

SPECIAL SECTION

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### REVIEWS

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*Z. Cheng et al.*

- 910 Soft Matter Models of Developing Tissues and Tumors  
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- 917 Unlike Bone, Cartilage Regeneration Remains Elusive  
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- 921 Printing and Prototyping of Tissues and Scaffolds  
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>> *Science Careers* articles; *Science Translational Medicine* Editorial, Commentary, Perspectives, and Reviews at [www.sciencemag.org/special/biomaterials](http://www.sciencemag.org/special/biomaterials)



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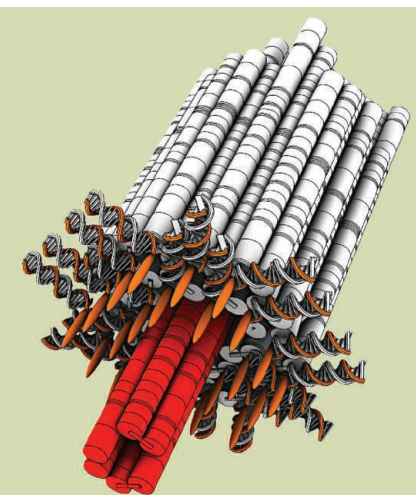
### COVER

A 36× enlarged triply periodic porous cube of photocured polymer, 60 millimeters in total length, shown reflected off a pool of uncured resin. Computer-aided design makes it possible to tailor materials with control over porosity, pore size, and mechanical properties. These materials may subsequently find use as scaffolds for tissue engineering and cell-laden hydrogel constructs. See the special section starting on page 899 for a series of articles on biomaterials.

*Fabrication: Ferry P. W. Melchels, Jan Feijen, Dirk W. Grijpma; Photograph: Nikki Hamers*

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M. D. Lima et al.  
Thermally driven actuators use a guest material within carbon nanotube yarns to generate fast torsional and tensile motions.  
>> *Perspective p. 893*

## REPORTS

- 932 Synthetic Lipid Membrane Channels Formed by Designed DNA Nanostructures  
M. Langecker et al.  
DNA-based transmembrane channels exhibit gating responses and can be used for single-molecule detection.  
>> *Perspective p. 890*
- 936 Coherent Phonon Heat Conduction in Superlattices  
M. N. Luckyanova et al.  
Coherent phonon transport is evidenced by linear increases of thermal conductivity with total superlattice thickness.
- 939 Evidence for a Dynamo in the Main Group Pallasite Parent Body  
J. A. Tarduno et al.  
Some pallasite meteorites might have formed when liquid FeNi from an impactor was injected into their parent body's mantle.  
>> *Perspective p. 897*
- 942 Evidence for Early Hafted Hunting Technology  
J. Wilkins et al.  
Damage on 500,000-year-old stone points implies their use on spears, perhaps by the ancestor of Neandertals and *Homo sapiens*.  
>> *Science Podcast*
- 946 Financial Costs of Meeting Global Biodiversity Conservation Targets: Current Spending and Unmet Needs  
D. P. McCarthy et al.  
Data for birds and protected area requirements yield estimated costs for maintaining worldwide diversity targets.
- 949 Pathological  $\alpha$ -Synuclein Transmission Initiates Parkinson-like Neurodegeneration in Nontransgenic Mice  
K. C. Luk et al.  
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- 953 Orbitofrontal Cortex Supports Behavior and Learning Using Inferred But Not Cached Values  
J. L. Jones et al.  
Inferred value can be used to both guide behavior and modulate learning in rats.
- 956 Akt-Mediated Regulation of Autophagy and Tumorigenesis Through Beclin 1 Phosphorylation  
R. C. Wang et al.  
A direct link between a cancer-promoting protein kinase and the control of autophagy is presented.  
>> *Perspective p. 889*
- 960 A Rab32-Dependent Pathway Contributes to *Salmonella* Typhi Host Restriction  
S. Spanò and J. E. Galán  
Expression of a single effector protein allows a human-specific pathogen to replicate within normally nonpermissive mice.
- 963 *Salmonella* Inhibits Retrograde Trafficking of Mannose-6-Phosphate Receptors and Lysosome Function  
K. McGourty et al.  
A bacterial pathogen interferes with intracellular trafficking of receptors needed for host cell lysosomal-enzyme targeting.
- 968 Convergent Evolution Between Insect and Mammalian Audition  
F. Montealegre-Z, et al.  
In an example of convergent evolution, rainforest katydids hear using similar mechanisms to those found in mammalian ears.  
>> *Perspective p. 894*
- 971 Offspring from Oocytes Derived from in Vitro Primordial Germ Cell-like Cells in Mice  
K. Hayashi et al.  
Mature, fully functional female gametes can be generated from mouse pluripotent stem cells.
- 975 A Genomic Regulatory Element That Directs Assembly and Function of Immune-Specific AP-1-IRF Complexes  
E. Glasmacher et al.  
Cooperative binding of transcription factors to composite genomic elements regulates T helper 17 cell differentiation.  
>> *Perspective p. 891*

## SCIENCEEXPRESS

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

Publication Ahead of Print

### C/EBP Transcription Factors Mediate Epicardial Activation During Heart Development and Injury

G. N. Huang et al.

10.1126/science.1229765

### Multiplex Targeted Sequencing Identifies Recurrently Mutated Genes in Autism Spectrum Disorders

B. J. O'Roak et al.

10.1126/science.1227764

### The COMPASS Subunit Spp1 Links Histone Methylation to Initiation of Meiotic Recombination

L. Acquaviva et al.

10.1126/science.1225739

### Porphyry-Copper Ore Shells Form at Stable Pressure-Temperature Fronts Within Dynamic Fluid Plumes

P. Weis et al.

10.1126/science.1225009

### Optomechanical Dark Mode

C. Dong et al.

10.1126/science.1228370

### Alignment of Magnetized Accretion Disks and Relativistic Jets with Spinning Black Holes

J. C. McKinney et al.

10.1126/science.1230811

## SCIENCENOW

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

Highlights From Our Daily News Coverage

### Wired for Harmony?

A new study shows that the ear and brain prefer harmonic sounds.

[http://scim.ag/Wired\\_Harmony](http://scim.ag/Wired_Harmony)

### Human Ancestors Were Grass Gourmands

Fossil teeth suggest that early hominins had a taste for the green stuff.

<http://scim.ag/Grass-Gourmands>

### Bodystorming: Dance Grooves

Show How Molecules Move

Dancers help scientists assess models of molecular motion inside a cell.

<http://scim.ag/Molecular-Motion>

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

**13 November issue: <http://scim.ag/ss111312>**

### RESEARCH ARTICLE: Single Amino Acid Substitutions Confer the Antiviral Activity of the TRAF3 Adaptor Protein onto TRAF5

P. Zhang et al.

Two single amino acid changes enable the adaptor protein TRAF5 to promote antiviral responses.

### RESEARCH ARTICLE: The Tetraspanin CD37

Orchestrates the  $\alpha 4 \beta 1$  Integrin–Akt Signaling Axis and Supports Long-Lived Plasma Cell Survival

A. B. van Spruiel et al.

Antibody-producing B cells require CD37-dependent integrin signaling for long-term survival.

### PERSPECTIVE: PTEN—An Intercellular Peacekeeper?

N. R. Leslie

Transfer of PTEN between cells has potential as an intercellular form of tumor suppression.

### ST NETWATCH: The EMBO Meeting YouTube Channel

Eminent scientists discuss their work and share their perspectives on careers in research.

### ST NETWATCH: Protein Structure and Structural Bioinformatics

An online guide highlights the principles of protein structure.

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

**14 November issue: <http://scim.ag/stm111412>**

### EDITORIAL: Regenerative Engineering

C. T. Laurencin and Y. Khan

The future of tissue regeneration lies in “regenerative engineering,” with biomaterials playing a key role.

### COMMENTARY: What Is the Greatest Regulatory Challenge in the Translation of Biomaterials to the Clinic?

G. D. Prestwich et al.

Leaders in the field list the greatest barriers to biomaterials translation.

### PERSPECTIVE: Building Vascular Networks

H. Bae et al.

Advances in generating vascular networks in biomaterials may aid translation of tissue engineering technologies.

### PERSPECTIVE: Dynamic Environments—The Fourth Dimension

M. W. Tibbett and K. S. Anseth

Four-dimensional cell matrices will aid in the translation of cell-based therapies.

### REVIEW: Engineering Complex Tissues

A. Atala et al.

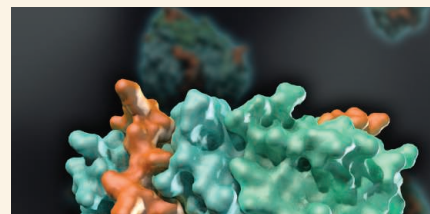
Advances in tissue engineering technologies will enable regeneration of complex tissues and organs.

### REVIEW: Designing Regenerative Biomaterial Therapies for the Clinic

E. T. Pashuck and M. M. Stevens

Research, regulatory, and clinical aspects are considered for biomaterial translation.

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SCIENCE SIGNALING

Understanding adaptor specificity.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

**<http://scim.ag/SciCareers16November2012>**

### Tooling Up: Questions to Set Your Sails By (Part 1)

D. Jensen

Answering these six questions can help you choose your career path.

### Careers in Biomaterials Science—An Overview

E. Pain

Scientists with an ability to work across fields can find exciting opportunities in biomaterials.

### Materials Researchers in Biomedicine

M. Price

As biomedical applications emerge, materials scientists find new funding and research opportunities.

>> *Biomaterials section p. 899*

## SCIENCE PODCAST

[www.sciencemag.org/multimedia/podcast](http://www.sciencemag.org/multimedia/podcast)

Free Weekly Show for 16 November 2012

Listen to stories on biomaterials, preserving mussel diversity, early hunting technology, and more.

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2012 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$149 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$990; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. Publications Mail Agreement Number 1069624. Printed in the U.S.A.

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# Science

**338 (6109)**

*Science* **338** (6109), 861-981.

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