EDITORIAL
9 The New Patrons of Research
Marcia McNutt

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

NEWS & ANALYSIS
16 Even for Slide-Prone Region, Landslide Was Off the Chart
17 Cassini Plumbs the Depths of the Enceladus Sea

POLICY FORUM
41 Science Funding and Short-Term Economic Activity
B. A. Weinberg et al.

NEWS FOCUS
24 Chasing the Money
The Vulnerable: Talene Yacoubian
The Veteran: Russ Hille
The Adapter: Rachel Brewster
The Administrator: Jay Walsh
The Well-Heeled: Donald Bowden
The Crowd-Funder: Heidi Moretti
Anatomy of a Grant: Michael Imperiale

PERSPECTIVES
44 Optogenetic Regeneration
S. M. Iyer and S. L. Delp

BOOKS ET AL.
39 Reading Darwin in Arabic, 1860–1950
M. Elshakry, reviewed by B. H. Küçük
40 Vikings
G. Williams et al., curators

LETTERS
34 NextGenVOICES

ON THE WEB THIS WEEK
>> Science Podcast
On this week’s show: life under rapid funding change and a news roundup with David Grimm.

>> Find More Online
Check out Science Express, the weekly podcast, videos, daily news, our research journals, and Science Careers at www.sciencemag.org.

CONTENTS continued >>

COVER
A lone scientist considers the state of biomedical funding in the United States. As researchers adapt to new constraints, they are reconsidering their strategy and their science, and trying to find a road forward. See pages 9, 24, and 41.
Illustration: Mark Smith, MarkSmithIllustration.com

DEPARTMENTS
8 This Week in Science
10 Editors’ Choice
12 Science Staff
105 New Products
106 Science Careers
RESEARCH ARTICLES

55 Total Synthesis of a Functional Designer Eukaryotic Chromosome
N. Annaluru et al.
A synthetic version of yeast chromosome III with every gene tagged can substitute for the original.

58 Structure of a Class C GPCR Metabotropic Glutamate Receptor 1 Bound to an Allosteric Modulator
H. Wu et al.
Insight into the activation mechanism of a human neuronal G protein–coupled receptor.

65 Polyhedra Self-Assembled from DNA Tripods and Characterized with 3D DNA-PAINT
R. Iinuma et al.
Stiff DNA tripod units enabled the assembly of wireframe polyhedra with edges 100 nanometers in length.

REPORTS

70 Soft Microfluidic Assemblies of Sensors, Circuits, and Radios for the Skin
S. Xu et al.
Flexible skin-integrated electronic sensors enable continuous, wireless health monitoring.

75 A Simple Complex on the Verge of Breakdown: Isolation of the Elusive Cyanofomate Ion
L. J. Murphy et al.
Characterization of a cyanide–carbon dioxide adduct bolsters its possible role in protecting a plant enzyme from cyanide inhibition.

78 The Gravity Field and Interior Structure of Enceladus
L. Iess et al.
The saturnian moon is differentiated and likely hosts a regional subsurface sea at its southern pole.

80 Geophysical and Geochemical Evidence for Deep Temperature Variations Beneath Mid-Ocean Ridges
C. A. Dalton et al.
Temperature variations in the upper mantle drive mantle convection.

84 A 12-Million-Year Temperature History of the Tropical Pacific Ocean
Y. G. Zhang et al.
A strong Pacific zonal surface ocean temperature gradient has existed for the past 12 million years.

87 Construction of a Vertebrate Embryo from Two Opposing Morphogen Gradients
P.-F. Xu et al.
Owing gradients of bone morphogenetic protein and Nodal can induce the formation of a zebrafish embryo.

90 Monolignol Ferulate Transferase Introduces Chemically Labile Linkages into the Lignin Backbone
C. G. Wilkerson et al.
Engineered poplar lignin with readily cleavable ester bonds in the polymer backbone improves wood degradability.

94 Optical Control of Muscle Function by Transplantation of Stem Cell–Derived Motor Neurons in Mice
J. B. Bryson et al.
Transplanted neurons controlled by light can drive muscle function in damaged mouse sciatic nerves.

97 Neuronal Control of Drosophila Walking Direction
S. S. Biddle et al.
Activation of descending command neurons in Drosophila induces flies to walk backward.

101 SRP RNA Remodeling by SRP68 Explains Its Role in Protein Translocation
J. T. Grotwinkel et al.
Structures of part of the signal recognition complex help explain how newly synthesized proteins are inserted into membranes.