

SPECIAL SECTION

## Spatial Cell Biology

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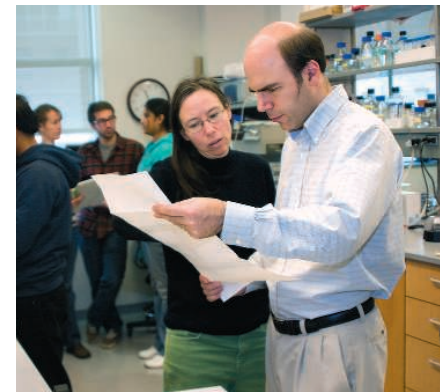
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Liver cells possess a well-defined morphology and interact in time and space with their neighbors, with the extracellular matrix, and with the bloodstream. A special section starting on page 1205 describes some of the basic tenets of spatial cell biology.

Image: Frank Geisler/Alamy (liver cells); iStockphoto.com (compass rose)

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Androgen signaling facilitates the formation of an oncogenic fusion gene in prostate cancer cells.

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- 1235 Proteome Organization in a Genome-Reduced Bacterium  
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The simplified proteome of a bacterium provides insight into the organization of proteins into molecular machines.  
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## REPORTS

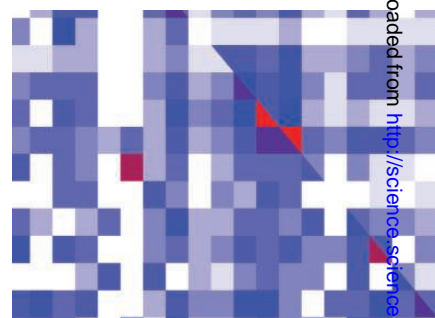
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*T. Salger et al.*  
A quantum ratchet, which operates without dissipation, is created with a Bose-Einstein condensate and optical potentials.
- 1244 Visualizing the 3D Internal Structure of Calcite Single Crystals Grown in Agarose Hydrogels  
*H. Li et al.*  
Electron tomography shows that physical interactions may be sufficient to incorporate macromolecules into a calcite crystal.  
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- 1247 Formation of Compositionally Abrupt Axial Heterojunctions in Silicon-Germanium Nanowires  
*C.-Y. Wen et al.*  
A solid alloy catalyst is used to synthesize atomically sharp interfaces in silicon-germanium nanowires.
- 1250 Selective Phenol Hydrogenation to Cyclohexanone Over a Dual Supported Pd-Lewis Acid Catalyst  
*H. Liu et al.*  
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- 1253 Climate-Driven Basin-Scale Decadal Oscillations of Oceanic Phytoplankton  
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- 1256 Global Signatures and Dynamical Origins of the Little Ice Age and Medieval Climate Anomaly  
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- 1271 Crystal Structure of the Catalytic Core of an RNA-Polymerase Ribozyme  
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The structure of a ligase ribozyme suggests how RNA might be able to replicate itself.
- 1275 A High-Resolution Structure of the Pre-microRNA Nuclear Export Machinery  
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- 1279 Crystal Structure of a Nucleocapsid-Like Nucleoprotein-RNA Complex of Respiratory Syncytial Virus  
*R. G. Tawar et al.*  
In negative-strand RNA viruses, viral RNA wraps around a nucleocapsid helix with the bases accessible to the viral polymerase.

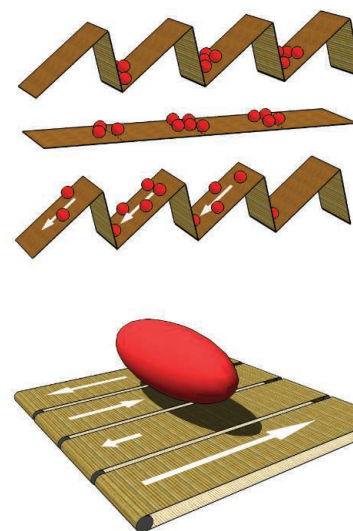
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

### Modulated High-Energy Gamma-Ray Emission from the Microquasar Cygnus X-3

*The Fermi LAT Collaboration*

Gamma-ray emission from the jet of an accreting binary star system is correlated with the jet's radio emission.

10.1126/science.1182174

### Ligand-Enabled Reactivity and Selectivity in a Synthetically Versatile Aryl C–H Olefination

*D.-H. Wang et al.*

A palladium-based catalyst eliminates the need for halogenated compounds for the formation of carbon-carbon bonds.

10.1126/science.1182512

### On the Origin of Species by Natural and Sexual Selection

*G. S. van Doorn et al.*

Modeling demonstrates how speciation occurs due to sexual selection.

10.1126/science.1181661

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### Tetrathiomolybdate Inhibits Copper Trafficking Proteins Through Metal Cluster Formation

*H. M. Alvarez et al.*

Complex formation between a copper chaperone and a metallo-drug prevents copper transfer to target enzymes.

10.1126/science.1179907

## SCIENCE NOW

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Highlights From Our Daily News Coverage

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A new model argues that a massive cash infusion could halt the spread of the disease.

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Observations show how magnetic fields guide the emergence of a massive new star.

## SCIENCE SIGNALING

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### RESEARCH ARTICLE: mTOR Regulation and Therapeutic Rejuvenation of Aging Hematopoietic Stem Cells

*C. Chen et al.*

Rapamycin reverses aging-related declines in hematopoietic stem cell function.

### RESEARCH ARTICLE: Eukaryotic Protein Domains as Functional Units of Cellular Evolution

*J. Jin et al.*

Clustering proteins into groups on the basis of their domain compositions provides insight into protein evolution.

### RESEARCH ARTICLE: Ca<sup>2+</sup> Puffs Originate from Pre-Established Stable Clusters of Inositol Triphosphate Receptors

*I. F. Smith et al.*

Localized calcium signals called Ca<sup>2+</sup> puffs arise at pre-established clusters of IP<sub>3</sub>Rs.

### PERSPECTIVE: Maintaining Diplomatic Relations Between Mammals and Beneficial Microbial Communities

*D. A. Hill and D. Artis*

The adaptive immune system compensates if innate mechanisms fail to contain microbes in the mammalian intestine.

## PODCAST

*T. Pawson and A. M. VanHook*

Bioinformatics analysis reveals how protein domain composition correlates with evolutionary change.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

### Careers in Climate Change Research: Feature Index

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Opportunities are expanding for natural scientists willing to tackle climate change.

### Climate Science Broadens to Meet New Challenges

*S. Carpenter*

New programs help prepare scientists for the interdisciplinary nature of climate change research.

### On-the-Ground Training for Climate Change Researchers

*E. Pain*

Climate change scientists need a unique blend of skills that often must be acquired informally.

## SCIENCE TRANSLATIONAL MEDICINE

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Integrating Medicine and Science

### COMMENTARY: Use of Forensic Methods Under Exigent Circumstances Without Full Validation

*S. E. Schutzler et al.*

In emergency situations, forensic methods need preliminary validation to ensure accurate interpretation.

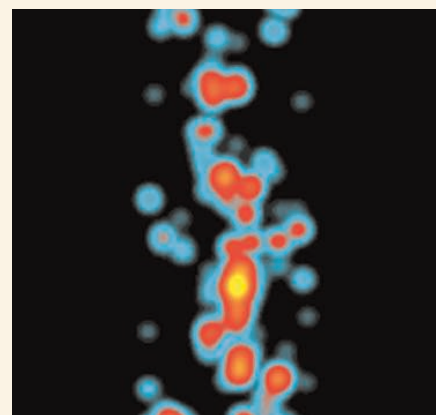
### RESEARCH ARTICLE: Efficacy of Cetuximab in the Treatment of Ménétrier's Disease

*W. H. Fiske et al.*

### PERSPECTIVE: Ménétrier's Disease Therapy: Rebooting Mucosal Signaling

*S. C. Nalle et al.*

A new study offers insight into the causes of a rare stomach disorder and describes a promising targeted therapeutic approach.



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Visualizing the molecular environments of protein dynamics.

### RESEARCH ARTICLE: In Situ Regulation of DC Subsets and T Cells Mediates Tumor Regression in Mice

*O. A. Ali et al.*

An implanted matrix elicits an immune response network that can eradicate established tumors in mice.

## SCIENCE PODCAST

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A History of Beginnings

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