



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!

Federal Agency Funding Opportunities

Biden-Harris Administration announces \$5 million funding opportunity to help communities address extreme heat through Investing in America Agenda

...The Department of Commerce and NOAA announced a \$5 million funding opportunity through President Biden's Investing in America agenda to help communities address extreme heat. This competitively awarded funding will support two new virtual research centers that will provide actionable, place-based information that communities and individuals can use as climate change makes heat waves more frequent and intense. The new virtual research centers, funded through the Inflation Reduction Act, will provide science-based support to community and government entities working to address climate and health issues. Specifically, NOAA is seeking applicants to establish the following two new centers: (1) Center for Community Climate and Health Observations, Monitoring and Evaluation. (2) Center for Climate and Health Assessments, Policy and Practice. The funding competition to create these centers of excellence will be managed by the National Integrated Heat Health Information System (NIHHIS), which is led by

NOAA and the Centers for Disease Control and Prevention (CDC) and managed by NOAA's Climate Program Office. Letters of intent are due on Monday, August 14, 2023 at 5 p.m. ET. Full applications are due on Monday, October 16, 2023 at 5 p.m. ET...
National Oceanic and Atmospheric Administration - Jul 11, 2023

Biden-Harris Administration Announces \$45 Million to Boost Domestic Solar Manufacturing

...The U.S. Department of Energy (DOE) today announced \$45 million, including \$18 million from the Bipartisan Infrastructure Law, to support pilot manufacturing of solar components that can contribute to a domestic manufacturing sector capable of meeting the Administration's solar deployment goals without relying on imported products. The funding will also support the development of new dual use solar technologies such as agrivoltaics and building-integrated photovoltaics, to create new markets for American products. Mandatory concept papers are due by September 27, 2023, at 5 p.m. ET...
Department of Energy - Jul 6, 2023

DOE's NREL Launches New Prize To Propel Wind Turbine Materials Recycling

...With more than 142 gigawatts of wind power installed across the United States as of June 2023, wind energy manufacturing is accelerating to help meet the nation's ambitious clean energy goals. The potential growth of the wind energy industry raises a critical question: How can the nation holistically consider the life cycle of a wind turbine—from deployment to decommissioning—to create a sustainable wind energy economy? The U.S. Department of Energy's Wind Energy Technologies Office launched the Wind Turbine Materials Recycling Prize, a \$5.1 million competition that is administered by the National Renewable Energy Laboratory (NREL). Part of DOE's American-Made Challenges program, the prize aims to help the country develop a cost-effective and sustainable recycling industry for two high-impact categories of wind turbine materials: fiber-reinforced composites and rare earth elements. The Wind Turbine Materials Recycling Prize aims to expand the nation's ongoing efforts to advance wind turbine materials recycling, such as NREL's thermoplastic resin research for wind turbine blades. To learn more about the timeline and structure of the prize register for the informational webinar hosted by NREL on Aug. 3, 2023, at 1 p.m. ET...
National Renewable Energy Laboratory - Jul 12, 2023

HPC

NOAA launches new hurricane forecast model - HAFS - that uses NOAA's updated supercomputers

...NOAA's Hurricane Analysis and Forecast System (HAFS) was put into operations on June 27 and will run alongside existing models for the 2023 season before replacing them as NOAA's premier hurricane forecasting model. HAFS is the first new major forecast model implementation using NOAA's updated weather and climate supercomputers. HAFS would not be possible without the speed and power of these new supercomputers, called the Weather and Climate Operational Supercomputing System 2 (WCOSS2). HAFS was the first model last year to accurately predict that Hurricane Ian would undergo secondary rapid intensification as the storm moved off the coast of Cuba and barreled toward southwest Florida. Over the next four years, HAFS will undergo several major upgrades, ultimately leading to even more increased accuracy of forecasts, warnings and life-saving information. HAFS provides more accurate, higher-resolution forecast information both over land and ocean and is comprised of five major components: a high-resolution moving nest; high-resolution physics; multi-scale data assimilation that allows for vortex initialization and vortex cycling; 3-D ocean coupling; and improved assimilation techniques that allow for the assimilation of novel observations. As HAFS uses the FV3 — the same dynamic core as the U.S. Global Forecast System — it will have a unified starting point when initiated for hurricane prediction and will also integrate with ocean and wave models as underlying inputs...
National Oceanic and Atmospheric Administration - Jul 13, 2023

Georgia State researchers use ORNL supercomputer to gain new insights into DNA repair

...A team of researchers led by chemistry professor Ivaylo Ivanov of Georgia State University used the Summit supercomputer at the Department of Energy's Oak Ridge National Laboratory to help answer how can one protein assembly participate in critical roles both in transcription — the highly regulated enzymatic synthesis of RNA from a DNA template — and in the repair of damaged DNA. The researchers discovered that TFIIH is a shapeshifter, reconfiguring itself to meet the demands of each task. Understanding how genetic mutations impair the function of TFIIH is the first step in designing therapeutic strategies such as gene editing. To understand TFIIH's functional dynamics during transcription initiation and DNA repair required the GSU team to model the large-scale dynamics of systems of nearly 2 million atoms — with multiple copies running simultaneously. This only becomes possible if you have a large number of GPU nodes available, such as on Summit. ... This study was funded by the National Science Foundation's Directorate for Biological Sciences, the National Institute of Environmental Health Sciences and the National Cancer Institute...
Oak Ridge National Laboratory - Jul 7, 2023

Artificial Intelligence / Machine Learning

NOAA Fisheries Scientists Identify More Efficient Means to Determine the Age of Fish Using AI and Near-Infrared Technology

...Scientists used Fourier transform near infrared spectroscopy (FT-NIR) and artificial intelligence (AI), in combination, to more quickly produce reliable estimates of fish age. Rapid and reliable age estimation is crucial for effectively and efficiently managing fish stocks. Almost 15,000 walleye pollock otoliths are aged annually for the stock assessment model. Otoliths are small calcified structures in the inner ear of a fish that have layers visible like tree rings. Scientists count the growth rings under a microscope. This model provides estimates of pollock abundance, which resource managers then use to determine annual catch limits in commercial fisheries. For several years, scientists have used FT-NIR spectroscopy to determine fish ages focusing light from a special near-infrared source on the otolith. Scientists measure the amount of light that is absorbed with an instrument known as a spectrometer. More recently scientists are beginning to use AI models that were trained on data from a total of 8,617 walleye pollock otoliths. Using FT-NIR and AI analysis together, the process of ageing a fish is much more efficient. It takes just 30–50 seconds per otolith to estimate the age of the fish. This is more than 10 times faster than traditional methods. The AI model also provides more accurate ages for older fish...

Noaa Fisheries - Jul 13, 2023

DTRA/DARPA/NIH-funded MIT scientists build a system that can generate AI models for biology research

...In your machine-learning project, how much time will you typically spend on data preparation and transformation? Google states that it takes over 80 percent of project time to format the data, and that's not even taking into account the time needed to frame the problem in machine-learning terms. BioAutoMATED is an automated machine-learning system that can select and build an appropriate model for a given dataset and even take care of the laborious task of data preprocessing, whittling down a months-long process to just a few hours. Automated machine-learning (AutoML) systems are still in a relatively nascent stage of development, with current usage primarily focused on image and text recognition, but largely unused in subfields of biology. Currently, biology-centric labs need to invest in significant digital infrastructure and AI-ML trained human resources before they can even see if their ideas are poised to pan out. With BioAutoMATED, researchers have the freedom to run initial experiments to assess if it's worthwhile to hire a machine-learning expert to build a different model for further experimentation. ... This work was supported, in part, by a Defense Threat Reduction Agency grant, the Defense Advance Research Projects Agency SD2 program, and the National Institute of Allergy and Infectious Diseases of the National Institutes of Health.

MIT News - Jul 6, 2023

NIH/NSF-Funded Biologists' Mapping Method Illustrates Paths to New Proteins Using Machine Learning

...Scientists at The University of Texas at Dallas are using machine learning to study proteins in a way that could impact protein engineering, human health and the evolutionary tracking of proteins related to infectious diseases. A team led by Dr. Faruck Morcos is using advanced computer techniques to generate a 3D "landscape" that allows scientists to visualize how viable new proteins could be engineered. Using variational autoencoders (VAE) — an unsupervised learning model incorporating a neural network and coevolutionary modeling, an inference technique developed by the research team — Morcos said scientists can classify protein sequences by their evolutionary changes and their specific functions, then generate new sequences similar in composition, along with a rating of their compatibility with real-world function. Recent focus in the field has shifted toward using machine-learning approaches to predict protein structures and understand protein sequence attributes. The UTD researchers used mathematical methods to create peaks and valleys in the virtual landscape. These barriers represent sets of improbable sequences that help isolate groups of proteins in terms of their function or evolutionary trajectory. ... The research was supported by NIH and NSF.

The University of Texas at Dallas - Jul 7, 2023

Robotics / Autonomous Vehicles

NSF-funded robot caterpillar demonstrates new approach to locomotion for soft robotics

...U.S. National Science Foundation-funded researchers at North Carolina State University have shown that a caterpillar-like soft robot can move forward, backward and dip under narrow spaces. The caterpillar-bot's movement is driven by a novel pattern of silver nanowires that use heat to control the way the robot bends, allowing users to steer the robot in either direction. The caterpillar-bot consists of two layers of polymer, which respond differently when exposed to heat. The bottom layer shrinks, or contracts. The top layer expands. A pattern of silver nanowires is embedded in the expanding layer of polymer. The researchers demonstrated that the caterpillar-bot's movement could be controlled to the point where users are able to steer it under a very low gap — such as guiding the robot to slip under a door. ... NSF program director Debora Rodrigues stated, "Such research and bio-inspired design could have applications beyond the lab for tremendous impact. For example, NSF is supporting research to find out whether this technology could be used in wearable motion tracking in sports or health applications."

National Science Foundation - Jul 13, 2023

NASA Humanoid Robot to Be Tested in Australia

...NASA's Valkyrie robot is beginning a new mission as part of a reimbursable Space Act Agreement with Woodside Energy in Perth, Western Australia. NASA plans to use a Valkyrie robot to develop remote mobile dexterous manipulation capabilities to accommodate remote caretaking of uncrewed and offshore energy facilities. Woodside Energy will test the resulting software and provide data and feedback to NASA, helping accelerate the maturation of robotic technology. The new capabilities may have applications for NASA's Artemis missions and for other Earth-based robotics objectives. Remotely operated mobile robots on the lunar and Martian surface could enable Earth-based operators to conduct important activities, even when astronauts are not physically present...

National Aeronautics and Space Administration - Jul 7, 2023

NSF-funded engineers advance a new era of prosthetics wrapped in layers of self-healing electronic skin that realigns autonomously when cut

...Human skin provides a barrier between the body and bad things in the world. U.S. National Science Foundation-supported engineers are keen to create synthetic skin to give robots and prosthetic limbs skinlike qualities and because of the skin's remarkable ability to heal. Skin has evolved immune mechanisms that rebuild the tissue with the original layered structure through a complex process involving molecular recognition and signaling. The team might be able to create multitiered synthetic skin with individually functional layers as thin as a micron. The material of different layers can be engineered to sense thermal, mechanical or electrical changes...

National Science Foundation - Jul 13, 2023

Office of Naval Research funding bridges gap between biology and engineering to develop AUVs inspired by Robotic Fish

...The robotic fish is a concept first spawned as part of a UVA research collaboration to test the limits of underwater mobility. Drawing inspiration from the exceptional speed and endurance of tuna, Carl White's mission centers on bridging the gap between biology and engineering to develop autonomous underwater vehicles, or AUVs. Whereas AUVs are traditionally propeller-driven tubes, bioinspired vehicles based on fish have bodies with complex, undulatory motions. In 2021, White unveiled the new generation, dubbed "Tunabot Flex." The robot was not only more flexible, but it was faster and more than twice as efficient in its movements as its similarly sized predecessor. This unprecedented combination led to funding from the Office of Naval Research. White designed the new iteration using high-speed video, photographs and a 3-D model of tuna. In a custom-flow tank capable of high-speed conditions, Tunabot Flex cruised at the tank's upper limit with a voltage input of just 60% so the robot could have flapped much faster, generating even higher speeds, but was untestable due to the flow tank's limits. Robotic fish are currently unable to match the combined swimming speed and efficiency of high-performance fish. If this gap were to close, AUVs could outperform fish. ... A group of robotic fish could coordinate to quickly complete a task, such as surveying or repairs, and then swim in a school to the next location – all while minimizing ecological disruption...

UVA Today - Jul 10, 2023

Training robots how to learn, make decisions on the fly

...Researchers in the Departments of Aerospace Engineering and Computer Science at the University of Illinois Urbana-Champaign developed a novel learning-based method so robots on extraterrestrial bodies can make decisions on their own about where and how to scoop up terrain samples. One of the challenges for this research is the lack of knowledge about ocean worlds like Europa. NASA wants to send battery-powered rovers rather than nuclear to Europa because, among other mission-specific considerations, it is critical to minimize the risk of contaminating ocean worlds with potentially hazardous materials. This method of learning to learn is also unique because it allows the robot to use vision and very little on-line experience to achieve high-quality scooping actions on unfamiliar terrains—significantly outperforming non-adaptive methods and other state-of-the-art meta-learning methods. The robot is modeled after the arm of a lander with sensors to collect scooping data on a variety of materials, from 1-millimeter grains of sand to 8-centimeter rocks, as well as different volume materials such as shredded cardboard and packing peanuts. The model the team created will be deployed at NASA's Jet Propulsion Laboratory's Ocean World Lander Autonomy Testbed...

News Bureau - Jul 7, 2023

Quantum

DOE-Funded Research Finds that Thanks to Trapped Electrons, a Material Expected to be a Conducting Metal Remains an Insulator

...Quantum materials have properties that aren't predicted by the parts that make up those materials. New research sheds light on the mechanism behind how a special material changes from an electrically conducting metal to an electric insulator. The researchers studied lanthanum strontium nickel oxide derived from a quantum material La₂NiO₄. Quantum materials have unusual properties that result from how their electrons interact. ... This work was supported by the Department of Energy Office of Science, Basic Energy Sciences program.

Department of Energy - Jul 12, 2023

Cybersecurity / Privacy

FACT SHEET: Biden-Harris Administration Publishes the National Cybersecurity Strategy Implementation Plan

...The Biden-Harris Administration's recently released National Cybersecurity Strategy calls for two fundamental shifts in how the United States allocates roles, responsibilities, and resources in cyberspace: (1) Ensuring that the biggest, most capable, and best-positioned entities – in the public and private sectors – assume a greater share of the burden for mitigating cyber risk; (2) Increasing incentives to favor long-term investments into cybersecurity. The Administration is announcing a roadmap to realize this bold, affirmative vision. It is taking the novel step of publishing the National Cybersecurity Strategy Implementation Plan (NCSIP) to ensure transparency and a continued path for coordination. This plan details more than 65 high-impact Federal initiatives. Sample initiatives from the plan are organized by the NCS pillars and strategic objectives and include...
The White House - Jul 13, 2023

Department of the Air Force Conducts Zero Trust Brainstorming Event

...The recently established Department of the Air Force Zero Trust Functional Management Office hosted its first “zero trust” brainstorming event in Arlington, Virginia, June 27-28. The effort is part of the Department of Defense's Zero Trust Strategy, a cybersecurity model that requires continuous verification of all users and applications on digital networks using active-monitoring software. The brainstorming event's purpose was to develop a framework for implementation of zero trust across Department of the Air Force networks. In addition to the Department of the Air Force Zero Trust Functional Management Office, participants in the event included members of the Secretary of the Air Force Chief Information Officer, Air Combat Command, Air Force Materiel Command, Chief Data and Artificial Intelligence Office, 16th Air Force information warfare unit and the Space Force...
Air Force Link - Jul 11, 2023

USDOT-Funded Cyber Research Center Leads the Way to Cyber Safety on Roads and Highways

...CYBER-CARE – the Transportation Cybersecurity Center for Advanced Research and Education – is a U.S. Department of Transportation (USDOT) University Transportation Center (UTC) that is supported by a \$2 million USDOT grant for its first year with anticipated total federal funding of \$10 million over five years. The new research center, led by the University of Houston, is helping to prevent potential cyberattacks that could threaten the safe and efficient movement of people and goods in the United States and throughout the world. The teams will establish a fundamental knowledge base and explore advanced theories of how to best mitigate impacts of potential large-scale cyberattacks on transportation infrastructure. CYBER-CARE will focus on four goals: (1) Protecting vehicle control systems that perform safety-critical functions; (2) Detecting and responding to potential cyber incidents involving U.S. traffic networks; (3) Building a framework that incorporates cyber-resilience and enables rapid recovery after cyber incidents; (4) Disseminating information as a resource in the development of industry-wide best practices...
University of Houston - Jul 6, 2023

Information Integrity Research & Development

NSF grant is good news for researchers studying journalism, recommender systems

...“We have put all this control over the public square of journalistic discourse into the hands of companies that don't have any transparency or accountability relative to what they're doing,” said Robin Burke, professor and chair of the Information Science department at UCB. He is a respected expert in the recommender systems that are key to digital life—everything from suggesting the next song in a playlist, to suggesting an online dating partner. The business model governing recommendations is optimized to sell ads while keeping users on a platform. As part of his work, Burke hopes researchers can experiment with alternative incentives that reimagine how we engage with technology. Burke is part of a team of researchers from a group of top schools, including Minnesota, Northwestern and Clemson, that is seeking to better understand how digital recommender systems are performing the tasks once left to professional editors. The team secured a \$2 million grant from the National Science Foundation to build a platform for researchers eager to experiment with the artificial intelligence that powers news recommender systems. Burke's work aims to create “fairness-aware” algorithms that eliminate inequality around, for instance, gender and ethnicity—which is closely related to what he's building through NSF...
CU Boulder Today - Jul 6, 2023

5G, Wireless Spectrum, Networking & Communications

IARPA Launches Effort to Develop Photorealistic Site Models

...The Intelligence Advanced Research Projects Activity (IARPA) — the advanced research and development arm of the Office of the Director of National Intelligence — launched a new program to research and develop technology that can build photorealistic virtual models using satellite, ground-level, and other available imagery. The Walk-through Rendering from Images of Varying Altitude (WRIVA) program seeks to produce innovations that will advance 3-D site modelling capabilities far beyond today's state of the art, giving personnel virtual "ground truth" with unrivaled insights into locations that would be difficult, if not impossible, to view...
Office of the Director of National Intelligence - Jul 11, 2023

A new NASA-funded technique uses remote images to gauge the strength of ancient and active rivers BEYOND Earth.

...Rivers have flowed on two other worlds in the solar system besides Earth: Mars, where dry tracks and craters are all that's left of ancient rivers and lakes, and Titan, Saturn's largest moon, where rivers of liquid methane still flow today. For rivers on other planets, measurements are more limited, and largely based on images and elevation measurements collected by remote satellites. A new technique developed by MIT geologists allows scientists to see how intensely rivers used to flow on Mars, and how they currently flow on Titan. The method uses satellite observations to estimate the rate at which rivers move fluid and sediment downstream. On Mars this technique gives us a time machine, to take the rivers that are dead now and get a sense of what they were like when they were actively flowing. Parker's mathematical equations, which accurately predict a river's flow rate, or how much water and sediment it can move downstream, were adapted to work only with width and slope inputs. They tested the modified equations on data from 491 rivers on Earth, and found that the predictions based solely on each river's width and slope were accurate. They applied the equations to Mars found that rivers likely flowed for at least 100,000 years at Gale Crater and at least 1 million years at Jezero Crater — long enough to have possibly supported life. The team then took their approach to Titan, where the moon's thick atmosphere and distance from Earth make it harder to explore, and there are far fewer available images. [Read on to explore this really cool NASA-funded research...]
MIT News - Jul 10, 2023

Advanced Manufacturing

Baldrige/MEP Help Manufacturers Implement Industry 4.0 Concepts

...Digital transformation — often informally referred to as Industry 4.0 — is and will continue to redefine the standards of competitiveness, performance, and, further, the minimal ability [of U.S. manufacturers] to participate in the market. So how can U.S. manufacturers ensure that they have the systems and processes in place to implement the latest advanced technologies? That is where the Baldrige Performance Excellence Program and its Baldrige Excellence Framework® come in. Such thinking led Phil Centonze, managing partner, POS-IMPACT LLC and FloridaMakes to team up with IMEC, as well as the Baldrige-based Florida Alliance for Performance Excellence Program The Sterling Council, the national MEP program, and the national Baldrige Program. The basic concept of the project was to develop a Baldrige-based assessment for manufacturers that would help them understand their preparedness for and adoption of advanced manufacturing technologies. With a shared purpose, the project team set out with two main goals: (1) Help manufacturers understand the relevance of and renew their interest in the Baldrige framework to improve competitiveness. (2) Help manufacturers understand how high performance facilitates effective implementation of advanced manufacturing technologies...
National Institute of Standards and Technology - Jul 11, 2023

Microelectronics

DOE-funded and Fermilab-led microelectronics team works to develop a cutting-edge particle detector

...The U.S. Department of Energy's Fermi National Accelerator Laboratory is designing and fabricating three components of a new, superconducting particle detector: chip, circuits and sensor. Each piece of this project is cutting-edge on its own, and together they make something completely new. The detector will be able to function in the ultracold, strong-magnetic-field, high-radiation environment found at particle accelerator facilities where others cannot. When completed, scientists could use this detector for groundbreaking experiments in fields ranging from nuclear physics to the search for dark matter. The detector's unique hybrid design enables near-sensor computing modeled after the human brain and will ultimately make the detectors scalable without sacrificing performance. The DOE-funded proposal aims to revolutionize cryogenic detectors able to detect single particles or photons. To this end, the team is developing two complementary classes of cryogenic detectors, one based on ultra-low-noise semiconductor sensors, and one based on superconducting nanowire single-photon detectors, or SNSPDs, that operate below minus 268 Celsius...
Fermilab - Jul 12, 2023

Climate Change / Green Energy & IT

DOE Invests Over \$23 Million to Reduce Carbon Emissions Across the United States

...The U.S. Department of Energy (DOE) announced 16 projects across 14 states are set to receive \$23.4 million to provide locally-tailored technical assistance and enhanced stakeholder engagement around carbon management technologies. The projects, housed at both universities and private sector companies, aim to connect carbon management developers with local communities to foster collaboration and education toward the advancement of commercial deployment of carbon capture, transport, and storage technologies across the United States. A key element of this assistance is close engagement with the communities affected by current and proposed carbon capture, transport, and storage infrastructure to facilitate public understanding of the technical aspects of the projects...

Department of Energy - Jul 10, 2023

NASA-funded research finds that the ocean's color is changing as a consequence of climate change

...The ocean's color has changed significantly over the last 20 years, and the global trend is likely a consequence of human-induced climate change. Scientists detected changes in ocean color over the past two decades that cannot be explained by natural, year-to-year variability alone. These color shifts, though subtle to the human eye, have occurred over 56 percent of the world's oceans — an expanse that is larger than the total land area on Earth. The shift in ocean color indicates that ecosystems within the surface ocean must also be changing, as the color of the ocean is a literal reflection of the organisms and materials in its waters. The team analyzed measurements of ocean color taken by the Moderate Resolution Imaging Spectroradiometer (MODIS) aboard the Aqua satellite, which has been monitoring ocean color for 21 years. MODIS takes measurements in seven visible wavelengths, including the two colors researchers traditionally use to estimate chlorophyll. They carried out a statistical analysis using all seven ocean colors measured by the satellite from 2002 to 2022 together and then zoomed out to see how these annual variations in ocean color changed over a longer stretch of two decades. The model used simulated the Earth's oceans under two scenarios: one with the addition of greenhouse gases, and the other without it. The greenhouse-gas model predicted that a significant trend should show up within 20 years and that this trend should cause changes to ocean color in about 50 percent of the world's surface oceans — almost exactly what the team found in their analysis of real-world satellite data. This suggests that the trends are consistent with anthropogenic climate change. This research was supported, in part, by NASA...

MIT News - Jul 12, 2023

Digital Health

AI Can Accurately Predict Potentially Fatal Cardiac Events in Firefighters

...Researchers at the National Institute of Standards and Technology and their colleagues have used a form of AI known as machine learning to accurately identify abnormal cardiac rhythms in firefighters. The researchers hope their work will eventually lead to a portable heart monitor that firefighters could wear to catch early warning signs of heart trouble and prompt them to seek medical attention. Sudden cardiac death claimed the lives of 36 firefighters on duty in 2022 and occurs when an irregular heart rhythm causes the heart to stop pumping blood. The researchers used machine learning and the Rochester dataset to build what they call the Heart Health Monitoring (H2M) model. They trained H2M with 12-second segments of a large portion of the electrocardiogram data...

National Institute of Standards and Technology - Jul 11, 2023

Teams Selected to Develop New Mental Health Screening Tool for Early Detection of Suicidality

...The Neural Evidence Aggregation Tool (NEAT) program seeks to provide clinicians with new information to save warfighters' lives. Rather than rely solely on subjective self-report questionnaires for screening, NEAT will attempt to provide mental health professionals with objective biomarkers of suicidality. These biomarkers consist of extremely fast automatic brain and body responses reflecting pre-attentional processing rather than consciously filtered subjective responses to questions. DARPA has selected two industry-led and two university-led teams for the NEAT program...

DARPA - Jul 12, 2023

Six Standards Advance as Part of SVAP 2023

...ONC has now published the Approved Standards for 2023 (2023 SVAP standards) as part of ONC's annual Standards Version Advancement Process (SVAP). The SVAP is designed to make the ONC Health IT Certification Program responsive to industry needs and better aligned with standards version advancement. The SVAP helps expedite the

use of newer versions of standards under the Program and improves the ability of health IT developers to provide relevant, timely, and innovative solutions to their clients...
Health IT - Jul 12, 2023

NIH-Funded AI Tool Decodes Brain Cancer's Genome During Surgery

...Scientists have designed an AI tool that can rapidly decode a brain tumor's DNA to determine its molecular identity during surgery — critical information that under the current approach can take a few days and up to a few weeks. Knowing a tumor's molecular type enables neurosurgeons to make decisions such as how much brain tissue to remove and whether to place tumor-killing drugs directly into the brain — while the patient is still on the operating table. The tool, called CHARM (Cryosection Histopathology Assessment and Review Machine), is freely available to other researchers. The new tool's ability to expedite molecular diagnosis could be particularly valuable in areas with limited access to technology to perform rapid cancer genetic sequencing. When tested on a never-before-seen set of brain samples, the tool distinguished tumors with specific molecular mutations at 93 percent accuracy and successfully classified three major types of gliomas with distinct molecular features that carry different prognoses and respond differently to treatments. It was capable of spotting telltale areas with greater cellular density and more cell death within samples, both of which signal more aggressive glioma types. Scientists have already designed AI models to profile other types of cancer — colon, lung, breast — but gliomas have remained particularly challenging due to their molecular complexity and huge variation in tumor cells' shape and appearance. This work was supported in part by the National Institute of General Medical Sciences grant...
Harvard Medical School - Jul 7, 2023

NSF/NIH-Funded Device That Dissolves in Body Shows Promise in Monitoring and Treating Heart Disease

...Researchers at George Washington University have developed an experimental device that could one-day help monitor and treat heart disease and dysfunction in the days, weeks or months following traumatic heart-related event before dissolving safely in the body. The dissolvable device would also help avoid complications and burdens associated with removal from the body, such as infection or the high cost of another surgical procedure. The device is an advanced soft electronics system that uses an array of sensors and actuators to perform more complicated investigations of the heart than traditional devices like a pacemaker has been able to do in the past. Not only can it be placed on various sections of the heart, but it can communicate information to physicians in real time about the health status of the patient's heart. The study was supported by the National Science Foundation and the National Institutes of Health...
The George Washington University - Jul 12, 2023

NIH/DOE-funded researchers discover another step in how your cells assemble using quantum mechanics-based method

...A new computational study from the University of Chicago shows how the microtubules—part of the cell's internal scaffolding—assemble and function. Microtubules are also a frequent target for cancer drugs. questions remained about precisely how microtubules form. A better understanding of this process could allow researchers to try to design drugs that more precisely target cancerous activity while leaving other functions less affected. The researchers built and ran simulations of the processes underlying microtubule shrinkage, using quantum mechanics-based method to describe the key chemistry. This model was so complex that it took two years of computing time to run. Because microtubules are so important for cells to divide, they are the target of a number of cancer drugs. ... Funding was by the National Institutes of Health and the U.S. Department of Energy's Office of Basic Energy Sciences...
UChicago News - Jul 10, 2023

Other IT Related

OSTP Principal Deputy Director for Policy Koizumi Represents United States at G20 Research Ministerial Meeting

...From July 5-6, 2023, White House Office of Science and Technology Policy (OSTP) Principal Deputy Director for Policy Kei Koizumi represented the United States and the Biden-Harris Administration as Head of Delegation at the Group of Twenty (G20) Research Ministerial Meeting in Mumbai, India. The ministerial focused on research and innovation for topics of critical importance, which also align with Biden-Harris Administration priorities...
The White House - Jul 6, 2023

NASA Opens New Center for Digital Engineering Innovation

...NASA is leading the future of spaceflight by equipping the next generation of aerospace innovators with modern engineering skills at a new DEDC (Digital Engineering Design Center) located at NASA's Johnson Space Center in Houston. Digital engineering is an emerging field of study that is crucial to the efficient design of aerospace hardware. Instead of having to manufacture and assemble parts to test them, designs can now be built, tested, and refined in virtual environments. NASA's DEDC is operated by the UTEP (University of Texas at El Paso) Aerospace Center and will provide immersive, project-based learning and training on state-of-the-art digital engineering toolsets and processes. NASA engineers and students who enroll in the program will learn and work together on NASA projects related to ISRU (in-situ resource utilization), which can enable astronauts

on Artemis missions to leverage resources found on the Moon and Mars. NASA engineers will also provide subject matter expertise to the students in the ISRU discipline area, while professors from UTEP provide instruction on the digital engineering software...
National Aeronautics and Space Administration - Jul 13, 2023

DOE Announces \$72 Million For Small Business Research and Development Grants

...The U.S. Department of Energy (DOE) announced \$72 million in funding for small businesses to pursue scientific, clean energy, and climate research, development, and demonstration projects. The funding will support 296 projects across 44 states and addresses multiple topic areas, such as renewable energy, nuclear energy, cybersecurity, advanced materials and manufacturing, microelectronics, and artificial intelligence...
Department of Energy - Jul 10, 2023

STEM / Workforce & IT

ERDC announces 2023 Women of Color STEM Award winners

...Five U.S. Army Engineer Research and Development Center (ERDC) employees were recently named 2023 Women of Color STEM award winners for their exceptional accomplishments in science, technology, engineering and mathematics at a national level. The awardees are Pat Sullivan, the deputy director of ERDC; Elizabeth Gao, a materials engineer at the ERDC's Construction Engineering Research Laboratory (CERL); Brandy Diggs-McGee, a mechanical engineer from ERDC-CERL; Jessica Frierson, the ERDC training and program manager and Dr. Catherine Thomas, a research biologist from ERDC's Environmental Laboratory (EL)...
U.S. Army Engineer Research and Development Center - Jul 7, 2023

STEM educators become students again through ERDC's annual RESET program

...Eleven STEM instructors from across the country are adding new tools to their skill sets during an annual summer research program for teachers at the U.S. Army Engineer Research and Development Center (ERDC). The Research Experience for STEM Educators and Teachers (RESET) program is designed to provide high-school and middle-school educators with high-quality professional development and an authentic summer research experience at participating Army research laboratories and centers. The program introduces teachers to innovative experiments and equipment, exposing them to various technological resources. Working alongside ERDC researchers gives the teachers a chance to be students again. Participating teachers are learning more than the latest research methods; they're also getting a glimpse of what STEM careers lie ahead. Researchers understand the integral role the program plays in bringing attention to ERDC...
U.S. Army Engineer Research and Development Center - Jul 12, 2023

Researcher Receives National Science Foundation Grant to Integrate AI Into Science Classrooms

...Ha Nguyen, assistant professor in Instructional Technology and Learning Sciences at Utah State University, has been awarded a grant of \$499,801 by the National Science Foundation on an Innovative Technology Experiences for Students and Teachers (ITEST) project. project will focus on utilizing AI technology to enhance the way science communication is taught in schools and help students develop a better understanding of scientific concepts. This research represents a partnership between Utah State University, University of California-Irvine, and community partners in Orange County, California. Using recent advances in artificial intelligence, such as ChatGPT, Nguyen will provide leadership in developing conversational agents to be integrated into high school curriculum that will help students learn about science communication and marine biodiversity...
USU News - Jul 12, 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 - Jun 21, 2023

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

Combat Disinformation & Violent Extremism: Research, Emerging Tech & Comms for a Better World

...U.S. Department of State is looking for six to ten students to track and summarize academic and think-tank research (among many other learning and engagement opportunities) to help our broad international counter-disinformation efforts. Students will be working with GEC's Academic & Think-Tank Outreach and Technology Engagement Units and other virtual interns to ensure that our efforts are informed by cutting-edge research and analysis on topics such as artificial intelligence, deep-fakes, state and non-state-sponsored propaganda, and counterterrorism. The internship is open to American citizens only and participants must be enrolled as students when applying. Applications for the internship are due July 28th, 2023. Internships are unpaid but may be eligible for course credit and are entirely virtual.
openopps.usajobs.gov - Jul 13, 2023

Upcoming Conferences / Workshops / Webinars

DARPA Seeks Input on Novel Methods to Separate, Purify Rare Earth Elements

...Rare Earth Elements (REEs) are used in a range of products and manufacturing processes – including permanent magnets, catalysts, fiber optics, and phosphor displays – critical to wind turbines, cell phones, and electric vehicles, among other modern technologies. REEs comprise 17 elements, including scandium, yttrium, and the lanthanide series. REE extraction, separation, and purification from a complex feedstock can be environmentally degrading, energy inefficient, and difficult to permit. The SPREE ARC opportunity is soliciting ideas to explore the following question: How can we purify Department of Defense (DoD)-relevant REEs using environmentally sustainable, energy-efficient, and commercially viable techniques that can be incorporated by the U.S. domestic mining sector? DARPA is sponsoring a hybrid workshop July 25 from 9 a.m. – 4 p.m. EDT. Registration is required for all workshop attendees and closes Monday, July 24, 2023 at 12:00 p.m. EDT...
DARPA - Jul 13, 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

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