

CONTENTS

1 August 2019 / Vol 572 / Issue No 7767

THIS WEEK

EDITORIAL

5 ETHICS

Digital-data studies need consent
Rules for research ethics must be fit for the digital age

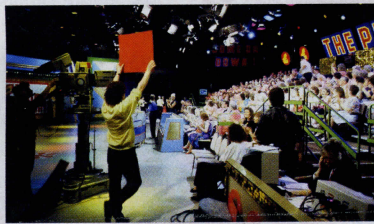
WORLD VIEW

7 Telescope opponents fight the process, not science

Rosie Alegado
Why it is a false dichotomy to paint Native Hawaiian culture as against modern science

RESEARCH HIGHLIGHTS

8 SELECTIONS FROM THE SCIENTIFIC LITERATURE



Laughter boon for bad jokes / Black-hole data match Einstein's predictions / Lifespan boost seen in genes / Vanilla spices up diversity / Water flows uphill

SEVEN DAYS

10 THE NEWS IN BRIEF

Arctic wildfires / World Bank to fund Ebola fight / Chinese firm launches rocket / European heatwave / Japan funds hybrid embryo work

CAREERS

143 AFRICA

Continental shift

African scientists discuss the implications of research at home and abroad



NEWS IN FOCUS

13 POLITICS

What Boris Johnson's leadership could mean for UK science



15 GENE EDITING

European court ruling creates conundrum for CRISPR crops

16 INFECTIOUS DISEASE

Ebola clinical trials continue despite ongoing violence in outbreak region

18 BIOSECURITY

Bid to destroy stocks of deadly livestock virus and avoid accidental release

FEATURE

MEDICAL RESEARCH

Beyond first steps

The challenge of taking electrical stimulators for spinal-cord injuries from research to reality **PAGE 20**



TECHNOLOGY

141 TOOLBOX

Julia: come for the syntax, stay for the speed

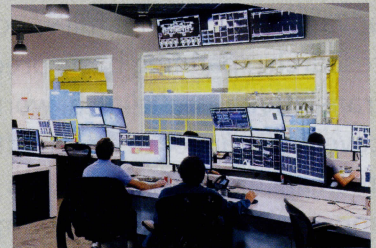
Open-source language could be the answer to efficiency in programming

COMMENT

ARTIFICIAL INTELLIGENCE

Model behaviour

Machine learning needs clear standards in research and reporting, cautions Google's Patrick Riley **PAGE 27**

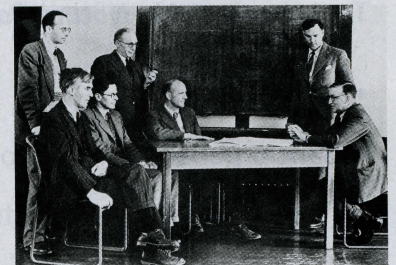


BOOKS & ARTS

30 HISTORY

Betrayal and the bomb

Ann Finkbeiner



31 BOOKS IN BRIEF

CORRESPONDENCE

32 Aboriginal fish farms and climate adaptation / Science council celebrates centenary / Africa builds research momentum / Manage rivers with a raft of measures / Don't overlook the work of collectors in crediting reusable data

FUTURES



148 Proxima junk
Mark Vandersluis

CONTENTS

1 August 2019 / Vol 572 / Issue No 7767

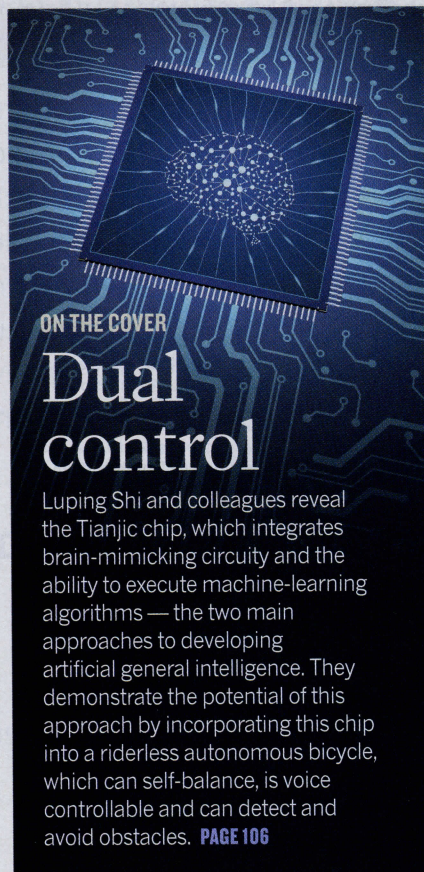
RESEARCH

NEW ONLINE

- 33 Papers published this week at nature.com

NEWS & VIEWS

- 34 **PHYSIOLOGY**
A drain at the base of the brain
Vessels drain fluid and waste from the brain into the rest of the body
Taija Mäkinen
[SEE ARTICLE P.62](#)
- 35 **CLIMATE SCIENCE**
Weak sensitivity of cloud water to aerosols
A key constraint on the overall cooling effect of aerosol emissions
Anna Possner
[SEE ARTICLE P.51](#)
- 36 **MEDICAL RESEARCH**
Deep learning detects impending organ injury
Artificial intelligence identifies patients at risk of kidney damage
Eric J Topol
[SEE LETTER P.116](#)
- 38 **MATERIALS SCIENCE**
Bioprinting in space and time
A quantitative analysis of a living ink used for 3D printing
Zev Gartner & Alex Hughes
- 39 **INFECTIOUS DISEASES**
A trial to tackle tiger mosquitoes
Tiger mosquitoes almost eradicated from test sites in a trial
Peter A Armbruster
[SEE ARTICLE P.56](#)
- 40 **CONDENSED-MATTER PHYSICS**
Spectroscopy with a magic twist
Insights into the properties of twisted bilayer graphene
Mathias S Scheurer
[SEE LETTERS P.95 & P.101](#)
- REVIEW**
- 43 **NEUROSCIENCE** **Memory editing from science fiction to clinical practice**
E A Phelps & S G Hofmann
- ARTICLES**
- 51 **CLIMATE SCIENCE** **Weak average liquid-cloud-water response to anthropogenic aerosols**
V Toll, M Christensen, J Quaas & N Bellouin [SEE N&V P.35](#)



- 56 **INFECTIOUS DISEASES** **Incompatible and sterile insect techniques combined eliminate mosquitoes**
X Zheng et al.
[SEE N&V P.39](#)
- 62 **PHYSIOLOGY** **Meningeal lymphatic vessels at the skull base drain cerebrospinal fluid**
J H Ahn et al.
[SEE N&V P.34](#)
- 67 **CANCER** **Childhood cerebellar tumours mirror conserved fetal transcriptional programs**
M C Vladoiu et al.
- 74 **CANCER** **Resolving medulloblastoma cellular architecture by single-cell genomics**
V Hovestadt et al.
- 80 **STRUCTURAL BIOLOGY** **Conformational transitions of a neurotensin receptor 1-G₁ complex**
H E Kato et al.

LETTERS

- 86 **QUANTUM PHYSICS** **Quantum-enhanced sensing of a single-ion mechanical oscillator**
K C McCormick et al.
- 91 **OPTICAL PHYSICS** **Nonlinear optics in the fractional quantum Hall regime**
P Knüppel et al.
- 95 **CONDENSED-MATTER PHYSICS** **Maximized electron interactions at the magic angle in twisted bilayer grapheme**
A Kerelsky et al. [SEE N&V P.40](#)
- 101 **CONDENSED-MATTER PHYSICS** **Spectroscopic signatures of many-body correlations in magic-angle twisted bilayer grapheme**
Y Xie et al. [SEE N&V P.40](#)
- 106 **ELECTRONIC DEVICES** **Towards artificial general intelligence with hybrid Tianjic chip architecture**
J Pei et al.
- 112 **ANTHROPOLOGY** **Elemental signatures of *Australopithecus africanus* teeth reveal seasonal dietary stress**
R Joannes-Boyau et al.
- 116 **MEDICAL RESEARCH** **A clinically applicable approach to continuous prediction of future acute kidney injury**
N Tomašev et al.
[SEE N&V P.36](#)
- 120 **DEVELOPMENTAL BIOLOGY** **Single-cell analysis of cardiogenesis reveals basis for organ-level developmental defects**
T Yvanka de Soysa et al.
- 125 **GENETICS** **A mutation-independent approach for muscular dystrophy via upregulation of a modifier gene**
D U Kemaladewi et al.
- 131 **PLANT SCIENCES** **A calmodulin-gated calcium channel links pathogen patterns to plant immunity**
W Tian et al.
- 136 **MOLECULAR BIOPHYSICS** **Rotation tracking of genome-processing enzymes using DNA origami rotors**
P Kosuri, B D Altheimer, M Dai, P Yin & X Zhuang

COVER IMAGE: CENTER FOR BRAIN-INSPIRED COMPUTING RESEARCH, TSINGHUA UNIVERSITY