



FEDERAL  
AGENCY  
FUNDING  
OPPORTUNITIES

HPC

ARTIFICIAL  
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5G, WIRELESS  
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ADVANCED  
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STEM /  
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## 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](mailto: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 \$50 Million to Incentivize Smart Manufacturing at Small- and Medium-Sized Facilities**

...The Biden-Harris Administration, through the U.S. Department of Energy (DOE), announced \$50 million in funding from President Biden's Bipartisan Infrastructure Law for states to ensure that smart manufacturing technologies and high-performance computing are more accessible by domestic manufacturing firms. The State Manufacturing Leadership Program aims to remove existing barriers that prevent innovative, data-driven tools and technologies from being used by small- and medium-sized manufacturers (SMMs). DOE seeks applications for programs that will be self-sustaining long-term. Competitive funding awards of up to \$2 million per state will be made over an up-to three-year period. States will be required to provide a cost match of at least 30% of the award. Full applications are due on May 30, 2023 at 5 p.m. ET...

## HPC

### **DOD Makes Headway on Cloud Computing**

...The Defense Department is moving ahead quickly on the adoption of cloud computing and implementation of a "zero trust" computing environment. The enterprise cloud will help the department advance its Joint All Domain Command and Control effort and will further enhance efforts involving artificial intelligence and machine learning efforts, software modernization and cybersecurity. In December, the Defense Department awarded contracts to four technology companies to provide services in support of its Joint Warfighting Cloud Capability. The four companies include Amazon Web Services Inc., Google Support Services LLC, Microsoft Corp and Oracle. In October the department released its strategy on zero trust and that strategy has since become a "North Star document" for the DOD and other federal agencies. The DOD plans to implement zero trust by 2027...

U.S. Department of Defense - Mar 29, 2023

### **Kestrel Supercomputer Arrives at NREL**

...The first delivery of the National Renewable Energy Laboratory's (NREL's) latest high-performance computing (HPC) system, Kestrel, arrived. Operations teams are working to install the CPU-based compute nodes and the underlying network and storage systems so Kestrel's first phase can undergo testing and be ready for research computing this summer. The second phase of Kestrel, comprising the graphics processing unit (GPU)—or "accelerator"—nodes is expected to arrive in the fall. Kestrel's heterogeneous architecture, including CPU-only and GPU-accelerated nodes, is designed to better enable emerging workflows such as artificial intelligence and machine learning, providing the U.S. Department of Energy (DOE) and industry partners with the ability to tackle energy challenges and move into a renewable and sustainable future. Kestrel will play a critical role in computing including advancing research in computational materials, continuum mechanics, and large-scale simulation and planning for future energy systems. For example, Kestrel's accelerated, more powerful computing will allow NREL to develop simulations that project optimal charging station infrastructure for electric vehicles across the country...

National Renewable Energy Laboratory - Mar 29, 2023

## Artificial Intelligence / Machine Learning

### **AI Could Set a New Bar for Designing Hurricane-Resistant Buildings**

...Equipped with 100 years of hurricane data and modern AI techniques, researchers at the National Institute of Standards and Technology (NIST) have devised a new method of digitally simulating hurricanes demonstrating that the simulations can accurately represent the trajectory and wind speeds of a collection of actual storms. The researchers suggest that simulating numerous realistic hurricanes with the new approach can help to develop improved guidelines for the design of buildings in hurricane-prone regions. Advances in AI-based tools and years of additional hurricane records have made an unprecedented approach possible, which could result in more realistic hurricane wind maps down the road. NIST postdoctoral researcher Rikhi Bose, together with Pintar and NIST Fellow Emil Simiu, used these new techniques and resources to tackle the issue from a different angle. Rather than having their model mathematically build a storm from the ground up, the authors of the new study taught it to mimic actual hurricane data with machine learning. With enough quality information to study, machine-learning algorithms can construct models based on patterns they uncover within datasets that other methods may miss. Those models can then simulate specific behaviors, such as the wind strength and movement of a hurricane. However, there were some discrepancies, such as in the Northeastern coastal states, where data was sparse so the model generated less realistic storms...

National Institute of Standards and Technology - Mar 29, 2023

### **NASA-enabled AI Predictions May Give Time to Prepare for Solar Storms**

...Like a tornado siren for life-threatening storms in America's heartland, a new computer model that combines artificial intelligence (AI) and NASA satellite data could sound the alarm for dangerous space weather. The model uses AI to analyze spacecraft measurements of the solar wind (an unrelenting stream of material from the Sun) and predict where an impending solar storm will strike, anywhere on Earth, with 30 minutes of advance warning. This could provide just enough time to prepare for these storms and prevent severe impacts on power grids and other critical infrastructure. To help prepare, an international team of researchers at the Frontier Development Lab – a public-private partnership that includes NASA, the U.S. Geological Survey, and the U.S. Department of Energy – have been using artificial intelligence (AI) to look for connections between the solar wind and geomagnetic disruptions, or perturbations, that cause havoc on our technology. The researchers applied an AI method, called "deep learning, to identify

relationships between solar wind measurements from heliophysics missions and geomagnetic perturbations observed at ground stations across the planet. From this, they developed a computer model called DAGGER (formally, Deep Learning Geomagnetic Perturbation) that can quickly and accurately predict geomagnetic disturbances worldwide, 30 minutes before they occur...

National Aeronautics and Space Administration - Mar 30, 2023

### **NSF/ONR-funded researchers show method for designing neural networks with the right building blocks can more accurately perform tasks**

...MIT researchers conducted an analysis of neural networks and proved that they can be designed so they are “optimal,” meaning they minimize the probability of misclassifying borrowers or patients into the wrong category when the networks are given a lot of labeled training data. The researchers discovered that the building blocks that enable a neural network to be optimal are not the ones developers use in practice. Optimal building blocks, called activation functions, help the network learn complex patterns in the input data by applying a transformation to the output of one layer before data are sent to the next layer. If you take the standard activation functions that people use in practice, and keep increasing the depth of the network, it gives you really terrible performance. But if you design with different activation functions, as you get more data, your network will get better and better. One method classifies a new input based on a weighted average of all the training data points that are similar to it. Their analysis shows that this is the only method of the three that leads to optimal performance. They identified a set of activation functions that always use this optimal classification method. This work was supported by the National Science Foundation and the Office of Naval Research...

MIT News - Mar 30, 2023

### **AI predicts enzyme function better than leading tools**

...A new artificial intelligence tool can predict the functions of enzymes based on their amino acid sequences, even when the enzymes are unstudied or poorly understood. The researchers said the AI tool, dubbed CLEAN, outperforms the leading state-of-the-art tools in accuracy, reliability and sensitivity. Better understanding of enzymes and their functions would be a boon for research in genomics, chemistry, industrial materials, medicine, pharmaceuticals and more. “We are not the first one to use AI tools to predict enzyme commission numbers, but we are the first one to use this new deep-learning algorithm called contrastive learning to predict enzyme function. We find that this algorithm works much better than the AI tools that are used by others,” study leader Huimin Zhao, a University of Illinois Urbana-Champaign professor said. The researchers verified their tool experimentally with both computational and in vitro experiments. The National Science Foundation supported this work through the Molecule Maker Lab Institute, an AI Research Institute Zhao leads...

News Bureau - Mar 30, 2023

## **Robotics / Autonomous Vehicles**

### **NSF-funded wheeled robot measures leaf angles to help breed better corn plants**

...The U.S. National Science Foundation-supported technology makes data collection on on corn plants' leaf angles significantly more efficient than conventional techniques, providing plant breeders with useful data more quickly. The angle of a plant's leaves, relative to its stem, is important because the leaf angle affects how efficient the plant is at performing photosynthesis. Conventional methods for measuring leaf angles involve measuring leaves by hand with a protractor and is both time-consuming and labor-intensive. Instead, a robotic device mounted on wheels is steered manually between crop rows that are spaced 30 inches apart. The device itself consists of four tiers of cameras, each of which is set to a different height to capture a different level of leaves on the surrounding plants. Each tier includes two cameras, allowing it to capture a stereoscopic view of the leaves and enable 3D modeling of plants. All this visual data is fed into a software program that computes the leaf angle for the leaves of each plant at different heights. Researchers tested the accuracy of AngleNet and found it was within five degrees of the angles measured by hand...

National Science Foundation - Apr 4, 2023

### **ONR-funded researchers built robotic hand that can identify objects with just one grasp**

...Inspired by the human finger, MIT researchers have developed a robotic hand that uses high-resolution touch sensing to accurately identify an object after grasping it just one time. The MIT team built a robotic finger with a rigid skeleton encased in a soft outer layer that has multiple high-resolution sensors incorporated under its transparent “skin.” The sensors, which use a camera and LEDs to gather visual information about an object’s shape, provide continuous sensing along the finger’s entire length. Each finger captures rich data on many parts of an object simultaneously. Using this design, the researchers built a three-fingered robotic hand that could identify objects after only one grasp, with about 85 percent accuracy. This work was supported by the Office of Naval Research...

MIT News - Apr 3, 2023

### **Saildrones to navigate Hawai'i waters for critical UH research**

...Three Sairdron Explorer, uncrewed surface vehicles used to measure ocean data, embarked on a six-month journey around Hawai'i Island, Maui, O'ahu and Kaua'i to evaluate ocean health across the state. The University of Hawai'i at Mānoa, NOAA's Pacific Marine Environmental Lab (PMEL), and the Cooperative Institute for Climate, Ocean, and Ecosystem Studies (CICOES), are working with Sairdron Inc. to pilot this effort. The 23-foot ocean drones will send back critical data and images in real-time to scientists so they can assess how climate change and ocean acidification are impacting our coastal waters. The saildrone's integration of pH and carbon dioxide measurements gives researchers the ability to better understand whether nearshore waters are accumulating fossil fuel emissions. They will be able to develop maps from field measurements to help them look for "hot spots" of ocean acidification. The research is also connected to a NOAA-funded project to assess the vulnerability of the Hawaiian Islands to climate change and ocean acidification...

The Magazine of the University of Hawaii - Malamalama - Apr 2, 2023

## Quantum

### **Quantum 'shock absorbers' allow perovskite to exhibit superfluorescence at room temperature**

...When collective behavior happens in the quantum world, it leads to processes such as superconductivity, superfluidity and superfluorescence. In all these processes, a group of quantum particles forms a coherent system that acts like a giant quantum particle. Superfluorescence normally requires very low temperatures. Semiconducting perovskites that exhibit superfluorescence at room temperature do so because of built-in thermal "shock absorbers" that protect the material. A U.S. National Science Foundation funded research team observed superfluorescence at room temperature in hybrid perovskites. They noticed the formation of polarons in these materials — quasiparticles made of bound lattice motion and electrons. Lattice motion refers to a group of atoms that are collectively oscillating. When an electron binds to these oscillating atoms, a polaron forms. Their analysis showed that formation of large polarons creates a thermal vibrational noise filter mechanism called 'Quantum Analog of Vibration Isolation,' or QAVI. According to the researchers, QAVI is an intrinsic property that exists in certain materials, for example hybrid perovskites. Understanding how this mechanism works could lead to quantum devices that operate at room temperature...

National Science Foundation - Apr 5, 2023

### **NIWC Pacific and Its Partners are Building a Quantum Navy**

...Naval Information Warfare Center (NIWC) Pacific's mission touches cyber, sea, space — and, since 2000, the subatomic realm. Quantum entanglement is what Albert Einstein called "spooky action at a distance." It's often described as two dice that always show the same number when rolled, together or even miles apart. When an entangled particle is measured, its partner instantaneously matches the measured particle's state. For Joanna Ptasinski, head of NIWC Pacific's Cryogenic Electronics and Quantum Research branch, this strangeness is what defines quantum: it's a complex system of matter or information where these phenomena — which can't be explained by classical notions of how the world works — are possible. Heisenberg's Uncertainty Principle, superposition, and entanglement are all part of a growing mathematical framework for subatomic phenomena called quantum mechanics, and it raises questions about the nature of reality as we know it. If matter exists in many forms at once until we observe it, what role does observation play in building the world around us? And how do we harness a domain defined by potentiality? This is what NIWC Pacific scientists explore in its labs, with its partners, and on the National Science & Technology Council's Subcommittee on Quantum Information Science. The dilution fridge provides the low temperatures needed to measure quantum systems with accuracy. NIWC Pacific's dilution fridge functions in the tens of millikelvin — colder than outer space — and is one of only two across all warfare centers and the Naval Research Laboratory. With a dilution fridge, researchers can measure and manipulate qubits. Co-leads Naval Research Laboratory and NIWC Pacific established the Naval Quantum Computing Program Office Dec. 2 where quantum subject matter experts across all 14 naval warfare centers will collaborate on quantum applications for the Department of Defense. The program office will manage access to the Air Force Research Laboratory's hub and its advanced quantum computing power on the IBM Quantum Network...

United States Pacific Command - Mar 31, 2023

### **\$1M NSF Award Supports Reimagining Cryptography in a Post-Quantum World**

...University of Maryland researchers—backed by \$1 million in funding from the National Science Foundation—are developing a framework for cryptographic systems that can weather increasingly powerful quantum computers. They are also focused on fundamentally changing the way that cryptography is taught, developed and practiced. The researchers will explore constructions of cryptosystems that can be proven secure against quantum computers. Initially they will focus on the private-key setting. Two kinds of cryptography are currently in use: public-key and private-key. The former is ideal for negotiating a connection over the internet but slow for sending data. The latter is very fast but needs a preexisting, already-negotiated connection. In practice, both types get used often. While cryptography in a post-quantum future will require people to think differently about the challenge of securing critical information, it will also require new knowledge on quantum-based security features that are not currently possible...

UMIACS - Apr 2, 2023

## Cybersecurity / Privacy

### **Joint Statement on Efforts to Counter the Proliferation and Misuse of Commercial Spyware**

...The governments of Australia, Canada, Costa Rica, Denmark, France, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, and the United States recognize the threat posed by the misuse of commercial spyware and the need for strict domestic and international controls on the proliferation and use of such technology. Commercial spyware has been misused across the world by authoritarian regimes and in democracies. There is a fundamental national security and foreign policy interest in countering and preventing the proliferation of commercial spyware that has been or risks being misused for such purposes. The Guiding Principles on Government Use of Surveillance Technologies and the Code of Conduct developed within the Export Controls and Human Rights Initiative will be implemented to advance these interests...

The White House - Mar 30, 2023

### **FACT SHEET: Advancing Technology for Democracy**

...The first wave of the digital revolution promised that new technologies would support democracy and human rights. The second saw an authoritarian counterrevolution. Now, the United States and other democracies are working together to ensure that the third wave of the digital revolution leads to a technological ecosystem characterized by resilience, integrity, openness, trust and security, and that reinforces democratic principles and human rights. OSTP released a National Strategy to Advance Privacy-Preserving Data Sharing and Analytics, a roadmap for harnessing privacy-enhancing technologies, coupled with strong governance, to enable data sharing and analytics in a way that benefits individuals and society, while mitigating privacy risks and harms and upholding democratic principles...

Networking and Information Technology Research and Development - Mar 30, 2023

### **The Importance of Transparency – Fueling Trust and Security Through Communication**

...Product developers increasingly consider security as they design and build products, but they may not always communicate critical cybersecurity information about their connected products. Information gaps present a challenge to stakeholders—especially customers—who have limited insight into the security processes, functions and features that protect connected products, components, and services. Effective communication is the next step towards a more secure connected ecosystem. All audiences could benefit from a consistent framework to identify what needs to be communicated, how to organize the information, and the processes that underlie it. We are exploring the idea of an approach to creating a Cybersecurity Transparency Framework for Connected Products. Our goal would be to describe a structured approach to achieving necessary and appropriate communication of relevant cybersecurity information among participants involved in the creation, consumption, and use of connected products. Such a framework would be a tool for sharing information and expectations across the supply chain...

National Institute of Standards and Technology - Apr 3, 2023

### **Treasury Releases 2023 DeFi Illicit Finance Risk Assessment Building on E.O. "Ensuring Responsible Development of Digital Assets"**

...The U.S. Department of the Treasury published the 2023 DeFi Illicit Finance Risk Assessment, the first illicit finance risk assessment conducted on decentralized finance (DeFi) in the world. The assessment considers risks associated with what are commonly called DeFi services. While there is currently no generally accepted definition of DeFi, the term broadly refers to virtual asset protocols and services that purport to allow some form of automated peer-to-peer transactions, often through use of self-executing code known as "smart contracts" based on blockchain technology. ... The DeFi risk assessment builds upon Treasury's other recent national risk assessments and furthers the work outlined in Executive Order 14067 on "Ensuring Responsible Development of Digital Assets."

U.S. Department of the Treasury - Apr 6, 2023

### **DoD Chief Digital and Artificial Intelligence Office Launches Hack the Pentagon Website**

...DDS launched their long-running program: Hack the Pentagon (HtP) in 2016, using bug bounties as an innovative way to secure critical Department of Defense (DoD) systems and assets. HtP invites "ethical hackers", to discover, investigate, and report vulnerabilities, which DoD can then remediate. DDS built the HtP website as a resource for Department of Defense organizations, vendors, and security researchers to learn how to conduct a bug bounty, partner with the CDAO DDS team to support bug bounties, and participate in DoD-wide bug bounties. The Chief Digital and Artificial Intelligence Office (CDAO) Directorate for Digital Services (DDS) has launched a website ([www.hackthepentagon.mil](http://www.hackthepentagon.mil)). While the website is primarily an educational tool for DoD organizations to use as a foundational step before launching a bug bounty, it also is a platform to engage and recruit technical talent...

U.S. Department of Defense - Mar 30, 2023

### **Secretary Mayorkas Discusses New U.S. Efforts to Counter the Misuse of Technology and the Spread of Digital Authoritarianism**

...Secretary of Homeland Security Alejandro N. Mayorkas outlined new initiatives by the Biden-Harris Administration to counter the misuse of technology. He highlighted the Cybersecurity and Infrastructure Security Agency's (CISA) High-Risk Community Protection initiative, which is dedicated to strengthening the cybersecurity of communities — such as civil society organizations— in the United States who are at heightened risk of cyber threat targeting and transnational repression. CISA, in coordination with the State

Department, will cohost a Strategic Dialogue on Cybersecurity of Civil Society under Threat of Transnational Repression with the United Kingdom. This will build on CISA's High-Risk Community Protection initiative because other countries have also witnessed a rise in transnational repression targeting organizations within their borders. As part of this Strategic Dialogue, CISA's counterparts from Australia, Canada, Denmark, Estonia, France, Japan, New Zealand, Norway, the United Kingdom, and the United States will work to improve the cybersecurity of civil society organizations, engage in information sharing on the threats facing high-risk communities, and identify opportunities for greater collaboration around the world. The first meeting will take place in the coming months...

Homeland Security - Mar 30, 2023

### **Debevoise Discusses White House's National Cybersecurity Strategy**

...On March 2, 2023, the White House Office of the National Cyber Director ("ONCD") released the Biden Administration's (the "Administration") long-awaited National Cybersecurity Strategy (the "Strategy"), the first since the Trump Administration's strategy was issued in September 2018. The Strategy positions cybersecurity very clearly as a critical national security issue and builds on the Administration's issuance of the May 2021 Executive Order on Improving the Nation's Cybersecurity that created the ONCD as well as its creation of a new Deputy National Security Advisor for Cyber and Emerging Technology position on the National Security Council. With its five guiding pillars, the Strategy codifies disparate cybersecurity actions across states and private industry by (i) advocating for legislation to protect national critical infrastructure; (ii) emphasizing threat actor deterrence and detection by officially declaring ransomware as a national security threat; (iii) proposing to shape market activity through government purchasing and proposed legislation; (iv) seeking public-private investment in cybersecurity resilience; and (v) working internationally to protect cyberspace...

CLS Blue Sky Blog - Mar 30, 2023

## **5G, Wireless Spectrum, Networking & Communications**

### **New Instrument Catches a Ride on a Satellite to Track Air Pollution Hourly, Shed Light on Disparities**

...NASA is preparing for the launch of an instrument that will provide new insight into air quality in North America, observing air pollution from space more frequently and in greater detail than previous space-based instruments. It will also reveal disparities in pollution exposure. The Tropospheric Emissions Monitoring of Pollution instrument (TEMPO) is scheduled for an early April launch from Cape Canaveral Space Force Station. TEMPO is mounted on a commercial communications satellite and will fly in an orbit that allows for hourly daytime observations of air quality in North America. TEMPO will primarily observe three main pollutants: nitrogen dioxide, formaldehyde, and ozone. The instrument will measure sunlight reflected by Earth's surface and by gases and particles in the atmosphere. That reflected light – both ultraviolet and visible – is projected onto a spectrometer that separates it into different wavelengths. Since different gases have unique fingerprints, or spectra, scientists can study the wavelengths of light that are being absorbed and determine the nature and amount of gases in the atmosphere...

National Aeronautics and Space Administration - Mar 30, 2023

### **Space Development Agency Successfully Launches Tranche 0 Satellites**

...The Space Development Agency (SDA) today announced the successful initial launch of Tranche 0 (T0) of the Proliferated Warfighter Space Architecture (PWSA), the Transport and Tracking Layer satellites that will demonstrate the low-latency communication links to support the warfighter with a resilient network of integrated capabilities, including tracking of advanced missile threats, from low-Earth orbit (LEO). A SpaceX Falcon 9 reusable, two stage rocket from Vandenberg Space Force Base, California, launched the first 10 of the planned 28 satellites. Once completed, Tranche 0 will include 20 optically-connected data transport satellites and eight optically-connected missile warning/missile tracking satellites equipped with wide-field-of-view sensors. SDA programs provide an integral part of the national security hybrid space architecture in the areas of communications, data transport, and missile warning...

U.S. Department of Defense - Apr 2, 2023

### **Do Earth-like exoplanets have magnetic fields? Far-off radio signal is promising sign**

...Researchers have now identified a prospective Earth-sized planet in another solar system as a prime candidate for also having a magnetic field — YZ Ceti b, a rocky planet orbiting a star about 12 light-years away from Earth. NSF-funded researchers Sebastian Pineda and Jackie Villadsen observed a repeating radio signal emanating from the star YZ Ceti using the Karl G. Jansky Very Large Array, a radio telescope operated by the U.S. National Science Foundation's National Radio Astronomy Observatory. The researchers theorize that the stellar radio waves they detected are generated by the interactions between the magnetic field of the exoplanet and the star it orbits. However, for such radio waves to be detectable over long distances, they must be very strong. While magnetic fields have previously been detected on massive Jupiter-size exoplanets, doing so for a comparatively tiny Earth-sized exoplanet requires a different technique...

National Science Foundation - Apr 3, 2023

### **Filling the Gap: Using Satellite Tagging to Acquire Long-Term Data on Highly Migratory Species in Curaçao**

...NOAA Fisheries scientists, Derke Snodgrass and Eric Orbesen, ventured to the southern Caribbean in February to satellite tag highly migratory species around the waters of Curaçao. To understand how spatial movement patterns vary over the species' range, it is essential to monitor fish in as many diverse locations as possible. They transmit summarized sets of data via the Argos satellite system after the tag detaches from the fish. They focused on satellite tagging to capture data that will add to our growing knowledge on yellowfin tuna habitat use and movement patterns. By attaching satellite tags to these heavily targeted fish the team is able to acquire long-term data that assists in the management of these populations...

Noaa Fisheries - Mar 29, 2023

### **Scientists aboard NOAA research vessel use satellite tracking and sample collection of the Great Atlantic Sargassum Belt during an unprecedented bloom**

...The National Oceanic and Atmospheric Administration (NOAA) ship, Ronald H. Brown, set sail from Port Suape, Brazil on March 6 as part of the Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP), funded by both NOAA and the National Science Foundation. The international program brings together scientists to develop a globally coordinated network as part of the global ocean/climate observing system. Reserchers are tracking the Sargassum belt from satellite observations and analyzing these opportunistic samples, with the goal of studying the distribution of different species of Sargassum and measuring their elemental composition to better understand their origin. The nutrient supply feeding these blooms remains enigmatic, and hypothesized sources include upwelling/mixing, atmospheric deposition, and river runoff. The sampling in the the Great Atlantic Sargassum Belt will take some of the first samples from a massive, ongoing bloom. Photos and video from the ship show the algae mats on the surface of the eastern Atlantic in the belt that extends from west Africa to the Gulf of Mexico.

The Woods Hole Oceanographic Institution - Mar 29, 2023

## **Advanced Manufacturing**

### **NIST Manufacturing Blog: Cydney Severio: From Stitcher to CEO**

...CEO Cydney Severio has done it all during her years at Electro Medical Equipment Company, Inc. (EME), a client of the Manufacturing Extension Partnership of Louisiana. The veteran-owned medical textile manufacturer started as an EKG machine distributor in 1960. What Cydney likes most about manufacturing is "the continuous improvements that we have made year after year. These include automation, to use ultrasonic welding instead of sewing machines. I like to see progress and growth in action with every challenge that is thrown our way." Cydney's advice to women interested in working in manufacturing "is to find a place in the company where your talents will be an asset to the business. Work hard, and above all, be a team player. It's not about the individual accomplishments, it's about the company's success and growth. Without these, there is no future for you or them." ...

National Institute of Standards and Technology - Mar 30, 2023

## **Microelectronics**

### **NSF director underscores 'CHIPS & Science Act' opportunities in visit to Washington state**

...U.S. National Science Foundation Director Sethuraman Panchanathan was joined by leaders from Washington state higher education institutions to discuss the "CHIPS & Science Act," next generation technologies and workforce training and development. Director Panchanathan outlined his vision for the NSF Directorate for Technology, Innovation and Partnerships, specifically focusing on chip development and manufacturing and artificial intelligence. The "CHIPS & Science Act" authorized funding that triples NSF's annual STEM education budget over five years and doubles overall NSF funding for research and education. If that funding is appropriated, it will have a profound impact on the future of innovative science and engineering research that will shape next generation technology, the STEM workforce and jobs of the future...

National Science Foundation - Apr 5, 2023

## **Climate Change / Green Energy & IT**

### **FACT SHEET: Biden-Harris Administration Announces New Private and Public Sector Investments for Affordable Electric Vehicles**

...The White House is announcing the first set of public and private commitments to support America's historic transition to electric vehicles (EV) under the EV Acceleration Challenge. These commitments are part of President Biden's Investing in America agenda. President Biden's Inflation Reduction Act adds and expands tax credits for purchases of new and used EVs—helping bring the benefits of clean energy to communities across the nation. The law also provides incentives to electrify heavy-duty vehicles like clean school buses, and includes support for the installation of residential, commercial, and municipal EV charging infrastructure. The White House announced the EV Acceleration Challenge to bring a clean, safe, affordable, and reliable transportation future to Americans even faster. The Federal Government is announcing a Station Locator Tool that will help consumers charge their EVs quickly, affordably and conveniently...

The White House - Mar 30, 2023

### **FACT SHEET: Biden-Harris Administration Continues to Advance American Offshore Wind Opportunities**

...President Biden set a goal of deploying 30 gigawatts of offshore wind electricity generation by 2030—enough to power more than 10 million American homes with clean energy. In addition to expanding economic opportunities for American workers and communities, offshore wind deployment will strengthen the nation's energy security, make the power grid more reliable while lowering costs, and reduce dangerous climate pollution. The Administration is supporting offshore wind through actions across the Departments of the Interior, Energy, Commerce, Transportation, and other federal agencies...

The White House - Mar 29, 2023

### **NASA Releases Agency Climate Strategy**

...NASA's Office of the Chief Scientist established a cross-agency working group and released "Advancing NASA's Climate Strategy." The strategy assesses NASA's climate portfolio across the agency for the first time, extending beyond science and exploration efforts to include every mission directorate and NASA facility. The strategy lays out four key priorities for the agency to aide with the integration of climate across NASA: innovate, inform, inspire, and partner. The first priority of innovation relies on continuing NASA's 60+ years of Earth science studied not only from space – but also through airborne research, direct measurements and field campaigns. With new missions coming online in 2023 to observe air pollution (TEMPO), Earth's water to help improve climate models (SWOT), and the increasing intensity of storms (TROPICS), NASA-powered observations of our planet are at the core of how we study the effects of climate change. NASA's innovation efforts also extend to aeronautics engineering, as NASA seeks to advance the development of greener aerospace technology. Such advances in science and engineering can also lay a foundation for future innovation as NASA technologies and know-how are shared with the world, including agency collaborations to develop remote sensing technology, combat wildfires, and develop space power systems that could advance power alternatives on Earth...

National Aeronautics and Space Administration - Mar 29, 2023

### **NSF-funded research shows ocean surface tipping point could accelerate climate change**

...The oceans help limit global warming by soaking up carbon dioxide (CO<sub>2</sub>) emissions. But scientists have discovered that intense warming in the future could lessen that ability, leading to even more severe warming. The U.S. National Science Foundation-supported scientists analyzed a climate simulation configured to a worst-case emissions scenario and found that the oceans' ability to soak up CO<sub>2</sub> would peak by 2100, becoming only half as efficient at absorbing the greenhouse gas by 2300. The decline is a result of the emergence of a surface layer of low-alkalinity water that hinders the ability of the oceans to absorb CO<sub>2</sub>. The findings reveal a previously unknown tipping point that if activated would release an important brake on global warming. Climate simulations had previously shown that the oceans slow their absorption of CO<sub>2</sub> over time, but none had considered alkalinity as an explanation. To reach their conclusion, the researchers recalculated pieces of a 450-year simulation until they hit on alkalinity as a key cause of the slowing. The effect begins with extreme climate change, which supercharges rainfall and slows ocean currents. That leaves the surface of the oceans covered in a warm layer of fresh water and this surface layer becomes more saturated with CO<sub>2</sub>, its alkalinity falls, and its ability to absorb CO<sub>2</sub> falls with it...

National Science Foundation - Apr 3, 2023

### **Warming Strongly Increases Nutrient Availability in a Nutrient-Limited Bog**

...Researchers investigated climate impacts on peatland nutrient availability as part of the large-scale Spruce and Peatland Responses Under Changing Environments (SPRUCE) experiment. With SPRUCE, researchers can conduct experiments on warming and carbon dioxide levels in a nutrient-limited bog. Researchers examined whether a gradient of whole-ecosystem warming would increase plant-available nitrogen and phosphorus in an ombrotrophic bog in Northern Minnesota and they examined whether elevated carbon dioxide would modify the nutrient response. The experiment found that above- and below-ground warming exponentially increased the availability of nutrients throughout the below-ground peat layers. However, elevated carbon dioxide did not affect the availability of nutrients. The magnitude and timing of the observed increases in peat nutrient availability with warming in the SPRUCE experiment were not captured in the virtual space of ELM-SPRUCE. This is a special version of the Energy Exascale Earth System Model (E3SM) land model (ELM) for simulating the unique vegetation, hydrology, and soil in peatland ecosystems. This mismatch pinpoints a need for improved model mechanisms of how nutrients move in order to predict future peatland climate responses...

Department of Energy - Apr 3, 2023

### **NSF-funded research indicates sea-level rise poses particular risk for Asian megacities**



...New research supported by the U.S. National Science Foundation looked at the effects of natural sea-level fluctuations on the projected rise due to climate change. The research team identified several Asian megacities that may face especially significant risks by 2100 if society emits high levels of greenhouse gases: Chennai, Kolkata, Yangon, Bangkok, Ho Chi Minh City and Manila. What's notable about the new study is the way it incorporates naturally occurring sea-level fluctuations caused by such events as El Niño or changes in the water cycle (a process known as internal climate variability). By using both a computer model of global climate and a specialized statistical model, the scientists could determine the extent to which these natural fluctuations can amplify or reduce the impact of climate change on sea-level rise along certain coastlines. The study drew on a set of simulations conducted with the NSF-sponsored National Center for Atmospheric Research (NCAR) based Community Earth System Model that assume society this century emits greenhouse gases at a high rate. The simulations were run at the NCAR-Wyoming Supercomputing Center. The authors said it's critical for society to be aware of the potential of extreme sea-level rise to develop effective adaptation strategies. In a worst-case scenario, the combined effect of climate change and internal climate variability could result in local sea levels rising by more than 50% of what is due to climate change alone, thus posing significant risks of more severe flooding to coastal megacities and threatening millions of people...

National Science Foundation - Apr 5, 2023

## Digital Health

### **NSF-funded researcher addresses longstanding problem with pulse oximeters and dark-skinned patients**

...Oxygen saturation is measurement of how well a person's lungs are working using a device called a pulse oximeter. It uses infrared light to measure the level of oxygen in a person's blood. There is a problem - using light to measure blood oxygen levels does not work well for people with dark skin tones. The melanin in their skin can interfere with the absorption of light used to measure the amount of oxygenated blood in a person's finger. That means the pulse oximeter can provide inaccurate readings and poorer treatment outcomes. Valencia Koomson, at Tufts University, has developed a device that measures oxygenation in tissues rather than blood. This pulse oximeter device will provide an alternative technology to address many confounding factors that affect pulse oximeter accuracy, including skin pigmentation, motion artifact and others. Koomson's device was developed under the U.S. National Science Foundation's Partnerships for Innovation program. PFI helps researchers translate fundamental research into prototypes or solutions that can benefit society...

National Science Foundation - Mar 31, 2023

### **Increased use of telehealth services and medications for opioid use disorder during the COVID-19 pandemic associated with reduced risk for fatal overdose**

...The expanded availability of opioid use disorder-related telehealth services and medications during the COVID-19 pandemic was associated with a lowered likelihood of fatal drug overdose among Medicare beneficiaries. This study is a collaborative research effort led by researchers at the National Center for Injury Prevention and Control, a part of CDC; the Office of the Administrator and the Center for Clinical Standards and Quality, both part of the Centers for Medicare & Medicaid Services (CMS); and the National Institute on Drug Abuse, a part of the National Institutes of Health. Researchers analyzed data among two cohorts of Medicare beneficiaries to explore receipt of opioid use disorder-related telehealth services, receipt of medications for opioid use disorder, and fatal overdoses before and during the COVID-19 pandemic. Although the results of this study were able to identify the positive impact opioid use disorder-related telehealth services had on lowering the risk for fatal drug overdose in the pandemic cohort, the authors note that only 1 in 5 Medicare beneficiaries in the pandemic cohort received OUD-related telehealth services...

National Institutes of Health - Mar 29, 2023

### **Genomic study reveals signs of tuberculosis adaptation in ancient Andeans**

...A new genomic study, supported through multiple U.S. National Science Foundation grants, suggests that indigenous populations in present-day Ecuador adapted to the tuberculosis bacterium, thousands of years before the arrival of Europeans. The investigators had originally set out to investigate how the Indigenous people of Ecuador adapted to living at high altitude. "We were surprised to find that the strongest genetic signals of positive selection were not associated with high altitude but for the immune response to tuberculosis," says John Lindo, senior author of the study. "Computational techniques for sequencing genomes and modeling ancestral selection keep improving," says Sophie Joseph, first author of the paper. "The genomes of people living today give us a window into the past." ...

National Science Foundation - Mar 29, 2023

### **Health IT Standards – The “Secret Sauce” that Brings Electronic Health Information to the Patient and their Care Team**

...Matt is the deputy director for the standards division in the office of technology at ONC. The standards division is responsible for providing technical subject matter expertise to ONC and health IT partners to encourage the adoption and use of health IT standards. It is important for providers and patients to have access and share health data because it allows for improved health care outcomes. When two or more systems are able to exchange and access information with each other this is called interoperability. Improving

interoperability in healthcare enhances patient care, ultimately leading to better outcomes. When patients and providers have secure access to their data it can be used to optimize health experiences. ONC has established specific content and transport standards, which can allow for exchange of communication between systems...  
Health IT - Apr 3, 2023

### **NIH-funded study uses machine learning models to rank predictive risks for Alzheimer's disease**

...Once adults reach age 65, the extent of their genetic risk may outweigh age as a predictor of whether they will develop Alzheimer's disease. A NIH-funded study is the first to construct machine learning models with genetic risk scores, non-genetic information and electronic health record data from nearly half a million individuals to rank risk factors in order of how strong their association is with eventual development of Alzheimer's disease. For older adults the genetic risk as determined by a polygenic risk score was more predictive. A low household income also emerged as an important risk factor, ranking either third or fourth after the effects of age and genetics. Xiaoyi Raymond Gao, at Ohio State University College of Medicine, uses biomedical big data and artificial intelligence to study the genetics behind Alzheimer's and ocular diseases. Results showed that in people with AD, higher systolic and lower diastolic blood pressure were more common, diabetes was more prevalent, household income and education were lower, and recent falls, hearing difficulty and a mother's history of having AD were higher. The top-20 list of risk factors for the full sample of adults also included diagnoses of high blood pressure, urinary tract infection, depressive episodes, fainting, unspecified chest pain, disorientation and abnormal weight loss. Other risk factors in the top 20 for people 65 and older included high cholesterol and gait abnormalities. "Machine learning can explore relationships among all of those features, or variables, pick the important features and rank certain features at the top that contribute much more to Alzheimer's disease risk than the rest of the features," Gao said. This work was supported by the National Institutes of Health...

Ohio State News - Mar 30, 2023

### **NIH-funded WVU researcher prototypes new equipment to improve head and neck cancer treatment**

...Head and neck cancer may not be as common as breast or prostate cancer, but it's one of the most challenging to treat. Its five-year survival rate can be as low as 25%, while its recurrence rate can be as high as 43%. West Virginia University researcher Raymond Raylman has developed a new technology to improve the treatment of head and neck cancers. The scanner combines positron emission tomography and X-ray computed tomography. It has much higher resolution than the standard PET/CT system and it's designed specifically for head and neck cancer imaging. The prototype was made possible by funding from the National Cancer Institute of the National Institutes of Health, which awarded the project \$1.9 million over five years...

WVU - Apr 3, 2023

## **Other IT Related**

### **Maintaining U.S. Preeminence in Low Earth Orbit**

...The United States holds the preeminent global position in space thanks to steadfast investments in space research and technology development, and strategic partnerships and collaborations. As we work to further explore the Moon and Mars, the use of Low Earth Orbit (LEO) grows, and the International Space Station begins its phased retirement, it is crucial that we maintain preeminence in space research. The National Low Earth Orbit Research and Development Strategy outlines how the nation can realize and institutionalize the scientific, economic, diplomatic, and educational benefits of LEO research platforms for the future. Specifically, it identifies five policy objectives and supporting activities for U.S. leadership in LEO...

The White House - Mar 31, 2023

### **A Proclamation on Arab American Heritage Month, 2023**

...This month, we join together to celebrate the immeasurable contributions of Arab Americans to our Nation and recommit ourselves to the timeless work of making sure that all people have the opportunity to achieve the American Dream. The achievements of Arab Americans are reflected in the arts and sciences; in businesses and faith communities; in classrooms and hospitals; and in police stations, firehouses, and every branch of the military. I, JOSEPH R. BIDEN JR., President of the United States of America, by virtue of the authority vested in me by the Constitution and the laws of the United States, do hereby proclaim April 2023 as Arab American Heritage Month...

The White House - Mar 31, 2023

### **NSF statement on the National Objectives for Digital Assets R&D**

...The National R&D Agenda for Digital Assets will identify research frontiers that can in turn advance the underpinnings of digital assets as well as their many use cases. By bringing together the Federal Government with America's colleges and universities, private industry including startups and small businesses, nonprofits, and civil society, we will unleash the full potential for digital assets in a safe, secure, transparent, resilient, trustworthy, and equitable manner...

National Science Foundation - Apr 4, 2023

### **NATIONAL OBJECTIVES FOR DIGITAL ASSETS RESEARCH AND DEVELOPMENT**

...This document lays out national objectives for R&D related to digital assets, as defined in President Biden's Executive Order on Ensuring the Responsible Development of Digital Assets. This includes R&D on techniques and technology that supports digital assets, such as blockchain and other distributed ledger technology, applied R&D for digital assets both inside and outside of the financial ecosystem, and translational R&D to pilot, prototype, and deploy digital assets technologies. The National Digital Assets R&D Agenda is being developed by a Fast-Track Action Committee (FTAC) under the National Science and Technology Council's Networking and Information Technology Research and Development Subcommittee. The Fast-Track Action Committee on Digital Assets R&D is a multi-agency venue to build a whole-of-government approach for research and development related to digital assets...

Networking and Information Technology Research and Development - Apr 4, 2023

### **Sounding Out a New Way to Measure Gas Flow**

...Researchers at NIST have developed a new — and sound — way to accurately measure the rate at which gas flows in and out of a vessel. The technique, which uses acoustic waves to determine the average temperature of the gas and microwaves to ascertain the volume of the vessel, can measure gas flows and leaks from large containers. To calibrate large gas flows using the current national standard, metrologists must use a bootstrap strategy. The new method employs acoustic waves to determine the average gas temperature in large vessels. This technique, which does not require extra temperature sensors, is reliable even if the temperature varies across the volume of the gas...

National Institute of Standards and Technology - Mar 31, 2023

### **5 Key Highlights from the FY24 Budget Request for Nuclear Energy**

...The U.S. Department of Energy (DOE) released its Fiscal Year 2024 budget request, which includes more than \$1.56 billion for the Office of Nuclear Energy (NE). NE is requesting more than \$660 million for nuclear energy research and development activities that enables the current reactor fleet to keep operating, advances the commercial deployment of advanced reactors, addresses major gaps in the nation's nuclear fuel cycle, and strengthens international partnerships with like-minded nations worldwide as they work to secure a trusted source of carbon-free power to meet their future energy goals. Here are five key takeaways from the Department's latest budget request for nuclear energy. \* Access to high-assay low-enriched uranium (HALEU) \* Commercial small modular reactor technology Demonstration \* Advanced Reactor Testing Capabilities \* Securing the INL Lab Complex \* Strengthening International Partnerships...

Department of Energy - Apr 3, 2023

### **More than 150 Idaho technologies licensed in 2022**

...Discoveries at Idaho National Laboratory include everything from cybersecurity software that reduces risk of cyberattacks to inventions that improve the safety and efficiency of nuclear reactors. But to truly make impact, the technologies must make the jump from the benchtop to the marketplace. In 2022, INL modified or entered into 156 technology licensing agreements with various businesses, organizations and government institutions, bringing the number of active licenses to nearly 500. Here is a sampling of license agreements from 2022...

Idaho National Laboratory - Apr 3, 2023

## **STEM / Workforce & IT**

### **UH West O'ahu cybersecurity students were honored by the National Security Agency and the Hawai'i State Senate**

...University of Hawai'i—West O'ahu cybersecurity students were honored by the Hawai'i State Senate and the National Security Agency (NSA) at the UH West O'ahu Cybersecurity Coordination Center. The NSA recognized UH West O'ahu for its team participation in the National Centers of Academic Excellence NSA Cyber Exercise in April 2022. more than 10,000 students from more than 500 colleges and universities and 100 high schools participate in National Cyber League (NCL) competitions, which test students' skills in identifying hackers from forensic data, pentesting (penetration testing) and auditing vulnerable websites, recovering from ransomware attacks and more. The UH West O'ahu cybersecurity program is currently ranked No. 14 by NCL in overall college power rankings and No. 7 in the Western region. These rankings represent the ability of students to perform real-world cybersecurity tasks on the Cyber Skyline platform...

The Magazine of the University of Hawaii - Malamalama - Mar 31, 2023

### **Multidisciplinary student team demonstrates astronaut training device at NASA's Johnson Space Center**

...Students from engineering, game design, and 3D design will travel to NASA's Johnson Space Center in Houston to demonstrate PLANETS, a portable sensory device to help astronauts recover normal balance and movement on earth after an extended stay in space. A device consisting of high-tech wearable sensors, balance board, and a challenging, but fun, virtual reality game, is being presented to staff and health specialists of the Astronaut Strength Conditioning Rehab (ASCR) Laboratory. The students' project could contribute to the personal health of today's astronauts, and also be among the different technologies NASA is exploring for space missions of the future...  
Rochester Institute of Technology - Mar 31, 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 - Mar 9, 2023

### **AI Researchers Portal**

...Our Nation's AI innovation begins with the inspirational ideas of researchers from all across the country. To make it easier for researchers to locate and explore the many Federal resources and funding programs available to support and investigate novel ideas in AI, the National AI Initiative Office, in partnership with Federal departments and agencies and the Networking and Information Technology Research and Development coordination office, established an AI Researchers Portal. This portal connects AI researchers to Federal resources that can support their research, including data, computing, and testbeds, as well as AI-relevant grant funding programs. It also provides searchable repositories of approximately 140 current Federal grant programs relevant to AI, and around 40 Federally-funded testbed resources, in addition to a wide variety of data and computing resources useful for AI research...

National Artificial Intelligence Initiative - Apr 6, 2023

## Upcoming Conferences / Workshops / Webinars

### **DOE's Webinar: World Quantum Day April 14**

...Celebrate World Quantum Day with the Office of Science (SC) while learning about the broad range of User Facilities and other infrastructure capabilities that work in quantum. We will hear from researchers currently using quantum test beds, X-ray light sources and Nanoscale Science Research Centers -in addition to other facilities- for their work. Apr 14, 2023 12:00 PM in Eastern Time

science-doe.zoomgov.com - Apr 4, 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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