

# CONTENTS

28 January 2016 / Vol 529 / Issue No 7587

## THIS WEEK

### EDITORIALS

#### 437 ARTIFICIAL INTELLIGENCE

##### Digital intuition

Computer program leaves observers in dark as to its methods

#### 437 CONSERVATION

##### In praise of parks

Conservation efforts should not end at the designation of protected areas

#### 438 IMPOSTER SYNDROME

##### Found out

Researchers are rarely alone in feeling like they don't belong



### WORLD VIEW

#### 439 India needs

##### home-grown

##### GM food to stop

##### starvation

Anurag Chaurasia

Reliance on products developed abroad will only exacerbate the problem

### RESEARCH HIGHLIGHTS

#### 440 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Antibodies from Ebola survivors / Springing the flytrap / Sea-level rise unevenly distributed / Domestic infestation / Voles stick together / Hydrogel 3D printing

### SEVEN DAYS

#### 442 THE NEWS IN BRIEF

New frog genus / 2015 was hottest year / AI pioneer dies / Researchers charged with stealing pharma secrets / Committee proposes data-sharing rules

## CAREERS

#### 555 PSYCHOLOGY

##### Faking it

Setbacks are part of life for young researchers, making them especially vulnerable to chronic self doubt

#### 557 TURNING POINT

Louis Picker's decision to develop a cytomegalovirus-based HIV vaccine was a long shot, but clinical trials start soon

## NEWS IN FOCUS

#### 445 MACHINE LEARNING

DeepMind program beats human professionals at Go board game

#### 446 GENOMICS

Dog project looks for links between genes and mental illnesses



#### 448 PHYSICS

Hawking's latest work on black-hole paradox divides physicists

#### 449 GENETICS

Transgenic monkeys used to model autism

#### 450 CLIMATE

Pacific warming helped 2015 to smash heat record

#### 450 CARBON ACCOUNTANCY

Developing countries come to terms with emissions reporting rules

## FEATURES



### CONSERVATION

## Songbird slaughter

Widespread killing linked to crime, controversy and data dispute **PAGE 452**

#### 456 LAB PRACTICE

##### Quality time

A focus on quality assurance is helping to improve the standard of research

## COMMENT



### TRANSPARENCY

## Open target

Processes to improve openness must not be allowed to stifle research, say Stephan Lewandowsky & Dorothy Bishop **PAGE 459**

## BOOKS & ARTS

#### 462 IN RETROSPECT

##### The Selfish Gene

Matt Ridley

#### 464 HISTORY

##### Archive of wonders

Philip Ball



## CORRESPONDENCE

466 Help Turkey's academics / Evidence mapping: insufficient / V20 should lead on atmosphere protection / Grants for women / Boost solar-energy research

## FUTURES

#### 560 Robot burial

H E Roulo





# CONTENTS

28 January 2016 / Vol 529 / Issue No 7587

## RESEARCH

### NEW ONLINE

467 Papers published this week at nature.com

### NEWS & VIEWS

#### 468 GENOME EDITING

##### The domestication of Cas9

Engineered Cas9 enzymes that have minimal off-target effects

Fyodor Urnov [SEE ARTICLE P.490](#)

#### 469 NEUROSCIENCE

##### Fluorescent boost for voltage sensors

Rapid measurement of subthreshold neuronal activity in live animals

Viviana Gradinaru & Nicholas C Flytzanis

#### 470 EVOLUTION

##### A lizard that generates heat

Endothermy during the reproductive period of a tegu lizard

Colleen G Farmer

#### 472 INFECTION BIOLOGY

##### Small RNA with a large impact

Dual RNA-seq over the course of *Salmonella* infection of human cells

Matthias P Machner & Gisela Storz

[SEE ARTICLE P.496](#)

#### 473 STELLAR ASTROPHYSICS

##### The mystery of globular clusters

Evidence of a late burst of star formation in young clusters

Antonella Nota & Corinne

Charbonnel [SEE LETTER P.502](#)

#### 474 NEUROSCIENCE

##### A mechanism for myelin injury

TRPA1 channels might mediate myelin damage during ischaemia

Aiman S Saab & K-A Nave

[SEE LETTER P.523](#)

#### 475 BIOANALYTICAL DEVICES

##### Technological leap for sweat sensing

A wearable sweat monitor that measures several biomarkers

Jason Heikenfeld [SEE LETTER P.509](#)

### PERSPECTIVE

#### 477 CLIMATE SCIENCES Allowable CO<sub>2</sub>

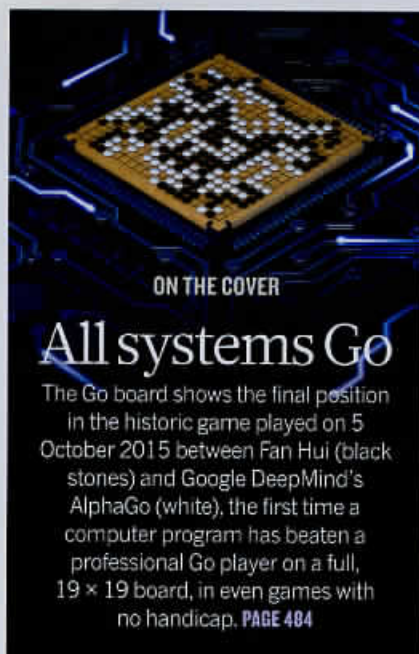
emissions based on regional and impact-related climate targets

S I Seneviratne, M G Donat, A J Pitman,

R Knutti & R L Wilby

### ARTICLES

#### 484 COMPUTER SCIENCE Mastering the game



ON THE COVER

## All systems Go

The Go board shows the final position in the historic game played on 5 October 2015 between Fan Hui (black stones) and Google DeepMind's AlphaGo (white), the first time a computer program has beaten a professional Go player on a full, 19 × 19 board, in even games with no handicap. [PAGE 484](#)

of Go with deep neural networks and tree search

D Silver et al.

#### 490 BIOTECHNOLOGY High-fidelity CRISPR-

Cas9 nucleases with no detectable genome-wide off-target effects

B P Kleinstiver et al. [SEE N&V P.468](#)

#### 496 MICROBIOLOGY Dual RNA-seq unveils

noncoding RNA functions in host-pathogen interactions

A J Westermann et al. [SEE N&V P.472](#)

### LETTERS

#### 502 ASTROPHYSICS Formation of new stellar

populations from gas accreted by massive young star clusters

C Li et al. [SEE N&V P.473](#)

#### 505 QUANTUM PHYSICS Measurement noise

100 times lower than the quantum-projection limit using entangled atoms

O Hosten, N J Engelsen, R Krishnakumar & M A Kasevich

#### 509 HEALTH SCIENCES Fully integrated

wearable sensor arrays for multiplexed *in situ* perspiration analysis

W Gao et al. [SEE N&V P.475](#)

#### 515 BATTERY TECHNOLOGY Lithium-ion

battery structure that self-heats at low temperatures

C-Y Wang et al.

#### 519 PALAEOCEANOGRAPHY No iron fertilization in the equatorial Pacific Ocean during the last ice age

K M Costa et al.

#### 523 NEUROSCIENCE Proton-gated Ca<sup>2+</sup>-permeable TRP channels damage myelin in conditions mimicking ischaemia

N B Hamilton, K Kolodziejczyk,

E Kougioumtzidou & D Attwell

[SEE N&V P.474](#)

#### 528 STEM CELLS Mitofusin 2 maintains haematopoietic stem cells with extensive lymphoid potential

L L Luchsinger, M J de Almeida,

D J Corrigan, M Mumau & H-W Snoeck

#### 532 IMMUNOLOGY Graded Foxo1 activity in T<sub>reg</sub> cells differentiates tumour immunity from spontaneous autoimmunity

C T Luo, W Liao, S Dadi, A Toure & M O Li

#### 537 IMMUNOLOGY A mechanism of viral immune evasion revealed by cryo-EM analysis of the TAP transporter

M L Oldham et al.

#### 541 CANCER Structure of the E6/E6AP/p53 complex required for HPV-mediated degradation of p53

D Martinez-Zapatero et al.

#### 546 STRUCTURAL BIOLOGY Structure of a HOIP/E2-ubiquitin complex reveals RBR E3 ligase mechanism and regulation

B C Lechtenberg et al.

#### 551 STRUCTURAL BIOLOGY Structure of transcribing mammalian RNA polymerase II

C Bernecky, F Herzog, W Baumeister,

J M Plitzko & P Cramer

### HEALTH SCIENCES

## Get a grip

Wearable sensors track metabolites and electrolytes in sweat. [PAGE 509](#)



GOOGLE DEEPMIND