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Power lynx

The way climate change alters how different species interact is one of the key factors determining how an ecosystem might respond to the pressures of a warming world. But little is known about how interactions between top vertebrate predators might be reshaped in such circumstances. In this week's issue, Fabrizio Sergio and colleagues shed some light on this problem, looking at interactions between two top predators in the Doñana National Park of southern Spain. The researchers found that, after disease had reduced the number of rabbits in the park, subsequent drought conditions sparked a kind of arms race between Iberian lynx (— show all

Cover image: Fabrizio Sergio.

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Nature awards recognize inspiring women in science

This year's winners are a materials scientist and a champion of women's science education. They — like all those shortlisted — are driven by the desire to support others.

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Ecosystems depend on people: don't abandon them

It might seem counterproductive to put more people in nature, but sometimes human activity nurtures biodiversity.

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I built the UK government's metascience unit – here's what countries need to know

To find evidence-backed ways to improve grant-funding processes, metascientists need freedom and money to experiment, as well as leaders who are willing to make change.

Jen Gold

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Trump's executive order on women's health feels like déjà vu

Previous US administrations fell short on promised improvements to women's-health research — here's what real change will take.

Alina Salganicoff

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Even stupendous black holes can't explain dark matter

The theoretical objects would have left a larger imprint on cosmic radiation if they were a source of the invisible force pulling together the galaxies.

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Barn owls' ancestors made a transatlantic flight

Genomic analysis shows that the owls spread from Eurasia to the Caribbean, then colonized the rest of the Western Hemisphere.

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Measles made a stealthy return as another virus took the spotlight

Vaccination rates dropped after the COVID-19 pandemic disrupted public-health programmes and their funding.

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Methane emissions remain flat even as biggest US oil region opens the tap

Output of the greenhouse gas from the Permian Basin has remained near constant over a period during which oil and gas production tripled.

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Brazil election: many scientists relieved as Lula wins surprise victory

Scientific organizations in Brazil had rallied around Luiz Inácio Lula da Silva, who defied expectations to defeat his opponent in a run-off.

Mariana Lenharo

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These three red flags could unmask dodgy journals

As poor publishing practices proliferate, scholarly databases are under pressure to ensure the titles they list are reputable.

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Can science make your dog live longer? Longevity craze comes to pets

The emerging science — and industry — of animal longevity is attracting interest from companies and academics alike.

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The brain liquidates billions of mutant neurons around the time we're born

Faulty neurons can contribute to various neurological conditions, but researchers have uncovered a system that might clean them up.

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Is research funding now a lottery? Elite funder ERC swamped by applications

A marked rise in submissions for the European Research Council's grants is pushing down success rates.

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Could a giant sunshade in space 'solve global warming'? Scientists are taking the idea seriously

Some say the concept is complete fantasy, but a detailed analysis suggests that the falling cost of rocket launches might make it feasible in a few decades.

James Dinneen

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Mysterious flickering brain signals could help to unlock secrets of consciousness

Monkeys' brain activity flips 15 times per second between patterns linked to objects of which the monkeys are aware and patterns for objects outside their awareness.

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This cholesterol drug promised to be a game-changer. Why did it flop in the clinic – and is there still hope?

Physicians were excited about several therapies that slash levels of lipoprotein(a) — an important cardiovascular risk factor. One major trial failed to show a benefit, and now scientists are scrambling to work out what that means.

Cassandra Willyard

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When humans disappear, biodiversity takes a surprising turn

For decades, conservation has worried about the risks of too many people. In some places, depopulation is the real threat.

Emma Marris

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Earth's resources sustain humanity – but they come at a high price

Two books explore the damage caused by our unsustainable extraction of raw materials.

Richard Schiffman

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How researchers debunked 'race science': 'a triumph of scientific self-correction'

An account of how nineteenth-century studies aiming to find a biological basis for human races were dismantled by good scientific practices — although their effects are still felt today.

David Silverberg

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Cities are changing – and architects must adapt

Climate change is reshaping urban environments. Architect Carlo Ratti tells *Nature* that technology offers solutions, but citizens must get the final say.

David Adam

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Five overlooked steps to identify new epidemics, fast

Current measures to track emerging epidemics have a key limitation: they don't work if the disease causes unusual or unexpected symptoms.

Serge Tonen-Wolyec & Laurent Belec

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How democracy depends on science – and must protect it

Verified information from trusted experts is crucial to help the public and governments navigate rapid changes and increasing complexity.

Martin Kahanec, Naomi Ellemers ... Mangala Srinivas

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Why we're setting up an institute for radically broad thinking

The scale of today's challenges demands a fresh approach — across all disciplines. Here's how we're making space for researchers to generate new ideas.

Alon Chen, Patrick Cramer & David Nirenberg

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Universities must measure learning, both with and without AI assistance

Christoph Trattner

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Safety alerts must reach visiting PhD students

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Will my lack of country-specific grants limit my chances of employment abroad?

A researcher in Latin America seeks advice on the best way to present themselves when applying for faculty positions in Europe and North America.

Christine Ro

Collection: An 'agony aunt' for working scientists

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Meet Neuropixels: how probes that track hundreds of brain cells at once are revolutionizing neuroscience

From rodents to humans, tools that enable large-scale, single-cell neuronal recordings are exposing the inner workings of the brain.

Diana Kwon

Technology Feature: Neuropixels: inside the mind's eye

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Cutting-edge technique uncovers how the spine's shock absorbers bear load

An exciting imaging approach reveals how discs of soft tissue in the spine respond to compressive force at the micrometre and nanometre scales.

Hanna Isaksson

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Using AI to offer personalized health advice

The use of artificial-intelligence tools in medicine is increasing. What types of technology might be on the horizon and how can such health-advice tools be tested?

Emma Pierson

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Large-scale single crystals printed layer by layer

A 3D-printing method has made single crystals of metals and alloys in complex shapes and up to one metre in length, as needed for advanced technological applications.

Gregory S. Rohrer

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Spider snooze stages

How similar are vertebrate and invertebrate sleeping behaviours? An analysis of spiders offers insights about how sleep evolved.

Mary Abraham

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People's social networks can be unintentionally reshaped during randomized interventions

A re-examination of a randomized controlled trial for a health-advice intervention reveals ripple effects and altered relationships in communities in rural Honduras.

Joana Gonçalves-Sá & Ana Maria Jaramillo

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How early tetrapods got their neck

As fish evolved into four-limbed creatures, their skull separated from their shoulders to form a neck. Now we learn that this early neck was surprisingly rigid.

Tatsuya Hirasawa

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Accelerating commercialization and deployment of indoor photovoltaics

Recent progress in photovoltaics has been investigated to translate state-of-the-art cells in the laboratory into deployable products suited to real indoor conditions, focusing on wide-bandgap absorbers, reduced non-radiative voltage losses and reshaping module design.

Tae Hyuk Kim, Yong Cui ... Jae Won Shim

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Imaging exoplanets below the telescope stability limit

A new physics-based method combining the use of automatic differentiation to optimize millions of model parameters with a flexible physical model is described for starlight subtraction from real, on-sky coronagraphic images to greatly improve sensitivity.

Rodrigo Ferrer-Chavez, Jason J. Wang ... Marshall D. Perrin

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Subcycle videography of Landau–Zener–Majorana transitions in graphene

An experimental concept enabling attosecond-precision, subcycle band-structure videography covering the entire first Brillouin zone is demonstrated and used to visualize the lightwave-driven electron motion of Landau–Zener–Majorana transitions in graphene.

V. Eggers, G. Inzani ... U. Höfer

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Time-reversal-symmetry-breaking spin injection from a compensated magnet

Experiments show that altermagnetic Mn_5Si_3 generates spin currents despite zero net magnetization, demonstrating a central prediction of altermagnetic spintronics.

Jone Mencos, Antonin Badura ... Fèlix Casanova

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Delayed electron–hole recombination in a pseudo-direct semiconductor

Pseudo-direct bandgap character in bismuth sulfide retards bimolecular electron–hole recombination while preserving strong light absorption.

Marcello Righetto, Debalina Banerjee ... Laura M. Herz

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Monolithically and in situ integrated PbS infrared imagers

A method for growing infrared image sensors directly from solution using raw materials by monolithic in situ integration of high-performance semiconductor PbS photodetectors on readout integrated circuits is described, yielding films with excellent electronic properties.

Sen Li, Jing Liu ... Jiang Tang

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Multimodal X-ray imaging reveals hierarchical fibre mechanics

The X-ray visualization platform TomoSAXS, demonstrated here on intervertebral spinal discs, can visualize nanoscale to macroscale mechanics in intact biological organs and fibrous materials.

Elis Newham, Alissa L. Parmenter ... Himadri S. Gupta

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Additive manufacturing of ultralong and architected single crystals

A free-form additive manufacturing method that uses alternating and pulsed heat inputs is described for fabricating metre-tall, centimetre-diameter single crystals of Ti-6Al-4V, as well as hard-to-process refractory metals, including W, Mo, Nb and MoNb alloys.

Changmeng Liu, Yinan Cui ... Y. Morris Wang

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The deep Earth origin of the Great Unconformity

Continental-scale uplift and subsidence associated with long-wavelength dynamic topography due to mantle convection drove the formation and preservation of the Great Unconformity.

Santosh Dhungana & Nicolas Flament

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Educational intervention can rewire village social networks

A randomized controlled trial involving a health-education intervention in rural villages in Honduras shows that the intervention changed social network connections, including not only health-related connections but also friendships and financial ties.

Marios Papamichalis, Laura Forastiere ... Nicholas A. Christakis

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Drought and disease trigger novel interactions among top predators

Climate-driven drought and prey decline triggered lynx predation on raptors, reducing raptor fitness and abundance and producing cascading effects across lower trophic levels.

Fabrizio Sergio, Haruki Natsukawa ... Julio Blas

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Early tetrapod neck mobility modelled using an extant analogue

Biomechanical analysis of several early tetrapods using sturgeon as an analogue revealed that early tetrapods had limited neck mobility despite separation of the head and shoulders.

Dana E. Korneisel, Cassandra M. Donatelli ... Hillary C. Maddin

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Within-family effect of ancestry on complex traits in a Mexican population

This study uses a within-family design to identify significant ancestry differences in complex traits such as height and type 2 diabetes in a genetically diverse population from Mexico City.

Siqi Wang, Jaime Berumen ... Peter M. Visscher

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Predicting genome-wide functional constraints with GPN-Star

GPN-Star, a genomic language model with a phylogeny-aware architecture for whole-genome alignment data, is shown to be a scalable and flexible tool for genetic variant effect prediction across species.

Chengzhong Ye, Gonzalo Benegas ... Yun S. Song

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Neuronal detection of social actions directs collective escape behaviour

Collective escape in *Danionella cerebrum* arises from visual detection of rapid, biologically realistic motion of other fish, with midbrain and thalamic neurons encoding social offsets that enable fish to infer danger from others' behaviour.

Jo-Hsien Yu, Geoff T. Meyerhof ... Matthew Lovett-Barron

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A retinoic acid autoregulatory loop governing prefrontal–motor arealization

MEIS2, encoding a transcription factor linked to intellectual disability and autism spectrum disorder, is a key hub of a retinoic-acid-associated gene regulatory network.

Lin Yang, Mikihito Shibata ... Nenad Sestan

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Transcriptional activation of plant immunity by salicylic acid

A mechanistic basis for how the hormone salicylic acid promotes transcriptional activation during plant immune responses is described.

Songwen Zhang, Madeline Gish ... Ning Zheng

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Mechanisms of transcriptional regulation by salicylic acid receptors

Deciphering a dual receptor pathway of salicylic acid signalling in plants offers a comprehensive view of salicylic acid-mediated defence gene activation, triggering transcriptional activation through NPR1 and relieving transcriptional repression by NPR3 and NPR4.

Yujun Peng, Hainan Tian ... Yuelin Zhang

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Alveolar stem cells transdifferentiate to drive bronchiolar regeneration

Identification of a cross-compartmental cellular mechanism for bronchiolar epithelial repair informs therapeutic strategies for airway injury.

Kuo Liu, Zixin Liu ... Bin Zhou

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The anatomy of a personal health agent

A multi-agent framework that coordinates data science, medical reasoning and health coaching over longitudinal wearable and clinical data to provide holistic personal health support is described.

A. Ali Heydari, Ken Gu ... Xuhai Orson Xu

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Identification of broadly tumour-reactive γδ TCRs from multiple myeloma

A machine-learning algorithm, PreGame, is developed to identify tumour-reactive γδ T cells from single-cell CITE sequencing data, and expansion of this cell population can be used as a biomarker of therapeutic response.

Michael St. Paul, Liam D. Hendrikse ... Tak W. Mak

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Evolution and heterogeneity of lethal metastatic bladder cancer subtypes

A rapid autopsy programme provides valuable resources to enable detailed molecular and genetic analyses of the temporal evolution of aggressive histological subtypes and therapy resistance in metastatic bladder cancer.

Pushpa Itagi, Samantha L. Schuster ... Gavin Ha

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Hepatocytes promote liver metastasis of pancreatic cancer by providing serine

Metastatic pancreatic ductal adenocarcinoma (PDAC) in the liver that lack the enzyme necessary to synthesize serine can reprogram hepatocytes to produce this amino acid, thus promoting tumour growth and survival.

Koelina Ganguly, Keisuke Yamamoto ... Alec C. Kimmelman

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A TBK1/ULK1 signalling axis couples lysosomal stress to TFEB activation

Proteomic and phosphoproteomic analyses of lysosomes identify a nutrient-independent regulatory arm of mTORC1 signalling that mediates lysosomal adaptation to stress and whose deregulation underlies tumorigenesis in follicular lymphoma.

Alessandra Esposito, Ibrahim Bayramoglu ... Gennaro Napolitano

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Mechanism of spliceosome termination

A coordinated sequence of RNA helicases and associated factors dismantles normal and defective spliceosome complexes to enable intron degradation and ensure accurate gene expression.

Vytaute Boreikaite, Rupert Faraway ... Clemens Plaschka

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Author Correction: Long-read sequencing reveals pre-meiotic gene conversion in sperm

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Neuropixels: inside the mind's eye

Researchers — and philosophers — have long desired to understand what's happening inside other peoples' minds.

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The field of neuroscience has seen rapid progress over the past decade, owing in part to better technology and increasing cross-discipline studies.

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