NITRD News Brief

We are pleased to continue NITRD's News Brief that offers insight into the activities NITRD's member agencies are conducting to achieve the Nation's priorities through the lens of the public-facing news sources. These are divided into networking and information technology topics that have been identified as of great importance for improving Americans' daily lives.

For ease of access, under NITRD's logo, the title of each section is listed as a link to that section. The titles of the articles under the section's heading are links that provide immediate access to the news article listed. We hope you find this informative and helpful in your daily activities.

Do you know someone who would like to receive NITRD's weekly news brief? They can email NITRD's IT aficionados at nco@nitrd.gov and voilà they will receive the news brief with the cool technology articles each week!

NITRD News

FEDERAL HIGH END COMPUTING INFORMATION PORTAL

...Networking and Information Technology Research and Development (NITRD) has a portal that provides information about U.S. Federal government high performance computing activities, including available computing resources; HEC relevant publications; fellowship and training opportunities; and technology transfer, licensing, and industry engagement opportunities. The HEC IWG (Interagency Working Group on High End Computing) agencies provide the information contained in this portal. HEC IWG agencies are involved in various Federal activities in the HEC area including R&D and providing infrastructure and application. Take a look at it!
Networking and Information Technology Research and Development - Jun 14, 2023

Federal Agency Funding Opportunities

Biden-Harris Administration Announces $80 Million To Strengthen American Manufacturing

...The U.S. Department of Energy (DOE) today announced up to $80 million in grant funding from the Bipartisan Infrastructure Law for small- and medium-sized manufacturing firms (SMMs) to accelerate the adoption of recommendations made by DOE to improve energy efficiency to lower costs and reduce industrial emissions. DOE's Industrial Assessment Center (IAC) and Combined Heat and Power Technical Assistance Partnership (CHP TAP) programs are deeply community-centered, leveraging the expertise of and providing training to community colleges, trade schools, and union training programs across the country. This will bolster the U.S. manufacturing base by making grants available to support projects that modernize SMMs' facilities with improved energy and material efficiency, enhanced cybersecurity, and increased use of smart and advanced manufacturing technologies to reduce waste and pollution, while increasing productivity. Applications are due on Thursday, July 14, 2023, at 5 p.m. ET...
Department of Energy - Jun 7, 2023

Cybersecurity DOD: C4ISR, Information Operations, Cyberspace Operations and Information Technology System

...The Naval Information Warfare Center, Pacific is soliciting white papers and proposals. Submissions in response to this announcement shall be for areas relating to the advancement of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) capabilities, enabling technologies for Information Operations and Cyberspace Operations, and Information Technology systems. Current Closing Date for Applications: Jun 07, 2024
United States Department of Defense - Jun 8, 2023

HPC

Simulating Supernovae with DOE's Supercomputers

...Supernovae – massive exploding stars – are some of the most spectacular phenomena in the universe. Researchers at Princeton University are simulating these explosions on supercomputers at the Department of Energy's Argonne Leadership Computing Facility user facility. This research also gives us insight into how these explosions created many of the elements in our universe. Scientists have been studying this topic for 60 years, but computers couldn't provide accurate simulations. Previous models could only simulate explosions in one dimension. The scientists realized that they needed to model the supernovae in three dimensions in space. To access that type of computing power, the researchers turned to the DOE Office of Science. They received time on the ALCF's supercomputers to run their models. With the current 3D simulation, the model supernovae are now behaving the way that supernovae behave in nature. The model is closer than ever to describing and predicting what happens in these explosions...
Department of Energy - Jun 12, 2023

Using Supercomputers to Get to the Bottom of When the Smallest Meson Melts

...Theorists have performed calculations to predict the temperature at which bottomonium mesons will melt. Bottomonium mesons are particles made of one of the six types of quark: a heavy bottom quark bound to its antimatter partner, an antibottom quark. The calculations show that the smallest bottomonium particles can stay intact at very high temperatures and require extreme conditions to melt. The researchers used powerful supercomputers and a technique called lattice quantum chromodynamics (QCD) to model the interactions in one of the spatial dimensions...
Department of Energy - Jun 9, 2023

Building a new memristor computer so artificial intelligence can be trustworthy and sustainable

...Used in a wide range of applications, GPU technology has advanced to open new opportunities for gaming, high-performance computing, machine learning and artificial intelligence (AI), and more. While GPUs continue to open new doors for AI and machine learning that can benefit society, they are still consuming an immense amount of energy from the data centers with a record high for power consumption from a single data center is 500 megawatts, which is equal to half of what a single nuclear power plant generates. Dr. Suin Yi, at Texas A&M University, is working to change this by developing a better hardware system that mimics the human brain and can better process the work being done by the GPUs. Yi is bridging the gap between digital computers and quantum computers to develop a new memristor computer that builds upon the existing infrastructure of current semiconductor chip manufacturing technology but is far more advanced and energy efficient than what is currently available. Yi is aiming to expand the memristor computer to more large-scale synapses (over 1 trillion), which approaches what the human brain has (about 100 trillion synapses), to accommodate applications such as chatGPT. ... This project, funded by the U.S. Air Force Office of Scientific Research and Sandia National Laboratories...
Texas A&M University College of Engineering - Jun 12, 2023

Artificial Intelligence / Machine Learning

Visionary DOE report unveils ambitious roadmap to harness the power of AI in scientific discovery

...The report, “AI for Science, Energy, and Security,” lays out a comprehensive vision for the U.S. Department of Energy (DOE) to expand its work in scientific use of AI by building on its existing strengths in world-leading high performance computing systems and data infrastructure. It is the product of a series of workshops held in 2022 under the guidance of DOE’s Office of Science and the National Nuclear Security Administration. The report identifies six AI capabilities and describes their potential to transform DOE’s program areas. These range from control of complex systems like power grids to foundation models like the large language models behind generative AI programs such as ChatGPT. The report also lays out the crosscutting technology needed to enable these AI-powered transformations. The report describes scientific “grand challenges” where AI plays a major role in making progress toward solutions. These include improved climate models, the search for new quantum materials, new nuclear reactor designs for clean energy and more...
Argonne National Laboratory - Jun 12, 2023

Robotics / Autonomous Vehicles

New NSF-funded research shows highly dexterous robot hand can operate in the dark — just like humans

...Our hands and fingers are incredibly skilled mechanisms, and highly sensitive. Robotics researchers have long been trying to create "true" dexterity in robot hands, but spurred by advances in both sensing technology and machine-learning techniques to process the sensed data, the field of robotic manipulation is changing very rapidly. U.S. National Science Foundation-supported researchers at Columbia Engineering have demonstrated a highly dexterous robot hand that combines an advanced sense of touch with motor learning algorithms, which allow a robot to learn new physical tasks via practice. The hand does not rely on vision to manipulate objects, which means that it can do so in very difficult lighting conditions that would confuse vision-based algorithms — it can even operate in the dark. The researchers designed and built a robot hand with five fingers and 15 independently actuated joints. Each finger was equipped with the team's touch-sensing technology. The next step was to test the ability of the tactile hand to perform complex manipulation tasks. To do this, they used a new method for motor learning, called deep reinforcement learning, augmented with new algorithms that they developed for effective exploration of possible motor strategies...
National Science Foundation - Jun 9, 2023

DAF hosts robotic process automation bot roadshow

...The Department of the Air Force’s District of Washington sponsored and organized a three-day Robotics Process Automation Roadshow that utilized an automation program called UiPath, which mimics human actions and connects multiple systems without changing the existing information technology. The RPA Roadshows were created to test the creativeness of Air Force Sustainment Center employees in implementing the automation processes and finding ways to maximize its potential...
Air Force Link - Jun 8, 2023

Autonomous Satellite Swarms for Science ‘Grow up’ at NASA Ames

...Researchers at NASA’s Ames Research Center in California’s Silicon Valley are developing satellite swarms, which are groups of spacecraft working together as a unit, without being managed individually by mission controllers. A swarm’s ability to perform autonomously will make new types of science and exploration possible, particularly as they venture farther into deep space. This summer, swarm science will reach a major milestone as NASA launches the Starling mission into space. It will test technologies that let four spacecraft operate in a coordinated manner without resources from the ground. A swarm is not to be confused with a constellation, although both refer to a group of spacecraft working toward a common goal. If you’re operating a lot of spacecraft individually, you’ve got a constellation. Contrast that with a multi-talented, self-coordinating swarm. These spacecraft know how to communicate with each other, monitor and maintain their relative spacing, and maneuver to get where each needs to be. Researchers at Ames developed the Distributed Spacecraft Autonomy project. DSA is maturing technologies critical for future swarms via simulation studies and by launching spacecraft. It will give a swarm the ability to plan and schedule for itself which operations the satellites conduct under different conditions...
National Aeronautics and Space Administration - Jun 13, 2023

Quantum

Multi-Service Team Wins $45 Million Research Award to Pursue Quantum-Based Precision Targeting

...The Department of Defense today announced an Army Research Laboratory-led project team investigating quantum constructs to revolutionize precision weapons as the winner of the 2024 Applied Research for Advancement of Science and Technology Priorities, or ARAP, program award competition. The Army Research Laboratory, under the

U.S. Army Combat Capabilities Development Command, collaborated with the Naval Research Laboratory and the Air Force Research Laboratory to submit the winning CLAWS proposal. The project team will advance quantum technology applications to kinetic weapons systems, enabling greater precision at longer range, lower collateral damage, and more agile platforms. The winning team, comprised of representatives from multiple military Services, will partner with academia and industry in a multidisciplinary effort to develop emerging technologies into disruptive capabilities in areas including imaging, positioning, navigation, and timing, and quantum...
U.S. Department of Defense - Jun 14, 2023

A Network Security Revolution Enhanced by Quantum Communication

...Can you blend the best of both classical and quantum communications to produce a scalable, vastly more secure networking infrastructure? That is the question DARPA seeks to answer through its Quantum-Augmented Network (QuANET) program. Through QuANET, DARPA will explore how integrating quantum and classical approaches to networking could provide quantum physics-based security capabilities to critical network infrastructures. QuANET researchers will focus on combining current and near-future quantum networking infrastructure (both hardware and protocols) with classical infrastructure with the goal of delivering security capabilities relevant to national security. QuANET seeks to enable network infrastructure to use quantum systems that incorporate quantum communications in various ways and does not focus on quantum key distribution (QKD) – the typical application of quantum communications. Additionally, quantum interconnects such as quantum repeaters, switches, and routers are not in the initial program's scope. The QuANET program seeks solutions for networks that scale up to the size of a metropolitan area network...
DARPA - Jun 13, 2023

Argonne and UChicago PME researchers “split” phonons – or sound – in step toward new type of quantum computer

...What sounds like a continuous wave of music is actually transmitted as tiny packets of quantum particles called phonons. The laws of quantum mechanics hold that quantum particles are fundamentally indivisible and therefore cannot be split, but researchers at the U.S. Department of Energy’s (DOE) Argonne National Laboratory and the Pritzker School of Molecular Engineering (PME) at the University of Chicago are exploring what happens when you try to split a phonon. The researchers used a device called an acoustic beam splitter to “split” phonons and thereby demonstrate their quantum properties. By showing that the beam splitter can be used to both induce a special quantum superposition state for one phonon and further create interference between two phonons, the research team took the first critical steps toward creating a new kind of quantum computer. The work is supported in part by Q-NEXT, a U.S. DOE National Quantum Information Science Research Center...
Argonne National Laboratory - Jun 9, 2023

Cybersecurity / Privacy

DOE and NIST Collaboration Strengthens Cybersecurity Across the Liquified Natural Gas Lifecycle

...The National Institute of Standards and Technology (NIST) National Cybersecurity Center of Excellence (NCCoE) released the Cybersecurity Framework Profile for Liquified Natural Gas (LNG). The LNG Cybersecurity Framework, funded by the U.S. Department of Energy’s Office of Cybersecurity, Energy Security, and Emergency Response (CESER), will help industry partners manage and reduce cyber risks at all stages of the LNG lifecycle, from the liquefaction process through distribution. It is an application of the broader NIST Cybersecurity Framework within the LNG industry. NIST and CESER, in collaboration with experts from the LNG industry, developed the LNG Cybersecurity Framework as part of an inter-agency agreement to develop tools and research to strengthen the cybersecurity of maritime transportation systems within the energy sector relating to LNG...
Department of Energy - Jun 8, 2023

Information Integrity Research & Development

NSF-funded researcher explores vulnerabilities of AI systems to online misinformation

...A University of Texas at Arlington researcher is working to increase the security of natural language generation (NLG) systems to guard against misuse and abuse that could allow the spread of misinformation online. Shirin Nilizadeh has earned a five-year, $567,609 Faculty Early Career Development Program (CAREER) grant from the National Science Foundation (NSF) for her research. Understanding the vulnerabilities of artificial intelligence (AI) to online misinformation is “an important and timely problem to address." These systems have complex architectures and are designed to learn from whatever information is on the internet. An adversary might try to poison these systems with a collection of adversarial or false information. The system will learn the adversarial information in the same way it learns truthful information. The work will focus on two common natural language generation techniques: summarization, and question-answering. In summarization, the AI is given a list of articles and asked to summarize their content. In question answering, the system is given a document, finds answers to questions in that document and generates text answers...

The University of Texas at Arlington - Jun 8, 2023

5G, Wireless Spectrum, Networking & Communications

NSF-supported research used multi-temporal satellite data to reveal hidden ice melt in Himalayan glaciers

...A new study reveals that the mass loss of lake-terminating glaciers in the Great Himalayas has been significantly underestimated due to the inability of satellites to see glacier changes occurring underwater. That has implications for projecting glacier disappearance and availability of water resources. The U.S. National Science Foundation-supported research, which combines multi-temporal satellite data with bathymetric measurements, offers new insights into the growing issue of subaqueous mass loss in the Himalayas. A particularly interesting case in this region is Galong Co lake, which was underestimated by 65%. The oversight was largely due to the limitations of satellite imaging in detecting underwater changes. From 2000 to 2020, glacial lakes in the region increased by 47% in number, 33% in area and 42% in volume. Previous studies did not consider this loss as the satellite data can only measure the lake water surface, not the ice underwater replaced by water...
National Science Foundation - Jun 8, 2023

US-German Satellites Show California Water Gains After Record Winter

...California just saw its greatest year-over-year water gains in two decades, according to data from the GRACE-FO (Gravity Recovery and Climate Experiment Follow-On) satellite mission, a partnership between NASA and the German Research Centre for Geosciences (GFZ). GRACE-FO measurements include all the water contained in the lakes, rivers, soil, snowpack, and underground aquifers within that region. While surface water basins are filling, underground stores of fresh water (aquifers) that are tapped for irrigation and other needs could take years to fully recharge. The GRACE-FO team will continue to track how California’s water storage evolves through the summer after the snowpack melts and water levels in the state’s lakes, rivers, and reservoirs start to recede during drier weather. The GRACE-FO mission consists of two identical satellites that fly one behind the other. As the lead satellite flies over an area with greater mass – such as an area with more water than another region – the slight change in gravity tugs it forward, increasing the distance between the two satellites. Microwave and laser instruments aboard the spacecraft precisely measure the minute distance changes between the two, revealing details about the overall mass of water that caused those changes...
National Aeronautics and Space Administration - Jun 7, 2023

NASA's new keen-sighted satellite will view distant stars, assist Webb telescope

...NASA’s James Webb Space Telescope (JWST), the most powerful telescope ever launched into space, will soon get a new “sidekick”—a small but nimble satellite that borrows its name from a multicolored sea creature. Last month, NASA selected the $8.5 million space mission, which is called Monitoring Activity from Nearby sTars with uv Imaging and Spectroscopy (MANTIS). This “CubeSat,” or mini-satellite, will be about the size of a toaster oven and will be designed and built at the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder. The MANTIS spacecraft will be able to observe the night sky in the full range of ultraviolet light. That includes an especially energetic form of radiation called extreme ultraviolet (EUV) light. MANTIS will observe the volatile physics of stars burning dozens of light-years from Earth, including as they eject huge bursts of energy in the form of flares. Data from the craft will complement Webb’s own observations of exoplanets, helping scientists piece together the conditions that could make these worlds habitable—or not. MANTIS will use two high-tech telescopes packed into its small frame. The first will observe lower-energy ultraviolet radiation. The second will use a design that’s never before flown into space to collect extreme ultraviolet light...
CU Boulder Today - Jun 7, 2023

Advanced Manufacturing

Biden-Harris Administration Announces $43 Million Investment to Advance Innovation in Wood Products and Wood Energy Economies through Investing in America Agenda

...The Biden-Harris Administration announced that the U.S. Department of Agriculture is investing more than $43 million to expand innovative uses of wood, including as a construction material in commercial buildings, as an energy source, and in manufacturing and processing input for wood products used in framing homes, making paper products and more. Funded proposals under these USDA grant programs expand and retrofit wood energy systems and wood products manufacturing facilities and develop markets for innovative uses of mass timber and renewable wood energy...
USDA APHIS - Jun 9, 2023

Microelectronics

Report Card: Two Years of Building Stronger Supply Chains and a More Resilient Economy

...Supply chain bottlenecks for critical inputs, like semiconductors, exposed major U.S. economic and national security vulnerabilities, many of which were decades in the making. The Biden-Harris Administration made supply chain resilience and response a top priority on day one. As a result, critical supply chains are significantly more fluid and resilient than they were when the President took office. In his first months in office, President Biden signed Executive Order (E.O.) 14017, “America’s Supply Chains,” directing the federal government to undertake a first-of-its-kind comprehensive 100-day review of the supply chains of four critical products – semiconductors, large capacity batteries, critical minerals and materials, and pharmaceuticals and active pharmaceutical ingredients – to identify vulnerabilities, assess risks, and develop strategies to promote resilience. To undertake this comprehensive review, the Biden Administration established an internal task force spanning more than a dozen agencies, consulting with hundreds of stakeholders and released the 100-day review. More than 70 recommendations across the report have been completed to date – from providing financing across the full battery supply chain to leveraging the Defense Production Act in historic ways to diversifying supply chains by supporting small- and medium-sized businesses...
The White House - Jun 8, 2023

Treasury Department Bolsters Semiconductor Supply Chain Confidence with Key CHIPS Investment Tax Credit Guidance

...The U.S. Department of the Treasury and the Internal Revenue Service (IRS) today are releasing a notice of proposed rulemaking to propose clear rules of the road for taxpayers seeking to utilize the elective payment option to more quickly gain the benefits of the section 48D Advanced Manufacturing Investment Credit (CHIPS ITC), which was established by the CHIPS Act of 2022. The proposed rules would provide procedural certainty for taxpayers seeking to elect the full amount of a CHIPS ITC by clarifying the timing of when elective payment elections are made, explaining how to determine the amount of the credit and elective payment, and laying out clear procedural rules. The proposed regulations support the CHIPS ITC’s mission of strengthening the resilience of the semiconductor supply chain and creating jobs by incentivizing investments in semiconductor manufacturing facilities across the United States...
U.S. Department of the Treasury - Jun 14, 2023

DOE/NSF-funded research develops superconducting diode that could improve performance of artificial intelligence and quantum computers

...A University of Minnesota Twin Cities-led team has developed a new superconducting diode, a key component in electronic devices, that could help scale up quantum computers for industry use and improve the performance of artificial intelligence systems. A diode essentially serves as half of a transistor — which is the main element in computer chips. Diodes are typically made with semiconductors, but researchers are interested in making them with superconductors, which additionally have the ability to transfer energy without losing any power along the way. Compared to other superconducting diodes, the researchers’ device is more energy efficient, can process multiple electrical signals at a time, and contains a series of gates to control the flow of energy, a feature that has never before been integrated into a superconducting diode. ... This research was funded primarily by the U.S. Department of Energy with partial support from the National Science Foundation.
University of Minnesota Twin Cities - Jun 7, 2023

Climate Change / Green Energy & IT

White House Office of Science and Technology Policy Announces National Climate Assessment Art Submission Award Winners

...The White House Office of Science and Technology Policy (OSTP) announced the top five award winners of Art x Climate, the first-ever call for visual art for the fifth National Climate Assessment (NCA5). Acknowledging the need for broad engagement to address the urgent climate crisis, and recognizing the power of art to shape and drive conversations across issues, Art x Climate invited artists to explore the themes of NCA5 by visualizing climate change in the United States. Background on Art x Climate Led by OSTP and the U.S. Global Change Research Program, Art x Climate received more than 800 submissions from every corner of the nation. The effort seeks to highlight new perspectives and broaden the growing community of people working towards climate solutions. Finalists were separated into youth (ages 13 to 17) and adult categories, and works were selected by a panel of experts at the art-environment interface. The award winners’ work will be featured in the upcoming NCA5 alongside 87 additional finalists, including 10 youth artists, whose original pieces were selected for inclusion in the report...
The White House - Jun 9, 2023

International Sea Level Satellite Spots Early Signs of El Niño

...El Niño is a periodic climate phenomenon that can affect weather patterns around the world. El Niño is also associated with a weakening of the trade winds. The condition can

bring cooler, wetter conditions to the U.S. Southwest and drought to countries in the western Pacific. The most recent sea level data from the U.S.-European satellite Sentinel-6 Michael Freilich indicates early signs of a developing El Niño across the equatorial Pacific Ocean. The data shows Kelvin waves, a potential precursor of El Niño conditions in the ocean, high at the ocean surface and hundreds of miles wide. When they form at the equator, Kelvin waves bring warm water, which is associated with higher sea levels. Satellites like Sentinel-6 Michael Freilich can detect Kelvin waves with a radar altimeter, which uses microwave signals to measure the height of the ocean's surface. When an altimeter passes over areas that are warmer than others, the data will show higher sea levels. The U.S. National Oceanic and Atmospheric Administration (NOAA) and the World Meteorological Organization have recently reported increased chances that El Niño will develop by the end of the summer. Continued monitoring of ocean conditions in the Pacific by instruments and satellites such as Sentinel-6 Michael Freilich should help to clarify in the coming months how strong it could become. Sentinel-6 Michael Freilich is one of two satellites that compose the Copernicus Sentinel-6/Jason-CS (Continuity of Service) mission. Sentinel-6/Jason-CS was jointly developed by NASA, NOAA, ESA, EUMETSAT, and CNES...
National Aeronautics and Space Administration - Jun 12, 2023

When Climate Gets Under Your Skin – Climate Change: Satellite Data Provides Vital Signs of the Planet

...CDC officially reports about 30,000 cases of Lyme disease each year, cases are on the rise in the United States, and the risk is expanding as global temperatures warm and areas become more habitable to ticks. Untreated, Lyme disease can affect the heart, joints, and central nervous system. NASA/U.S. Geological Survey Landsat satellite data can help predict the risk of Lyme disease in high-exposure areas. Scientists at NASA's Ames Research Center and New York Medical College combined Landsat imagery with geographic information system technology that helps manage, analyze, and visualize geographic data. They found residential areas covered by plants and trees and located adjacent to woodlands had a higher risk of Lyme disease transmission. Scientists are also using NASA satellite data to track vegetation health, rainfall, and temperatures and monitor environmental conditions favorable to mosquitoes. Climate-related droughts and extreme weather events are creating new mosquito breeding grounds. Warmer temperatures are also allowing mosquitoes to breed more quickly and for longer periods of time, thus some mosquito-borne diseases are expanding. NASA and the Peruvian government partnered to use the Land Data Assimilation System (LDAS), a land-surface modeling effort supported to identify where mosquito breeding grounds were likely to form...
National Aeronautics and Space Administration - Jun 12, 2023

Digital Health

Updated Insights on Hospital Leaders' Perceptions of Information Blocking

...Data from the 2020 American Hospital Association (AHA) Information Technology Supplement gathered from April-June 2021 showed that 42% of hospitals perceived that at least one type of information blocking "actor" engaged in practices that may constitute information blocking. In addition, 36% of responding hospitals reported perceiving that health care providers engaged in information blocking. We also observed important trends where hospitals using health IT developers with smaller national market shares were more likely to report perceived information blocking, as were for-profit hospitals, and hospitals in health care markets where health systems—as opposed to independent hospitals—held large market shares...
Health IT - Jun 14, 2023

Machine learning helps NIH-funded scientists see how the brain adapts to different environments

...Johns Hopkins scientists have developed a method involving artificial intelligence to visualize and track changes in the strength of synapses, which should lead to a better understanding of how such connections in human brains change with learning, aging, injury, and disease. Different life experiences, such as exposure to new environments and learning skills, are thought to induce changes at synapses, strengthening or weakening these connections to allow learning and memory. Scientists trained a machine learning algorithm with images taken of brain slices (ex vivo) derived from the same type of genetically altered mice. Because these images weren't from living animals, it was possible to produce much higher quality images. This cross-modality data collection framework enabled the team to develop an enhancement algorithm that can produce higher resolution images from low quality ones, similar to the images collected from living mice. ... The researchers are now using this machine learning approach to study synaptic changes in animal models of Alzheimer's disease, and they believe the method could shed new light on synaptic changes that occur in other disease and injury contexts. This research was funded by the National Institutes of Health...
Hub - Johns Hopkins University - Jun 7, 2023

Researchers Respond to NIH's Call for 3D in vitro Models and Create Engineered Human Tissue to Study Mosquito Bites, Disease

...Malaria, dengue, Zika virus and West Nile virus are all transmitted by mosquitos. Even for those who survive these illnesses, many are left suffering from organ failure, seizures and serious neurological impacts. A UCF research team has engineered tissue with human cells that mosquitoes love to bite and feed upon — with the goal of helping fight deadly diseases transmitted by the biting insects. Biomedical researcher Bradley Jay Willenberg came up with the engineered tissue idea when he learned the National

Institutes of Health (NIH) was looking for new in vitro 3D models that could help study pathogens that mosquitoes and other biting arthropods carry. Willenberg's team lined 3D capillary gel biomaterials with human cells to create engineered tissue and then infused it with blood. They hope to use this new platform to study how pathogens that mosquitoes carry impact and infect human cells and tissues. Willenberg hopes to adapt his new platform for application to other vectors such as ticks, which spread Lyme disease...
UCF Today - Jun 8, 2023

NIH/NSF-funded AI model offers a way to speed up drug discovery

...Researchers have begun using computational methods to screen libraries of drug compounds to speed up drug discovery, but it can take a long time to calculate each target protein's three-dimensional structure from its amino-acid sequence, and then use those structures to predict which drug molecules it will interact with. Researchers at MIT and Tufts University have now devised an alternative computational approach based on a type of artificial intelligence algorithm known as a large language model. The new model, known as ConPLex, can match target proteins with potential drug molecules without having to perform the computationally intensive step of calculating the molecules' structures. Using this method, the researchers can screen more than 100 million compounds in a single day. ... The research was funded by the National Institutes of Health and the National Science Foundation.
MIT News - Jun 8, 2023

An 'AI Doctor' Is Helping Hospitals Predict Readmissions

...New York University doctors and hospital executives are using an artificial intelligence (AI) computer program to predict whether a newly discharged patient will soon fall sick enough to be readmitted. The AI program "NYUTron" reads physicians' notes to estimate a patient's risk of dying, the potential length of their hospital stay, and other factors important to their care. NYUTron is what its developers call a "large language model," which can read and understand the creative and individualized notes frequently taken by doctors. Lavender Jiang and her colleagues trained NYUTron to scan unaltered text from electronic health records and, from what it learns, to make useful assessments about patient health status. The study results showed that the program could predict about 80% of those who were readmitted. In testing, NYUTron identified 85% of those who died in the hospital and estimated 79% of patients' actual length of stay. Funding for the study was partly provided by the U.S. National Institutes of Health...
UC San Diego Health - Health Library - Jun 7, 2023

FSU psychologist earns prestigious award for suicide prevention work using machine learning tool

...In 2018, Associate Professor of Psychology Jessica Ribeiro Ribeiro and former FSU Assistant Professor of Psychology Joseph Franklin were awarded $1.5 million from the U.S. Department of Defense to develop a revolutionary machine-learning tool to address an alarming surge in suicides among U.S. veterans. This clinical decision support tool is based on powerful machine learning algorithms for electronic health records that can predict with 80-90 percent accuracy whether someone will attempt suicide as much as two years into the future. This machine learning algorithm to predict suicidal behavior among active duty servicemembers was completed in fall 2022, and the team has worked with primary care providers at the Navy Medical Center in Portsmouth, Virginia, to increase deployment of the tool. Ribeiro has earned the 2023 Edwin S. Shneidman Award from the American Association of Suicidology in recognition of her research into suicide causes and prevention.
Florida State University News - Jun 6, 2023

NSF-funded research invents process to produce previously unknown material that could revolutionize cancer treatment

...A new material, created at the little-explored intersection of organic and inorganic chemistry, could not only enable more powerful solar panels, but it could also usher in the next generation of cancer treatments. The composite is made of ultra-tiny silicon nanoparticles, and an organic element closely related to those used in OLED televisions. Lorenzo Mangolini, a mechanical engineering and materials science professor at UC Riverside, helped invent the process for producing the silicon nanoparticles with the right specifications. High-energy light, such as ultraviolet laser light, can form free radicals able to attack cancer tissue. UV light, however, doesn't travel far enough into tissues to generate therapeutic radicals close to the tumor site. On the other hand, near-infrared light penetrates deeply into the body, but doesn't have enough energy to generate the radicals. The new material achieve the emission of light with higher energy than the one aimed at the material and the silicon "dots" that form the base of this high-energy material are not toxic. This research was funded by the National Science Foundation...
University of California,Riverside - Jun 12, 2023

Other IT Related

FACT SHEET: White House Launches Invest.gov, Highlights Record Public and Private Investment in Communities Under President Biden's Investing in America Agenda

...The White House launched Invest.gov, a new website showing the historic public and private sector investments President Biden's Investing in America agenda is bringing to states and territories across America. Invest.gov features an interactive map showing infrastructure projects underway that are funded by President Biden's Bipartisan Infrastructure Law as well as private sector investments mobilized by President Biden's agenda. The website also includes summaries of the impact of President Biden's Investing in America agenda in each state and territory, including jobs created, new businesses started, spotlight infrastructure projects funded, and manufacturing investments made under the Biden presidency. The website will be updated regularly to reflect recent investments, projects, and announcements...
The White House - Jun 6, 2023

FACT SHEET: Biden-Harris Administration Announces New Actions, Hosts Inaugural ARPA-I Summit to Highlight the Next Generation of Transportation Infrastructure Innovation for Americans

...President Biden's Investing in America agenda is making a once-in-a-generation investment to modernize the nation's infrastructure. The Biden-Harris Administration is announcing new actions to accelerate innovations in America's transportation infrastructure through the newly-formed Advanced Research Projects Agency – Infrastructure (ARPA-I). ARPA-I was authorized by the Bipartisan Infrastructure Law and established within the U.S. Department of Transportation (DOT). In its infancy, the newest agency created under the ARPA model aims to leverage the success pioneered by DARPA and ARPA-E to ensure that the future of transportation in America is safe, secure, efficient, and resilient for all...
The White House - Jun 13, 2023

NSF selects 34 semifinalists for the inaugural NSF Regional Innovation Engines competition

...The U.S. National Science Foundation announced 34 semifinalists for the first-ever NSF Regional Innovation Engines (NSF Engines) competition, spanning nearly all key technology areas and societal and economic challenges highlighted in the "CHIPS and Science Act." The NSF Engines will be led by universities, nonprofits, businesses and other organizations from across U.S. states and territories. NSF has completed initial merit review of proposals, narrowing to the 34 semifinalists. During the next stage, NSF will interview each team to assess their proposed leadership's ability to rapidly mobilize in the first two years; their competitive advantages; and budget and resources for their planned research and development, translation and workforce development efforts. Those selected, move to the final round in July. Semifinalists not selected to receive an NSF Engine award may be considered for an NSF Engine Development Award of up to $1 million over two years. These planning awards will help teams build their initial ecosystems, cultivate the necessary partnerships and potentially compete for additional funding, including through future NSF Engines competitions. "Today's announcement builds upon the 44 NSF Engines Development Awards that we announced in early May," noted Erwin Gianchandani, NSF assistant director for TIP. "Over the next two years, those awards will help organizations create connections and develop their local innovation ecosystems to prepare strong proposals for becoming future NSF Engines...
National Science Foundation - Jun 14, 2023

NSF-funded researchers use sensors to determine that elephant seals drift off to sleep while diving far below the ocean surface

...U.S. National Science Foundation funded research show that while elephant seals may spend 10 hours a day sleeping on the beach during breeding season, they average just 2 hours of sleep per day when they are at sea on monthslong foraging trips. They sleep for about 10 minutes at a time during deep, 30-minute dives, often spiraling downward while fast asleep, and sometimes lying motionless on the seafloor. During their months at sea, elephant seals rival the record for the least sleep among all mammals, currently held by African elephants, which appear to sleep just 2 hours per day based on their movement patterns. Researchers developed a system that can reliably record brain activity in wild elephant seals during their normal diving behavior at sea. With a neoprene headcap to secure the EEG sensors and a small data logger to record the signals, the system can be recovered when the animals return to the beach. They used the same sensors as used for a human sleep study at a sleep clinic. The seals carried time-depth recorders, accelerometers and other instruments that allowed the researchers to track the seals' movements along with the corresponding brain activity. The recordings show diving seals going into the deep sleep stage known as slow-wave sleep while maintaining a controlled glide downward, then transitioning into REM (rapid eye movement) sleep, when sleep paralysis causes them to turn upside down and drift downward in a "sleep spiral." ...
National Science Foundation - Jun 8, 2023

Beyond Liquid Crystal: DARPA Seeks Novel Tunable Optical Materials

...Liquid crystals are ubiquitous tunable optical materials most commonly known for the vibrant colors and sharp images they enable on flatscreen TVs, smartphones, tablets, and monitors. Despite being well-suited for optical filtering in visual displays, liquid crystals are not effective for militarily relevant areas of interest in both visible and infrared spectral regions. DARPA's Accelerating discovery of Tunable Optical Materials (ATOM) program aims to discover and develop new tunable optical materials (TOMs) in the visible and mid- and longwave infrared (MWIR/LWIR) bands of the electromagnetic spectrum. The ultimate goal is to enable solid-state materials that can be optically tuned on demand across multiple spectral ranges without requiring physical filtering or mechanical input to achieve this dynamic functionality. Such a breakthrough could enable low size, weight, and power single-lens optical devices to carry out a wide array of warfighter missions. ATOM comprises two technical areas: infrared and visible spectrum tunable optical materials. To date, optical material discovery is largely based on intuitive design coupled with first-principles simulations, like density functional theory. Identifying novel optical materials with unique tunable properties across a broad bandwidth requires new data science and learning-based approaches...
DARPA - Jun 7, 2023

NASA’s New Detectors Could Improve Views of Gamma-Ray Events

...Using technology similar to that found in smartphone cameras, NASA scientists are developing upgraded sensors to reveal more details about black hole outbursts and exploding stars — all while being less power hungry and easier to mass produce than detectors used today. Dr. Regina Caputo leads an instrument-development effort called AstroPix at NASA’s Goddard Space Flight Center. The silicon pixel sensors in AstroPix — still in development and testing — are reminiscent of the semiconductor sensors that allow smartphone cameras to be so small. AstroPix could record lower-energy gamma rays than current technology because these photons tend to get lost filtering through the multiple layers of a strip detector. Capturing them would provide more information about what happens during short-lived, energetic events. Pixelated silicon detectors have been proven in particle accelerator experiments, she said, and their common use and mass production for cell phones and digital cameras make them easier and less expensive to obtain...

National Aeronautics and Space Administration - Jun 6, 2023

DOE Funds Digital-Twin Project to Green-Lights Traffic Congestion Improvements

...The Chattanooga Digital Twin Project, a collaboration between the U.S. Department of Energy’s (DOE’s) National Renewable Energy Laboratory (NREL) and Oak Ridge National Laboratory, was funded through DOE’s Vehicle Technologies Office. It aimed to reduce transportation-based energy emissions and commuting delays using advanced computing. Traffic congestion plays a role in increasing these emissions and to combat these growing emissions, researchers used machine learning and real-time data collected from a wide range of infrastructure sensors to create a “digital twin” depicting Chattanooga traffic conditions. Via sensors installed on roads, this dynamic, data-informed simulation captured real-time traffic conditions, providing researchers with a portal to understand some of the underlying causes of existing traffic congestion. These insights generated from the digital twin allowed researchers to pinpoint specific areas for improvement, test possible solutions, and recommend effective traffic management strategies for city officials. This research shows the power of a digital twin to help us fully understand a system, the improvements of developed optimal control algorithms, and the potential impact of artificial intelligence trained in a digital world...

National Renewable Energy Laboratory - Jun 8, 2023

STEM / Workforce & IT

University of Houston Students Shine in DOE’s American-Made Carbon Management Competition

...The first American-Made Carbon Management Collegiate Competition, hosted by the U.S. Department of Energy's Office of Fossil Energy and Carbon Management (FECM), challenged students to develop the future carbon management by proposing regional carbon networks capable of transporting significant amounts of carbon dioxide. GreenHouston, a team of University of Houston students mentored by Assistant Professor Jian Shi from the UH Cullen College of Engineering, created a winning proposal for an optimized carbon dioxide transportation pipeline specifically tailored for the Houston area. The team’s strategy, which factored in cost analysis, revenue potential, safety considerations, weather hazards and social impact on neighboring communities, addressed complex challenges surrounding carbon management and won third place. DOE hopes to inspire the next generation of carbon management professionals to develop carbon dioxide transport infrastructure that will help drive technological innovation and emissions reductions...

University of Houston - Jun 8, 2023

NSF-funded MSU's summer program provides students with Autism Spectrum Disorder interactive opportunity to learn physics, explore college options

...Mississippi State is offering a highly interactive summer experience for students with Autism Spectrum Disorder. The students are learning about nuclear physics, electricity, aerodynamics, astronomy and robotics, among other topics. The physics summer school is designed to offer students with ASD a comprehensive postsecondary transition and to teach them physics and socialization skills. This is also a way for them to learn about research projects and consider the option of pursuing a STEM degree at a four-year university. The camp is funded through a prestigious $600,000 National Science Foundation CAREER program grant awarded to Crider in 2019. The NSF project is jointly funded by its Experimental Nuclear Physics Program and the Established Program to Stimulate Competitive Research, known as EPSCoR...

Mississippi State University - Jun 7, 2023

DOE Grant will help Clemson, Winston-Salem State grow a diverse workforce in quantum information science

...Clemson University is partnering with Winston-Salem State University (WSSU) to help grow a diverse workforce for the emerging field of quantum information science and engineering. A $2.26 million grant from the U.S. Department of Energy will establish the Winston-Salem Quantum Education Collaboratory (WS-QEC). Led by WSSU, the collaboratory will work with regional education centers to support the increasing demand for employees in the quantum industry. The grant will be used in part to help develop

instructional infrastructure at WSSU along with funding instructors.
Clemson University - Jun 7, 2023

STEM / Workforce Resources & Opportunities

R&D WORKFORCE TRAINING: FEDERAL AGENCIES' STEM INTERNSHIPS, SCHOLARSHIPS, AND TRAINING OPPORTUNITIES

...Increasing the availability of STEM opportunities is a priority in the Biden Harris Administration. To help facilitate this, the team at NITRD developed a STEM Portal that allows anyone to search for internships and other training opportunities at Federal agencies. The NITRD STEM PORTAL is a searchable database that includes a description, link, and contact information for each program listing. Government sponsored internships and training programs are competitive, but there are many Federal opportunities and the NITRD STEM Portal is here to help...
The Networking and Information Technology Research and Development (NITRD) Program - May 17, 2023

Upcoming Conferences / Workshops / Webinars

Smithsonian National Education Summit: July 18-20, 2023

...Welcome to your Smithsonian and the 2023 Smithsonian National Education Summit, Together We Thrive: Fostering a Sense of Belonging. Our Summit theme, “Together We Thrive” stems from an emerging body of research in the Science of Learning and Development that validates an optimistic outlook about the potential of all learners. The research tells us that all students can thrive across all disciplines, provided they have the right circumstances, contexts, and support. A panel of students will share their own personal learning journeys, discuss their experiences with Smithsonian programs, and provide insights into the types of intentionally designed learning environments that can foster empowering, culturally-affirming, transformative, and personalized experiences. Smithsonian National Education Summit is a free, three-day professional learning opportunity July 19 - 20, 2023. This annual education conference offers in-person workshops at the Smithsonian in Washington D.C., as well as online-specific sessions. PreK-12 educators, librarians, media specialists, and policymakers nationwide are invited to participate in sessions exploring four distinct tracks: (1) Life on a sustainable Planet (2) STEAM Education (3) Reckoning with Our Racial Past (4) An Integrated Arts Education...
Smithsonian - Jun 12, 2023

U.S. Leadership in Software Engineering & AI Engineering: Critical Needs & Priorities 2023

...Carnegie Mellon University (CMU) Software Engineering Institute (SEI) and the Networking and Information Technology Research and Development (NITRD) Software Productivity, Sustainability, and Quality (SPSQ) Interagency Working Group are partnering on this workshop, to inform a community strategy for building and maintaining U.S. leadership in software engineering and AI engineering, and positively impact progress in multiple application domains. Using Architecting the Future of Software Engineering: A National Agenda for Software Engineering Research and Development as a starting point, we will identify and explore important research areas for the future of software engineering that are critical for multidisciplinary research. June 20-21, 2023...
resources.sei.cmu.edu - May 24, 2023

Federal Register: Request for Information (RFI)

Request for Information: National Priorities for Artificial Intelligence

...The Biden-Harris Administration is developing a National Artificial Intelligence (AI) Strategy that will chart a path for the United States to harness the benefits and mitigate the risks of AI. This strategy will build on the actions that the Federal Government has already taken to responsibly advance the development and use of AI. To inform this strategy, OSTP requests public comments to help update U.S. national priorities and future actions on AI. Comments must be submitted via the Federal eRulemaking Portal at regulations.gov. Interested individuals and organizations are invited to submit comments by 5:00 p.m. ET on July 7, 2023...
The White House - May 24, 2023

Notice of Workshop on U.S. Leadership in Software Engineering & Artificial Intelligence Engineering: Critical Needs & Priorities

...The workshop on U.S. Leadership in Software Engineering & AI Engineering: Critical Needs & Priorities will take place on June 20 and 21, from 9:30 a.m. to 5:00 p.m. (ET), at the National Science Foundation, in Alexandria, VA. Workshop goals are to: (1) Identify research questions that excite the computing community and spark new collaborations. (2) Identify addendums or updates to the National Agenda for Software Engineering roadmap. (3) Produce a report summarizing challenges and strategic priorities for building and maintaining U.S. leadership in software engineering & AI engineering for the advanced computing and software community. Due to space limitations, in-person attendance is by invitation only; remote participation will be available via Zoom...
Federal Register - May 24, 2023

National Artificial Intelligence Advisory Committee

...The National Institute of Standards and Technology (NIST) announces that the National Artificial Intelligence Advisory Committee will hold a series of virtual briefing sessions. These sessions will be held on Tuesday, June 20, 2023; Thursday, June 22, 2023; and Tuesday, June 27, 2023. The purpose of these sessions is for invited experts to brief the Committee on topics of interest related to the Committee's year two efforts. Registration is required to view each of the virtual sessions and members of the public should register...
Federal Register - Jun 7, 2023

Note: Any mention in the text of commercial, non-profit, academic partners, or their products, or references is for information only; it does not imply endorsement or recommendation by any U.S. Government agency.

Innovation Through NITRD Coordination

Networking and Information Technology Research and Development National Coordination Office, Washington, DC USA