

# CONTENTS

31 May 2018 / Vol 557 / Issue No 7707

## THIS WEEK

### EDITORIALS

#### 611 ENERGY

##### Get JET set

Brexit confusion fuels anxiety at UK site

#### 611 STEM CELLS

##### Racing hearts

Japan must prove the efficacy of its stem-cell treatment

#### 612 MATHEMATICS

##### False testimony

Algorithms and the right to explanation

### WORLD VIEW



#### 613 No reproducibility without preproducibility

Philip Stark

Push researchers to provide enough data for others to repeat their work

### RESEARCH HIGHLIGHTS

#### 614 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Liquid crystals / Zika spread / Relic rescuer / Galaxy size bump / Frog trills

### SEVEN DAYS

#### 616 THE NEWS IN BRIEF

North Korea summit / Satellite instrument fails / Cool lab launches / Grizzly-bear hunt



## CAREERS

#### 745 IMAGERY

##### Crunch time for data

The promise of satellite and cloud-computing services

#### 747 CAREER BRIEFS

## NEWS IN FOCUS

#### 619 REGENERATIVE MEDICINE

Reprogrammed stem cells approved to mend human hearts

#### 620 PHYSICS

Muon-based measurement technique goes mainstream

#### 621 DIVERSITY

Share of African American men pursuing medicine dwindles

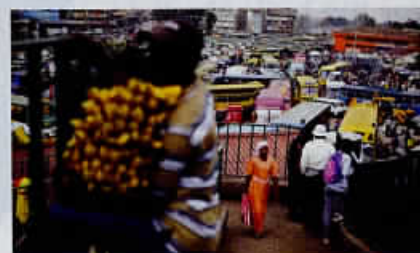
#### 622 ENERGY

US zero-carbon plant starts testing

#### 623 INTELLECTUAL PROPERTY

Rule change sends institutions scrambling to protect antibody patents

### FEATURES



#### ECONOMICS

## Trials tackle poverty

Projects test schemes to provide universal basic income **PAGE 626**

## SPOTLIGHTS

#### S51 CHINA REACHES OUT

##### Zhejiang province is open for science business

Historic region embraces the high-tech sector

#### S53 Q&A

##### The zest of Zhejiang

A neuroscientist explains her motivations for moving back home

#### S55 BIOPHARMACEUTICALS

##### Computer-calculated compounds

How artificial intelligence is changing drug discovery

## COMMENT



#### EQUALITY

## Diversity push

How the American Physical Society is making physics more inclusive **PAGE 629**

### BOOKS & ARTS

#### 633 PSYCHIATRY

##### Depression revisited

Alison Abbott

#### 634 IN RETROSPECT

##### Ape and Essence

Richard Rhodes

#### 635 BOOKS IN BRIEF

### CORRESPONDENCE

637 Prize generosity / India's solar engineering / Cooperate on integrity / Microbes for the economy

### OBITUARY

#### 638 Peter Grünberg (1939–2018)

Albert Fert

### FUTURES

#### 750 Masques

Mike Adamson





# CONTENTS

31 May 2018 / Vol 557 / Issue No 7707

## RESEARCH

### NEW ONLINE

- 639 Papers published this week at [nature.com](http://nature.com)

### NEWS & VIEWS

#### 640 MOLECULAR BIOLOGY

##### Safeguarding stem-cell fidelity

The ChAHP protein complex promotes local condensation of euchromatin  
*Kristoffer N Jensen & Matthew C Lorincz*  
[SEE LETTER P.739](#)

#### 641 QUANTUM PHYSICS

##### Molecular dynamics simulated by photons

A photonic chip that can model the quantum dynamics of molecules  
*Fabien Gatti* [SEE ARTICLE P.660](#)

#### 642 IMMUNOLOGY

##### Gut molecules control brain inflammation

Microglia modulate astrocytes in response to gut-derived metabolites  
*Hartmut Wekerle* [SEE LETTER P.724](#)

#### 644 STRUCTURAL BIOLOGY

##### Enzyme illuminates bacterial ubiquitination

The catalytic process that attaches ubiquitin to proteins is revealed  
*Kathy Wong & Kalle Gehring*  
[SEE ARTICLE P.674 & LETTERS P.729 & P.734](#)

#### 645 QUANTUM MATERIALS

##### Spinning on the edge of graphene

Magnetic edge states in graphene nanoribbons  
*Fernando Luis & Eugenio Coronado*  
[SEE LETTER P.691](#)

#### 647 SYNTHETIC BIOLOGY

##### Yeast shuffles towards a diverse future

Rearranging a synthetic yeast genome  
*Jee Loon Foo & Matthew Wook Chang*

#### 648 IN RETROSPECT

##### A catalyst for 50 years of cancer research

The historic discovery of a link between faulty DNA repair and cancer  
*Richard D Wood*

### ANALYSIS

#### 651 CLIMATE CHANGE Emerging trends in global freshwater availability

*M Rodell et al.*



#### ON THE COVER

## On the origin of lizards

An artist's impression of the Middle Triassic lizard *Megachirella wachtleri*. Tiago Simões and colleagues unveil a detailed analysis of the fossil, showing that *M. wachtleri* is 75 million years older than other known squamates — the group of reptiles that includes lizards and snakes. This puts the initial diversification of the major reptile lineages more than 252 million years ago. [PAGE 706](#)

### ARTICLES

#### 660 QUANTUM PHYSICS Simulating the vibrational quantum dynamics of molecules using photonics

*C Sparrow et al.* [SEE N&V P.641](#)

#### 668 NEUROSCIENCE Pyramidal cell regulation of interneuron survival sculpts cortical networks

*F K Wong et al.*

#### 674 STRUCTURAL BIOLOGY Structural basis of ubiquitin modification by the *Legionella* effector SdeA

*Y Dong et al.* [SEE N&V P.644](#)

#### 679 GENETICS Spatiotemporal regulation of liquid-like condensates in epigenetic inheritance

*G Wan et al.*

### LETTERS

#### 684 ASTRONOMY A small amount of mini-charged dark matter could cool the baryons in the early Universe

*J B Muñoz & A Loeb*

#### 687 NUCLEAR PHYSICS An increase in the $^{12}\text{C} + ^{12}\text{C}$ fusion rate from resonances at astrophysical energies

*A Tumino et al.*

#### 691 QUANTUM MATERIALS Magnetic edge states and coherent manipulation of graphene nanoribbons

*M Słota et al.* [SEE N&V P.645](#)

#### 696 NANOSCALE MATERIALS Approaching the Schottky–Mott limit in van der Waals metal–semiconductor junctions

*Y Liu et al.*

#### 701 SURFACE CHEMISTRY The effect of hydration number on the interfacial transport of sodium ions

*J Peng et al.*

#### 706 PALAEOLOGY The origin of squamates revealed by a Middle Triassic lizard from the Italian Alps

*T R Simões et al.*

#### 710 ECOLOGY Long-term effects of species loss on community properties across contrasting ecosystems

*P Kardol, N Fanin & D A Wardle*

#### 714 STEM CELLS Reciprocal signalling by Notch–Collagen V–CALCR retains muscle stem cells in their niche

*M B Baghdadi et al.*

#### 719 VIROLOGY Reconstruction of antibody dynamics and infection histories to evaluate dengue risk

*H Salje et al.*

#### 724 IMMUNOLOGY Microglial control of astrocytes in response to microbial metabolites

*V Rothhammer et al.* [SEE N&V P.642](#)

#### 729 STRUCTURAL BIOLOGY Mechanism of phosphoribosyl-ubiquitination mediated by a single *Legionella* effector

*A Akturk et al.* [SEE N&V P.644](#)

#### 734 STRUCTURAL BIOLOGY Insights into catalysis and function of phosphoribosyl-linked serine ubiquitination

*S Kalayil et al.* [SEE N&V P.644](#)

#### 739 MOLECULAR BIOLOGY Activity-dependent neuroprotective protein recruits HP1 and CHD4 to control lineage-specifying genes

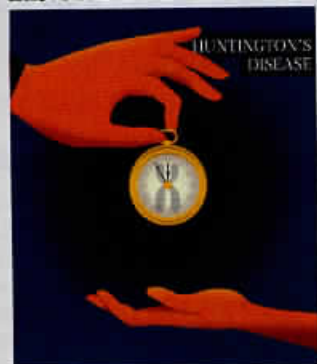
*V Ostapczuk et al.* [SEE N&V P.640](#)

COVER IMAGE: DAVIDE BONACCINNA



## HUNTINGTON'S DISEASE

### natureOUTLOOK



The fight against  
a deadly inheritance

Turn to page 638

#### S36 BIOLOGY

##### Chain of mystery

Why is Huntington's disease still  
puzzling researchers?

#### S38 GENETIC TESTING

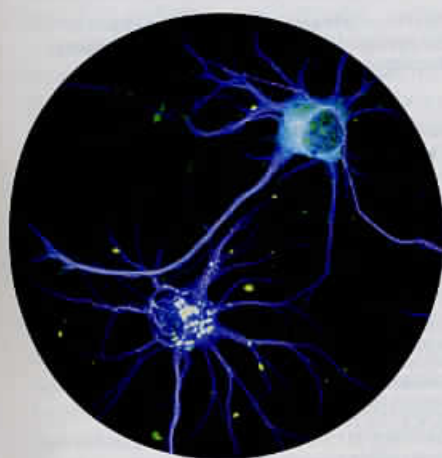
##### Darkness and light

Finding out what the future  
might hold

#### S39 TREATMENTS

##### The big hope for Huntington's

Innovative approaches could be  
heading to the clinic



Elli Hofmeister began to show signs of Huntington's disease at an early age (see page S44).

#### S42 GENE EDITING

##### To cut is to cure

Targeting the gene implicated in  
Huntington's disease

#### S46 CLINICAL TRIALS

##### The endpoint is near

An updated rating scale could better  
gauge the efficacy of treatments

#### S44 PAEDIATRICS

##### Ahead of time

Not just a disease of middle age

#### S48 RESEARCH

##### 4 big questions

How research is moving forward



#### NATURE.COM

- For a primer on Huntington's disease, visit:  
[go.nature.com/2g0eh6f](http://go.nature.com/2g0eh6f)
- To read more on disorders related to polyglutamine, see:  
[go.nature.com/2ncsbom](http://go.nature.com/2ncsbom)

#### COLLECTION

- Visit our online edition, which includes an exclusive collection of the latest research papers on understanding and treating Huntington's disease:  
[go.nature.com/2ia3bnr](http://go.nature.com/2ia3bnr)