

Science & Technology

1. Microbial glues go from foe to friend with a simple chemical tweak

Biofilms act as a complex protective matrix that protects embedded cells from mechanical stress and extreme environmental conditions, such as alternating wet and dry conditions and high osmotic pressure, which are essential for their survival in environments such as sinks and industrial plants. The profound strength of mature biofilms is generally attributed to the physical barrier function of extracellular polymeric substances (EPS), which prevent disinfectants such as bleach from effectively penetrating all embedded cells, especially those in a physiologically altered state.

Source: JAMES COOK UNIVERSITY- Australia

<https://www.jcu.edu.au/news/releases/2025/december/microbial-glues-go-from-foe-to-friend-with-a-simple-chemical-tweak>

2. New species of beetle named in honour of Gerald Durrell

Durrell's books were publicly available because they featured a unique combination of popular science, conservation themes, and humor, providing politically neutral content that appealed to the public, while avoiding the heavy censorship imposed on foreign politically or ideologically sensitive publications. Telnov's keen interest in the exotic, tropical context (from Durrell) led to his passion for collecting and studying insects—the only fauna available in his native Latvian region—a process of intellectual transposition.

Source: Natural History Museum- United Kingdom

<https://www.nhm.ac.uk/discover/news/2025/december/new-species-of-beetle-named-in-honour-of-gerald-durrell.html>

3. Only Cowbirds Sing the Watery Blues

Timbre refers to the quality or 'color' of a sound, allowing listeners to distinguish between different sound productions, even when the pitch and amplitude are the same. The syrinx is the vocal organ of birds. Its structure, often described as a double voice box, allows for complex sound modulation. Watery timbre is characterized by a sharp burst followed by a slow wave, resembling a drop hitting water and the subsequent bursting of an air bubble.

Source: THE UNIVERSITY of UTAH- United States

<https://www.biology.utah.edu/uncategorized/only-cowbirds-sing-the-watery-blues/>

4. Severe drought linked to the decline of the hobbits 61,000 years ago

Insular dwarfism is an adaptation to limited insular resources, favoring smaller body size to reduce calorie needs and reproductive success, a process exacerbated by potential founder effects. The relatively small stature and brain size of australopithecines raise serious questions about its evolutionary relationship, leading to a heated debate over pathological microcephaly versus endemic insular speciation.

Source: UNIVERSITY OF WOLLONGONG- Australia

<https://www.uow.edu.au/media/2025/severe-drought-linked-to-the-decline-of-the-hobbits-61000-years-ago.php>

5. Skoltech researchers developed a method to accurately evaluate fibrous material porosity from a single image

In composite materials, controlling porosity appropriately affects interfacial coupling strength and prevents detrimental pore clustering, which directly impacts mechanical performance and failure mechanisms. 2D projections actually 'compress' depth information, leading to overestimation or underestimation of free space (porosity) because closed voids are not distinguished by physical fiber overlap.

Source: Skoltech- Russia

<https://www.skoltech.ru/en/news/skoltech-researchers-developed-method-accurately-evaluate-fibrous-material-porosity-single-image>

6. A Molecular Switch for Green Hydrogen: Catalyst Changes Function Based on How It's Assembled

The vanadium cluster (a polyoxometalate) contains redox-active sites that are essential for mediating both multi-electron OER and HER pathways by undergoing several stable oxidation states. Topological control means that the structure or physical arrangement (supramolecular architecture) determines the function, while the chemical composition (elemental makeup) of the active site remains the same.

Source: Centro Singular de Investigación en Química Biolóxica e Materiais Moleculares- Spain

<https://www.usc.es/ciquis/en/news/molecular-switch-green-hydrogen-catalyst-changes-function-based-how-its-assembled>

7. New Scientific Discovery unlocks real-time insight into quantum behavior, paving way for advanced sensing and quantum technologies

Quantum coherence in superconductivity is essentially linked to the phase rigidity of the macroscopic quantum wave function, allowing for zero-resistance flow of supercurrent. The core of the Josephson effect requires that the macroscopic wave functions of two superconductors overlap without any loss at a weak link or tunneling barrier, allowing phase-dependent coherent tunneling.

Source: CNR-INO- Italy

<https://www.ino.cnr.it/?p=26668>

8. New Image Sensor Breaks Optical Limits

In conventional systems, resolving small features typically requires a high NA objective, which physically requires the lens to be very close to the object (short working distance), limiting non-invasive applications. Synthetic aperture imaging relies on the coherent combination of data from widely spaced sensors, using their separation distance as the diameter of the synthetic aperture, to increase resolution.

Source: UCONN- UNIVERSITY OF CONNECTICUT- United States

<https://today.uconn.edu/2025/12/new-image-sensor-breaks-optical-limits/>

9. Demonstrating a Novel Method to Modulate Heat Flow Through the Collective Motion of Spins

This finding contradicts the common belief that in metals where electrons are the primary heat carriers, magnon contributions are minimal, especially at room temperature. This result suggests a new important thermal transport channel, particularly at interfaces, that was previously overlooked. In highly metallic systems like CoFe, electrons dominate the bulk thermal conductivity. For magnons to become significant thermal contributors, they must provide a highly efficient secondary channel, preferably one that is better at interfaces and overcomes the intrinsic thermal boundary resistance more effectively than the electron-phonon or phonon-phonon channels.

Source: NIMS- Japan

<https://www.nims.go.jp/eng/press/2025/10/202510060.html>

10. Flaring black hole whips up ultra-fast winds

The initial X-ray outburst heated the surrounding material, causing rapid ionization and acceleration, leading to the signature of blue-shifted spectral absorption lines indicating emerging, high-velocity winds. This mechanism is clearly comparable to solar flares, which are driven by magnetic field reconfiguration ('untwisting'), suggesting magnetic pressure or reconnection as the immediate kinetic driver of ultra-fast outflows (UFOs).

Source: THE EUROPEAN SPACE AGENCY- France

https://www.esa.int/Science_Exploration/Space_Science/XMM-Newton/Flaring_black_hole_whips_up_ultra-fast_winds