



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!

Cybersecurity Awareness Month & Cybersecurity Career Awareness Week

Kicking-off Cybersecurity Career Awareness Week: Education Department Announces Ohio and California Teachers as 2022 Presidential Cybersecurity Education Awardees

...The U.S. Department of Education is announcing the 2022 recipients of the Presidential Cybersecurity Education Award, kicking-off Cybersecurity Career Awareness Week. The Presidential Cybersecurity Education Award, now in its third year, is presented annually to two teachers selected for their superior accomplishments as educators, academic achievement indicators, and leadership contributing to the field of cybersecurity. The program also helps to create awareness for cybersecurity occupations, for which

there are currently more than 700,000 job openings in the U.S. Employment for information security analysts -- just one type of cybersecurity job – is projected to grow much faster than other occupations through 2031...
U.S. Department of Education - Oct 17, 2022

Cybersecurity Career Awareness Week: Cybersecurity in Your Community

...There is a high demand for skilled cybersecurity workers. Cybersecurity practitioners are part of a dynamic industry with practically unlimited growth. There are many places where you can see state-of-the-art technology; all of which are touched by cybersecurity. Check out information: FOR K12 CLASSROOM TEACHER, SCHOOL CLUB, AND AFTER SCHOOL OR INFORMAL PROGRAMS | TIPS FOR EXPLORING CYBERSECURITY IN YOUR LOCAL COMMUNITY...
National Institute of Standards and Technology - Oct 20, 2022

Cybersecurity Awareness Month 2022: Using Strong Passwords and a Password Manager

...The key behavior that we are highlighting this week for Cybersecurity Awareness Month is using strong passwords and a password manager. In today's blog we interviewed NIST's Connie LaSalle, a senior technology policy advisor, and she offers four specific ways to mitigate your cybersecurity risks online while discussing the importance of adopting strong passwords. Take a look at her responses to our questions below...
National Institute of Standards and Technology - Oct 13, 2022

Cybersecurity Awareness Month 2022: Updating Software

...Cybersecurity Awareness Month is flying by, and today's blog identifies different security vulnerabilities that can be exposed if you are unable to keep up with your software updates. We interviewed NIST's Michael Ogata, a computer scientist in the Applied Cybersecurity Division, and he walked us through different strategies to minimize your cybersecurity risks. Michael also was able to provide cyber tips to improve online safety. This week's Cybersecurity Awareness Month theme is updating software...
National Institute of Standards and Technology - Oct 17, 2022

Cybersecurity Awareness Month: Empowering Airmen on cybersecurity

...October is Cybersecurity Awareness Month, a global effort between the U.S. government including 16th Air Force and private industry to raise awareness about online security to protect personal information and communication tools used for work, family and friends. "Cybersecurity is similar to electronic warfare," said U.S. Air Force Col. Clayton Small, 16th Air Force division chief of A37/8 Operations Support. "It's a constant cat and mouse game and staying one step ahead of the adversary is paramount to ensure protection of yourself, the area you work in and the joint force." Ways to protect yourself include enabling multi-factor authentication, strong passwords, updating software and lastly, recognizing and reporting cybercrimes. Strong passwords can also secure your accounts by making it harder for hackers to guess it. Examples of strong passwords are lengthy, misspelled words with upper and lowercase letters containing special characters. Repeatable passwords and using personal information that can be tied to you should be avoided...
10th Air Force - Oct 13, 2022

Federal Agency Funding Opportunities

NSF solicitation for a new education center at Arecibo Observatory

...The U.S. National Science Foundation issued a solicitation Oct. 13 for a new multidisciplinary, world-class educational center at the Arecibo Observatory in Puerto Rico that aims to serve as a hub for STEM education and outreach. The center would expand upon existing education and outreach opportunities currently in place at the Arecibo Observatory site, while also implementing new STEM programs and initiatives. The new center is expected to open in 2023. The solicitation calls for proposals to manage the education, STEM research, and outreach aspects of the center. Resources available on site include: a learning center, the Ángel Ramos Science and Visitor's center, exhibition space, laboratory space, auditorium, cafeteria, office space, and dormitories. This new educational center opportunity is consistent with guidance provided in the "CHIPS and Science Act". ...
National Science Foundation - Oct 13, 2022

NSF: Computer Science for All (CSforAll: Research and RPPs)

...This program aims to provide all U.S. students with the opportunity to participate in computer science (CS) and computational thinking (CT) education in their schools at the preK-12 levels. With this solicitation, the National Science Foundation (NSF) focuses on both research and researcher-practitioner partnerships (RPPs) that foster the research and development needed to bring CS and CT to all schools. Specifically, this solicitation aims to provide (1) high school teachers with the preparation, professional development

(PD) and ongoing support they need to teach rigorous computer science courses; (2) preK-8 teachers with the instructional materials and preparation they need to integrate CS and CT into their teaching; and (3) schools and districts with the resources needed to define and evaluate multi-grade pathways in CS and CT. The due date is February 8, 2023.

National Science Foundation - Jan 13, 2020

Artificial Intelligence / Machine Learning

WHAT THEY ARE SAYING: White House Blueprint for an AI Bill of Rights Lauded as Essential Step Toward Protecting the American Public

...The White House Office of Science and Technology Policy released the Blueprint for an AI Bill of Rights, which lays out five common sense protections to which everyone in America should be entitled in the design, development, and deployment of AI and other automated technologies. Technologists, business leaders, civil rights groups, technology associations, international leaders, privacy advocates, and elected officials are praising this “critical step” for its potential to make “a monumental impact” in the lives of the American people. What they’re saying...

The White House - Oct 17, 2022

A Machine Learning-Based Solution Could Help Firefighters Circumvent Deadly Backdrafts

...A lack of oxygen can reduce even the most furious flame to smoldering ash. But when fresh air rushes in, say after a firefighter opens a window or door to a room, the blaze may be suddenly and violently resurrected. This explosive phenomenon, called backdraft, can be lethal and has been challenging for firefighters to anticipate. Now, researchers at the National Institute of Standards and Technology (NIST) have hatched a plan for informing firefighters of what dangers lie behind closed doors. The team obtained data from hundreds of backdrafts in the lab to use as a basis for a model that can predict backdrafts. The team analyzed the measurements and picked up on certain trends. Fuel pouring into the chamber at higher rates coincided with a higher likelihood of backdrafts, for instance. To get more out of the data, the researchers also used a machine learning algorithm to establish a predictive backdraft model from their treasure trove of information...

National Institute of Standards and Technology - Oct 17, 2022

Robotics / Autonomous Vehicles

It Takes a (Worldwide) Village to Improve Drone Technology for First Responders

...Today’s first responders mostly use commercial-off-the-shelf (COTS) drones with preloaded camera and video technology. They look for a low-cost drone that’s rich in features and durability, easy to operate, and secure to perform specialized tasks. However, COTS drones can be limiting. Peering through thick foliage or other opaque materials can delay the time it takes to complete a rescue mission, so they need different types of cameras, data analytics, sensors or other adjunct devices to enhance the image detection. Confirming which of these technologies would work best became the goal of a recent prize challenge called the First Responder UAS Triple Challenge 3.1: FastFind. In Challenge 3.1, we asked competitors to build a low-cost UAS that could positively identify a person quickly. The top winners of Challenge 3.1 were academic teams. The final head-to-head competition took place in a forest near Mississippi State University in Starkville, Mississippi, where teams flew their aircraft in hot and humid conditions. The weather conditions weren’t ideal for the competitors, who had difficulty with their UAS and camera equipment. However, it highlighted the fact that first responders operate SAR missions in tough conditions every day, and it was useful for NIST and competing teams to capture data outside of a comfortable research facility...

National Institute of Standards and Technology - Oct 19, 2022

NSF-funded engineers study bird flight to understand response to air disturbances to help improve drone designs

...A new study, partly supported by the U.S. National Science Foundation, uses modeling and aerodynamics to describe how gulls can change the shape of their wings to control their response to gusts or other disturbances. The lessons could one day apply to uncrewed aerial vehicles or other flying machines. Gulls can adjust how they respond to perturbations by adjusting their wrist and elbow joints and morphing the shape of the wings. The team was able to predict the gulls’ flying qualities and speed of recovery from a perturbation such as a gust. That reaction time also gives insights into the controllable range for the bird and into applying bird flight dynamics to aircraft. As uncrewed aerial vehicles, or drones, become more widely used, they need to be able to navigate complex urban environments, something birds do very well. A deeper understanding of bird flight could help improve drone designs for various uses...

National Science Foundation - Oct 18, 2022

Drone Piloting Proficiency Takes Flight with Certification Course

...The “Advanced Open/Obstructed Test Proctor Course for Evaluating Drone Capabilities and Remote Pilot Proficiency” was developed by the National Institute of Standards and Technology (NIST) in conjunction with the Science and Technology Directorate (S&T). “When we started, there was no measurement science or standards infrastructure available to objectively evaluate drone capabilities or remote pilot proficiency, so we filled that void,” said Adam Jacoff, NIST project leader for Emergency Response Robots and chair of the ASTM E54.09 Subcommittee on Response Robots. Although these drone test methods are specifically designed to help emergency responders and public safety organizations maintain a safe operational standoff while performing extremely hazardous tasks, they similarly support a wide variety of commercial and industrial applications. ... The drone standard test methods are expected to be accepted by ASTM by spring of 2023 and next up will be underwater test methods for aquatic robots.
Homeland Security - Oct 13, 2022

Can Robots and Humans Co-exist in Public? UT Campus Study Will Offer Answers

...The UT Austin researchers study human-AI partnerships through the Good Systems research grand challenge. The new \$3.6 million grant from the National Science Foundation expands on their six-year project Living and Working with Robots, which kicked off in September 2021. The researchers plan to use two different types of dog-like robots made by Boston Dynamics and Unitree. In later phases of the research, the robots will go out in teams of two, monitored both by chaperones and people remotely. This means researchers will always have the ability to stop the robots if necessary. The team will study ways to improve oversight for a fleet of robots. The researchers expect to gain insights from observing and interviewing people who encounter the robots in a variety of contexts. This work could help designers figure out how future public-facing robots should be designed to co-exist within diverse communities like UT Austin’s, as well as how and where they should move...
UT News - The University of Texas at Austin - Oct 17, 2022

Tracking Trust In Human-Robot Work Interactions

...Ranjana Mehta, at Texas A&M University latest NSF-funded work focuses on understanding the brain-behavior relationships of why and how an operator’s trusting behaviors are influenced by both human and robot factors. Using functional near-infrared spectroscopy, Mehta’s lab captured functional brain activity as operators collaborated with robots on a manufacturing task. They found faulty robot actions decreased the operator’s trust in the robots. That distrust was associated with increased activation of regions in the frontal, motor and visual cortices, indicating increasing workload and heightened situational awareness. Interestingly, the same distrusting behavior was associated with the decoupling of these brain regions working together, which otherwise were well connected when the robot behaved reliably. Mehta said this decoupling was greater at higher robot autonomy levels, indicating that neural signatures of trust are influenced by the dynamics of human-autonomy teaming. The next step is to expand the research into a different work context, such as emergency response, and understand how trust in multi-human robot teams impact teamwork and taskwork in safety-critical environments. Mehta said the long-term goal is not to replace humans with autonomous robots but to support them by developing trust-aware autonomy agents...
Texas A&M Today - Oct 13, 2022

Cybersecurity / Privacy

Open for Public Comment, Draft NIST IR 8406, Cybersecurity Framework Profile for Liquefied Natural Gas | NCCoE

...The National Cybersecurity Center of Excellence (NCCoE) has published for comment a draft NIST Interagency Report (NIST IR) 8406, Cybersecurity Framework Profile for Liquefied Natural Gas. The LNG Cybersecurity Framework Profile, created in collaboration with the Department of Energy’s Office of Cybersecurity, Energy Security, and Emergency Response, in addition to working with LNG security experts, provides a voluntary, risk-based approach for managing cybersecurity activities and reducing cyber risk to all components of the LNG supply chain. The public comment period is open until November 17, 2022.
National Institute of Standards and Technology - Oct 17, 2022

Be Cyber Smart: Get your “Shields Up” Simple Steps for Safety Online

...Cyber scams are nothing new. Every day, hackers and other cyber criminals are looking for the easiest target online. Do you think you’re not worth being the target of online predators? Think again! Whether it’s your identity, your bank account information, or simply what’s in your email, your information is valuable and cyber criminals will do whatever they can to access it. They’re counting on you thinking you’re not a target. It’s time to get your Shields Up and take steps to prevent yourself from becoming the victim of a cyber crime...
cisa.gov - Oct 18, 2022

National Security Agency awards grant to Texas A&M researchers

...The National Centers of Academic Excellence in Cybersecurity (located within the National Security Agency) has awarded a grant to the Department of Computer Science and Engineering at Texas A&M University and the Texas A&M Cybersecurity Center. The funds will support a research project focused on automating risk detection and mitigation in cybersecurity systems. The research will focus on developing a novel malware detection system for cybersecurity analysts that uses autonomic methods based on the latest advancements in machine-learning and deep-learning techniques. With the number of automated cyber-attacks increasing rapidly, autonomic computer system defenses need to promptly respond and defend against malicious software...

Texas A&M University College of Engineering - Oct 17, 2022

Cyber security professor awarded \$1.5 million from National Science Foundation

...The National Science Foundation (NSF) has awarded Elias Bou-Harb, associate professor of cyber security in UTSA's Carlos Alvarez College of Business, two grants totaling \$1.5 million to further his work on Internet of Things (IoT) and critical infrastructure security. The first project, "Collaborative Research: CISE-MSI: Active and Passive Internet Measurements for Inferring IoT Maliciousness at Scale," began this month. The three-year \$500,000 grant is dedicated to support research endeavors for minorities pursuing cybersecurity careers. Using data-driven methodologies, the researchers will design and implement algorithms to fingerprint exploited IoT devices and discover their inherent security problems. Work will begin first on consumer devices, which are readily available, but will also include an analysis of sensors deployed in critical infrastructure systems such as power grids and water systems. The researchers will develop mitigation tactics for improving Internet security on IoT devices. The second grant, "Collaborative Research Cyber Training Implementation: Medium Cross-Disciplinary Training for Joint Cyber Physical Systems and IoT Security," is a \$1 million grant co-led by UTSA faculty members Paul Rad, an associate professor, and Rita Mitra, a professor of practice from the UTSA Department of Information Systems and Cyber Security. Uniquely studying both cyber and physical attacks, the researchers will focus on critical infrastructure security in water systems related to water quality. The primary focus of this grant will be on enhancing the cyber security and data science workforce, with a complementary research component...

The University of Texas at San Antonio - Oct 19, 2022

Information Integrity Research & Development

The National Security Agency hosts Information Viz challenge

...In September, the Texas A&M University College of Engineering held the first Aggies Invent of the year. This month's challenge, Information Viz, was sponsored by the National Security Agency (NSA). Teams were urged to focus on the different aspects of data to allow access to information to all people. "The problems that have been posed to the participants all have aspects that are relevant to the kinds of work the NSA does; they're not precisely NSA problems, but they have the same attributes," said Neil Ziring, technical director for the cybersecurity directorate at the NSA. The judges chose to include a fourth-place team, Mediator. The team developed software that could integrate with social media platforms to combat disinformation. It would analyze primary sources, cross-verify citations and assign a score based on its perceived credibility. It allows you to integrate both of those perspectives into your thinking and decision-making processes when you're coming up with solutions and thinking of policy...

Texas A&M University College of Engineering - Oct 13, 2022

Baylor Researchers Lead Interdisciplinary Team Identifying Illicit Activity Online in NSF-Funded Grant

...Many people use consumer-to-consumer web sites for common household transactions. Unfortunately, criminals likewise utilize these consumer-to-consumer websites but do so to facilitate illicit business in human trafficking, the sale of stolen goods and more. It's these types of transactions that two Baylor University professors and an interdisciplinary team of computer scientists are looking to thwart with a \$314,284 grant from the National Science Foundation (NSF) to utilize technology to identify and disrupt illicit transactions online. The team will seek to determine the ability of Natural Language Processing (NLP) to identify suspicious listings online...

Baylor University - Oct 13, 2022

5G, Wireless Spectrum, Networking & Communications

NASA Study Finds Evidence That Fuel Regulation Reduced Air Pollution from Shipping

...Ship tracks, the polluted marine clouds that trail ocean-crossing vessels, are a signature of modern trade. Like ghostly fingerprints, they trace shipping lanes around the globe, from the North Pacific to the Mediterranean Sea. But in 2020, satellite observations showed fewer of those pollution fingerprints. Drawing on nearly two decades of satellite imagery, researchers found that the number of ship tracks fell significantly after a new fuel regulation went into effect. A global standard implemented in 2020 by the International Maritime Organization (IMO) – requiring an 86% reduction in fuel sulfur content – likely reduced ship track formation. Scientists used advanced computing techniques to create

the first global climatology (a history of measurements) of ship tracks. They used artificial intelligence to automatically identify ship tracks across 17 years of daytime images (2003-2020) captured by NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) aboard the Aqua satellite...
National Aeronautics and Space Administration - Oct 18, 2022

UCI and BlackBerry win National Science Foundation convergence accelerator grant

...The National Science Foundation has awarded \$750,000 to a multidisciplinary team from the University of California, Irvine's Cybersecurity Policy & Research Institute, its Donald Bren School of Information and Computer Sciences and BlackBerry to address the challenges around secure communications on public 5G networks. The funds are being allocated under the NSF convergence accelerator program, which supports projects that tackle national problems. In the case of connected vehicles, the mass adoption of 5G-based vehicle-to-everything technologies has the potential to significantly improve the overall safety of increasingly chaotic and dangerous streets, allowing for advanced levels of connectivity, data sharing and improved coordination between cars and infrastructure, bicycles, pedestrians and scooters. Today's 5G networks are not able to provide customers with continuous and real-time indicators of the security of these public networks, even for higher-security connections called "secure slices." Collaborators in this newly funded, multi-stakeholder project between UCI and BlackBerry will formulate techniques for assessing the trustworthiness of software running within 5G network infrastructures and will develop technical foundations and legal and regulatory frameworks for Cooperative Zero Trust, a novel ZT framework to enable cooperation across traditional ZT boundaries for 5G networks...

UCI News - Oct 12, 2022

Advanced Manufacturing

NIST Announces Awards to Manufacturing Centers in Kentucky, Nebraska, Rhode Island and South Dakota

...National Institute of Standards and Technology (NIST) is announcing cooperative agreement awards totaling nearly \$19.8 million to four organizations to operate Manufacturing Extension Partnership (MEP) Centers in Kentucky, Nebraska, Rhode Island and South Dakota. The MEP Centers will be operated by the four awardees, the University of Louisville Research Foundation, the University of Nebraska-Lincoln, the University of Rhode Island Research Foundation, and South Dakota's Lake Area Technical College, and will provide services to small and medium-sized manufacturers in their states. The centers will use the new Job Quality Toolkit, which is rooted in the Baldrige Excellence Framework, to provide guidance on expanding opportunities for high-quality jobs. NIST's Hollings Manufacturing Extension Partnership program strengthens U.S. manufacturing by supporting 51 centers across the 50 states and Puerto Rico. Through this program, more than 1,400 manufacturing experts provide hands-on technical expertise that addresses the critical needs of manufacturers in their states...

National Institute of Standards and Technology - Oct 17, 2022

U.S. Manufacturing Ecosystem Key to Economic Growth, Innovation, Competitiveness

...Approaching an era where automation and cognitive computing seamlessly connect to smart factories, supply chains are entering into a fourth industrial revolution known as Industry 4.0. This transformation, through advanced digital technologies across engineering and manufacturing, is set to bring the U.S. manufacturing ecosystem to the forefront of modernization — and with it, a demand for a sustained pipeline of talent and strong domestic manufacturing centers. Known manufacturing chokepoints across sectors — including skilled labor, machine tools, critical chemicals and a reliance on foreign resources — are impacting operational readiness. The Defense Department is taking decisive action to combat these challenges in order to achieve two imperatives: to maintain capability and capacity to sustain legacy systems; and to expand and modernize manufacturing capabilities to build tomorrow's defense systems. This effort requires significant investment in American workers and infrastructure, including \$372 million in the president's fiscal 2023 budget to strengthen the Nation's supply chains through domestic manufacturing...

U.S. Department of Defense - Oct 14, 2022

Manufacturers Identify Top Challenges They Expect to Face

...As part of the annual National Institute of Standards and Technology (NIST) Manufacturing Extension Partnership (MEP) Survey, MEP Center clients are asked to identify the top three challenges their companies face over the next three years from a pre-determined list. Fiscal Year 2021's responses had a new frontrunner, a new top challenge reported by MEP clients — employee recruitment and retention. In fact, employee recruitment and retention has grown 29.8% as an MEP client challenge during the past 10 years, the highest increase for any reported challenge in the MEP survey. This aligns with the workforce challenge we are seeing nationally, and not only because of the COVID-19 pandemic impacts. Technology has grown the third most as a client challenge during the past 10 years. Small and medium-sized manufacturers (SMMs) need assistance bridging the gap between their state of practice and the state-of-the-art options available to U.S. manufacturers. Industry 4.0 technologies, for example, can raise productivity by up to 40% and transform some scale-based activity into flexible production...

National Institute of Standards and Technology - Oct 14, 2022

Machine Learning Accelerates Development of Advanced Manufacturing Techniques

...The materials manufacturing industry is using new and innovative technologies, processes, and methods to improve existing products and create new ones. Pacific Northwest National Laboratory (PNNL) is a leader in this space, known as advanced manufacturing. Scientists working in PNNL's Mathematics for Artificial Reasoning in Science initiative are pioneering approaches in the branch of artificial intelligence known as machine learning to design and train computer software programs that guide the development of new manufacturing processes. These software programs are trained to recognize patterns in manufacturing data and use this pattern recognition capability to recommend, or predict, settings in manufacturing processes that will yield materials with improved properties—lighter, stronger, or more conductive, for example—than materials produced using traditional methods. Using these machine learning tools, the team believes it can shorten to months, instead of years, the timeline from lab to factory floor. With the guidance of the tools' predictions, the materials scientists only need to perform a handful of experiments, instead of dozens, to determine, for example, what settings lead to desired properties in an aluminum tube...

Pacific Northwest National Laboratory (PNNL) - Oct 17, 2022

Microelectronics

CHIPS for America Seeks Public Input on Financial Incentives, New Institutes for Semiconductor Manufacturing

...The U.S. Department of Commerce's National Institute of Standards and Technology (NIST) CHIPS for America initiative is seeking public input on two programs that aim to restore U.S. global leadership in semiconductor manufacturing. Both were authorized under the Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Act. Chips and other semiconductor devices are critical components in artificial intelligence, quantum computing and other advanced technologies and are a mainstay of the consumer products we use every day. The CHIPS for America initiative includes two main components. First, it provides financial incentives to encourage investment in domestic semiconductor manufacturing. Second, it establishes collaborative networks for research and innovation that will ensure an enduring technological edge. The two Requests for Information (RFIs) announced today cover both aspects of the initiative. **Responses are due by 5 p.m. Eastern time on Nov. 14, 2022.** | A second RFI seeks public input on the development of up to three new Manufacturing USA institutes that will enhance U.S. leadership in semiconductor manufacturing through advanced research, education and workforce development. Manufacturing USA is a network of institutes that brings together people, ideas and technology to solve advanced manufacturing challenges. Like all Manufacturing USA institutes, the ones envisioned in the CHIPS Act will be public-private collaborations focused on technology, supply chain, and education and workforce development. **Responses are due by Nov. 28, 2022.**

National Institute of Standards and Technology - Oct 13, 2022

Climate Change / Green Energy & IT

Biden-Harris Administration Announces First-Ever Offshore Wind Lease Sale in the Pacific

...In a new development in the pursuit of a clean energy future, the Department of the Interior today announced that the Bureau of Ocean Energy Management (BOEM) will hold an offshore wind energy lease sale on Dec. 6, 2022, for areas on the Outer Continental Shelf (OCS) off central and northern California. This will be the first-ever offshore wind lease sale on America's west coast and the first-ever U.S. sale to support potential commercial-scale floating offshore wind energy development. This sale will be critical to achieving the Biden-Harris administration's deployment goals of 30 gigawatts (GW) of offshore wind energy by 2030 and 15 GW of floating offshore wind energy by 2035... U.S. Department of the Interior - Oct 18, 2022

USACE developing multifaceted approach to environmental forecasting

...The U.S. Army Corps of Engineers (USACE) recently adopted a set of "Top 10 Research and Development (R&D) Priorities." One of these priorities, "Ensure Environmental Sustainability and Resilience," directs USACE researchers to innovate holistic approaches to aligning civil works projects with ecosystem benefits. Leaning into this priority, a team at the U.S. Army Engineer Research and Development Center (ERDC) is taking a new approach to predicting environmental response. Ecological modeling constructs and analyzes mathematical models of ecological processes, including both purely biological and combined biophysical models. ERDC's Environmental Laboratory team have taken ecological models a step further by integrating them with engineering models. Dr. Todd Swannack, a research biologist at ERDC's Environmental Laboratory said, "We are taking advantage of ERDC's engineering and ecological knowledge and developing state-of-the-art tools to be able to forecast environmental response more accurately." ... US Army Corps of Engineers - Oct 14, 2022

NASA Dust Detective Delivers First Maps From Space for Climate Science

...NASA's Earth Surface Mineral Dust Source Investigation (EMIT) mission aboard the International Space Station has produced its first mineral maps, providing detailed images that show the composition of the surface in regions of northwest Nevada and Libya in the Sahara Desert. Windy desert areas such as these are the sources of fine dust particles that, when lifted by wind into the atmosphere, can heat or cool the surrounding air. But scientists haven't been able to assess whether mineral dust in the atmosphere has overall heating or cooling effects at local, regional, and global scales. EMIT's measurements will help them to advance computer models and improve our understanding of dust's impacts on climate...

National Aeronautics and Space Administration - Oct 12, 2022

New tool helps researchers investigate clouds, rain and climate change

...Climate scientists at the U.S. Department of Energy's (DOE) Argonne National Laboratory, Pennsylvania State University and the NASA Goddard Institute for Space Studies developed an easier way to compare cloud models with observations from weather instruments. The result is Earth Model Column Collaboratory (EMC2), an open-source research platform that pairs complex data with weather observations to create highly accurate climate models and forecast predictions. Results from current climate models don't directly compare to those from radars, satellites and other sensors whose signals can't directly detect key cloud parameters like liquid water content and number of drops. Instead, they detect microwave and visible light reflected by clouds and precipitation. As an instrument simulator, EMC2 can convert the more detailed model-simulated cloud parameters to these weather instrument signals. EMC2 helps represent the spatial variability of cloud cover inside each grid cell on smaller scales like those covered by the weather instruments. This smaller reference point allows climate scientists to evaluate models more accurately. Using an approach developed for NASA, Argonne scientists plan to use EMC2 in collaboration with DOE's Energy Exascale Earth System Model (E3SM), a high-resolution model designed to examine the most detailed dynamics of climate-generating behavior...

Argonne National Laboratory - Oct 12, 2022

Future emissions from 'country of permafrost' significant, must be factored into global climate targets

...By the end of this century, permafrost in the rapidly warming Arctic will likely emit as much carbon dioxide and methane into the atmosphere as a large industrial nation, and potentially more than the U.S. has emitted since the start of the industrial revolution. Using more than a decade of synthesis science and region-based models, a new study, led by the NSF-funded international Permafrost Carbon Network, forecasts cumulative emissions from this "country of permafrost" through 2100 under low, medium and high warming scenarios. The team estimates that under a low warming scenario—one that could be achieved if the global community limited warming to 2 degrees Celsius or below by reducing fossil fuel emissions—permafrost would release 55 petagrams (Pg) of carbon by the end of the century in the form of greenhouse gases carbon dioxide (CO₂) and methane (CH₄). If nothing is done to mitigate climate warming, the study estimates the Arctic could release 232 Pg of carbon by the end of the century. Once formerly frozen ground erodes or subsides, the carbon stored there can enter the atmosphere via microbial respiration or methane. Such rapid, non-linear shifts quickly and permanently change permafrost's ability to store carbon and could toggle large swaths of the Arctic region from carbon sinks to carbon sources. The study also underscores the importance of monitoring this quickly changing region using collaborative networks like the Permafrost Carbon Network and scientific tools like remote sensing technology. Remote sensing products can really help us see and track what is happening to permafrost in a physical way. High-resolution sensors can see evidence of thermokarst soil collapse, how water bodies are changing and even how wet or frozen the soils are. But satellites that tell us how much carbon from permafrost ends up in the atmosphere are limited, and there needs to be investment from space agencies in these capabilities as soon as possible. The study was authored by an international team of scientists from U.S. Geological Survey, Lawrence Berkeley National Laboratory, National Center for Atmospheric Research, Oak Ridge National Laboratory, and academic institutions. The Permafrost Carbon Network synthesis work is supported by a grant from the National Science Foundation.

NAU News - Oct 17, 2022

Digital Health

The 2022 National Biodefense Strategy builds upon administration S&T priorities for pandemic preparedness

...The National Biodefense Strategy and Implementation Plan on Countering Biological Threats, Enhancing Pandemic Preparedness, and Achieving Global Health Security provides a whole-of-government framework that organizes how the U.S. Government manages its activities to more effectively assess, prevent, prepare for, respond to, and recover from biological threats. It builds from a holistic "One Health" approach by interweaving efforts addressing human, animal, plant, and environmental threats throughout. The strategy also expands the U.S. Government's efforts to address the full range of future biological threats of natural, accidental, and deliberate origin, incorporates both technological and policy needs revealed by the COVID-19 pandemic, and provides an opportunity for our government to build core values of equity and accountability into our efforts to protect the health and security of the American people...

The White House - Oct 18, 2022

Two Sides of the AI/ML Coin in Health Care

...One clear use of these algorithms is through evidence-based, clinical decision support interventions (DSIs). We see a rapid growth in data-based, predictive DSIs, which use models created using machine learning (ML) algorithms or other statistical approaches that analyze large volumes of real-world data (called “training data”) to find patterns and make recommendations. While both evidence-based and predictive DSI types (models) could be used to address the same problem, they rely on different logic that’s “baked into” their software...

Health IT - Oct 19, 2022

How muscle, fat tissues respond to exercise, obesity

...Taking advantage of recent single-cell technologies and advancements in computational biology, a team led by co-author Laurie Goodyear, HMS professor of medicine at Joslin and senior investigator of Integrative Physiology and Metabolism at Joslin Diabetes Center, launched a collaboration with a computational biology and artificial intelligence lab at MIT led by co-author Manolis Kellis to investigate how three metabolic tissues respond to exercise and to high-fat diet-induced obesity at single-cell resolution. Among the most striking findings, the scientists observed that genes governing extracellular modeling and circadian rhythm were regulated by both exercise and obesity across all three tissue types. ... This work was supported by the National Institutes of Health.

Harvard Medical School - Oct 13, 2022

Newly identified protein drives breast cancer stemness and metastasis

...A Northwestern medicine study, enabled by machine learning, has identified a protein that drives breast cancer stemness and metastasis. Combining machine learning and experimental investigation, the team demonstrated that the protein membrane CD81 interacts with another previously identified tumor-initiating cell marker, called CD44, in promoting tumor cell cluster formation and lung metastasis of triple-negative breast cancer (TNBC). Machine learning and deep learning have transformed protein structure modeling, greatly facilitating the molecular understanding and therapeutic development for TNBC and other metastatic disease. ... This research was supported by the Department of Defense, the National Institutes of Health, the National Cancer Institute, and the National Science Foundation.

Texas A&M University College of Engineering - Oct 17, 2022

Other IT Related

Dinosaurs Did Not Have a Planetary Defense Program but NASA Does

...The White House Office of Science and Technology (OSTP) led the creation of the first U.S. National Near-Earth Object Preparedness Strategy and Action Plan, which outlines our whole-of-government strategy for planetary defense. The DART mission is a key part of this strategy. ... The DART mission was a daring, successful example of Planetary defense, bolstering our nascent efforts to protect Earth from a devastating impact by asteroids. Planetary defense, with missions like DART, gives us a model for other kinds of internation. The DART mission is a reminder that we have the potential to save the world with science and engineering, so long as we prioritize humanity as we develop cutting edge technologies...

The White House - Oct 17, 2022

Biotechnology sector materializes from Yellowstone hot springs

...Today, NSF supports programs and provides funding opportunities for biotechnology in four priority areas: foundational research, infrastructure, workforce and translation. New biotechnologies will advance the U.S. bioeconomy, accelerating scientific discovery and the harnessing biological systems to create goods and services that contribute to agriculture, health, security, manufacturing and climate resilience. NSF's SBIR/STTR program, also known as America's Seed Fund, awards over \$200 million each year to about 400 startups and small businesses to transform scientific discoveries into products and services. One such company, Ginkgo Bioworks, specializes in using genetic engineering to produce bacteria with industrial applications, and many other small biotechnology companies that are now fueling the economy through their discoveries. In 2007, a team of researchers discovered a bacterium in Yellowstone National Park that transforms light into chemical energy...

National Science Foundation - Oct 19, 2022

NASA Telescope Takes 12-Year Time-Lapse Movie of Entire Sky

...Every six months, NASA's Near-Earth Object Wide Field Infrared Survey Explorer, or NEOWISE, spacecraft completes one trip halfway around the Sun, taking images in all directions. Stitched together, those images form an “all-sky” map showing the location and brightness of hundreds of millions of objects. Using 18 all-sky maps produced by the spacecraft (with the 19th and 20th to be released in March 2023), scientists have created what is essentially a time-lapse movie of the sky, revealing changes that span a decade. Each map is a tremendous resource for astronomers, but when viewed in sequence as a time-lapse, they serve as an even stronger resource for trying to better

understand the universe. Comparing the maps can reveal distant objects that have changed position or brightness over time, what's known as time-domain astronomy. NEOWISE was originally a data processing project to retrieve asteroid detections and characteristics from WISE – an observatory launched in 2009 and tasked with scanning the entire sky to find and study objects outside our solar system. In 2013, NASA repurposed it to track asteroids and other near-Earth objects, or NEOs. Both the mission and the spacecraft received a new name: NEOWISE. [Take a look at the cool video!]
National Aeronautics and Space Administration - Oct 18, 2022

ERDC uses digital twin technology to recreate damaged Air Force base

...The U.S. Army Engineer Research and Development Center (ERDC) has partnered with Tyndall Air Force Base to complete a multibillion-dollar reconstruction project, and with the help of the Research and Development Environment (RDE) network and digital twin technology, Tyndall is on its way to being the country's most advanced military installation to date — an Installation of the Future. When Hurricane Michael came ashore, in 2018, 60 percent of the base was destroyed, and leadership faced a looming question of what to do next. The decision was made to not just rebuild, but to build back smarter and fully capable to take on the 21st century. With digital twin technology, users are able to virtually step inside the base and experience construction plans first-hand. Being able to 'walk through' areas of new construction gives users the opportunity to offer feedback and make changes before actual construction begins...

U.S. Army Engineer Research and Development Center - Oct 13, 2022

STEM / Workforce & IT

New NSF workforce development program opens new doors in emerging technology fields

...The U.S. National Science Foundation today launches a new \$30 million workforce development program, Experiential Learning for Emerging and Novel Technologies, or ExLENT. The program will expand practical learning opportunities for individuals interested in entering or gaining more experience in emerging and novel technology areas such as advanced manufacturing, artificial intelligence, biotechnology, quantum information science, and semiconductors and microelectronics. With awards of up to \$1 million over three years, the program will promote partnerships between organizations in emerging technology fields and those with expertise in workforce development. Using a cohort model and emphasizing the importance of mentorship, the ExLENT program will connect interested companies, governments and nonprofits with current and potential learners in science, technology, engineering and mathematics who are seeking paid opportunities to explore career paths and develop skills in emerging technology areas. ExLENT offers three pathways for people with varying STEM experience levels. Learn more about the program by joining the Introduction to ExLENT Webinar Nov 1, 2022 at 3:00 p.m. E.T.

National Science Foundation - Oct 19, 2022

Students Tackle New Challenges in Fifth Hacking for Homeland Security Course

...The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) launched its fifth course of the Hacking for Homeland Security (H4HS) program this Fall 2022 semester. The growing program is now available for students at the Rochester Institute of Technology (RIT) and Texas A&M University (Texas A&M) to develop solutions for pressing homeland security challenges for the Transportation Security Administration (TSA), Federal Emergency Management Agency (FEMA), Cybersecurity and Infrastructure Security Agency (CISA), and the U.S. Immigration and Customs Enforcement's Homeland Security Investigations (HSI). Launched in 2020, H4HS engages engineering, business, and policy students from leading universities to develop innovative solutions to mission-critical homeland security challenges...

Homeland Security - Oct 12, 2022

Teachers Detail Digital Safety Concerns, Strategies in Elementary Schools

...A new study led by a North Carolina State University researcher reveals a need for consistent education about digital safety for elementary school students, school staff and parents. Drawing from concerns raised in the study, researchers developed a digital safety summer camp for students and lesson plan on the topic. Researchers identified five general areas of concern for digital safety from the teacher interviews – concerns that were based on teachers' observations in classrooms, as well as virtually when coursework was shifted online during the COVID-19 pandemic. The concerns were related to content students were accessing online; their online conduct; contact with others online; "contract"-related issues with privacy; and issues with home use. They also found some teachers are monitoring chats on networking platforms during their classes, and using tracking programs to see how kids are interacting or if they're distracted. ... The project was supported by National Science Foundation.

College of Education | NC State University - Oct 12, 2022

Laser-focused on science education

...Desiré Whitmore may not be a hero in the comic-book sense, but the self-described Blaxican American physicist whose moniker is LaserChick is indeed an inspiring role model for children – especially girls – from underrepresented communities who are interested in STEM careers. In her role as a staff physicist educator for the Teacher Institute of San Francisco's Exploratorium, Whitmore, who earned a Ph.D. at UCI in 2011, amplifies her impact on the next generation of learners by developing and teaching hands-on activities that middle and high school teachers can use to spark their students' interest in and excitement about science. In a photo on Whitmore's website, laserchick.net, she points to herself and holds up a sign saying: "This is what a scientist looks like." Whitmore's obsession with quantum mechanics drew her to the labs at the National Science Foundation-funded Center for Chemistry at the Space-Time Limit. Whitmore seized the opportunity to combine two dream jobs into one at San Francisco's Exploratorium, a public learning laboratory dedicated to exploring the world through science, art and human perception. As a staff physicist educator in the Exploratorium's Teacher Institute, she educates middle and high school teachers on how to relay science in an inquiry driven manner and use students' own curiosity to help them learn science...
UCI News - Oct 12, 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 (NITRD) Program - Oct 18, 2022

Cybersecurity Summer Institute

...Lawrence Livermore National Laboratory (LLNL) is offering advanced undergraduate and graduate students and recent Bachelor's and Master's level graduates (within one year of degree) the opportunity to join the Cybersecurity Summer Institute (CSI) for an internship. You will work on topics related to cybersecurity that are broadly applicable to LLNL's national security concerns. This 12-week summer internship program provides you with the opportunity to learn and allows you to use your ideas, passions, and skills to explore and develop innovative technologies and approaches that enhance the resiliency of U.S. infrastructure cybersecurity threats. You'll also participate in the CSI Grand Challenge, where teams of students will work together to develop and present a system of solving hard problems relevant to LLNL's Mission...

cyber-internship.llnl.gov - Oct 18, 2022

HPC Cluster Engineer Academy | Computing

...HPC Cluster Engineer Academy is a 9-week paid internship that will give you direct experience with running and maintaining high performance computing (HPC) systems. As an HPC Academy intern, you'll learn the basics of cluster engineering and system installation under the guidance of our experts. This internship provides practical, real-world application of knowledge no HPC center—like LLNL—can live without. Now accepting applications for the 2023 session until January 31.

computing.llnl.gov - Oct 18, 2022

Data Science Summer Institute

...Lawrence Livermore National Laboratory is offering data science graduate students and advanced undergraduate students like you the opportunity to join the Data Science Summer Institute (DSSI). Our interns get to work on real problems that really matter to our country. This is a flexible summer internship program that runs for 12 weeks. As a DSSI intern, you'll apply your ideas, passion, and the skills you've acquired in machine learning, statistics, and high-performance computing to projects in areas of national importance...

data-science.llnl.gov - Oct 18, 2022

Computational Chemistry and Materials Science Summer Institute

...Lawrence Livermore National Laboratory (LLNL) is planning to hold its Computational Chemistry & Materials Science (CCMS) Summer Institute from June 5 to August 12, 2023. The 2023 CCMS Summer Institute will focus on "Non-equilibrium and Functional Materials in Materials and Chemistry" to highlight challenges and research opportunities in the development and application of methods to predict, analyze, and optimize the properties of materials for a broad range of applications. Each student will spend ten to twelve weeks at LLNL or remotely as a guest of an LLNL host scientist working on a computational project in the host's area of expertise...

pls.llnl.gov - Oct 18, 2022

Upcoming Conferences / Workshops / Webinars

SAFER AG Workshop: Safety For Emerging Robotics and Autonomous Agriculture Nov 9-10

...Over 80% of agricultural digital technologies are currently in the research and testing phase, providing a unique opportunity to evaluate and address potential safety concerns to labor and the environment before widespread adoption of these technologies. The USDA National Institute of Food and Agriculture is sponsoring a two-day workshop that aims to bring together representatives from farm operators, academia, industry, and governmental interests to discuss and provide current information; gaps in knowledge; and research needs that connect to issues such as risk, insurability, regulations and policy, workforce, and societal implications. This effort is a direct result of Federal collaboration through the NITRD Intelligent Robotics and Autonomous Systems (IRAS) Interagency Working Group (IWG).

University of Illinois Extension - Oct 19, 2022

Robotics and AI: New Perspectives Webinar: 1-4 November 2022

...Over the past few decades, we have integrated robots and artificial intelligence (AI) into our daily lives. But automated, intelligent systems also create new risks and concerns. Algorithmic biases encoded in these systems can perpetuate negative stereotypes and amplify social harms against underserved groups. Through critical, cross-disciplinary dialogue, our expert panelists will engage with our online audience to articulate the social benefits, negative impacts, and future prospects for innovations in robots and artificial intelligence. Free registration required. 1-4 November 2022, 1:00-2:30 p.m. ET daily.

Lemelson Center for the Study of Invention and Innovation - Oct 18, 2022

Innovation Through NITRD Coordination

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

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