SCIENCE ADVANCES

VOLUME 12 | ISSUE 15 | 10 APR 2026

ONLINE COVER: A molecular dynamics simulation of nucleosomes and linker histone H1 with single-H1 trajectories (background). Histone H1, the most abundant chromatin protein, condenses chromatin and modulates DNA transactions, but how it does so remains unclear. Shimazoe *et al.* combined direct visualization of single-H1 molecules in living human cells with molecular...

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SOCIAL AND INTERDISCIPLINARY SCIENCES AND PUBLIC HEALTH

Ancient genomes reveal an extensive kinship network and endogamy in a Three-Kingdoms period society in Korea

BY HYUNSEUNG KIM, DUDEROM KIM, ALINA N. HISS, DONHYEONG LEE, Dae Gyun LEE, EFFIA MENSAH-NAYO, GUIDO ALBERTO DINEZIO-RUSCONE, JOHANNES KRAUSE, ILAN LIM HYU CHOONGWON JEONG • 08 APR 2026

Ancient genomes reveal a dense network of sex-unbiased kinship and endogamy in a fourth to sixth century CE society in Korea.

ABSTRACT

Multimodal platform for ITN efficacy: Surface chemistry, bioavailability, and mosquito behavior

BY HARIHAY W. GRIMA, NGA-TSING THAM, JEFF JONES, KYLE WALKER, JONATHAN THORNTON, MARK PAINE, STEPHAN KARL, LISA REIMER, RASHITA RAVAL • 08 APR 2026

Removing PFAS from ITNs compromises insecticide bioavailability and effectiveness, particularly against resistant malaria vectors.

ABSTRACT

NEUROSCIENCE

Pulmonary neuroendocrine cell–derived exosomes regulate iron homeostasis and oxidative stress in lung neurons

BY ABHIMANYU THAKUR, XUE ZHANG, JONATHAN CHEN, SHUYA WEI, JACE CHEN, APOLLINE VERDELL, EMILY JACOBS, LIZA MULDER, ABIGAIL WHITFORD, ASHOK THURAIAH, [...] HUIMAHUN JOYCE CHEN • +7 authors • 08 APR 2026

Nicotine triggers PNEC-derived exosomes that alter iron and redox balance associated with neuronal dysfunction.

ABSTRACT

Selective, genetically induced increase in synaptic vesicle priming

BY MOHAMMAD ALQURAISHI, SUNITA SHELDON, ANDREA LORINCZ, INGI LIPPERMA, NILS BRIESE, DILSHA NURSEY • 08 APR 2026

Selective increase of synaptic vesicle priming reveals the mechanisms of functional synaptic diversity.

ABSTRACT

EARTH, ENVIRONMENTAL, ECOLOGICAL, AND SPACE SCIENCES

Faulting triggered by a quasi-diffusionless shear transition of olivine in deep subducted slabs

BY KOHEI MATSUDA, TOMOHIRO OHUCHI, SAYAKO INOUE, YUJI HIGO, NORITOSHI TSUJINO, SHO KAKUZAWA, TAKESHI SAKAI • 08 APR 2026

A quasi-diffusionless phase transition of olivine to ringwoodite via poinsotite induces deep earthquakes in cold deep slabs.

ABSTRACT

As above, not so below: Ion fractionation in planetary analog ices

BY JOSEF C. HAFFNER, SARA S. TEOLIS-POWELL, AASEN MURCEK, TARA C. TOMLINSON, ALEXA SCHMITT, TIMOTHY ARMSTON, CAROLINE GURD, ANGUS MCKENEN, NATALIE K. WOLFENBARGER, TAYLOR [...] CHILDS, [...] JOSEPH A. KEYER • +1 authors • 08 APR 2026

Laboratory experiments show how the physics of salty ice could change our understanding of ocean worlds across the solar system.

ABSTRACT

Satellite altimetry reveals spatially nonlinear kinetic energy cascade in the global ocean

BY XIN XU, RU CHEN, GUANGHUI WANG, ZHENGGUANG ZHANG, ANDREW STEWART, GUIHUA WANG • 08 APR 2026

Spatially nonlocal kinetic energy cascade prevails from mesoscale to large scales across the global ocean surface.

ABSTRACT

Meridionally consistent decline in the observed western boundary contribution to the Atlantic Meridional Overturning Circulation

BY QIANJUAN TANG, ZHANG CHEN, WILLIAM E. JOHNS, DAVID A. SMEED, BEN I. MOAT, JOHN M. LOSH • 08 APR 2026

Western boundary observations in the Atlantic suggest a meridionally consistent decline in the ocean overturning circulation.

ABSTRACT

Linking carbonatites, rare earth ores, and subduction-fertilized mantle lithosphere

BY CUN, SPANGLER, ANDREW V. KNIGHTON, JAMES GRIFFIN • 08 APR 2026

Continental intraplate magmatism and rare earth ores are linked to the ancient subduction-enriched mantle lithosphere.

ABSTRACT

Land subsidence on Java Island and its contributions to relative sea level change

BY LEONARDO, [...] SUKMA, RAHARDIYANI BARIQAH, PRAVARA KUMAR, ARIF ANTHIA, ANNASTEN THAHA, JAMES L. DAVIS, FELLIANA HALIANTO, ESTELLE DAVIGNEAU, NITHEANANDA, SAKHAWOHO, ELIZABETH DARKE [...] PHILIP E. J. MINDERHOUD • +4 authors • 08 APR 2026

Land subsidence will drive up to 81% of relative sea level rise along Java's coast by 2050, outpacing global ocean rise.

ABSTRACT

Measurement-based assessment reveals key drivers and mitigation potential of methane emissions from China's wastewater treatment

BY CHU DUO, YINGYU LIU, PHILIPPE CIAIS, GREGOIRE BROQUET, BO CHONG, HUILIN CHEN • 08 APR 2026

Mitigating China's wastewater methane remains challenging for decades; however, treatment upgrades can drive rapid cuts.

ABSTRACT

Wealth and land-cover change govern landslide fatalities on world's mountains

BY BIQUN PENG, TOLGA GÖRüM, ABDULLAH H.ERGü, WATER ERKENSTEIN, UGUR OZTURK • 08 APR 2026

Anthropogenic land-cover change correlates with landslide fatalities, thereby amplifying the disadvantage of the world's poor.

ABSTRACT

Impact-processed nitrogen-bearing organics in Chang'e-5 and Chang'e-6 lunar regolith

BY XIANFEI ZHAO, JINLONG NIU, K. H. CHANGELA, HENGCI TIAN, SHENGSHUAN HUANG, XINJIE HE, YUNFEIN LIU, XIAOGUANG LI, BEN HU, WEI YANG, YANSTING LIN • 07 APR 2026

Exogenous delivery, impacts, and solar wind implantation shape the evolution of lunar surface organic matter.

ABSTRACT

PHYSICAL AND MATERIALS SCIENCES

The optical nose: Monolayer sensitization of Au surfaces for plasmonic gas sensing

BY ELLIE H. WYATT, SARAH MAY DIBUS-TORRES, MARIKA MANOR, JAMES R. BEATTIE, TABITHA JONES, NICOLAS SPIEKERMEIER, JANA HOFMANN, BART DE NIJS, JEREMY J. BAUMBERG 08 APR 2026

SERS of sub–ppm acetonitrile is improved through precision surface sensitization of 4-nm gold nanoparticle aggregates using a water monolayer.

ABSTRACT

Filament sensing tension: A bionic artificial tendon for self–force-regulated artificial muscle–driven wearable robotics

BY DISHENG XIE, HAIDYU WANG, YUJIE SU, SHUK PAN TONG, XIAOLU LI, WINSHAN LIU, XIANGQIAN SHI, SHAOSHAN HE, JINGLANG PU, XIAN SONG, [...] RAYMOND KAITEI TONG • +4 authors 08 APR 2026

Force-sensing filaments help transmit and control the force of artificial muscle onto the body.

ABSTRACT

Increasing the power density of electrohydrodynamic pumps by mapping the fluid landscape

BY YICHI LIU, XIAFEIJIN SCHOUTEN, HERBERT SHEA • 08 APR 2026

Fluid viscosity and permittivity govern EHD pumping, boosting fluidic power output fivefold.

ABSTRACT

From vibrations to function: Spectroscopic detection and quantification of π–π stacking in drug-responsive protein complexes

BY MAHANDEBU ALTAHERIEB, ESTHER J. QUELA, BENJAMIN W. MEADOW, VLADISLAV Y. YAKOVLEV, SYUAN-TING KUO, VEERABHADRA REDDY VULUPALA, KAUSTAV KHATTER, HANYUAN ZHANG, XIN YAN, DAVID H. RUSSELL, [...] MARILAN S. ROUJI • +5 authors • 08 APR 2026

TRIP measures aromatic π–π protein interactions under near-physiological conditions, enabling structure-guided antiviral design.

ABSTRACT

A donor-acceptor integrated polymer for efficient organic solar cells

BY LUNBI HU, XINKANG WANG, XIAOXIN WU, QINGQI SONG, SHA LIU, RUIJIE MA, LIANKUN LI, LIANGBIN KONG, ZHI KING, YAO LI, [...] FEI HUANG • +9 authors • 08 APR 2026

A bipolar polymer enables efficient and stable organic solar cells with high thick-film tolerance.

ABSTRACT

Transferable generative models bridge femtosecond to nanosecond time-step molecular dynamics

BY JUAN VILLEGA-OSEZ, MATHIAS SCHREINER, SIMON OLSSON • 08 APR 2026

A generative model accelerates molecular dynamics 10,000-fold, unlocking slow conformational kinetics at the atomistic detail.

ABSTRACT

Scalable generalized meta-spanners enabling parallel multitasking optical manipulation

BY THOMAS LI, MINRUI DAO, BOYANG FU, THOMAS DENG, YUCHEN PU, SUMMI ZHUFFRE, JEBASH KUMAR NAYAK, BINJIANG FAN, XUEHAO HU, SHUSHENG WANG, [...] C. T. CHAN +4 authors • 08 APR 2026

Generalized optical meta-spanners enable propagation-varying and in-plane tailored vortices for parallel optical manipulation.

ABSTRACT

Reshaping static aqueous Zn⁻⁻Br battery chemistry without liquid Br_2 for intrinsic safety and cycle durability

BY QIHAN CHEN, YUJUN ZOU, YAN JIAO, HAN WU, SHAOJIAN ZHANG, CHENGHAO YANG, SHI-ZHANG QIAO • 08 APR 2026

Universal cathode strategy enables safer, higher-performance Zn⁻⁻Br batteries via intercalation-conversion chemistry.

ABSTRACT

BIOMEDICINE AND LIFE SCIENCES

CD69 regulates the tissue dynamics of epigenetically imprinted memory CD4⁺ T cells

BY RUI HUANGWEN, CHANG CHANGYING, HOU MENGMENG, TAKAHIRO HIRONIYI, HITOSHI SUGIYI, KOHEI KAWASAKIN, KAWAGUCHIRO, ASUNE KUROSUGI, MASAHIRO HIDAYOTO, KOTA KOKUBO, [...] KIYOSHI HIRAHARA • +73 authors • 08 APR 2026

CD69 regulates the tissue dynamics of CD4⁺ T_{RM} cells with the inheritance of tissue-resident properties.

ABSTRACT

DJ-1 inhibition reshapes tumor microenvironment and potentiates immune checkpoint inhibitors

BY HAIYING ZHU, TIEMIN LIN, LI JIANG, WENXI ZHAO, WENDEDE CHEN, BIN LU, ZHAN ZHOU, GUIJUAN HE, BO YANG, PETR TOMEK, [...] J. CAO • +1 authors • 08 APR 2026

DJ-1 inhibition reprograms macrophages to activate T cells and enhance antitumor immunity.

ABSTRACT

A diffusion-based framework for designing molecules in flexible protein pockets

BY JOHN WONG, DONG YAN ZHANG, DHRUBATI BASUNTE, NICOLAS V. DORRALOW • 08 APR 2026

YuelDesign generates drug-like molecules within flexible protein pockets using dual-diffusion models.

ABSTRACT

Vasculogenic tissue nanotransfection accelerates functional recovery after peripheral nerve injury

BY ANU J. SALAZAR-PUERTA, SARA KHEDRHAVA, JONATHON P. STRAHAN, WILLIE HARRIS, NADA KHATTAB, WEIQUN PUNGDA, GRANT BARRINGER, CARLOS A. VASQUEZ-MARTINEZ, SHIVAS, CORTES, NEIL OTT, [...] DANIEL GALLEGO PEREZ • +12 authors • 08 APR 2026

A nonviral gene-reprogramming strategy enhances vascular support to promote functional recovery after nerve injury.

ABSTRACT

Childhood immune imprinting shapes cohort and period influenza mortality

BY KYLE E. HOFFMAN, CHARLES GUSCHOV, HYEWON S. KWANGO • 08 APR 2026

Childhood exposure to different influenza strains shapes the age-profile of seasonal influenza mortality.

ABSTRACT

SLC13A2-transported citrate remodels transcriptional regulation through protein acetylation to suppress tumor growth

BY LEIHAITAO QIN, LONGCHENG SHANG, YAO CHEN, LI SHI, CHUN LIU, NING WAN, XINGNA HE, XINJIAO SHAO, SHENGTAO YUAN, WENQ YU, [...] JING KONG • +2 authors 08 APR 2026

SLC13A2-imported citrate induces protein acetylation that connects metabolism and epigenetics to suppress tumor growth.

ABSTRACT

Linker histone H1 functions as a liquid-like glue to organize chromatin in living human cells

BY MASA A. SHIMAZOE, JAN HUERTAS, CHARLES PHILLIPS, SATORU IDE, SACHIKO TAMURA, STEPHEN PARR, E. S. ASHWIN, MASAKI SASAI, ROSANA COLLEPARDO-GUEVARA, KAZUHIRO SUGIMURA • 08 APR 2026

Single-molecule imaging and MD simulations reveal how histone H1 acts as a liquid-like "glue" to compact chromatin in cells.

ABSTRACT

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The normals | Episode 1

7 APR 2026 BY SARAH CRESPI, KEVIN MCLEAN

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