



History unfolding:



An **ASU** research timeline

research.asu.edu

Changing the way the world **solves** problems



ASU's Knowledge Enterprise is showing the world a new way to solve problems. Through our focus on interdisciplinary teamwork, we unite diverse experts, find practical solutions and forge new paths of discovery. **We drive positive change as a leader in global impact, innovation, entrepreneurship and sustainability.** Over the past two decades, our research strength has grown nearly sixfold, propelling us to unmatched achievements.

Explore our timeline of discovery and innovation

to see how ASU researchers are helping us understand our world and our universe with an eye toward thriving people, a thriving planet and thriving societies.



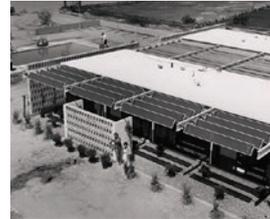
“**Our collective efforts** hold the key to **unlocking new frontiers of knowledge** and empowering us to tackle the urgent issues that confront us.”

Sally C. Morton
*Executive Vice President
Knowledge Enterprise*

1954

Solar gets its start

In the same year that the first solar cell is invented, Arizona State College (later becoming Arizona State University) becomes the headquarters of the new Association for Applied Solar Energy, a nonprofit scientific and education organization.

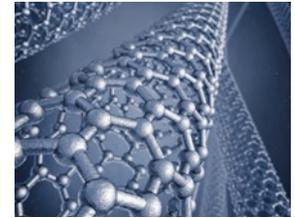


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71

Crystals to nanotubes

Sumio Iijima produces the first successful atomic resolution micrograph of crystals as a research associate at ASU. This pioneering work leads him to the discovery of carbon nanotubes in 1991.



Meteorite collection lands at ASU

ASU opens the Center for Meteorite Studies, which becomes the largest university-based meteorite collection in the world.



Extraterrestrial materials for life

ASU scientists discover amino acids — key building blocks for life — in meteorite samples. It's the first evidence that amino acids can be found in materials that originate from somewhere other than Earth.



Photovoltaic Testing Laboratory

ASU launches the Photovoltaic Testing Laboratory, where faculty, staff and students test and certify photovoltaic module reliability, durability and performance while forging key partnerships within the solar energy industry.



Phoenix becomes urban laboratory

The Phoenix area becomes a living laboratory as one of only two National Science Foundation Long-Term Ecological Research (LTER) sites located in a city. Researchers in the Central Arizona-Phoenix LTER explore every aspect of how humans interact with their environment.

Lucy discoverer joins ASU

ASU becomes the new home of the Institute of Human Origins, led by Donald Johanson, the paleoanthropologist who discovered "Lucy." A replica of Lucy, the 3.2-million-year-old *Australopithecus afarensis*, is on public display at the institute.



Space image goes postal

The Eagle Nebula, imaged in 1995 by ASU astronomers using Hubble Space Telescope data, appears on a U.S. postage stamp.



TRIF-ic research

Arizona voters deliver a powerful boost to ASU research through the Technology and Research Initiative Fund. TRIF drives economic growth and human well-being through initiatives in health, sustainability, national security, space exploration and workforce development across the state's three public universities.



Life in hydrothermal vents

ASU scientists discover green sulfur bacteria living near hydrothermal vents deep in the ocean. The bacterium is the first photosynthetic organism discovered that does not take energy from sunlight.



Modeling Phoenix water

The Decision Center for a Desert City launches WaterSim, an online model that integrates climate, land use, population growth and water policy information to enable users to gauge future water supplies.

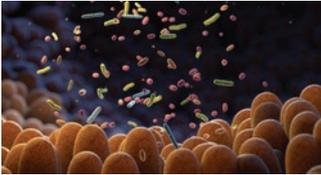


Microorganisms clean water

Scientists invent a membrane biofilm reactor that uses naturally occurring microorganisms to remove contaminants from water. The system provides the microorganisms with hydrogen gas, which allows them to change the chemical composition of a contaminant and render it harmless.

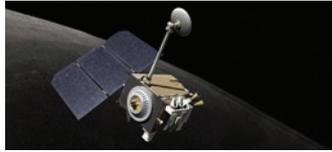
Obesity and the microbiome

Mayo Clinic and ASU collaborators report that gut microbes play a role in regulating weight. Modifying these bacteria could one day be a treatment option for obesity.



Shooting the moon

NASA's Lunar Reconnaissance Orbiter launches. ASU planetary geologist Mark Robinson leads the Lunar Reconnaissance Orbiter Camera, which he helped design and build. LROC is a system of three cameras that capture high-resolution photos of the moon's surface.



Fuel from sunlight

ASU launches an Energy Frontier Research Center with \$14 million from the U.S. Department of Energy. The center pursues advanced research on solar energy conversion based on the principles of photosynthesis, the process plants use to turn sunlight into energy.

West Nile therapeutic

ASU Biodesign Institute scientists are the first to demonstrate a plant-derived treatment to successfully combat West Nile virus after exposure and infection. Plants offer an inexpensive and effective "laboratory" for creating new treatments.

Early detection of breast cancer

Scientists discover powerful biomarkers for the early detection of breast cancer. The findings represent the first demonstration of a custom protein-array technology used to find biomarkers in breast cancer patients before they were clinically diagnosed with cancer.

QESST for energy

ASU leads the new national Engineering Research Center for Quantum Energy and Sustainable Solar Technologies focused on harnessing solar power in economic, sustainable ways. In that year, ASU is the only U.S. higher-ed institution to exceed 10 megawatts of solar energy capacity.



Bees reverse aging

Scientists at ASU discover that older honeybees effectively reverse brain aging when they take on nest responsibilities typically handled by much younger bees. These findings suggest that social interventions may be used to slow or treat age-related dementia.



Real-time chemistry a top 10 discovery

A technique called femtosecond nanocrystallography reveals the 3D structure of a protein. An ASU-led international team used an X-ray free electron laser to capture protein chemical reactions in real time. The journal Science named the discovery a top 10 breakthrough of 2012.



Rubén Darío manuscripts



ASU Library acquires a privately held collection of manuscripts created by Nicaraguan poet Rubén Darío. Darío (1867-1916) is considered one of Latin America's most famous poets and is recognized widely as the founder of Spanish American modernism.



BioXFEL center established

ASU teams up with seven universities to create the Biology with X-ray Free Electron Lasers Science and Technology Center. The center focuses on developing new bio-imaging techniques — including snapshot serial femtosecond nanocrystallography — to analyze a vast array of molecular drug targets.

Flex-ray

ASU's Flexible Electronics and Display Center and PARC, a Xerox company, manufacture the world's largest flexible X-ray detector. Flexible X-ray detectors offer capabilities ranging from detecting broken bones on the battlefield to finding leaks in natural gas pipes.



AC heats the city

Excess heat released from air conditioners can worsen the urban heat island effect. Researchers find the waste heat from AC units raises outdoor temperatures, resulting in increased electricity use for cooling. The effect is stronger between late afternoon and early morning.



Jane Austen letters

English literature scholar Devoney Looser and her colleague discover previously unpublished historic letters that shed new light on the life of novelist Jane Austen.



Paving the way for nonaddictive painkillers

In a first-of-its-kind study, chemist Petra Fromme joins an international team using X-ray crystallography and high-speed lasers to study the structure of opioid receptors and drugs that bind to these sites. The work paves the way for development of new, nonaddictive painkillers.



Earliest evidence of our genus

A fossil discovery provides the earliest evidence of our human genus, Homo. ASU scientists describe the fossil, part of a lower jaw with five teeth, and date it to 2.8 million years ago, predating the Homo lineage fossils by around 400,000 years.



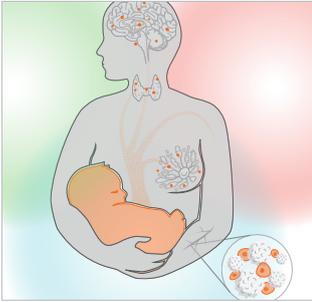
Biogeotechnical engineering

ASU is selected to lead another NSF Engineering Research Center, the Center for Bio-mediated and Bio-inspired Geotechnics. Its goal is to expand the emerging field of biogeotechnical engineering and pioneer solutions to some of the world's biggest environmental and infrastructure development challenges.



Fetal influence on mom

Dramatic research has shown that during pregnancy, cells of the fetus often migrate through the placenta, taking up residence in many areas of the mother's body, where their influence may either benefit or undermine maternal health.



Mind-controlled drones

People can now control multiple robotic drones with their own brains, thanks to a device developed by engineer Panagiotis Artemiadis. The technology could enable swarms of drones to perform complex tasks, such as search-and-rescue missions.



OTES sendoff

The first space instrument built entirely on the ASU campus, OSIRIS-REx Thermal Emission Spectrometer, launches on the OSIRIS-REx spacecraft. The 7-year NASA mission will travel to the asteroid Bennu, study it for a year and send material samples back to Earth.



Praise for Zika test

A small paper strip costing just \$1 effectively tests for Zika virus. The test, developed by ASU and Harvard researchers, holds potential to diagnose many diseases and wins the Popular Science 2016 Best of What's New award in health.



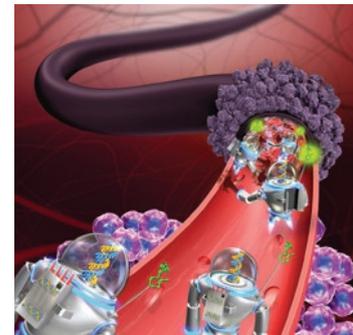
Leading a deep-space mission

NASA selects ASU to lead a mission to Psyche, an asteroid that may be an early planet's exposed core. It's targeted to launch in 2023 and arrive in 2030. Psyche could provide a unique look into the violent collisions that created Earth.



Tiny tumor fighters

Nanorobots built out of DNA successfully shrink tumors by cutting off their blood supply. The bots are developed and programmed by a team of researchers from ASU and the Chinese Academy of Sciences.



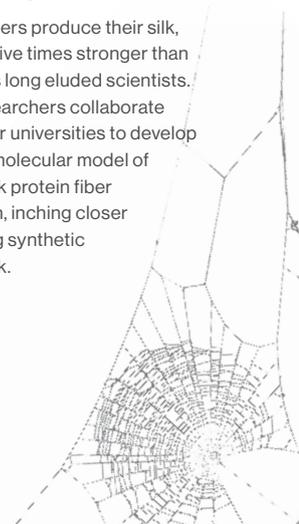
Detecting the first stars

Astronomers detect the first stars, formed 180 million years after the universe began. The ASU-led team also finds that gas in the early universe was probably much colder than expected. Physics World magazine names it a Top 10 Breakthrough of 2018.



Unraveling spider silk

How spiders produce their silk, which is five times stronger than steel, has long eluded scientists. ASU researchers collaborate with other universities to develop the first molecular model of spider silk protein fiber formation, inching closer to making synthetic spider silk.



New therapy for autistic children

Children with autism spectrum disorder show long-term improvements with a technique called Microbiota Transfer Therapy. The ASU-led study shows that harnessing connections between the gut microbiome and neurological health could help the 1 in 36 children diagnosed with autism in the U.S.

Stronger supply chains across Africa

The Center for Applied Research and Innovation in Supply Chain — Africa reimagines supply chains providing food and medical supplies to remote communities across Africa. The center is a partnership between ASU and the Kwame Nkrumah University of Science and Technology in Ghana.



Combating COVID-19 in Arizona

The Biodesign Institute at ASU pioneers the first FDA-approved saliva-based COVID-19 test in the western United States. In a collaborative effort with the Arizona Department of Health Services, ASU establishes free saliva-testing locations in underserved communities throughout the state.



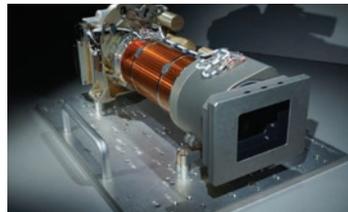
A lab for our planet's future

Driven to make meaningful change in response to current climate and environmental crises, ASU launches the Julie Ann Wrigley Global Futures Laboratory. The lab focuses on studying Earth's complex systems, keeping our planet habitable and advancing a future where everyone can thrive.



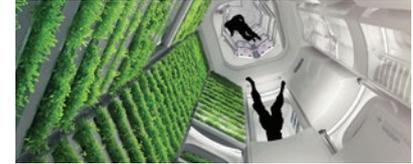
Mastcam-Z on Mars 2020 rover

NASA's Perseverance rover launches to investigate the Mars Jezero Crater, where the ancient environment may have been hospitable for microbial life. The rover will collect samples of regolith and rock for future return to Earth. ASU leads the rover's Mastcam-Z camera system.



New kind of space station

ASU is part of a team that is building a commercial space station, led by Blue Origin and Sierra Space. ASU leads a global consortium of universities providing research and outreach services to empower educators, scientists, businesses and nations in their off-world endeavors.



BIOS comes aboard

The Bermuda Institute of Ocean Science joins ASU, expanding the Global Futures Laboratory's capacity to explore global oceans and their role in the climate system.

Complete coral map

The Center for Global Discovery and Conservation Science announces the completion of the Allan Coral Atlas, providing the world's first comprehensive map of shallow water coral reefs.





Planting a MechanicalTree®

The first MechanicalTree®, a pioneering carbon capture mechanism to help the planet meet the global warming temperature limits established by the Paris Accords, is installed on the ASU Tempe campus in partnership with Carbon Collect Ltd.

Reason to shell-ebrate

Reported illegal exploitation of sea turtles declined by around 28% over the last decade, researchers discover. Additionally, their study finds most turtles illegally exploited in the last decade were from low-risk populations, so there hasn't been a major negative effect on most sea turtle populations.



25 years of urban desert research

The ASU-led Central Arizona-Phoenix Long Term Ecological Research project celebrates 25 years of research into the relationships between people and the environment in a desert city. NSF announces it will provide nearly \$8 million to support the program another 6 years.



Quantum boost

ASU launches the Quantum Collaborative, a major 21st century initiative poised to profoundly impact society and the American economy with new discoveries and applications in advanced quantum technology.

Securing our water supply

In the face of a megadrought across the U.S. Southwest and Colorado River shortages, the state of Arizona calls on ASU to lead a multiyear Arizona Water Innovation Initiative, which will provide actionable solutions to ensure the state's future water supply.

Creating Arizona's future

ASU joins the New Economy Initiative, a statewide plan to create a resilient Arizona economy. In addition to providing education and workforce development, ASU will create six science and technology centers that connect faculty and students with industry to solve challenges in manufacturing, energy, extreme environments, communications, human performance and sustainability.

And the discoveries won't stop here!

Be the first to learn more at research.asu.edu

First X-rays for laser

ASU begins a fresh chapter in X-ray science with a newly commissioned instrument that will help scientists see deeper into matter and living things. Scientists generate the first X-rays with the device, called the compact X-ray light source, marking a major milestone.



PTSD treatment success, explained

Early studies have shown that psychedelic-assisted therapy can successfully treat PTSD, but how does it work? ASU neuroscientist Candace Lewis explores the science behind the therapy's effect on the psyche and epigenome of people with PTSD.

