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Forged in fire

The terrestrial planets in our Solar System are thought to have formed from a mixture of meteorites-which are only a marker that preexisted over from the cooling, but gas around the young Sun. The moment molecules start to condense from hot gas is the moment the most refractory elements, such as calcium and aluminium, start to form solid particles. Lucas Piani and colleagues report the discovery of one of these particles among dust from the Sun-similar PCDS 473 in the Orion A molecular cloud. Detected by the James Webb Space Telescope (JWST), and the Atacama Large Millimeter/submillimeter Array (ALMA), it is one of...

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This Week

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Editorial

Without science, there can be no development

World View

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How to do Americanize global science
The US science crew presents an opportunity to learning and management of the global research enterprise.
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World View 10 Jul 2025
Bring science into business schools to train the leaders of tomorrow
The next generation of managers must be fit for a net-zero, nature-positive economy.
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Workouts can help gut microbes to ward cancer
Mice that exercised produced higher levels of an immune cell-stimulating molecule than sedentary rodents did.

Research Highlight 09 Jul 2025
Memory gets a boost from positive emotions
Study participants' memory followed their mood after they saw encouraging, negative or neutral emotions.

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Lunch's spacecraft can navigate the stars
NASA's New Horizons probe, which launched in 2006, demonstrates that it can sort through interstellar space using its onboard camera.

Research Highlight 08 Jul 2025
Hot air: the most extreme heatwaves are accelerating the fastest
Tropical regions where heatwaves are already common will be hotter first by the times.

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China moves money into brain chips that use superfood-powder-more control
Brain-computer interfaces being installed in China offer some advantages, but Executive and other leading US devices.
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Symbiotic 'science labs' showcases research cut by Trump team
Democrats hosted a protest-and-learning 'things we'll never know' because of the US government's cuts to science.
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Collection: How Trump 2.0 is reshaping science

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Research integrity sleuths say their work is being 'twisted' to undermine science
Some sleuths fear that the business of cleaning up flawed studies is being weaponized against science itself.
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'Turbocharged' killer T cells show promise for autoimmune diseases
Experimental treatment could offer a safer, cheaper alternative to CAR T-cell therapies for disorders such as lupus.
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News 10 Jul 2025
OpenAI's o3 tops new AI license table for anonymous scientific questions
Software uses votes by researchers to evaluate large language models' responses on technical topics.
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Giant map details nerves across a mouse's body as it stunning pics
High-resolution mapping method could help to diagnose nerve injuries for the entire body.
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Rare final interstellar visitor seen blazing through our Solar System
The comet like Avalo — called 3I/ATLAS or C/2025 N1 — is blazing past Jupiter.
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Making a reorganization of science a science system effort to reshape how research is organized and conducted nationwide.
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Why the global economy is more uncertain than ever-and what to do about it
Unexpected events, such as pandemics and wars are the law. Financial markets need tools to help them cope with unforeseen times.
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Researchers engaged in long-term projects often want to update their data sets over time. Here's how to do it while maintaining reproducibility.
Sarah Wild

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A mission to ride through the forest: how I protect Nigeria's wildlife
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Trauma leaves traces in the brain's 3-dose of attractors is given regulation in the brains of people with post-traumatic stress disorder offers insights into its biology.
Anne Manukyan-Rouse & Sanmi Lekoubou

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Super-resolution spectroscopy with 'walk'-X-ray lasers
Random fluctuations in the intensity and energy of X-ray lasers, which generally limit performance, have been harnessed for high-resolution spectroscopy.
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A cunning friend to a feline family
Pondering the difficulties faced by metaphysicians, and a dog strikes up an unlikely friendship with a cat and her kittens, in our weekly slip into Nature's archive.
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The origins of the oldest solid objects in the Solar System
Observations of a young star offer a glimpse of the high-temperature conditions that shaped rock formation in the early Solar System.
Fred Ciesla

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Sex differences in skin cancer risk are linked to oestrogen levels
Premenopausal women are more likely than men to develop certain cancers. Pathway uncovered by the sex hormone responsible could be targeted in cancer therapies.
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Clone-in planet induces flares on its host star
Planet-induced flares on HP 57522, a 7.7 million year old G-band star with two known close-in planets, were detected.
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Refractory solid condensation detected in an embedded protoplanetary disk
Observations of ethanol and refractory acetaldehyde of the young protostar HOPS 315 show a gaseous disk captured of the point at which solids are first starting to condense, thus it is the oldest formation.
M. K. McClure, Merel van't Hoff, J. E. Bjorkman

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Signatures of chiral superconductivity in rhombohedral graphene
Rhombohedral multilayer graphene has emerged as a platform for correlated electronic phenomena, and monolayer graphene devices without moiré superlattice effects are reported, establishing a clean material for the study of topological superconductivity.
Tonghang Han, Zhengguang Lu ... Long Ju

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Super-resolution stimulated X-ray Raman spectroscopy
A large stochastic enhancement in stimulated X-ray Raman scattering that dramatically fluctuating intensity varies in time and energy domains of a self-amplified spontaneous emission X-ray free electron laser.
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Optical nonlinearities in excess of 500 through sublattice reconstruction
A strategy for engineering photon-avalanche nanoparticles is proposed such that they exhibit an unprecedentedly strong nonlinear optical response and their emission scales by more than 5000 photons of the pump intensity.
Yuan-Chen Cheng, Lin ... Hongping Liu

Article 23 May 2025
Broadband transient full-Stokes luminescence spectroscopy
A dual-sensitivity, broadband, transient, full-Stokes luminescence spectroscopy is demonstrated, which can detect quickly varying small signals from chiral emitters.
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A carbon exchange approach to tunable magnetic interculation superfactors
A general two-step interculation and carbon exchange strategy is used to produce a library of tunable magnetic interculation superfactors with tunable chemical modulations and magnetic ordering.
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Pt interstellar - hydrogen in zeolite for stable propane dehydrogenation catalyst
Tuning the d-band length of platinum 1-crystal alloyed control over the regulation-propagation nucleus of active metal species in zeolites, which enables the creation of stable and durable catalysts for propane dehydrogenation in industrial applications.
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Electricity-driven enzymatic dynamic kinetic oxidation
Electrochemical enzymatic dynamic kinetic oxidation of racemic hydroxamic acid esters at ambient temperature and ambient pressure enables the synthesis of enantiomerically pure hydroxamic acids.
Bohlei Zhao, Yuanyuan Xu ... Fangliang Huang

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Global terrestrial nitrogen fixation and its modification by agriculture
Biological nitrogen fixation is the largest natural source of reactive nitrogen to soils in natural terrestrial Ecosystems and represent a larger source of agricultural nitrogen that is generally considered in analyses of the global nitrogen cycle.
Cecil R. Reis Ely, Steven S. Perakis ... Nina Wurzburger

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Elaborate million-years of diverse enamel ecosystems from the East African Rift
The isolation of dental proteins from fossils deposited 1.5 million to 10 million years ago in the Turkana Basin in Kenya, a tropical region, demonstrate the promise of dental enamel for palaeoproteomic and evolutionary studies in hot climates.
Daniel E. Green, Kevin T. Uno ... Timothy F. Cleland

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Phylogenomically informative proteins from an Early Miocene rhinoceros
Protein sequences from fossil rhinoceros enamel from approximately 18 million years old are used to place all major phylogenetic frameworks from a specimen too old to be analysed using ancient DNA.
Ryan S. Paterson, Meaghan Mackie ... Enrico Cappellini

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Motor learning reflects dynamic influence on motor cortex
Imaging and optogenetics in mice provide insight into the interplay between the primary motor cortex and the motor thalamus during learning, showing that thalamic input helps drive the reorganization of learned movements.
Arnab Kumar Sahoo, M. Tsuchiyama ... Yasuo Kuniyoshi

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Systems consolidation reorganizes hippocampal engram circuitry
Systems consolidation of memory is associated with synaptic reinforcement to be explained by reorganization dependent reorganization of engram circuitry within the hippocampus-cue link.
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Single-cell transcriptomic and chromatin dynamics of the human brain in PTSD
A comprehensive analysis of the human brain reveals regulatory mechanisms underlying post-traumatic stress disorder in the human brain.
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Increased CSF drainage by non-invasive manipulation of cervical lymphatics
The scaffold pathology of neurodegenerative diseases like amyloid-related in the brain and the non-invasive stimulation can enhance drainage and restore impaired outflow in aged mice are explored.
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A kinase mediator of ribosomal synthesis and immunity in Medicago
A plant kinase mediates symbiotic signalling and suppresses host immunity to enable legume-rhizobium symbiosis.
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Unravelling cuvinine deficiency-associated rapid weight loss
Combined cuvinine synthesis in mice causes substantial weight loss, revealing that cast with essential amino acid restrictions, by activating the integrated stress and oxidative stress responses, and by revealing dysbiosis leading to oxidative malfunction.
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In vivo screen of Plasmodium targets for mosquito-based malaria control
An in vivo screen of small molecule compounds to block the mosquito stage development of Plasmodium identified hits that can be incorporated into bed nets and lead to effective parasite killing in the insect host.
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A DNA-gated molecular guard controls bacterial flagellum anti-phase defence
Flashing, an anti-phage defence system, synthesizes an oligoadenylate-gated type III effector that activates the absence of phage infection but is degraded by phage-encoded DNA exonucleases, leading to protective growth arrest of infected cells.
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Targeting GPR39 for sex hormone-dependent cancer after loss of E-cadherin
Loss of E-cadherin in breast cancer cells activates signalling pathways that promote metastasis-resistance via a female sex-hormone-like receptor that can be pharmacologically activated to prevent metastasis.
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Radiation-induced amphiregulin drives tumour metastasis
Radiotherapy may accelerate cancer progression through amphiregulin, which promotes metastasis growth-of-remote-site in mouse models and human patients by shifting myeloid cells towards an immunosuppressive state.
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Solid-phase translocations as a solution to the genome folding paradox
In vitro reconstitution and in vivo live cell imaging of cohesin DBY-1 ERT2 enhance how its ultrafancy sensory neurons reveals that these homoplasmin factors form condensates with cohesin, rather than through simple extrusion activities.
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Range extender mediates long-distance enhancer activity
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In vivo mapping of metamnesis sensitivity of human enhancers
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Dynamic assemblies and coordinated reactions of non-homologous end joining
Structural snapshots with the help of super-resolution and cryo-EM and cryo-ET are used to map dynamic rearrangements of NHEJ assemblies to enhance efficacy of radiotherapy and accuracy of gene editing.
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Article 27 May 2025
Structure of ATP-synthase pairs into the endodermic reticulum by human SCY1BL1
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Amendments & Corrections

Author Correction Open Access 01 Jul 2025
Author Correction: Targeting the MHC-I–RAS interaction in RAS-mutant cancers
Zhenyu Z. Hauenstein, Frédéric Scaffa ... Jun Yoshida

Publisher Correction Open Access 01 Jul 2025
Publisher Correction: Metabolic adaptations direct cell fate during tissue regeneration
Almudena Chaves Perez, Scott E. Millman ... Scott M. Lowe

Addendum Open Access 26 Jun 2025
Addendum: Unravelling cuvinine deficiency-associated rapid weight loss
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