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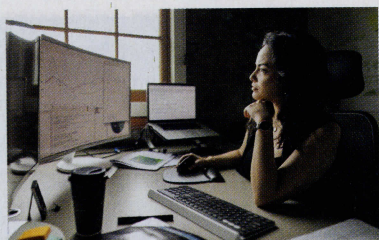
Lab-primate retirement plan / Ebola-vaccine reach extended / US Moon-lander design / Chinese scientists killed in Sri Lanka / Open-access world trends

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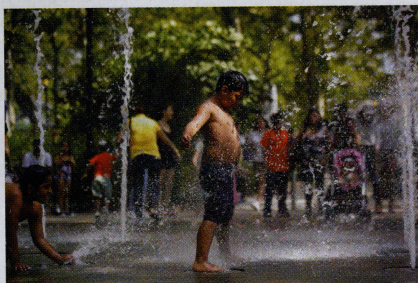
#### 445 OPEN SCIENCE

##### Setting your data free

Researchers who openly share data are reaping the benefits



## NEWS IN FOCUS



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##### Game of birds

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### NEWS & VIEWS

#### 338 PLANETARY SCIENCE

##### The Moon's mantle unveiled

Spectral observations of the far side of the Moon

Patrick Pinet [SEE LETTER P.378](#)

#### 339 QUANTUM PHYSICS

##### Scaling up quantum simulations

A programmable analog quantum simulator

Jürgen Berges [SEE ARTICLE P.355](#)

#### 340 MOLECULAR ENGINEERING

##### Protein assembles into Archimedean geometry

How to engineer a protein to make an extraordinary cage structure

Todd O Yeates [SEE LETTER P.439](#)

#### 342 DIABETES

##### A map of $\beta$ -cell differentiation

Production of pancreatic  $\beta$ -cells from stem cells

Fabian J Theis & Heiko Lickert

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#### 343 CANCER

##### Manipulating a tumour suppressor

Assessing how the protein Rb affects cancer reveals possible drug targets

Seth M Rubin & Julien Sage

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### REVIEW

#### 345 MOLECULAR BIOLOGY Transcription factors and 3D genome conformation in cell-fate decisions

R Stadhouders, G J Filion & T Graf

### ARTICLES

#### 355 QUANTUM PHYSICS Self-verifying variational quantum simulation of lattice models

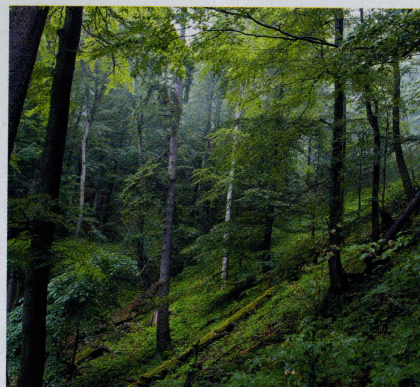
C Kokail et al. [SEE N&V P.339](#)

#### 361 DEVELOPMENTAL BIOLOGY The emergent landscape of the mouse gut endoderm at single-cell resolution

S Nowotschin et al.

#### 368 DIABETES Charting cellular identity during human in vitro $\beta$ -cell differentiation

A Veres et al. [SEE N&V P.342](#)



### ON THE COVER

## Tree dimensions

Root-associated microbial symbionts shape forest ecosystem function. Brian Steidinger and colleagues present a global map of the symbiotic status of forests, and find sharp transitions between dominant types of symbiosis, driven by climatically controlled decomposition rates. [PAGE 404](#)

### LETTERS

#### 374 ASTRONOMY A rapidly changing jet orientation in the stellar-mass black-hole system V404 Cygni

J C A Miller-Jones et al.

#### 378 PLANETARY SCIENCE Chang'E-4 initial spectroscopic identification of lunar far-side mantle-derived materials

C Li et al. [SEE N&V P.338](#)

#### 383 OPTICAL PHYSICS Temporal and spectral fingerprints of ultrafast all-coherent spin switching

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#### 388 CONDENSED-MATTER PHYSICS

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#### 393 NANOSCALE MATERIALS Atomic rheology of gold nanojunctions

J Comtet, A Lainé, A Niguès, L Bocquet & A Siria

#### 398 GEOCHEMISTRY Sampling the volatile-rich transition zone beneath Bermuda

S E Mazza et al.

#### 404 ECOLOGY Climatic controls of decomposition drive the global biogeography of forest-tree symbioses

B S Steidinger et al.

#### 409 ANTHROPOLOGY A late Middle Pleistocene Denisovan mandible from the Tibetan Plateau

F Chen et al.

#### 413 NEUROSCIENCE Voltage imaging and optogenetics reveal behaviour-dependent changes in hippocampal dynamics

Y Adam et al.

#### 418 MOLECULAR BIOLOGY MicroRNA therapy stimulates uncontrolled cardiac repair after myocardial infarction in pigs

K Gabisonia et al.

#### 423 CANCER RB constrains lineage fidelity and multiple stages of tumour progression and metastasis

D M Walter et al. [SEE N&V P.343](#)

#### 428 TUMOUR IMMUNOLOGY Prophylactic TNF blockade uncouples efficacy and toxicity in dual CTLA-4 and PD-1 immunotherapy

E Perez-Ruiz et al.

#### 433 BIOTECHNOLOGY Transcriptome-wide off-target RNA editing induced by CRISPR-guided DNA base editors

J Grünwald et al.

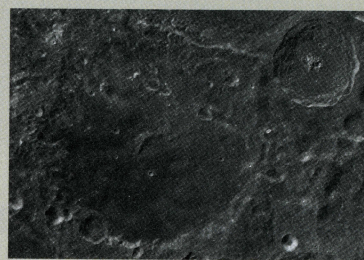
#### 438 MOLECULAR ENGINEERING An ultra-stable gold-coordinated protein cage displaying reversible assembly

A D Malay et al. [SEE N&V P.340](#)

### PLANETARY SCIENCE

## Moon rock

Far-side samples may originate from the lunar mantle. [PAGE 378](#)



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