CONTENTS

EDITORIAL
1127 Growing Latin American Science
Celia R. S. Garcia et al.

NEWS OF THE WEEK
1132 A roundup of the week’s top stories

NEWS & ANALYSIS
1135 Tough Financial Times Bring ESA Down to Earth
1136 News Flash: X-ray Laser Produces First Protein Structure
>> Science Express Report by L. Redecke et al.
1137 BP Criminal Case Generates Record Payout for Science and Restoration
1138 Experts Agree Global Warming Is Melting the World Rapidly
 >> Research Article p. 1183
1139 An Oil Gusher in the Offing, but Will It Be Enough?

NEWS FOCUS
1140 Raising Up a Fallen Ivory Tower
 >> Science Podcast
1143 Salt and the Sea Serpent
1144 Crusader Crisis: How Conquest Transformed Northern Europe
1146 Amid Europe’s Food Fights, EFSA Keeps Its Eyes on the Evidence

LETTERS
1149 The K Computer: User-Friendly
K. Hirao
The Final End of the Final Frontier?
C. M. Lisse and R. L. McNutt Jr.
Animal Welfare Development in China
X. Meng et al.
1151 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.
1152 Hawking Incorporated
H. Mialet, reviewed by J. Agar

POLICY FORUM
1153 From Acid Rain to Climate Change
S. Reis et al.

PERSPECTIVES
1155 iPSC Disease Modeling
F. Soldner and R. Jaenisch
1156 Building the Human Brain
C. K. Machens
 >> Report p. 1202
1157 Integrating the Captive and the Wild
K. H. Redford et al.
1159 LEGO-like DNA Structures
K. V. Gothelf
 >> Research Article p. 1177
1160 Embers of the Distant Past
V. Bromm
 >> Report p. 1190
1161 Outsmarting Outbreaks
M. J. Walker and S. A. Beatson
1163 Retrospective: E. Donnall Thomas (1920–2012)
F. R. Appelbaum

SCIENCE PRIZE ESSAY
1164 Solving Complex Problems
K. V. Hodges

CONTENTS continued >>

COVER
Computer-generated models of three-dimensional nanostructures that were self-assembled from synthetic DNA strands called DNA bricks. A master collection defines a 1000-voxel “molecular canvas” with a 25-nanometer edge. By selecting subsets of bricks, Ke et al. constructed a panel of 102 distinct shapes with sophisticated surface features and intricate interior cavities and tunnels. These nanostructures may find applications ranging from biomedicine to nanoelectronics. See page 1177.

Image: Yonggang Ke

DEPARTMENTS
1124 This Week in Science
1128 Editors’ Choice
1130 Science Staff
1166 AAAS News & Notes
1233 New Products
1234 Science Careers
REVIEW
1172  Ice-Sheet Response to Oceanic Forcing
I. Joughin et al.

RESEARCH ARTICLES
1177  Three-Dimensional Structures Self-Assembled from DNA Bricks
Y. Ke et al.
Stepwise assembly of 32-nucleotide DNA “bricks” can create a wide variety of nanoscale objects.
>> Perspective p. 1159

1183  A Reconciled Estimate of Ice-Sheet Mass Balance
A. Shepherd et al.
The mass balance of the polar ice sheets is estimated by combining the results of existing independent techniques.
>> News story p. 1138

REPORTS
1190  The Imprint of the Extragalactic Background Light in the Gamma-Ray Spectra of Blazars
M. Ackermann et al.
Gamma-ray spectra obtained with the Fermi Space Telescope constrain star formation and galaxy evolution over cosmic time.
>> Perspective p. 1160

1193  Superconducting Dome in a Gate-Tuned Band Insulator
J. T. Ye et al.
Liquid gating tunes the carrier density in molybdenum disulfide, revealing unconventional superconductivity.

1196  Formation of Regular Satellites from Ancient Massive Rings in the Solar System
A. Crida and S. Charnoz
An analytical model suggests that the terrestrial and giant planets in the solar system formed moons through a similar process.

1199  Chemically and Geographically Distinct Solid-Phase Iron Pools in the Southern Ocean
B. P. von der Heyden et al.
The distribution and composition of fine-grained marine iron particles vary strongly with location.

1202  A Large-Scale Model of the Functioning Brain
C. Eliasmith et al.
Two-and-a-half million model neurons recognize images, learn via reinforcement, and display fluid intelligence.
>> Perspective p. 1156

1206  Copy Number Variation of Multiple Genes at Rhg1 Mediates Nematode Resistance in Soybean
D. E. Cook et al.
Resistance to a damaging disease of soybean is conferred by a cluster of linked genes present in multiple copies.

1209  An Exon Splice Enhancer Primes IGF2:IGF2R Binding Site Structure and Function Evolution
C. Williams et al.
Parental genetic conflict may have exploited changes in the coding of a protein loop in a growth factor receptor.

1214  Cytoplasmic ATP Hydrolysis Powers Transport of Lipopolysaccharide Across the Periplasm in E. coli
S. Okuda et al.
Transporting lipopolysaccharide from inside the bacterial cell to the surface requires multiple molecules of adenosine triphosphate.

1217  Direct Observation of Stalled Fork Restart via Fork Regression in the T4 Replication System
M. Manosas et al.
Bacterial DNA replication machinery is able to stall, regress, and then migrate past a DNA lesion in vitro.

1220  Progenitor and Terminal Subsets of CD8+ T Cells Cooperate to Contain Chronic Viral Infection
M. A. Paley et al.
Chronic viral infections like HIV are kept in check by two functionally distinct types of T lymphocyte.

1225  Body Cues, Not Facial Expressions, Discriminate Between Intense Positive and Negative Emotions
H. Aviezer et al.
The body reveals what the face conceals.

1229  A Mutation in EGF Repeat-8 of Notch Discriminates Between Serrate/Jagged and Delta Family Ligands
S. Yamamoto et al.
A genetic screen identifies an extracellular motif in a conserved signaling receptor that confers ligand specificity.
RESEARCH ARTICLE: Regulation of Phosphatidylinositol-5-Phosphate Signaling by Pin1 Determines Sensitivity to Oxidative Stress
W.-J. Keune et al.
Increasing the abundance of the phospholipid PtXin3P protects cells from oxidative stress.

RESEARCH ARTICLE: Lack of the Phosphatase PTPN22 Increases Adhesion of Murine Regulatory T Cells to Improve Their Immunosuppressive Function
R. J. Brownlie et al.

PODCAST
R. Zamorska and A. M. VanHook
Loss of the phosphatase PTPN22 enhances the functions of both effector and regulatory T cells.

PERSPECTIVE: Remodeling a Tissue—Subtraction Adds Insight
J. D. Axelrod
Imaging, modeling, and genetics reveal the roles of an atypical myosin in morphogenesis.

FORUM: Highlights from Understanding Signaling Pathways in Cancer
L. K. Ferrarelli and N. R. Gough
Understanding the complexities of cell signaling is critical to developing therapies against cancer.

SCIENCE SIGNALING
www.sciencesignaling.org
The Signal Transduction Knowledge Environment
27 November issue: http://scim.ag/ss112712

RESEARCH ARTICLE: Treating Diabetes and Obesity with an FGF21-Mimetic Antibody Activating the βKlotho/FGFR1c Receptor Complex
I. L. Katzan and R. A. Rudick
An antibody mimic of FGF21 exerts beneficial metabolic effects in obese monkeys.

RESEARCH ARTICLE: Detection of Chromosomal Alterations in the Circulation of Cancer Patients with Whole-Genome Sequencing
R. J. Leary et al.
Massively parallel sequencing directly detects tumor-derived chromosomal alterations in plasma DNA.

RESEARCH ARTICLE: Tadalafil Treatment for Muscular Dystrophy Patients
E. A. Martin et al.
Tadalafil abrogates muscle ischemia in patients with Becker muscular dystrophy.