The Heavily Connected Brain

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COVER
Fiber pathways of a female human brain mapped noninvasively with diffusion magnetic resonance imaging. The image shows an axial view from above (front is at top). Major pathways of the human frontal lobes, and their organization as orthogonal grids, are shown here (cerebral association pathways, vertical; transverse pathways, horizontal). For a description of cortical networks, see the special section beginning on page 577.

Image: Van J. Wedeen, Aapo Nummenmaa, Ruopeng Wang, and Lawrence L. Wald/Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, with support of NIH Human Connectome Project and NSF
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573  Space Bats: Multidimensional Spatial Representation in the Bat
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590  On and Off Retinal Circuit Assembly by Divergent Molecular Mechanisms
L. O. Sun et al.
Work in mice reveals how motion-detection circuitry is established during visual system development.
Research Article Summary; for full text: http://dx.doi.org/10.1126/science.1241974

591  Circadian Clock NAD+ Cycle Drives Mitochondrial Oxidative Metabolism in Mice
C. B. Peek et al.
The coenzyme nicotinamide adenine dinucleotide mechanistically links the circadian clock to control of energy production by mitochondria.
Research Article Summary; for full text: http://dx.doi.org/10.1126/science.1243417

592  Structure-Based Design of a Fusion Glycoprotein Vaccine for Respiratory Syncytial Virus
J. S. McLellan et al.
Molecular engineering of a childhood virus surface protein significantly improves protective responses in mice and macaques.
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598  Evolution of the Magnetic Field Structure of the Crab Pulsar
A. Lyne et al.
Long-term measurements show the systematic evolution of the radiation pattern of one of the youngest neutron stars known.

601  Quantum Limit of Heat Flow Across a Single Electronic Channel
S. Jezouin et al.
The unit of heat carried by electrons is measured using noise thermometry and found to be consistent with predictions.
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604  Parameter Space Compression Underlies Emergent Theories and Predictive Models
B. B. Machta et al.
An information-theoretical approach is used to distinguish the important parameters in two archetypical physics models.

607  Deterministically Encoding Quantum Information Using 100-Photon Schrödinger Cat States
B. Vlastakis et al.
A scheme is demonstrated for coherently mapping the state of a single superconducting qubit onto a large number of photons.
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611  Real-Space Identification of Intermolecular Bonding with Atomic Force Microscopy
J. Zhang et al.
An atomic force microscope tip bearing a single carbon monoxide molecule was used to resolve hydrogen bonding contacts between molecules.

614  One-Dimensional Electrical Contact to a Two-Dimensional Material
L. Wang et al.
Metal contacts to graphene along its edge improve bonding and, in turn, electronic performance.

617  Pacific Ocean Heat Content During the Past 10,000 Years
Y. Rosenthal et al.
Marine records show how ocean heat content has varied in step with climate over the past 10,000 years.

621  Reconstructing the Microbial Diversity and Function of Pre-Agricultural Tallgrass Prairie Soils in the United States
N. Fierer et al.
Analysis of microbiota in prairie soil relicts offers insights into the ecological function of a near-extinct biome.
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Y. Sun et al.
The molecular basis for how a plant heterodimeric receptor responds to bacterial infection signals is elucidated.

628  Regulation of Temperature-Responsive Flowering by MADS-Box Transcription Factor Repressors
J. H. Lee et al.
A warm spring favors early flowering by invoking less transcriptional repression by a floral repressor complex.
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632  Mosaic Copy Number Variation in Human Neurons
M. J. McConnell et al.
Single-cell genomics reveals that individual adult human neurons acquire diverse individual genomes.
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637  Resident Neural Stem Cells Restrict Tissue Damage and Neuronal Loss After Spinal Cord Injury in Mice
H. Sabelström et al.
Glia scarring helps to maintain the integrity of the injured spinal cord in mice.
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