

CONTENTS

16 October 2014 / Vol 514 / Issue No 7522

THE UNIVERSITY EXPERIMENT

EDITORIAL

- 273 **Universities challenged**
The face of higher education is changing at a rapid rate

FEATURES

- 287 **The university experiment**
Evolution is the name of the game if the campus is to survive
- 288 **Campus as laboratory**
Universities around the world are finding fresh ways to teach and organize research
- 292 **The research rethink**
Arizona State University tries to break



nature.com/universities

down entrenched walls between disciplines

COMMENT

- 295 **Chinese university reform in three steps**
Jie Zhang
The way to build a world-class institution is to value and reward the faculty members
- 297 **Companies on campus**
Jana J Watson-Capps & Thomas R Cech
There are mutual benefits to be gained from having industry labs in an academic setting

THIS WEEK

EDITORIALS

- 273 **PUBLIC ENGAGEMENT**
Dust to dust
Lessons need to be learned from the media circus around gravitational waves
- 274 **PUBLISHING**
Review rewards
Welcome recognition for science publishing's unsung heroes

WORLD VIEW

- 275 **How terror-proof is your economy?**
Erwann Michel-Kerjan
Make use of scientific skills to analyse the threats posed to finance

RESEARCH HIGHLIGHTS

- 276 **SELECTIONS FROM THE SCIENTIFIC LITERATURE**
Colour-coordinated nests / Plant-derived anticlotting agent / Alzheimer's model / SCID gene therapy / Nobel guesswork / Bionic limb control

SEVEN DAYS

- 278 **THE NEWS IN BRIEF**
Ebola's economic impact / Ancient Greek treasures / Climate change as security risk / Research vessel sinks / Record high for sea ice



NEWS IN FOCUS

- 281 **STEM CELLS**
Reprogrammed cells offer diabetes hope and immunity challenge
- 282 **GENOMICS**
Mass merger of genome data creates analytical powerhouse
- 283 **MARINE LIFE**
Researchers struggle to arrest decline in African penguins
- 284 **INFECTIOUS DISEASE**
Ebola outbreak quantified
- 285 **NOBEL PRIZE**
Optics pioneers scoop chemistry prize for revealing inner lives of cells

CAREERS



395 MOLECULAR BIOLOGY

Genetic touch-ups

The development of CRISPR-Cas and similar techniques means that anybody with basic molecular-biology skills can be a gene editor

NATUREJOBS ADVERTISING FEATURE
Spotlight on genetics

COMMENT

- 299 **INFECTIOUS DISEASE**
Ebola: learn from the past
David L Heymann
Previous outbreaks hold the key to quelling the current crisis in West Africa
- BOOKS & ARTS**
- 302 **ORIGIN OF LIFE**
The first spark
David Deamer
- 303 **BOOKS IN BRIEF**
- 304 **POLITICS**
When Hodgkin met Thatcher
Jessa Gamble



CORRESPONDENCE

- 305 Pakistan's response to disaster / The Internet's energy consumption / Threats to whales and dolphins / Waugh on badgers / Sanctions hit wildlife



FUTURES

- 398 **The method**
Jon Hurwitz

CONTENTS

16 October 2014 / Vol 514 / Issue No 7522

RESEARCH

NEW ONLINE

307 Papers published this week at nature.com

NEWS & VIEWS

308 EVOLUTIONARY BIOLOGY

Survival of the fittest group

Group-level selection drives adaptation in social spiders

Timothy Linksvayer **SEE LETTER P.359**

309 CANCER

Staying together on the road to metastasis

Circulating tumour-cell clusters have high metastatic potential
Alessia Bottos & Nancy E Hynes

310 ASTROPHYSICS

How tiny galaxies form stars

Inefficient star formation in two small faint galaxies

Bruce Elmegreen **SEE LETTER P.335**

312 CANCER

The origin of human retinoblastoma

A childhood eye cancer arises in differentiating cone-cell precursors
Rod Bremner & Julien Sage

SEE LETTER P.385

313 SOLID-STATE PHYSICS

A historic experiment redesigned

Detection of Rydberg excitons in a natural crystal of copper oxide
Sven Höfling & Alexey Kavokin

SEE LETTER P.343

314 GENOMICS

Of monarchs and migration

The DNA sequences of 101 monarch butterflies
Richard H French-Constant

SEE ARTICLE P.317

ARTICLES

317 POPULATION GENETICS The genetics of monarch butterfly migration and warning colouration

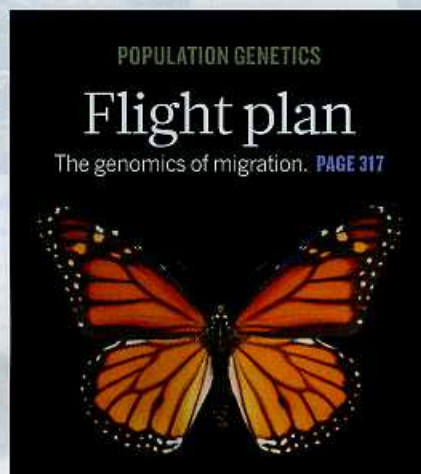
S Zhan et al. **SEE N&V P.314**

322 STEM CELLS Clonal dynamics of native haematopoiesis

J Sun et al.

328 NEUROSCIENCE Structural mechanism of glutamate receptor activation and desensitization

J R Meyerson et al.



LETTERS

335 ASTROPHYSICS Inefficient star formation in extremely metal poor galaxies

Y Shi et al. **SEE N&V P.310**

339 ASTROPHYSICS Binary orbits as the driver of γ -ray emission and mass ejection in classical novae

L Chomiuk et al.

343 SOLID-STATE PHYSICS Giant Rydberg excitons in the copper oxide Cu_2O

T Kazimierzczuk, D Fröhlich, S Scheel, H Stolz & M Bayer **SEE N&V P.313**

348 ELECTROCHEMISTRY Lithium-antimony-lead liquid metal battery for grid-level energy storage

K Wang et al.

351 ATMOSPHERIC CHEMISTRY High winter ozone pollution from carbonyl photolysis in an oil and gas basin

P M Edwards et al.

355 GEOCHEMISTRY Helium and lead isotopes reveal the geochemical geometry of the Samoan plume

M G Jackson et al.

359 EVOLUTION Site-specific group selection drives locally adapted group compositions

J N Pruitt & C J Goodnight

SEE N&V P.308

363 EVOLUTION *Hallucigenia*'s onychophoran-like claws and the case for Tactopoda

M R Smith & J Ortega-Hernández

367 PLANT SCIENCE OSCA1 mediates osmotic-stress-evoked Ca^{2+} increases vital for osmosensing in *Arabidopsis*

F Yuan et al.

372 IMMUNOLOGY Antiviral immunity via RIG-I-mediated recognition of RNA bearing 5'-diphosphates

D Goubau et al.

376 CELL BIOLOGY Stochasticity of metabolism and growth at the single-cell level

D J Kiviet et al.

380 CANCER CRISPR-mediated direct mutation of cancer genes in the mouse liver

W Xue et al.

385 CANCER Rb suppresses human cone-precursor-derived retinoblastoma tumours

X L Xu et al. **SEE N&V P.312**

389 IMMUNOLOGY Noncoding RNA transcription targets AID to divergently transcribed loci in B cells

E Pefanis et al.

394 CORRIGENDUM Three keys to the radiation of angiosperms into freezing environments

A E Zanne et al.

394 CORRIGENDUM A microbial ecosystem beneath the West Antarctic ice sheet

B C Christner et al.

394 CORRIGENDUM Connectomic reconstruction of the inner plexiform layer in the mouse retina

M Helmstaedter et al.

