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ONLINE COVER: Tumbleweed-inspired Twirbot in direct light. Spherical structures are ideal for omnidirectional movement, but existing spherical robots rely on onboard controls and power sources, increasing design complexity and cost. By weaving photoactive/passive bilayer strips into tumbleweed's typical hollow sphere, Chen et al. developed a robot that can roll...

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Precipitation variability, fertility, and metabolic stress over 5 millennia in the ancient Andes: A bioarchaeological path analysis
BY THOMAS J. SPODICK, MARTIN N. GROTE, DAVID A. SCHUCH • 29 APR 2026

Drought in the ancient Andes affected childhood stress, but variation characterizes responses to adverse climate conditions.
ABSTRACT

PSGRN: Gene regulatory network inference from single-cell perturbational data through self-training with synthetic gold standards
BY JIHOAN SONG, KAYEEN DEEB, WANGYI CHEN, TONGFANG GUAN • 29 APR 2026
A self-training strategy boosts discovery of gene regulatory networks from single-cell perturbations.
ABSTRACT

NEUROSCIENCE

Functional interrogation of neuronal connections by chemoptogenetic presynaptic ablation
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Organismal fitness influences not only selection but also the type and amount of mutation available to selection.
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Dust storms: Hidden drivers of extreme rainfall and global precipitation shifts
BY YUZHONG LIU, WEIYI YANG, TIANBEN SHAO, RUN LUO, ZIYUAN TAN, DAN LI, JIANPING HUANG • 29 APR 2026
Dust storms boost rain via ice nucleation effects, reshaping precipitation patterns globally.
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Shifts in Antarctic Intermediate Water properties coincide with atmospheric CO2 rise across the Mid-Brunhes Event
BY PAUL TAPPA, EEE LIND HO, DIRK HUNBERGER, A. NELLE MEHLER, YOSHIFUMI IKEDA, RALF TRIEDMANN • 29 APR 2026
Melwater-driven shifts in Antarctic Intermediate Water weakened ocean carbon storage across the Mid-Brunhes Event.
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Unlocking biodiversity data with robotic imaging and AI-driven transcription of natural history collections
BY CHRISTOPHER A. JOHNSON, DENISE WELLS-DRAKE, ELLEN Y. FRANKS, PARKER M. JUSTIN, EVELYN CHANG, PETER DALEY, ANN DAVIS, JOHANN M. DONIZALEZ, CHAI-WEI KANG, ROBERT E. J. MERRIS, [...] ESTEFANIA RODRIGUEZ • +5 authors • 29 APR 2026
Robotic imaging and AI transcription workflow accelerates specimen label digitization by 30x, unlocking biodiversity metadata.
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Physics-based models outperform AI weather forecasts of record-breaking extremes
BY ZHONGWEI ZHANG, BRUCE FISHER, JAVIER GONZALEZ-DE-SOLLA, TIGRAN HANEGAN • 29 APR 2026
Physics-based models still outperform artificial intelligence-based weather models in forecasting record-breaking extreme events.
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BY SANGHVIKAR L. KADAM, SAKSHI K. KADAM, SAKSHI K. KADAM, SAKSHI K. KADAM • 29 APR 2026
Elevated O3 due to wildfire smoke is a substantial health risk factor in the US and is poorly correlated with smoke PM2.5.
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The pace of meeting carbon emission targets alters regional climate risks
BY HONGHONG FANG, SHAOYUAN WANG, ANDREW D. KING • 29 APR 2026
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The rise and fall of the world's greatest marine biodiversity hotspot
BY ALEXANDRE C. SOGGERA, WOLFGANG HEDERLUND, MORGAN H. PAUL, DAVID R. BELLWOOD • 29 APR 2026
Miocene reef expansion shaped marine biodiversity, linking reef growth with the rise of tropical fish and coral diversity.
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Volcanic forcing of global climate cooling at the Younger Dryas onset preserved in North American sediments
BY LUCIAN NANA YODI, ALAN D. BRANDON, SYDNEY O'BRIEN, JESS J. KALLIGIAN, MICHAEL A. WATERS • 29 APR 2026
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Crystallization modulation of methylammonium-free narrow-bandgap perovskite for thermal-stable all-perovskite tandem solar modules
BY HAN GAO, JIE WEN, SHANG ZHANG, MANTU LI, SHENGCHENG YANG, HONGFENG SUN, CHENHONGYU LIU, SHU XIA, KUNDA NGUYEN, PEI WU, [...] HUIJUN TAN • +11 authors • 29 APR 2026
P-i-n conjugated semicarbamate hydrochloride enables all-perovskite tandem solar modules with improved efficiency and stability.
ABSTRACT

Dynamic assembly of interfacial organic cations enables highly stable and selective CO2 electroreduction in acid
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An organic cation-mediated acidic CO2 electrolysis system achieves exceptional selectivity and stability.
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H-linear magnetoresistance in NbSe2 due to impeded cyclotron motion
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Linear magnetoresistance in NbSe2 is shown to be linked to impeded cyclotron motion induced by the low-temperature charge order.
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Genetically engineered human cell-based microbots for selective cancer cell death
BY NHAH OLLAY SOOAN, EVELYN SHADY, JULIA URANISSET, CEM BALDA DAVAN, GUNTHER RICHTER, AHMET ONOZE, TUGBA BAQI-ONDER, METIN SIFTI • 29 APR 2026
Magnetically guided human cell-based microbots selectively kill cancer cells without harming surrounding healthy tissues.
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BY CHI CHEN, ZHAO WANG, YUCHEN WANG, PENGJIAO SHI, ZHIGAO LAU, MINGBO SHI, BOI DUAN, HENHAI HOU, YIMIN HE • 29 APR 2026
A tumbleweed-inspired robot enables untethered, autonomous, omnidirectional, multiterain locomotion at ultralow cost.
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Continuum tactile sensing via an amplified liquid metal interface
BY ERLONG WANG, MINGYUAN SUN, SU-AN GE, SHANG DONG, SHANG MA, SHAO PAN, HONGTIAN REN, YUEBEI ZHAI, HU JIN, SHI-YANG TANG, [...] SHIRUI ZHANG • +2 authors • 29 APR 2026
A simple liquid metal surface senses touch the same as a complex array by amplifying its signal upon contact.
ABSTRACT

In vivo membrane engineering traps Gd-based MRI contrast agents for detecting microhepatocellular carcinoma
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ABSTRACT

Space-time acoustofluidic tweezers for dynamic and selective manipulation of microparticles
BY QIANG WU, JIYUJUN SHI, XIAOHONG YANG, HAOJUN QIU, JIANG D. H. HUI, TAO NAGUI, MINGYUAN LIU, YING CHEN, JOSEPH RUFFO, JIYUNTING SHI, [...] TONGYI JIAN HUANG • +3 authors • 29 APR 2026
Space-time acoustofluidic tweezers use acoustic detuning to selectively control particles with opposite acoustic contrasts.
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Static-electricity-induced luminescence trajectory tracking: A paradigm for noncontact human-machine interaction in dark environments
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Static-electricity-induced luminescence trajectory tracking enables fast, noncontact human-machine interaction in the dark.
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TLR7 alters the maternal immune landscape during influenza A infection to increase maternal and fetal morbidity
BY GENNIA S. TROLLOPE, MARY A. MILES, MADISON CHANDLER-BATH, FELICIA LONG, DOUG A. BROOKS, JOHN J. O'LEARY, STAVROS SELEGNIOS, STELLA LONG • 29 APR 2026
TLR7 signaling drives systemic maternal and fetal pathology during gestational influenza infection.
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PARP4 ADP-ribosylates PIDD1 to complete a phospho/SUMO/PAR-ylation cascade that orchestrates PIDDosome assembly
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The orphan PARP, PARP4, is shown to play a critical role in the apoptotic response to unresolved DNA interstrand cross-links.
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Under stress conditions, stem cells rely on eIF2A-mediated CBC-dependent translation to sustain YAP synthesis and proliferation.
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Mechanism of the myosin inhibitor mavacamten is revealed by cryo-EM and cross-linking studies.
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A simple pulse-and-rest circuit may explain how immune cells strike hard at threats yet avoid self-destruction.
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BY FANJIAO BANG, MOHAMMAD ASLAM KHAN, SHAN LI, MORGAN PENNELL-SHALLON, SHAFIQ WANG, ROBERT A. MOBLEY, KELLY B. BARNETT, MATTHEW M. WELLS, MATTHEW BAUER, CHRISTOPHER WINCKEL, [...] SAMUEL W. BRADY • +11 authors • 29 APR 2026
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High-resolution structures reveal how cardiomyopathy drugs modulate myosin to suppress or enhance human heart contraction.
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