY**

The Spreading of Disorder
*K. Keizer, S. Lindenberg, L. Steg*

Upon observing signs of social disorder (such as littering or graffiti), individuals are more likely to disobey a variety of social rules, including prohibitions against theft.

>> News story p. 1175 10.1126/science.1161405

**CELL BIOLOGY**

Dynamic Proteomics of Individual Cancer Cells in Response to a Drug
*A. A. Cohen et al.*

Cells that escape death from a chemotherapy drug express a different array of proteins from genetically identical ones that died, which may help to inform cancer therapeutics.

>> News story p. 1176 10.1126/science.1160165

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**REVIEW**

**PSYCHOLOGY**

The Psychology of Transcending the Here and Now
*N. Liberman and Y. Trope*

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**ECOLOGY**

Fossil Pollen as a Guide to Conservation in the Galápagos
*J. F. N. van Leeuwen et al.*

Fossil pollen shows that six plant species in the Galápagos, presumed to be invasive, had actually been native to the islands for thousands of years before human colonization.  >> Science Podcast

**CHEMISTRY**

Time-Resolved Dynamics in N$_2$O$_4$ Probed Using High Harmonic Generation
*W. Li et al.*

Electrons can be ejected from multiple orbitals of N$_2$O$_4$ by exploiting different stages in its excited vibrations, yielding an attosecond light probe of molecular dynamics.  >> Perspective p. 1194

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**RESEARCH ARTICLES**

**CHEMISTRY**

**BIOCHEMISTRY**

The 2.6 Angstrom Crystal Structure of a Human A$_{2A}$ Adenosine Receptor Bound to an Antagonist
*V.-P. Jaakola et al.*

The ligand binding pocket of the caffeine-binding human adenosine receptor has a different position and orientation than that of other G protein–linked receptors.

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**PHYSICS**

Ab Initio Determination of Light Hadron Masses
*S. Dürr et al.*

A quantum electrodynamics model that includes a full representation of quarks and their electromagnetic interactions accurately determines the masses of neutrons and protons.

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**ASTRONOMY**

The Fermi Gamma-Ray Space Telescope Discovers the Pulsar in the Young Galactic Supernova Remnant CTA 1
*A. A. Abdo et al.*

The Fermi Space Telescope has detected a gamma-ray pulsar associated with a young supernova remnant, implying that such stars may be unidentified gamma-ray sources.

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**PHYSICS**

Broadband Invisibility by Non-Euclidean Cloaking
*U. Leonhardt and T. Tyc*

In theory, materials with a negative refractive index deployed in a curved, non-Euclidean space can provide a route to cloaking and invisibility across a range of wavelengths.

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**CHEMISTRY**

Real-Time DNA Sequencing from Single Polymerase Molecules
*J. Eid et al.*

Arrays of narrow waveguides can record the action of a DNA polymerase stepping along a primer template, potentially providing a way to sequence DNA molecules.

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**ASTRONOMY**

Observation of Pulsed $\gamma$-Rays Above 25 GeV from the Crab Pulsar with MAGIC
*The MAGIC Collaboration*

The MAGIC telescope has detected higher-energy, pulsed gamma rays from the Crab pulsar and a threshold suggesting that they are emitted from the outer magnetosphere.

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Electron ejection from multiple N2 orbitals, controlled by the molecule’s orientation relative to a laser, produces attosecond light spectra that can reveal molecular dynamics. >> Perspective p. 1194

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Radar Sounding Evidence for Buried Glaciers in the Southern Mid-Latitudes of Mars 1235
J. W. Holt et al.

Radar data from the Mars Reconnaissance Orbiter show that a series of lobate landforms at low latitudes are composed primarily of massive ice covered by debris.

EVOLUTION

Variation in Evolutionary Patterns Across the Geomorphic Range of a Fossil Bivalve 1238
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.

EVOLUTION

Selfish Genetic Elements Promote Polyandry in a Fly 1241
T. A. R. Price et al.

Genes that confer a deleterious sex ratio in Drosophila also decrease male fertility and promote repetitive mating in females, providing a possible explanation of polyandry.

CELL BIOLOGY

Regulation of Microtubule Dynamics by Reaction Cascades Around Chromosomes 1243
C. A. Athale et al.

A reaction-diffusion model involving regulatory molecules and a microtubule-stabilizing phosphoprotein predicts the spatial distribution of microtubules during cell division.

DEVELOPMENTAL BIOLOGY

Canonical Wnt Signaling Regulates Organ-Specific Assembly and Differentiation of CNS Vasculature 1247
J. M. Stenman et al.

In mice, two specialized ligands for a key developmental signaling pathway are produced by neuroepithelial cells and direct endothelial cells to form the blood-brain barrier. >> Perspective p. 1195

MEDICINE

Regulation of Pancreatic β Cell Mass by Neuronal Signals from the Liver 1250
J. Imai et al.

In obese mice, fat tissue stimulates proliferation of insulin-producing pancreatic cells via a neural relay through the liver, contributing to symptoms of metabolic syndrome.

ECOLOGY

Control of Toxic Marine Dinoflagellate Blooms by Serial Parasitic Killers 1254
A. Chambouvet, P. Morin, D. Marie, L. Guillou

As successive populations of protists have caused summer red tides in France, each has been killed off by a distinct, persistent parasite, establishing a self-regulating ecosystem.

IMMUNOLOGY

Antimicrobial Defense and Persistent Infection in Insects 1257
E. R. Haine, Y. Moret, M. T. Siva-Jothy, J. Roff

Flies fight some infections by quickly engulfing bacteria in phagocytic cells then deploying antimicrobial peptides, a system that avoids bacterial resistance. >> Perspective p. 1199

SOCIOLOGY

Multi-University Research Teams: Shifting Impact, Geography, and Stratification in Science 1259
B. F. Jones, S. Wuchty, B. Uzzi

Over the past 30 years, scientific papers have become increasingly likely to be written by teams of authors from more than one of a small number of elite universities.

Special Feature

Scientists as Financial Analysts

Finance’s Quant(um) Mechanics 1264
Analyzing Scientific Investments 1266

>> See Science Careers section p. 1157 or go to www.sciencecareers.org; Science Podcast
Focus Issue—An Expanding World for TGF-β Signaling

N. R. Gough

With new modes of regulation and new functions for members of the pathway, TGF-β breaks the canonical barrier.

PERSPECTIVE: Holding Their Own—The Noncanonical Roles of Smad Proteins

L. L. Hoover and S. W. Kubalak

There are TGF-β–independent regulatory mechanisms and functions of Smads.

PERSPECTIVE: PCTA—A New Player in TGF-β Signaling

F. Liu

The distribution of promyelocytic leukemia protein between the nucleus and cytoplasm controls Smad activation.

FORUM: Highlights from a TGF-β Workshop

N. R. Gough

In addition to talks emphasizing the role of TGF-β in cancer, many speakers shared memories of Anita Roberts, scientist mentor, colleague, and friend.

NETWATCH: Cell Biology Promotion

Find an array of images, animations, and slides for teaching cell biology and signal transduction; in Educator Sites.

NETWATCH: Pfam

Explore the structures and functions of thousands of protein domain families; in Protein Databases.

Special Feature: Scientists as Financial Analysts

A. Kotok

Despite today’s headlines, it might be a good time to plan for a career as a financial analyst.

Science Careers Podcast: Scientists as Quants

C. Wald

Financial systems executive Lee Maclin explains why scientists often succeed as quantitative analysts.

>> See Scientists as Financial Analysts feature p. 1264