COVER
The universe is filled with filamentary structures of dark and visible matter that make up the “cosmic web,” as suggested in this artist’s rendering of cosmic bubbles and connected clumps. A special section beginning on page 46 considers the latest research into the origins and evolution of the cosmic web.
*Image: Shigemi Numazawa/Atlas Photo Bank/Photo Researchers Inc.*

SPECIAL SECTION
Cosmic Web

INTRODUCTION
Warp and Woof 46

NEWS
Untangling the Celestial Strings 47

PERSPECTIVES
The Cosmic Web in Our Own Backyard 50
R. A. Ibata and G. F. Lewis
Numerical Simulations Unravel the Cosmic Web 52
C.-A. Faucher-Giguère, A. Lidz, L. Hernquist
Missing Baryons and the Warm-Hot Intergalactic Medium 55
F. Nicastro, S. Mathur, M. Elvis

NEWS OF THE WEEK
Promising Year Ends Badly After Fiscal Showdown 18
Squeezes Science
The Elusive ALS Genes 20
Saturn’s Rings Look Ancient Again 21

SCIENCESCOPE
21

NEWS FOCUS
U.S. Presidential Candidates
Science and the Next U.S. President 22
Hillary Clinton
John Edwards
Rudy Giuliani
Mike Huckabee
John McCain
Barack Obama
Bill Richardson
Mitt Romney
Fred Thompson
Three-Dimensional Super-Resolution Imaging by Stochastic Optical Reconstruction Microscopy

B. Huang, W. Wang, M. Bates, X. Zhuang

Three-dimensional fluorescence images of cellular structures in fixed cells are realized at 20- to 30-nm lateral and 50-nm axial resolution, without scanning.

10.1126/science.1153529

Direct Observation of Hierarchical Folding in Single Riboswitch Aptamers

W. J. Greenleaf et al.

Optical trapping reveals that activation by adenine stabilizes the weakest helix in a riboswitch, after which secondary and tertiary structures are formed sequentially.

10.1126/science.1151298

Mutations in the Pericentrin (PCNT) Gene Cause Primordial Dwarfism

A. Rauch et al.

In humans, an inherited condition with small brain size and near-normal intelligence is caused by mutations that disrupt chromosome separation during cell division.

10.1126/science.1151174

The Spatial Pattern and Mechanisms of Heat Content Change in the North Atlantic

M. S. Lozier et al.

Warming and cooling in different parts of the North Atlantic since 1950 reflect variable atmospheric circulation, complicating our understanding of anthropogenic changes.

10.1126/science.1146436

In Search of Peer Reviewers

W. F. Perrin

A Peer Review How-To

R. S. Zucker

Climate Change Goals: Where to Begin?

B. D. Goldstein

Response

C. Challen

Beyond Bad Nets

T. F. McCutchan

The Jewel House

Elizabethan London and the Scientific Revolution

D. E. Harkness, reviewed by N. S. Popper

Echo Objects

The Cognitive Work of Images

B. M. Stafford, reviewed by C. A. Jones

Revolutionizing China’s Environmental Protection

J. Liu and J. Diamond

Rules of Plasticity

M. Brecht and D. Schmitz

Beyond Born-Oppenheimer

J. M. Bowman

A Phase Transition Hidden in Higher Dimensions

P. Coppens

Functionally Degenerate—Y Not So?

W. R. Rice and U. Friborg

How Green Are Biofuels?

J. P. W. Scharlemann and W. F. Laurance

Retrospective: Seymour Benzer (1921–2007)

Y.-N. Jan and L. Jan

PALEOCLIMATE

Reduced North Atlantic Deep Water Coeval with the Glacial Lake Agassiz Freshwater Outburst

H. F. Kleiven et al.

Data on deep water formation in the North Atlantic indicate that the sudden draining of a huge glacial lake south of Hudson Bay led to dramatic cooling 8200 years ago.

GENETICS

The Physcomitrella Genome Reveals Evolutionary Insights into the Conquest of Land by Plants

S. A. Rensing et al.

Comparison of the moss genome sequence with those of other plants reveals hallmarks of colonization of land, including genes to manage terrestrial stresses such as dehydration.
**REPORTS**

**CHEMISTRY**
Hidden Degrees of Freedom in Aperiodic Materials
*B. Toudic* et al.
Neutron diffraction shows how a host-guest crystal can undergo a phase transition that affects only higher-dimensional parameters that relate two simple sublattices. >> Perspective p. 41

**CHEMISTRY**
Nonadiabatic Interactions in the Cl + H Reaction Probed by ClH$_2^-$ and ClD$_2^-$ Photoelectron Imaging
*E. Garand* et al.
Comparison of high-resolution spectra with theoretical simulations reveals that electronically excited ions subtly participate in an elementary reaction. >> Perspective p. 40

**GEOCHEMISTRY**
Helium and Neon Abundances and Compositions in Cometary Matter
*B. Marty* et al.
The amount and isotopic composition of helium and neon in Stardust samples imply that comet Wild 2 acquired these gases in a high-energy environment near the young Sun.

**PLANETARY SCIENCE**
Temperature and Composition of Saturn’s Polar Hot Spots and Hexagon
*L. N. Fletcher* et al.
Cassini observations show that Saturn’s atmosphere has stable, unusually hot vortices around both poles, even though its north pole is shrouded in darkness.

**PALEONTOLOGY**
The Avalon Explosion: Evolution of Ediacara Morphospace
*B. Shen, L. Dong, S. Xiao, M. Kowalewski*
Earth’s first complex life 575 million years ago rapidly encompassed the full range of ediacara morphologies before declining, a pattern like that in the later Cambrian explosion.

**GEOPHYSICS**
Intermittent Plate Tectonics?
*P. G. Silver and M. D. Behn*
Subduction may have stopped at times in Earth’s past as supercontinents formed, thus slowing the planet’s heat loss.

**EVOLUTION**
A Mosaic of Chemical Coevolution in a Large Blue Butterfly
*D. R. Nash, T. D. Als, R. Maile, G. R. Jones, J. J. Boomsma*
Because they are coated with a specific chemical, the larvae of a butterfly are adopted and cared for by an ant species, a relationship that shows signs of ongoing coevolution.

**MOLECULAR BIOLOGY**
Polymorphic Y Chromosomes Harbor Cryptic Variation with Manifest Functional Consequences
*B. Lemos, L. O. Araripe, D. L. Hartl*
Unexpectedly, the Y chromosome exerts strong regulatory effects on X-linked and autosomal genes in *Drosophila*. >> Perspective p. 42

**CELL BIOLOGY**
Formation of the centromere, the specialized region by which chromosomes are pulled apart during cell division, requires the presence of RNAi-induced heterochromatin.

**NEUROSCIENCE**
Small Circuits for Large Tasks: High-Speed Decision-Making in Archerfish
*T. Schlegel and S. Schuster*
Archerfish shoot their insect prey with a stream of water and then use sensory information and just a few neurons to calculate how to retrieve their food.
Science 319 (5859), 11-107.

http://science.sciencemag.org/content/319/5859

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