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

CAREER OPPORTUNITIES: Program Manager, National Strategic Computing Reserve Pilot Program Office: DEADLINE EXTENDED

...The Federal Government is creating a National Strategic Computing Reserve (NSCR) that can be called up in times of urgent national needs to address emergencies from pandemics to earthquakes to other natural or man-made disasters. The NSCR is envisioned as a coalition of resource providers (of compute, software, and data) and technical experts spanning government, academia, industry, nonprofits/foundations, civil society, and communities of practice supported by appropriate coordination structures and mechanisms that can be mobilized quickly to provide critical cyberinfrastructure capabilities and services in times of urgent need. The Networking and Information Technology Research and Development (NITRD) Program is seeking candidates interested in serving as the Program Manager for the NSCR Pilot Program Office. The NSCR Pilot Program Office will (1) develop a plan, to include the structures, policies, and processes for an NSCR Program Office, and (2) prototype the implementation and operation of these structures, policies, and processes. Submit your resume by January 15, 2023.

Federal Agency Funding Opportunities

NSF Scholarships in Science, Technology, Engineering, and Mathematics Program

...The S-STEM program encourages collaborations, including but not limited to partnerships among different types of institutions; collaborations of S-STEM eligible faculty, researchers, and academic administrators focused on investigating the factors that affect low-income student success (e.g., institutional, educational, behavioral and social science researchers); and partnerships among institutions of higher education and business, industry, local community organizations, national labs, or other federal or state government organizations, as appropriate. It supports institutions of higher education to fund scholarships for academically talented low-income students and to study and implement a program of activities that support their recruitment, retention and graduation in STEM. Proposers must provide an analysis that articulates the characteristics and academic needs of the population of students they are trying to serve. NSF is particularly interested in supporting the attainment of degrees in fields identified as critical needs for the Nation. The main goal of the S-STEM program is to enable low-income students with academic ability, talent or potential to pursue successful careers in promising STEM fields. To be eligible, scholars must be domestic low-income students, with academic ability, talent or potential and with demonstrated unmet financial need who are enrolled in an associate, baccalaureate, or graduate degree program in an S-STEM eligible discipline. ... March 2 2023 Deadline date for Tracks 2, 3 & Collaborative Planning Grants | March 29 2023 is Deadline date Track 1 proposals
National Science Foundation - Dec 2, 2022

NSF: Experiential Learning for Emerging and Novel Technologies

...Through this new initiative, the Directorate for Education and Human Resources (EHR) and the newly established Directorate for Technology, Innovation and Partnerships (TIP) seek to support experiential learning opportunities for individuals from diverse professional and educational backgrounds that will increase access to, and interest in, career pathways in emerging technology fields (e.g., advanced manufacturing, advanced wireless, artificial intelligence, biotechnology, quantum information science, semiconductors, and microelectronics). As NSF seeks to support the development of technologies in such fields, similar support will be needed to foster and grow a diverse science, technology, engineering, and mathematics (STEM) workforce to contribute to such innovation. The ExLENT program will support inclusive experiential learning opportunities designed to provide cohorts of diverse learners with the crucial skills needed to succeed in emerging technology fields and prepare them to enter the workforce ready to solve our Nation’s most pressing scientific and societal challenges. March 2 2023 is the deadline date for Pivots & Beginnings Tracks
National Science Foundation - Oct 17, 2022

National Science Foundation Research Traineeship Program

...The NSF Research Traineeship (NRT) program seeks proposals that explore ways for graduate students in research-based master’s and doctoral degree programs to develop the skills, knowledge, and competencies needed to pursue a range of STEM careers. The program is dedicated to effective training of STEM graduate students in high priority interdisciplinary or convergent research areas, through a comprehensive traineeship model that is innovative, evidence-based, and aligned with changing workforce and research needs. Proposals are requested that address any interdisciplinary or convergent research theme of national priority. Deadline date: September 6 2023
National Science Foundation - Nov 27, 2020

HPC

Yan receives NSF grant to advance multi-GPU supercomputer abilities

...Da Yan, Ph.D., assistant professor at the University of Alabama at Birmingham College of Arts and Sciences’ Department of Computer Science, received an RII Track-4 grant from the National Science Foundation to improve the efficiency of large-scale processing in Graphics Processing Unit supercomputers. The impact of this project will be significant, considering that the nation is replacing Central Processing Unit supercomputers with GPU supercomputers faster than ever before to benefit from significant performance improvement and energy efficiency...
UAB - Dec 12, 2022

Brains could help solve a fundamental problem in computer engineering

...Deep neural networks have radically expanded the limits of artificial intelligence—but they have also created a monstrous demand for computational resources, and these resources present an enormous financial and environmental burden. Training GPT-3, a text predictor so accurate that it easily tricks people into thinking its words were written by a human, costs $4.6 million and emits a sobering volume of carbon dioxide—as much as 1,300 cars. Stanford bioengineering professor Kwabena Boahen thinks he's figured out how to make chips so efficient that the enormous GPT-3 language prediction neural network could one day be run on a cell phone. Just as Feynman posited the "quantum supremacy" of quantum computers over traditional computers, Boahen wants to work toward a "neural supremacy." Making chips more energy efficient means deploying less energy to send information from chip to chip. Shortening wires can help, to the extent that it's physically feasible, but reducing how heavily the wires are used can make a huge difference as well. One way to use fewer signals is to invest each one with more meaning—to move from a binary system, where the only possible signals are zero and one, to a much higher base. Boahen devised a computational model of a dendrite that didn't just discriminate inward from outward sequences, but in fact would respond only if it received one specific sequence along a short stretch. So if that simulated stretch of dendrite responds to its inputs, the response encodes very specific information—it tells you exactly which neurons have fired, and in what sequence they fired. This characteristic of dendrites, Boahen says, can be used to encode numbers in much higher bases than base two. The challenge now is translating this biological mechanism into silicon. The work was supported by the US Office of Naval Research and US National Science Foundation...
Wu Tsai Neuroscience Institute - Dec 12, 2022

Robotics / Autonomous Vehicles

Drones and More Help USGS Respond to Mauna Loa

...The USGS Hawaiian Volcano Observatory (HVO) team has been focused on Mauna Loa for the past few years following Kilauea's eruption in 2018. Starting in July 2022, scientists harnessed HVO's monitoring network to detect further increases in earthquake activity and ground movement. In late summer, the data showed notable ground movement, which indicated that magma was accumulating beneath the surface. Since the last eruption of Mauna Loa in 1984, scientists are using a suite of new technologies and cutting-edge tools that mark important advancements for science and safety. Tools like high-resolution satellite imagery, InSAR (Interferometric Synthetic Aperture Radar), hand-held thermal cameras, physics-based lava flow models, and other cutting-edge tools put more and better information into the scientists' hands. The relatively new capability of instrumenting uncrewed aircraft systems (UAS), also known as drones, with onboard spectrometers and other instruments allow scientists to safely reach and sample places they could not reach before...
USGS - Dec 12, 2022

NASA's Lunar Flashlight Has Launched – Follow the Mission in Real Time

...NASA's Lunar Flashlight has communicated with mission controllers and confirmed it is healthy after launching Sunday, Dec. 11, at 2:38 a.m. EST. About 53 minutes after launch, the small satellite, or SmallSat, was released from its dispenser to begin a four-month journey to the Moon to seek out surface water ice in permanently shadowed craters at the lunar South Pole. A 3D digital version of the solar-powered SmallSat has made its debut in NASA's Eyes on the Solar System, the agency's recently revamped visualization tool. The system uses real trajectory data from the mission, so as Lunar Flashlight's journey unfolds, you can see exactly where the SmallSat is. To get close to the Moon's surface, the SmallSat will employ what's called a near-rectilinear halo orbit – designed for energy efficiency – that will take it within just 9 miles (15 kilometers) over the lunar South Pole and 43,000 miles (70,000 kilometers) away at its farthest point. Lunar Flashlight will use a reflectometer equipped with four lasers that emit near-infrared light in wavelengths readily absorbed by surface water ice. This is the first time that multiple colored lasers will be used to seek out ice inside these dark regions on the Moon, which haven't seen sunlight in billions of years. The Air Force Research Laboratory also contributed financially to the development of the Lunar Flashlight propulsion system. Lunar Flashlight is funded by the Small Spacecraft Technology program within NASA's Space Technology Mission Directorate...
National Aeronautics and Space Administration - Dec 11, 2022

NASA's Juno Exploring Jovian Moons During Extended Mission

...NASA's Juno mission is scheduled to obtain images of the Jovian moon Io on Dec. 15 as part of its continuing exploration of Jupiter's inner moons. Now in the second year of its extended mission to investigate the interior of Jupiter, the solar-powered spacecraft performed a close flyby of Ganymede in 2021 and of Europa earlier this year. During the flybys, Juno's Microwave Radiometer (MWR) added a third dimension to the mission's Jovian moon exploration: It provided a groundbreaking look beneath the water-ice crust of Ganymede and Europa to obtain data on its structure, purity, and temperature down to as deep as about 15 miles (24 kilometers) below the surface. Visible-light imagery obtained by the spacecraft's JunoCam, as well as by previous missions to Jupiter, indicates Ganymede's surface is characterized by a mixture of older dark terrain, younger bright terrain, and bright craters, as well as linear features that are potentially associated with tectonic activity...
National Aeronautics and Space Administration - Dec 14, 2022

Quantum

President Biden Announces Key Appointments to Boards and Commissions

...The National Quantum Initiative Advisory Committee (NQIAC) is the Federal Advisory Committee called for in the National Quantum Initiative (NQI) Act. The NQIAC is tasked with providing an independent assessment of the NQI Program and to make recommendations for the President, Congress, the National Science and Technology Council (NSTC) Subcommittee on Quantum Information Science, and the NSTC Subcommittee on Economic and Security Implications of Quantum Science to consider when reviewing and revising the NQI Program. The NQIAC consists of leaders in the field from industry, academia, and the federal laboratories. President Biden announced the appointment of individuals to serve in key roles...
The White House - Dec 9, 2022

Quantum repeaters and their role in information technology

...Repeaters are devices meant to avoid the loss of meaning and without repeaters, the data being sent over a connection can be rendered useless. In essence, we don’t get large-scale computer networking without repeaters. We do not have a fully functional quantum repeater yet. Paul Kwiat, head of the Kwiat Quantum Information Group and professor at the University of Illinois Urbana-Champaign, is also the leader of the quantum communications effort at Q-NEXT, a U.S. Department of Energy (DOE) National Quantum Information Science Research Center led by DOE’s Argonne National Laboratory. If you have a quantum bit and you don’t know what the state of that is, you cannot make a faithful copy of it. You’ll introduce noise. n quantum computing, this noise isn’t something a human can hear. It can be the electromagnetic signal from a nearby Wi-Fi or tiny disturbances in Earth’s magnetic field. One promising avenue is the concept of an entanglement swap...
Argonne National Laboratory - Dec 13, 2022

Princeton chemists create quantum dots at room temp using lab-designed protein

...Quantum dots are fluorescent nanocrystals used in electronic applications from LED screens to solar panels. Quantum dots are normally made in industrial settings with high temperatures and toxic, expensive solvents — a process that is neither economical nor environmentally friendly. But Hecht and his research group pulled off the process in the lab using water as a solvent, making a stable end-product at room temperature. The team’s process can also tune nanoparticle size, which determines the color quantum dots glow, or fluoresce, in. That holds possibilities for tagging molecules within a biological system, like staining cancer cells in vivo. ... This research was supported by the National Science Foundation MRSEC program.
Princeton University - Dec 12, 2022

Cybersecurity / Privacy

International Engagement Blog: Singapore International Cyber Week, the Regional Initiative for Cybersecurity Education and Training, and More

...NIST has continued to collaborate into the fall season with partners throughout the world on the Cybersecurity Framework 2.0 update. International engagement and alignment with international standards are important themes for the 2.0 update and will drive changes to ensure global relevance. As part of this ongoing international engagement, NIST welcomed visitors to the NCCoE and NIST headquarters to discuss various cybersecurity topics and explore areas for mutual collaboration...
National Institute of Standards and Technology - Dec 14, 2022

NSF 2022 Research Security Training for the United States Research Community awardees announced

...The U.S. National Science Foundation (NSF) has long worked in partnership with the National Institutes of Health, the Department of Energy, and the Department of Defense to improve the development and implementation of research security with the Research Security Training for the United States Research Community program. The program is a cornerstone of the NSF mandate to strengthen research security in the U.S. while encouraging principled international collaboration. Awardees will receive financial support to establish research security training frameworks that address U.S.-funded research and development security concerns, risks and threats. The four awardees will focus on developing training modules that detail research security insights and best practices, address the importance of disclosure, identify and remedy knowledge gaps in risk management and mitigation, and provide training on principled international collaboration. The 2022 Research Security Training for the United States Research Community awardees are listed...
National Science Foundation - Dec 9, 2022

NSA Releases Series on Protecting DoD Microelectronics From Adversary Influence

...The National Security Agency's Joint Federated Assurance Center (JFAC) Hardware Assurance Lab publicly released four Cybersecurity Technical Reports today to help the Department of Defense protect field-programmable gate array (FPGA)-based systems from adversary influence. The reports were created to help secure FPGAs — a form of programmable microelectronic components — during manufacturing, acquisition, programming, and first attachment of the devices...
National Security Agency/Central Security Service - Dec 8, 2022

DOE And NREL Announce First Cohort Of The Clean Energy Cybersecurity Accelerator Program

...The U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL) announced the first cohort of participants in the Clean Energy Cybersecurity AcceleratorTM (CECA) program, which aims to give next-generation cybersecurity tech a boost in the earliest stages of development to bring solutions to market more rapidly. DOE is working to ensure America's critical energy infrastructure remains reliable, resilient, and secure as more renewables are added to the power system. The Office of Cybersecurity, Energy Security, and Emergency Response (CESER) and Office of Energy Efficiency and Renewable Energy (EERE), which play critical roles in this effort, lead CECA and other programs and initiatives that support a streamlined clean energy transition, while encouraging the integration of cybersecurity measures at all phases of development and deployment. The three participants in the inaugural cohort have developed solutions to offer strong authentication for distributed energy resources and have recently begun the technical assessment of their technologies. The first cohort participants and their cyber defense technologies are...
Department of Energy - Dec 8, 2022

5G, Wireless Spectrum, Networking & Communications

NSF-funded study shows Antarctic summer thaw starts earlier, ends later than previously believed

...The U.S. National Science Foundation-supported study indicates that hydroclimatic processes in Antarctica are changing. The work also shows the power of public-private partnerships and NSF data facilities to acquire and analyze geospatial data. Researchers used newly available satellite imaging from Planet, an Earth imaging company, which can scan the surface of the Earth daily or multiple times per day. The new stream of data is having a major impact, the geoscientists said. In the past, they had to rely on far fewer satellite images or had to make the voyage to Antarctica to conduct soil measurements in person...
National Science Foundation - Dec 13, 2022

NASA's Latest International Water Satellite Packs an Engineering Punch

...Set for a Thursday, Dec. 15 launch, the Surface Water and Ocean Topography (SWOT) satellite promises to provide an extraordinary accounting of water over much of Earth's surface. Its measurements of fresh water and the ocean will help researchers address some of the most pressing climate questions of our time and help communities prepare for a warming world. Making this possible is a scientific instrument called the Ka-band Radar Interferometer (KaRIn). The instrument has been designed to capture very precise measurements of the height of water in Earth's freshwater bodies and the ocean. KaRIn will measure the height of water in the ocean, "seeing" features like currents and eddies that are less than 13 miles (20 kilometers) across – up to 10 times smaller than those detectable with other sea level satellites. It will also collect data on lakes and reservoirs larger than 15 acres (62,500 square meters) and rivers wider than 330 feet (100 meters) across. Until now, researchers looking to study a body of water relied on instruments that measure at specific locations – like gauges in rivers or the ocean – or that are space-based, gathering data along narrow "tracks" of Earth they can see from orbit. Researchers then have to extrapolate if they want a broader idea of what's happening in a water body. KaRIn is different. The radar instrument uses the Ka-band frequency at the microwave end of the electromagnetic spectrum to penetrate cloud cover and the dark of night. As a result, it can take measurements regardless of weather or time of day. The two KaRIn antennas will see the same spot on Earth from 553 miles (890 kilometers) above. Since the antennas look at a given point on Earth from two directions, the return signals reflected back to the satellite arrive at each antenna slightly out of step, or phase, with one another. Using this phase difference, the distance between the two antennas, and the radar wavelength, researchers can calculate the height of the water that KaRIn is looking at [Really cool tech!!]
National Aeronautics and Space Administration - Dec 12, 2022

NASA Scientists Map Global Salt Marsh Losses and Their Carbon Impact

...Historically, salt marshes were not considered important ecosystems for carbon storage and emissions, so there weren't as many efforts to track them. But, such "blue carbon" — organic carbon stored in coastal and marine ecosystems like marshes and mangroves — are an important part of Earth's carbon budget. According to a new NASA-led study, the world has lost 561 square miles (1,453 square kilometers) of salt marshes over the past 20 years. The work also allowed them to start estimating the amount of carbon dioxide — a greenhouse gas — emitted into the atmosphere as marshland is degraded or lost. Salt marshes are coastal grasslands that are regularly flooded by salty seawater, and they are both an indicator of and protector against climate change. They buffer coastal communities from severe storm impacts and rising sea levels. They provide vital habitat and nurseries for coastal plant, animal, and bird species, and recreation areas for humans. Furthermore, marshes sequester carbon in their vegetation, peaty muds, and other organic debris. The United States and Russia accounted for 64% of the total marsh losses over the span of the study period. NASA scientists conducted a global and

systematic change analysis of satellite images collected from 2000 to 2019, quantifying losses, gains, and recoveries of salt marsh ecosystems. Analyzing data from Landsat 5, 7, and 8 in Google Earth Engine, scientists identified marsh change and change drivers, including storm events, urbanization, and local sea-level change...
National Aeronautics and Space Administration - Dec 7, 2022

NASA Tests Lunar Communications Network in Lava Field

...The same networking technology that keeps us connected on Earth could soon be used by astronauts to communicate on the lunar surface when they return to the Moon during Artemis missions. NASA is developing a capability to overcome obstacles brought on by the harsh rocky environment of the lunar surface through accurately predicting how communication signals will propagate across the lunar surface. Regolith (Moon dust) holds static charge and stays suspended above the ground, which can interfere with communication signals in surprising ways. The Lunar LTE Studies project, or LunarLiTES, is a Space Communications and Navigation (SCaN) technology initiative supporting NASA's efforts to bring 4G and 5G networking to the Moon. The LunarLiTES capability tests how communication signals will spread across the terrain of the lunar South Pole, in an emulated environment at NASA Glenn. Findings from the LunarLiTES project will help NASA determine the best path forward in using 4G and 5G networking for Artemis communications...
National Aeronautics and Space Administration - Dec 8, 2022

Advanced Manufacturing

U.S. Department of Energy Announces $2.5 Billion Loan to Ultium Cells for Three Domestic Battery Cell Manufacturing Facilities

...The U.S. Department of Energy (DOE), through its Loan Programs Office (LPO), today announced the closing of a $2.5 billion loan to Ultium Cells LLC to help finance the construction of new lithium-ion battery cell manufacturing facilities. This loan boosts the nation's standing as a global leader of EV manufacturing. The announcement marks LPO's first closed loan exclusively for a battery cell manufacturing project under the Advanced Technology Vehicles Manufacturing (ATVM) program...
Department of Energy - Dec 12, 2022

Hill's 3D printing office supports AF maintenance operations

...A small unit in the Ogden Air Logistics Complex is making big waves by helping the Air Force replace hard to find parts and tools. The unit is called RAPID, or Reverse Engineering, Advanced Manufacturing, Prototyping, Innovation, and Design, and its aim is to support maintenance operations through three-dimensional modeling and printing. Located within the 809th Maintenance Support Squadron, RAPID has large industrial 3D printers and laser scanners to assist with a gamut of projects, including modeling, additive manufacturing and designing tooling. Some of the savings come from printing aircraft parts for fit checks. When aircraft maintainers need a part they don't have the exact specifications for or is simply hard to get, RAPID engineers will use laser scanners to determine the exact details of the part. They can then print the part and fit check it to determine if the specifications were correct...
Air Force Materiel Command - Dec 7, 2022

3D-printed decoder, AI-enabled image compression could enable higher-res displays

...Projecting high-resolution 3D holograms requires so many pixels that the task is beyond the reach of current consumer technology. A UCLA team has developed a technology for projecting high-resolution computer-generated images using one-sixteenth the number of pixels contained in their source images. The system compresses images based on an artificial intelligence algorithm, and then decodes them using an optical decoder — a thin, translucent sheet of plastic produced using a 3D printer — that is designed to interact with light in a specific way as part of the same algorithm. The decoder consumes no power, which could result in higher-resolution displays that use less power and require less data than current display technologies...
UCLA Newsroom - Dec 8, 2022

Microelectronics

Molecules Have an Orientation, and Scientists Have a New Way to Measure It

...In many advanced materials used in medicine, computer chip manufacturing and other industries, the molecules arrange themselves in complex patterns that dictate the material's properties. Researchers at the National Institute of Standards and Technology (NIST) have measured the 3D orientation of the molecular building blocks of plastics, called polymers, observing details as small as 400 nanometers, or billionths of a meter, in size. The measurements show polymer chains twisting and undulating in complex and

unexpected ways. The new measurements were made using a souped-up version of a technique called broadband coherent anti-Stokes Raman scattering, or BCARS. The new technique measures the average orientation of the polymer chains within 400-nanometer regions, along with the distribution of orientations around that average. These measurements will allow scientists to identify molecular orientation patterns that produce the mechanical, optical and electrical properties they seek. It can help with additive manufacturing, in which products are fabricated by 3D-printing them, layer upon layer. The new measurement technique might also be used to optimize the polymer-based ultrathin films used in semiconductor manufacturing. As the components within computer chips get smaller and smaller the molecular orientations in those films become increasingly important...
National Institute of Standards and Technology - Dec 8, 2022

Climate Change / Green Energy & IT

FACT SHEET: U.S-Africa Partnership in Supporting Conservation, Climate Adaptation and a Just Energy Transition

...At the United Nations Climate Meeting (COP27) in November 2022, President Biden announced U.S. plans to provide over $150 million in new funding to accelerate the President's Emergency Plan for Adaptation and Resilience (PREPARE). He emphasized the U.S. commitment to help vulnerable countries and communities in Africa adapt to and manage the impacts of climate change as part of PREPARE's work across the African continent. Since January 2021, the Biden-Harris Administration has invested and plans to provide at least $1.1 billion to support African-led efforts to support conservation, climate adaptation, and a just energy transition. New initiatives include...
The White House - Dec 13, 2022

DOE National Laboratory Makes History by Achieving Fusion Ignition

...The U.S. Department of Energy (DOE) and DOE's National Nuclear Security Administration (NNSA) today announced the achievement of fusion ignition at Lawrence Livermore National Laboratory (LLNL)—a major scientific breakthrough decades in the making that will pave the way for advancements in national defense and the future of clean power. On December 5, a team at LLNL's National Ignition Facility (NIF) conducted the first controlled fusion experiment in history to reach this milestone, also known as scientific energy breakeven, meaning it produced more energy from fusion than the laser energy used to drive it. LLNL's experiment surpassed the fusion threshold by delivering 2.05 megajoules (MJ) of energy to the target, resulting in 3.15 MJ of fusion energy output, demonstrating for the first time a most fundamental science basis for inertial fusion energy (IFE). Many advanced science and technology developments are still needed to achieve simple, affordable IFE to power homes and businesses, and DOE is currently restarting a broad-based, coordinated IFE program in the United States...
Department of Energy - Dec 13, 2022

Biden-Harris Administration Announces an Additional $325 Million in Pilot Projects through Partnerships for Climate-Smart Commodities, for Total Investment of $3.1 Billion

...The Biden-Harris Administration, through the U.S. Department of Agriculture (USDA) is investing an additional $325 million for 71 projects under the second funding pool of the Partnerships for Climate-Smart Commodities effort, bringing the total investment from both funding pools to over $3.1 billion for 141 tentatively selected projects. Partnerships for Climate-Smart Commodities is working to expand markets for American producers who produce climate-smart commodities, leverage greenhouse gas benefits of climate-smart production, and provide meaningful benefits to producers, including small and underserved producers...
USDA APHIS - Dec 12, 2022

Paper-thin solar cell can turn any surface into a power source

...MIT engineers have developed ultralight fabric solar cells that can quickly and easily turn any surface into a power source. These durable, flexible solar cells, which are much thinner than a human hair, are glued to a strong, lightweight fabric, making them easy to install on a fixed surface. They can provide energy on the go as a wearable power fabric or be transported and rapidly deployed in remote locations for assistance in emergencies. They are one-hundredth the weight of conventional solar panels, generate 18 times more power-per-kilogram, and are made from semiconducting inks using printing processes that can be scaled in the future to large-area manufacturing. ... This research is funded by the U.S. National Science Foundation.
MIT News - Dec 9, 2022

Digital Health

Guiding Developers through Foundational Federal Laws Applicable to Mobile Health Technology

...The Federal Trade Commission (FTC) released an update to the online, interactive Mobile Health Apps Tool. The updated tool was produced collaboratively, with contributions from ONC and the Food and Drug Administration (FDA). The interactive tool is structured simply, using a list of questions to help you assess which of the below federal laws may apply based on what an app will do or how it will be used, how users will get it, and who will use it. This tool helps you figure out whether, in addition to the FTC Act, you need to learn more about the following federal laws and how they may apply...
Health IT - Dec 12, 2022

NIH-supported UC Davis Health surgeons use FLIm imaging to detect head and neck cancer during surgery

...A UC Davis Health team of surgeons and scientists has integrated a novel imaging technology with robotic surgical systems to help detect primary cancerous tissue during head and neck cancer surgeries. The technology, known as Fluorescence Lifetime Imaging (FLIm), allows surgeons to identify and remove malignant primary tumors more precisely and thoroughly. Transoral robotic surgical platforms (TORS), such as the da Vinci® Surgical System, allow for minimally invasive surgeries to detect and remove tumors from hard-to-reach areas in the head and neck. To improve decision-making during surgeries and enhance the detection of elusive tumors, new diagnostic technologies compatible with TORS are needed. The technology allows for the objective visual detection of tumors using the tissue's intrinsic fluorescence properties. The surgeon scans the tissues for fluorescent changes related to alterations in tissue metabolism, a factor strongly linked to cancerous tumors. This project was supported by the National Institutes of Health...
UC Davis Health | University of California, Davis - Dec 8, 2022

Stanford Medicine teams use machine learning to find biomarkers that predict common, severe pregnancy complication

...A discovery by Stanford School of Medicine researchers of biomarkers in the blood and urine of women with a dangerous complication of pregnancy could lead to a low-cost test to predict the condition. At present, preeclampsia can be diagnosed only in the second half of pregnancy, and the sole treatment is to deliver the baby, putting infants at risk from premature birth. To figure out which biological signals could provide an early warning system for preeclampsia, the Stanford Medicine research team collected biological samples from pregnant women who did and did not develop preeclampsia. They conducted highly detailed analyses of all the samples, measuring changes in as many biological signals as possible, then zeroing in on a small set of the most useful predictive signals. Using the resulting thousands of measurements, as well as information about which participants developed preeclampsia and when in pregnancy each sample was collected, the scientists used machine learning to determine which biological signals best predicted who progressed to preeclampsia. The work was supported by the National Science Foundation...
Stanford Medicine - Dec 9, 2022

Other IT Related

Federal Research and Development: Funding Has Grown since 2012 and Is Concentrated within a Few Agencies

...Innovation is critical to U.S. competitiveness, prosperity, and security. In the last 10 years, the federal government has increased funding for research and development (R&D)—investing $179.5 billion in FY 2021. DOD and the Department of Health and Human Services received 77% of the FY 2021 funding. COVID-19 stimulus funding led to large R&D increases for HHS. For example, an HHS agency that helps develop vaccines saw increased spending from $736 million in FY 2019 to $16 billion in FY 2020. Some funding supports multi-agency initiatives in complex areas of strategic national importance—such as nanotechnology and artificial intelligence. This report describes (1) trends in federal R&D funding over the last 10 years and (2) the funding and organization for selected multi-agency R&D initiatives, among other objectives. To address these objectives, GAO analyzed data published by the National Science Foundation on annual R&D expenditures and examined Office of Management and Budget (OMB) data. GAO also reviewed agency documentation and collected written responses to structured questions on federal R&D from the Chief Financial Officer or budget office from the five agencies that fund most R&D...
gao.gov - Dec 15, 2022

New $20 million program promotes capacity building to broaden participation in regional innovation ecosystems

...The U.S. National Science Foundation announced Enabling Partnerships to Increase Innovation Capacity, or EPIIC, a new $20 million program encouraging minority-serving institutions, two-year institutions, primarily undergraduate institutions, and other emerging research institutions to participate in regional innovation ecosystems. The program will provide training and networking support to help build more inclusive ecosystems. EPIIC will provide up to $400,000 over three years to develop the capacity and institutional knowledge needed to build new partnerships and secure future external funding, enabling awardees to tap into their regional innovation ecosystems and potentially into an NSF Regional Innovation Engine, or NSF Engine for short. The program recognizes that many institutions, including minority-serving institutions, small academic institutions, and two-year institutions, stand to benefit from additional focused support for the infrastructure and resources needed to grow external partnerships and tap into innovation ecosystems, including engaging with NSF Engines. Participating institutions will develop strategies to advance efforts in workforce development, use-inspired research and development, and

the translation of research results to practice in emerging technology areas such as advanced manufacturing, advanced wireless, artificial intelligence, biotechnology, quantum information science, and semiconductors and microelectronics...
National Science Foundation - Dec 8, 2022

NSF accelerates use-inspired solutions for persons with disabilities

...The U.S. National Science Foundation is building upon basic research to accelerate solutions that enhance opportunities for persons with disabilities. With an investment of $11.8 million, NSF's Convergence Accelerator selected 16 multidisciplinary Phase 1 teams for the 2022 Cohort, Track H: Enhancing Opportunities for Persons with Disabilities. "Transdisciplinary, use-inspired research offers tremendous potential to accelerate novel solutions to the everyday challenges faced by persons with disabilities," said Erwin Gianchandani, NSF assistant director for Technology, Innovation and Partnerships. "Through the Convergence Accelerator's Track H, we are bringing together diverse perspectives and expertise spanning academia, industry, nonprofits and other communities to enable solutions and open opportunities for people who need it most." The awardees include: * AI-based Tools to Enhance Access and Opportunities for the Deaf, * Automating Transportation Affordances for People Living with Disabilities Using a Machine Learning Approach, * Convergent, Human-Centered Design for Making Voice-Activated AI Accessible and Fair to People Who Stutter, * Next Generation Augmentative and Alternative Communication Technology Powered by Artificial Intelligence, * Rapid Fabrication of Custom-Fit Reshapable Prosthetic Devices with Electronic Skin Sensors...
National Science Foundation - Dec 9, 2022

After 15 Years, 1,000 Tests, Orion's Heat Shield Ready to Take the Heat

...When Artemis I launched, NASA's new mega Moon rocket carried the Orion spacecraft – uncrewed, for now – into orbit for the first time, and a new era of lunar exploration began. After traveling beyond the Moon, nearly 270,000 miles from Earth, the capsule will work up a speed of 25,000 miles per hour. As it slams through Earth's atmosphere, friction will cut that speed to just 300 miles per hour in a matter of minutes. The result is heat – and a lot of it. A primary goal of Artemis I is to certify the Orion heat shield for use on flights with astronauts. Some data needed for that decision will come from sensors embedded in the Avcoat material. Ames-built instruments will measure the temperatures the heat shield experiences, while sensors for pressure and radiation were contributed by NASA's Langley Research Center...
National Aeronautics and Space Administration - Dec 9, 2022

NSF spurs use-inspired research and technology development to address food and nutrition security challenges

...The U.S. National Science Foundation today announced a $11 million investment to address challenges related to food and nutrition security. NSF has selected 16 multidisciplinary teams for Phase 1 of the Convergence Accelerator program's Track J: Food & Nutrition Security. Implementing convergence across food and nutrition sectors, Phase 1 teams under Track J will develop technologies, tools and approaches to combat challenges related to population health, climate change, and nutritional needs of vulnerable and disadvantaged communities. The awardees include: * Artificial-Intelligence-Based Decision Support for Equitable Food and Nutrition Security in the Houston Area, * Building a digital twin for national-scale field-level crop monitoring, prediction, and decision Support, * Data-driven Agriculture to Bridge Small Farms to Regional Food Supply Chains, * Food, Land, Water Environmental OpenSource Risk Intelligence Synthesis Model, or FLOWER-ISM, * Precision Agriculture for a Resilient Vegetable Supply Amidst Climate Change, or Precision Ag4Veggie ...
National Science Foundation - Dec 13, 2022

STEM / Workforce & IT

FACT SHEET: Biden Harris Administration Announces Bold Multi-Sector Actions to Eliminate Systemic Barriers in STEMM

...The White House Office of Science and Technology Policy (OSTP) is announcing a historic slate of bold actions across the U.S. government and businesses, civic, academic, nonprofit, community-based, and philanthropic organizations to advance the Biden-Harris Administration's STEMM Equity and Excellence priorities. These commitments activate a national vision and drive transformative change across the American science, technology, engineering, mathematics, and medicine (STEMM) ecosystem by dramatically expanding access and opportunities and bolstering America's global competitiveness. The STEMM Opportunity Alliance (SOA), a new landmark organization led by the American Association for the Advancement of Science (AAAS) and the Doris Duke Charitable Foundation (DDCF), is coordinating this effort with over 90 institutional partners across multiple sectors combining to account for over $1.2 billion in work and investment in initiatives that will advance action across five national STEMM Equity and Excellence pillars. More than $4 million has been committed to date to launch SOA; these pledges will serve as a force multiplier for the major strategic actions to expand STEMM opportunity being driven by departments and agencies across the U.S. government...
The White House - Dec 12, 2022

NOAA awards $60 million in education grants to Minority Serving Institutions

...As part of NOAA's long-term commitment to ensuring NOAA's future workforce is representative of the nation's population, the agency has awarded grants of up to $30 million each, over a five-year period, to two Minority Serving Institutions (MSIs): Howard University and the City College of the City University of New York. The ongoing partnership between NOAA and MSIs is part of the overarching effort to provide opportunities for students who are from traditionally underrepresented communities to advance America's competitiveness in science and technology innovation. The award to Howard University will support education, training and research for students in areas relevant to NOAA's atmospheric research mission, as well as to NOAA's National Weather Service meteorology mission. The award to the Research Foundation of the City University of New York supporting the Cooperative Center for Earth System Sciences and Remote Sensing Technologies (CESSRST) will increase the number of graduates with skills and competencies that are necessary to support ongoing efforts within the NOAA mission enterprise, and contribute to research and operational careers at NOAA's National Environmental Satellite, Data and Information Service...
National Oceanic and Atmospheric Administration - Dec 7, 2022

Inspiring the Artemis Generation: Cleveland Students See Robotics in Action at NASA Glenn

...More than 50 high school students jumped at the chance to become NASA engineers and scientists for a day. NASA's Glenn Research Center in Cleveland welcomed four FIRST Robotics teams onsite to tour state-of-the-art facilities, explore the latest technology, and learn about internships and career opportunities. Students toured the Simulated Lunar Operations (SLOPE) Laboratory and Graphics and Visualization (GVIS) Laboratory and participated in a STEM challenge to build a truss from straws. In the SLOPE Lab — an indoor facility designed to mimic lunar and planetary surface operations — students learned how NASA Glenn researchers test tools and techniques needed for rovers to traverse long distances and explore surfaces of the Moon and Mars. In the GVIS Lab, students used the latest augmented and virtual reality technology to see the X-59 supersonic aircraft up-close, step inside a virtual spacesuit, and explore Mars and Titan. NASA Glenn invests in building a future diverse STEM workforce that includes traditionally underrepresented students, such as young girls and women, minorities, students with disabilities, and other underserved individuals...
National Aeronautics and Space Administration - Dec 15, 2022

$5M DOE grant will prepare more STEM students for careers in nuclear science and security

...The UTSA-led Consortium on Nuclear Security Technologies (CONNECT) has received a five-year, $5 million renewal grant from the U.S. Department of Energy's National Nuclear Security Administration. The funds will go toward UTSA's efforts to educate and train the next generation of scientists and engineers, to provide innovative solutions to challenges related to nuclear security and to bolster the nation's pipeline of underrepresented students prepared for research careers. CONNECT provided funds for 45 students at three institutions during its first phase, which started three years ago. Participants included 23 undergraduate students and 22 graduate students. CONNECT is funded by the Department of Energy's National Nuclear Security Administration's (NNSA) Minority Serving Institution Partnership Program (MSIPP), a program that was created for the NNSA to raise awareness about the career opportunities available for minority students who are interested in STEM, particularly physics, computer science, electrical engineering and mechanical engineering...
The University of Texas at San Antonio - Dec 15, 2022

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 Program - Nov 22, 2022

USPTO: Explore our student programs

...As an intern at the USPTO, you will work on projects that make a real impact, while learning about the agency and its mission, networking with peers and our employees, and hearing directly from leadership about their career paths. Our internship programs also offer invaluable exposure to the world of intellectual property (IP) and a chance to jumpstart a unique career in protecting American innovation...
U.S. Patent and Trademark Office - Dec 14, 2022

Veterans Affairs: Edith Nourse Rogers STEM Scholarship

...The Edith Nourse Rogers Science Technology Engineering Math (STEM) Scholarship allows eligible Veterans and dependents using the Post-9/11 GI Bill or Fry Scholarship to get added benefits. This scholarship provides up to 9 months (or $30,000) of benefits for training in high-demand fields...
Veterans Affairs - Dec 2, 2022

Veterans Affairs: Veterans technology education courses

...The Department of Veteran Affairs 'Veteran Employment through Technology Education Courses (VET TEC) 5-year pilot program provides tuition and housing assistance to help Veterans advance in an IT career. Through VET TEC training programs, Veterans acquire high-tech skills to assist them in moving quickly into in-demand jobs in information science, computer software, computer programming, data processing, information science, and media applications. VET TEC training programs typically run from 6 to 28 weeks in length, which allows Veterans to complete training and enter the job market more rapidly than traditional college programs.
Veterans Affairs - Oct 12, 2022

Argonne seeks STEM interns to help design the future of science

...Researchers are just scratching the surface of harnessing robotics, artificial intelligence and machine learning to truly transform science. To explore the best applications for these cutting-edge technologies in biology, chemistry and materials sciences, the U.S. Department of Energy's Argonne National Laboratory is advancing the field of autonomous discovery. The lab is seeking undergraduate and graduate students who can bring fresh ideas, diverse perspectives and creative energy to the team during a robotics and instrumentation internship. These paid, 12-week internships will take place on site at Argonne's world-class facility in Lemont, Illinois, during the summer of 2023. The program includes round-trip travel reimbursement and housing support. Students who are interested in a robotics and instrumentation internship should apply by February 20, 2023, for priority review...
Argonne National Laboratory - Dec 14, 2022

NIST: NRC Postdoctoral Research Associateships Program

...The NIST NRC Postdoctoral Program supports a nationwide competitive postdoctoral program administered in cooperation with the National Academies/National Research Council (NRC). The postdoctoral program brings research scientists and engineers of unusual promise and ability to perform advanced research related to the NIST mission, introduces the latest university research results and techniques to NIST scientific programs, strengthens mutual communication with university researchers, shares NIST unique research facilities with the U.S. scientific and engineering communities, and provides a valuable mechanism for the transfer of research results from NIST to the scientific and engineering communities...
National Institute of Standards and Technology - Dec 8, 2022

NIST: Summer High School Intern Program (SURF)

...SURF is an 11-week summer fellowship program focused on undergraduate students interested in pursuing graduate degrees in science and engineering, or related areas. The program exposes students to cutting-edge research and promotes the pursuit of graduate degrees in STEM. The SURF Program is designed to inspire undergraduate students to pursue careers in STEM (science, technology, engineering, and mathematics) through a unique research experience that supports the NIST mission. Since 1993, SURF students from across the country have had the opportunity to gain valuable, hands-on experience, working with cutting edge technology in one of the world's leading research organizations and home to three Nobel Prize winners. Over the course of 11 weeks, SURF students contribute to the ongoing research of one of the six NIST facilities which are the Communications Technology Laboratory (CTL), Engineering Laboratory (EL), Information Technology Laboratory (ITL), Material Measurement Laboratory (MML), NIST Center for Neutron Research (NCNR), and Physical Measurement Laboratory (PML) (which now includes project in the Center for Nanoscale Science and Technology). The SURF Program is administered at the Boulder, CO and Gaithersburg, MD locations. Applications are required to be submitted through USAJOBS...
National Institute of Standards and Technology - Dec 8, 2022