



## 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!

## NITRD News

### **CAREER OPPORTUNITIES: Program Manager, National Strategic Computing Reserve Pilot Program Office: CLOSES Jan 15th!**

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

Program Office will (1) develop a plan, to include the structures, policies, and processes for an NSCR Program Office, and (2) prototype the implementation and operation of these structures, policies, and processes. Submit your resume by January 15, 2023.

The Networking and Information Technology Research and Development (NITRD) Program - Dec 14, 2022

## Federal Agency Funding Opportunities

### **Department of Energy Announces \$56 Million for Traineeships Supporting Historically Underrepresented Groups and Institutions**

...The U.S. Department of Energy (DOE) announced \$56 million to provide research opportunities to historically underrepresented groups and institutions in STEM. The funding, through the DOE Office of Science's Reaching a New Energy Sciences Workforce (RENEW) initiative, will support internships, mentorship, and training programs at Historically Black Colleges and Universities (HBCUs), other Minority Serving Institutions (MSIs), and other research institutions. These investments will diversify American leadership in the physical, biological, and computational sciences to ensure America's best and brightest students have pathways to STEM fields. RENEW will offer hands-on experiences and open new career avenues for talented young scientists, engineers, and technicians. A series of webinars will be held for potential applicants and research administrators to learn more about each Funding Opportunity Announcement (FOA)...

Department of Energy - Jan 9, 2023

### **NSF launches prize challenge to develop innovative learning technologies for K-12 students**

...The U.S. National Science Foundation today launched a \$6 million prize challenge to develop innovative learning technologies for K-12 students, made possible through a partnership with the Bill & Melinda Gates Foundation, Schmidt Futures, and the Walton Family Foundation. The three-phase, one-year challenge, known as the Visionary Interdisciplinary Teams Advancing Learning, or VITAL, Prize Challenge, will encourage interdisciplinary teams from the science and engineering research and startup or small-business communities to advance innovative concepts into prototypes for potentially game-changing learning technologies. The VITAL Prize Challenge will focus on providing interdisciplinary teams the funding and training to build K-12 learning technology innovations at speed and scale for adoption nationwide. Teams applying to the VITAL Prize Challenge will submit concept papers to one of three K-12 technology translation tracks, depending on the anticipated application, end user, and area of impact. The VITAL Prize Challenge portal will begin accepting concept papers in Winter 2023...

National Science Foundation - Jan 12, 2023

### **DOE Opens Call for Deployable Solutions to Secure America's Power Grid**

...The U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL) today announced a call for applications for the second cohort of the Clean Energy Cybersecurity Accelerator (CECA) program. The program brings together federal experts, energy industry representatives, and innovators in a unified effort to rapidly develop cybersecurity solutions for renewable energy resources and other grid operations and to bring them to market faster. NREL will select up to five participants for the second CECA cohort. The application portal is open now through February 10, 2023, at 11:59 p.m. MT...

Department of Energy - Jan 9, 2023

## Artificial Intelligence / Machine Learning

### **US AFRL & UK Dstl partnership demonstrates artificial intelligence technology**

...The U.S.'s Air Force Research Laboratory in partnership with the U.K.'s Defence Science and Technology Laboratory demonstrated state-of-the-art artificial intelligence technology at two major back-to-back military exercises. The exercises addressed the challenge of making AI and autonomy agile, adaptable, trustworthy and accessible to warfighters, albeit under different U.S. and U.K. military use cases. The goal was to deliver mission specific AI that can be deployed to meet the ever-changing mission conditions and needs of warfighters. Led by the U.S. Army Futures Command, PC22 is the Joint Force experimenting with speed, range, and decision dominance to achieve overmatch and inform the Joint Warfighting Concept and Joint All Domain Command and Control. A campaign of learning, it leverages a series of joint, multi-domain engagements to integrate artificial intelligence, robotics and autonomy to improve battlefield situational awareness, connect sensors with shooters, and accelerate the decision-making timeline...

Air Force Link - Jan 6, 2023

### **NSWC Crane collaborates with Indiana University to conduct research to develop AI/ML detection technique**

...Naval Surface Warfare Center, Crane Division (NSWC Crane) collaborated with Indiana University (IU) to conduct artificial intelligence (AI) and machine learning (ML)—analysis research. More than twenty IU undergraduate, graduate, and PhD-level students have participated in this research. The groups investigated new techniques for visualizing, debugging, and improving the machine learning algorithms that are at the heart of modern artificial intelligence...  
Navy.mil - Jan 10, 2023

### **DOE-funded scientists develop novel method to explore plant-microbe interactions using biosensors and AI-guided tools**

...Scientists at the U.S. Department of Energy's Argonne National Laboratory were recently awarded funding from DOE's Office of Science, Biological and Environmental Research (BER) bioimaging program to understand plant-microbe communication and how it facilitates plant growth and health. The researchers plan to develop a new imaging technique by using engineered plant-growth-promoting bacteria as biosensors. The modified microbes will be able to indicate which resources are being shared between bacteria in the rhizosphere — the region around the plant's root system — and the plants themselves. To accelerate discoveries from the images, the researchers will partially automate the imaging process. They plan to develop artificial intelligence (AI)-guided tools for image acquisition and analysis in collaboration with Argonne's team working on autonomous discovery and the Argonne Leadership Computing Facility...  
Argonne National Laboratory - Jan 9, 2023

### **NSF-Funded Research Applying Artificial Intelligence To Decarbonize Buildings**

...An international team of researchers is applying artificial intelligence techniques to design energy-efficient district heat pump systems that better serve human needs and behaviors while reducing the carbon footprint of buildings. The \$1.5-million project is funded by the National Science Foundation's (NSF) Partnerships for International Research and Education (PIRE) program. The project focuses on the technology of district heat pump systems, which distribute energy to buildings through a system of heat pumps and insulated networked pipes. One of the most pressing and widely agreed-upon methods of decarbonizing heating and cooling systems is shifting to electric energy sources to replace higher-emission power sources like natural gas. Researchers are working to build human-interactive artificial intelligence tools to equip building managers and owners with the occupancy and behavior modeling information they need to make timely heating and cooling decisions faster and, ideally, to incentivize a broader adoption of building decarbonization techniques...  
Texas A&M Today - Jan 6, 2023

## **Robotics / Autonomous Vehicles**

### **Robotics for Engineering Operations team participate in Project Convergence 2022**

...The U.S. Army Engineer Research and Development Center (ERDC) Construction Engineer Research Laboratory (CERL) Robotics for Engineering Operations (REO) team recently participated in Project Convergence 2022 (PC22). PC22 is a joint, multi-domain campaign effort to strengthen command and control, advance weapon systems, improve flow of information and enhance optimization of terrain through tests of evaluations, demonstrations and exercises. The goal of the project is to aid engineering operations with excavation equipment, robotic equipment and base platforms to go out and map an environment. The REO team took their technologies to the National Training Center (NTC) in Fort Irwin, California, to test and demonstrate the capability to perform tele-operated, semi-autonomous and autonomous construction, meaning Earth-moving obstacle reduction. The team tested these capabilities in the hot, harsh environment, facing difficulties and challenges and putting in the time necessary to get the job done and support the mission...  
U.S. Army Engineer Research and Development Center - Jan 6, 2023

### **\$5M USDA Grant Funds Illinois-Led Innovative Cover Cropping Project Using Robotic Sensing Technology**

...The U.S. Department of Agriculture (USDA) announced that it is funding a new project led by the University of Illinois Urbana-Champaign that will address major obstacles to adoption of cover crops in the United States. This \$4,999,999, four-year project is funded through the USDA's Partnerships for Climate-Smart Commodities program. The project will scale up robotic cover crop planting and verification of soil carbon through innovative radiological robotic sensing technologies, creating markets for climate-smart products for minority underserved farmers growing specialty crops and animal products...  
News Bureau - Jan 9, 2023

### **MSU continues UAS research, testing and evaluation for U.S. Homeland Security with \$18.7 million contract**

...Mississippi State University (MSU) will lead a major uncrewed aircraft systems (UAS) research, testing and evaluation project on behalf of the U.S. Department of Homeland Security (DHS). DHS Science and Technology Directorate (S&T), has awarded MSU a five-year contract with a funding ceiling of \$18.7 million. MSU has also been tasked with developing a cost-effective prototype UAS that is customized specifically for DHS needs and incorporates capabilities beyond what is currently available...

## Quantum

### **ARO/DOE/DOD-funded research develops new quantum computing architecture that could be used to connect large-scale devices**

...Quantum computers hold the promise of performing certain tasks that are intractable even on the world's most powerful supercomputers. One challenge in building a large-scale quantum computer is that researchers must find an effective way to interconnect quantum information nodes — smaller-scale processing nodes separated across a computer chip. MIT researchers have developed a quantum computing architecture that will enable extensible, high-fidelity communication between superconducting quantum processors. MIT researchers demonstrate step one, the deterministic emission of single photons — information carriers — in a user-specified direction. Their method ensures quantum information flows in the correct direction more than 96 percent of the time. Linking several of these modules enables a larger network of quantum processors that are interconnected with one another, no matter their physical separation on a computer chip. Using their architecture, multiple processing modules can be strung along one waveguide. A remarkable feature the architecture design is that the same module can be used as both a transmitter and a receiver. The researchers built a module comprising four qubits. The researchers found that their technique achieved more than 96 percent fidelity — this means that if they intended to emit a photon to the right, 96 percent of the time it went to the right. ... The research is funded the U.S. Army Research Office, the U.S. Department of Energy Office of Science National Quantum Information Science Research Centers, and the U.S. Department of Defense.

MIT News - Jan 5, 2023

## Cybersecurity / Privacy

### **NIST: Automotive Cybersecurity Community of Interest**

...The automotive industry is facing significant challenges from increased cybersecurity risk and adoption of AI and opportunities from rapid technological innovations. NIST is setting up this community of interest (COI) to allow the industry, academia, and government to discuss, comment, and provide input on the potential work that NIST is doing which will affect the automotive industry. The COI is open and will provide a way for NIST to facilitate the discussions and receive comments and feedback from the automotive industry, academia, and government...

National Institute of Standards and Technology - Jan 11, 2023

### **Identifying a vulnerability in critical spacecraft networks**

...Penn engineering's Linh Thi Xuan Phan and collaborators from NASA and the University of Michigan have identified a major security flaw in Time-Triggered Ethernet (TTE), an efficient communication protocol not only used to facilitate spacecraft-to-spacecraft connections but is also widely used in aviation and energy generation. TTE allows critical systems, like vehicle controls, to share hardware with non-critical systems, like in-flight Wi-Fi, while ensuring they do not interfere with each other. The team showed that TTE's safety guarantees could be compromised via electromagnetic interference—disrupting the timing of the high-priority signals enough to cause critical failure on a simulated docking procedure. The researchers showed that low-priority signals could be sent in such a way that the Ethernet cables transmitting the message would generate electromagnetic interference, enough to slip a malicious message through switches that would normally block them...

Penn News - Jan 5, 2023

### **Baylor Designated as National Center of Academic Excellence in Cyber Defense**

... The National Security Agency (NSA) and Department of Homeland Security (DHS) have designated Baylor University as a National Center of Academic Excellence in Cyber Defense (CAE-CD), a program that addresses the critical shortage of professionals with cybersecurity skills and highlights the importance of higher education as a solution to defending America's cyberspace. With the designation, Baylor joins a growing community of institutions developing the critical workforce and research needed to secure U.S. industrial and military infrastructure...

Baylor University - Jan 11, 2023

## 5G, Wireless Spectrum, Networking & Communications

### **NASA Space Missions Pinpoint Sources of CO2 Emissions on Earth**

...A duo of Earth-observing missions has enabled researchers to detect and track carbon dioxide (CO<sub>2</sub>) emission changes from a single facility. Researchers used space-based measurements from NASA's Orbiting Carbon Observatory (OCO) 2 and 3 missions to quantify the carbon dioxide discharged hundreds of miles below at Bełchatów Power Station in Poland, the largest single emitter in Europe. Analyzing the plant's emission plumes from several satellite overpasses between 2017 and 2022, they detected changes in carbon dioxide levels that were consistent with hourly fluctuations in electricity generation. Temporary and permanent unit shutdowns (for maintenance or decommissioning) reduced the plant's overall emissions, which the team was able to detect as well. NASA's OCO-2 satellite maps natural and human-made (anthropogenic) carbon dioxide emissions on scales ranging from regions to continents. The instrument samples the gas indirectly by measuring the intensity of sunlight reflected off Earth's surface and absorbed by carbon dioxide in the column of air from the ground to the satellite. OCO-2's spectrometers are tuned to detect the specific signature of CO<sub>2</sub> gas. OCO-3 was designed with a mapping mode that can make multiple sweeping observations as the space station passes over an area, allowing researchers to create detailed mini-maps from a city-scale area of interest. Because of the mapping mode observations of OCO-3, NASA data could be used more extensively in quantifying CO<sub>2</sub> point-source emissions in the future...

National Aeronautics and Space Administration - Jan 9, 2023

### **NASA Scientists and Satellites Make Sense of Earth's Subtle Motions**

...Scientists at NASA's Jet Propulsion Laboratory in Southern California are using advanced tools and creative data analyses to find and monitor Earth's moving surfaces. In the 1990s, scientists at JPL and elsewhere developed a new data-processing technique that enabled them to obtain very accurate images using a radar small enough to be mounted on a plane or satellite. Space agencies worldwide began launching satellite instruments using the new technology – called interferometric synthetic aperture radar or InSAR – and discoveries from this new way of looking at the planet were inevitable. Paul Lundgren, head of JPL's Earth Surface and Interior group, noticed that an Argentinian volcano named Domuyo was rapidly inflating – a sign of a potential eruption. It began inflating in mid-2014, rising about 20 inches (50 centimeters) by the time Lundgren spotted it. Domuyo topped out in 2020 and is now deflating again without having erupted. After additional analysis of land surface temperature data from NASA's Moderate Resolution Imaging Spectrometer satellite instruments, Lundgren and Girona concluded that while rising magma causes Domuyo to inflate, gases from the magma can dissipate through the rock, reducing the pressure inside the mountain. The escaping gas occasionally produces a minor explosion on the slopes, but the volcano eventually deflates without pressure building into a major explosion. The scientists are searching InSAR satellite data for other volcanos around the world that episodically rise and fall...

National Aeronautics and Space Administration - Jan 11, 2023

## **Advanced Manufacturing**

### **When in Crisis, Manufacturers Can Look to Kata**

...Practicing Toyota Kata, or kata, promotes a way of thinking, which can help companies become nimbler and more competitive so that they are able to not just survive but thrive during an adverse event such as a pandemic. Kata is a Japanese word that refers to a structured way of doing things or pattern of behavior. The Toyota Kata framework can be a stabilizing force to guide manufacturers through rough terrain and uncertainty while helping them become agile enough to respond to changes in their environment. The model is based on four steps that are driven by coaching questions to guide management and employees during their continuous improvement journey. The improvement kata serves as a foundation for manufacturers that are navigating a crisis...

National Institute of Standards and Technology - Jan 5, 2023

## **Microelectronics**

### **FACT SHEET: Key Deliverables for the 2023 North American Leaders' Summit**

...The North American Leaders' Summit (NALS) strengthens our partnerships and advances our shared priorities. This year, the leaders will build on last year's accomplishments with new initiatives. The three countries will deepen our economic cooperation, promote investment, and reinforce competitiveness, innovation, and resilience by: \* Organizing the first-ever trilateral semiconductor forum with industry to adapt government policies and increase investment in semiconductor supply chains across North America.

\* Coordinating semiconductor supply chain mapping efforts to develop a collective understanding of unmet needs. \* Convening industry and academia experts in semiconductors, ICT, biomanufacturing, and other key advanced manufacturing and logistics industries for design sessions on the skills needed to develop the workforce North America over the next five years...

The White House - Jan 10, 2023

### **Georgia Tech Receives \$65 Million Grant from Semiconductor Research Corporation for JUMP 2.0 Centers**

...Last year, the Semiconductor Research Corporation (SRC) and the Defense Advanced Research Projects Agency (DARPA) announced a new program to improve the nation's information and technology infrastructure. Two new research centers, representing an investment of about \$65.7 million, have been awarded to Georgia Tech through the SRC-administrated Joint University Microelectronics Program 2.0, or JUMP 2.0. JUMP 2.0 will support the work of dozens of inter-disciplinary researchers from multiple universities, tackling the technological issues of an increasingly connected world. The goal is to improve the nation's performance, efficiency, and capabilities for both commercial and military applications. JUMP 2.0 is a collaboration between SRC industrial participants (IBM, Intel, Raytheon, TSMC and Samsung, to name a few) and the Department of Defense...

Georgia Tech Research News - Jan 5, 2023

### **Silicon Carbide Research and Fabrication Facility Secures Tool Essential to Chip-Making Process**

...The U of Arkansas research team working to develop the Multi-Use Silicon Carbide Research and Fabrication Facility commissioned Deposition Technology to build a high-volume manufacturing tool critical to the silicon carbide chip-making process. The Multi-Use Silicon Carbide Research and Fabrication Facility will train the next generation of semiconductor researchers and engineers on cutting-edge equipment by providing an infrastructure of research experts focused on silicon carbide semiconductor devices, sensors and integrated circuits. The Multi-User Silicon Carbide Research and Fabrication Facility received nearly \$18 million from the National Science Foundation and \$5.4 million from the Army Research Laboratory. The facility will develop new electronics to address areas of national defense and create more energy-efficient and heat-resistant devices. The project also will fabricate superior integrated circuits for compact and robust electronic devices for branches of the U.S. military...

News - University of Arkansas - Jan 10, 2023

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

### **Climate attribution tools critical for understanding extreme events**

...New NOAA research finds that the extreme heat and drought experienced by California and Nevada from October 2020 to September 2021 was made six times more likely by climate change. A combination heat and drought event in the western U.S., simultaneous ocean and land heat waves in the northwestern region of the Pacific Ocean, a South Korean heat wave that was off the charts and wildfires in Cape Town, South Africa, were some of the recent extreme weather events made more likely by human-caused climate change, according to new the research. Research teams use both historical observations and model simulations to determine whether — and by how much — climate change may have influenced particular extreme weather events. One study found that South Korean average temperature during October 2021 was almost 7 degrees Fahrenheit higher than the average observed between 1991-2020, which corresponds to a one-in-6,250 year event. However, the climate model used in the study projected that this kind of heat wave could become a new normal in South Korea by 2060. Climate models suggest that extreme weather associated with the April 2021 Cape Town wildfire has become 90% more likely in a warmer world. The extreme weather events studied in the Explaining Extreme Events series were selected by individual researchers as a way to investigate the utility and skill of climate attribution analytical methods...

National Oceanic and Atmospheric Administration - Jan 9, 2023

### **NASA Says 2022 Fifth Warmest Year on Record, Warming Trend Continues**

...Earth's average surface temperature in 2022 tied with 2015 as the fifth warmest on record, according to an analysis by NASA. Continuing the planet's long-term warming trend, global temperatures in 2022 were 1.6 degrees Fahrenheit (0.89 degrees Celsius) above the average for NASA's baseline period (1951-1980). Recently, NASA scientists, as well as international scientists, determined carbon dioxide emissions were the highest on record in 2022. NASA also identified some super-emitters of methane — another powerful greenhouse gas — using the Earth Surface Mineral Dust Source Investigation instrument that launched to the International Space Station last year. The Arctic region continues to experience the strongest warming trends — close to four times the global average — according to NASA's Goddard Institute for Space Studies (GISS) research. NASA's global temperature analysis is drawn from data collected by weather stations and Antarctic research stations, as well as instruments mounted on ships and ocean buoys. These ground-based measurements of surface temperature are consistent with satellite data collected since 2002 by the Atmospheric Infrared Sounder on NASA's Aqua satellite and with other estimates. A separate, independent analysis by the National Oceanic and Atmospheric Administration (NOAA) concluded that the global surface temperature for 2022 was the sixth highest since 1880. NOAA scientists use much of the same raw temperature data in their analysis and have a different baseline period (1901-2000) and methodology...

National Aeronautics and Space Administration - Jan 12, 2023

### **DOE Sponsors Workshop to Accelerate and Improve Smart Use of Big Data to Predict Earth System Processes**

...Climate change is made up of a range of interconnected parts, everything from changing weather to what is happening in oceans, rivers, and soil systems. It's a complex array, with contributing social and cultural factors that we need to understand well enough to make accurate predictions. We develop and support climate models that tell us how fast things will change – at scales ranging from local to global levels. To make predictions about the climate system, researchers must have a robust database of information to work from, and that database needs to be built and maintained. More than 700 participants – public and private – attended the five-week virtual workshop to discuss the use of AI and ML to better utilize the massive tranche of big data available for Earth systems modeling. The AI4ESP workshop, sponsored by the Office of Science Earth and Environmental Systems Division and the Advanced Scientific Computing Research program, set the stage to build out a large swath of foundational science for the smart use of AI and ML tools for the next generation of Earth System Models (ESMs). The result was the development of solid goals for a novel and informed framework involving nine science themes related to Earth system predictions and eight cross-cut themes related to computational science and methodology...

Department of Energy - Jan 6, 2023

### **In an Advance for Solar Fuels, Hybrid Materials Improve Photocatalytic Carbon Dioxide Reduction**

...Scientists are working to transform CO<sub>2</sub> into valuable chemicals or fuels using sunlight. To convert carbon dioxide into more useful carbon monoxide (CO), researchers have identified a new hybrid material that consists of a light-absorbing semiconductor and a cobalt catalyst. To synthesize this hybrid system, researchers had to develop a better way to attach the catalyst to the surface of the material. Converting CO<sub>2</sub> into CO using sunlight could be a step toward storing solar energy in the form of a chemical fuel. The attachment strategy results in a high surface coverage of catalyst, and it arranges the molecules uniformly on the surface of the hybrid material. These two properties are key to high catalytic performance of this hybrid material, which very rapidly produces nearly exclusively CO from CO<sub>2</sub>...

Department of Energy - Jan 5, 2023

### **U.S. Department of Energy Announces \$42 Million to Develop More Affordable and Efficient Advanced Electric Vehicle Batteries in America**

...The U.S. Department of Energy (DOE) announced \$42 million in funding for 12 projects to strengthen the domestic supply chain for advanced batteries that power electric vehicles (EVs). Projects selected for the Electric Vehicles for American Low-Carbon Living (EVs4ALL) program aim to expand domestic EV adoption by developing batteries that last longer, charge faster, perform efficiently in freezing temperatures and have better overall range retention. Electrifying the transportation sector is critical to rapidly decarbonizing the American economy and eliminating heavy-emitting industries. The EVs4ALL program is managed by DOE's Advanced Research Projects Agency-Energy (ARPA-E). ARPA-E selected the following 12 teams from universities, national laboratories and the private sector to address and remove key technology barriers to EV adoption by developing next-generation battery technologies...

Department of Energy - Jan 10, 2023

### **NSF/NASA/USAID-supported research using machine learning to help monitor climate-induced hazards**

...Combining satellite technology with machine learning may allow scientists to better track and prepare for climate-induced natural hazards. Predicting the future is a pretty difficult task, but by using remote sensing and machine learning, our research aims to help create a system that will be able to monitor these climate-induced hazards in a manner that enables a timely and informed disaster response. Using geodetic data gathered from various space agency satellites, researchers conducted several case studies to test whether a mix of remote sensing and deep machine learning analytics could accurately monitor abrupt weather episodes, including floods, droughts and storm surges in some areas of the world. In one experiment, the team used these methods to determine if radar signals from Earth's Global Navigation Satellite System (GNSS), which were reflected over the ocean and received by GNSS receivers located at towns offshore in the Gulf of Mexico, could be used to track hurricane evolution by measuring rising sea levels after landfall. The data they used was collected by NASA and the German Aerospace Center's Gravity Recovery And Climate Experiment (GRACE) mission, and its successor, GRACE Follow-On. Both satellites have been used to monitor changes in Earth's mass over the past two decades, but so far, have only been able to view the planet from a little more than 400 miles up. But using deep machine learning analytics, Shum's team was able to reduce this resolution to about 15 miles, effectively improving society's ability to monitor natural hazards. This work was supported by the United States Agency for International Development (USAID), the National Science Foundation (NSF), and the National Aeronautics and Space Administration...

Ohio State News - Jan 12, 2023

## **Digital Health**

### **DOD Aims to Shield Warfighters From Novel Biological Agents Leveraging Cutting Edge Technology**

...The Office of the Deputy Assistant Secretary of Defense for Chemical and Biological Defense has always prioritized medical countermeasures, which consist of vaccines, medical tests and drugs. So having medical countermeasures as an added layer for protection makes sense. This contrasts to the past, when DOD developed medical countermeasures against a defined list of specific threats, typically ones adversaries had already weaponized. But this "one bug, one drug" approach isn't viable in the face of the exponentially larger number of potential threats, including novel ones. Nonspecific medical countermeasures will enable warfighters to remain on the battlefield after being

exposed to an agent. Nonspecific medical countermeasures are broad-spectrum acting and are designed to target a set of similar agents, diseases or symptoms. Nonspecific medical countermeasures are particularly vital for novel agents that have no medical countermeasures. Administering nonspecific medical countermeasures could alleviate symptoms, slow down disease progression and reduce transmission of the agent, allowing troops to remain in the battle with little impairment. While the agent may be suppressed for a given period, a medical countermeasure that targets and eliminates the novel agent is still required. To rapidly develop narrow-spectrum medical countermeasures, the CDBP will leverage cutting edge technology including artificial intelligence and machine learning and establish partnerships with known pharmaceutical manufacturers. The CDBP considers manufacturing capacity a strategic challenge, which the new approach addresses as a goal.  
U.S. Department of Defense - Jan 10, 2023

### **NIH launches Home Test to Treat, a pilot COVID-19 telehealth program**

...The National Institutes of Health, in collaboration with the Administration for Strategic Preparedness and Response (ASPR) at the U.S. Department of Health and Human Services, has launched the Home Test to Treat program, an entirely virtual community health intervention that will provide free COVID-19 health services—at-home rapid tests, telehealth sessions and at-home treatments—in selected communities. The Home Test to Treat program allows those who are sick an alternative to venturing out for testing or treatment, potentially reducing the spread of COVID-19 in the community. Telehealth services provider eMed will implement the Home Test to Treat program. Their services are provided under a contract award by NIBIB contractor, VentureWell. Having administered millions of verified at-home telehealth sessions during the pandemic, eMed will host the user-friendly Home Test to Treat website, where participants can sign up for the program, report symptoms, receive telehealth and antiviral treatment delivery, and coordinate telehealth enabled test kits...  
National Institutes of Health - Jan 5, 2023

### **Disparities in Patient Access to Electronic Health Information: Insights from a National Survey**

...Historically, patient access to electronic health information (EHI) has largely occurred through patient portals, which enable patients to access their health information online. In 2019, about 60% of office-based physicians and nearly all hospitals (97%) enabled patients to view their EHI using a patient portal. While overall growth in patient portal engagement is encouraging, prior studies have identified persistent disparities in patients' access and use of online medical records, including racial and ethnic disparities in patients being offered access to their portal. A recent ONC study leveraged the latest available data from the Health Information National Trends Survey to identify racial and ethnic disparities in patient portal offers, access, and use. It was found that in 2019 and 2020, Black and Hispanic individuals were offered and accessed patient portals at significantly lower rates than white individuals. However, when access and use were examined among those who reported being offered a portal, disparities largely diminished – which suggests differences in access were likely driven by disparities in being offered a portal. To help advance patient access to EHI, the ONC Cures Act Final Rule called on developers of certified health IT to adopt standards-based application programming interfaces (APIs) that enable patients to access their EHI using health apps via their smartphone or other methods...  
Health IT - Jan 5, 2023

### **NIH funds eight studies to advance rapid diagnosis of COVID-19-related inflammatory syndrome in children**

...The National Institutes of Health has awarded eight research grants to refine new technologies for early diagnosis of severe illnesses resulting from SARS-CoV-2 infection in children. The new awards follow grants issued in 2020 to foster methods for diagnosing children at high risk for Multisystem Inflammatory Syndrome in Children. The awards are part of the Rapid Acceleration of Diagnostics Radical (RADx-rad) program to support new, non-traditional approaches and reimagined uses of existing tools to address gaps in COVID-19 testing and surveillance. The new awards will allow researchers to continue their efforts to develop ways to rapidly diagnose MIS-C and identify those at risk for serious and long-term effects of SARS-CoV-2: \* Data science approach to MIS-C identification and management associated with SARS; \* AICORE-kids: Artificial intelligence COVID-19 risk assessment for kids; \* COVID-19 network of networks expanding clinical and translational approaches to predict severe illness in children...  
National Institutes of Health - Jan 9, 2023

### **Why technology alone can't solve the digital divide**

...A study of the Bhutanese refugee community in Columbus found that even though more than 95% of the population had access to the internet, very few were using it to connect with local resources and online news and nearly three-quarters of respondents never used the internet for telehealth services. Many people in our country see the internet as just a place where their children or grandchildren play games, or attend classes. They don't see it as a place where they can access their health care or find resources to help them in their daily lives. Because the study was done during the COVID-19 pandemic, one of the main areas of focus in the study was access to health care and information on COVID-19. Even though telehealth services were one of the main ways to access health care during the pandemic, about 73% said they never used the internet for that purpose. The study was funded in part by the National Institutes of Health...  
Ohio State News - Jan 5, 2023



## Other IT Related

### **FACT SHEET: Biden-Harris Administration Announces New Actions to Advance Open and Equitable Research**

...The White House Office of Science and Technology Policy (OSTP) announced new actions to advance open and equitable research, including new grant funding, improvements in research infrastructure, broadened research participation for emerging scholars, and expanded opportunities for public engagement. OSTP is also launching the Year of Open Science, featuring actions across the federal government throughout 2023 to advance national open science policy, provide access to the results of the nation's taxpayer-supported research, accelerate discovery and innovation, promote public trust, and drive more equitable outcomes. OSTP's updated policy guidance, Ensuring Free, Immediate, and Equitable Access to Federally Funded Research, will increase public access to federally funded research, foster greater collaboration and innovation, and strengthen public trust. The Administration's actions include...

The White House - Jan 11, 2023

### **Request for Information; Identifying Ambiguities, Gaps, Inefficiencies, and Uncertainties in the Coordinated Framework for the Regulation of Biotechnology**

...The National Biotech and Biomanufacturing Initiative (NBBI) identified biotechnology regulation clarity and efficiency as a priority of the Administration. The White House Office of Science and Technology Policy (OSTP) requests relevant data and information, including case studies, that may assist in identifying any regulatory ambiguities, gaps, inefficiencies, or uncertainties in the Coordinated Framework for the Regulation of Biotechnology, particularly with regard to new and emerging biotechnology products. Interested persons and organizations are invited to submit comments on or before 5 p.m. ET February 3, 2023.

Federal Register - Dec 20, 2022

### **NSF, NobleReach Emerge partner on new effort to speed biotechnology development and translation**

...A new \$5 million partnership between the U.S. National Science Foundation and NobleReach Emerge (formerly known as IQT Emerge) seeks to identify and accelerate the translation of NSF-funded research into biotechnologies and bio-inspired designs with commercial and societal impacts. NobleReach Emerge will help researchers assess the potential paths to product development and the research team's business fundamentals. The first step in the partnership will be to identify researchers based on market research, grant analysis and investigator-readiness evaluations. NSF staff will identify research with the potential for commercial applications and select and connect researchers with NobleReach Emerge. Once potential investigators are selected and engaged, the NobleReach Emerge team will work with them to prepare their research for market. "The road to translate breakthrough research into technologies can be long and winding," said Erwin Gianchandani, NSF assistant director for Technology, Innovation and Partnerships. "With this pilot effort, NSF hopes to equip interested researchers with the support and training necessary to much more seamlessly take the next step toward commercial and societal impact. Biotechnology breakthroughs contribute to a host of important applications, and we hope to support researchers as they begin their journey toward commercialization." ...

National Science Foundation - Jan 10, 2023

### **NASA's Retired Compton Mission Reveals Superheavy Neutron Stars**

...Astronomers studying archival observations of powerful explosions called short gamma-ray bursts (GRBs) have detected light patterns indicating the brief existence of a superheavy neutron star shortly before it collapsed into a black hole. This fleeting, massive object likely formed from the collision of two neutron stars. A neutron star forms when the core of a massive star runs out of fuel and collapses. This produces a shock wave that blows away the rest of the star in a supernova explosion. Neutron stars typically pack more mass than our Sun into a ball about the size of a city, but above a certain mass, they must collapse into black holes. Both the Compton data and computer simulations revealed mega neutron stars tipping the scales by 20% more than the most massive, precisely measured neutron star known – dubbed J0740+6620 – which weighs in at nearly 2.1 times the Sun's mass. Computer simulations of these mergers show that gravitational waves exhibit a sudden jump in frequency – exceeding 1,000 hertz – as the neutron stars coalesce. These signals are too fast and faint for existing gravitational wave observatories to detect...

National Aeronautics and Space Administration - Jan 9, 2023

### **NASA Selects Experimental Space Technology Concepts for Initial Study**

...The NASA Innovative Advanced Concepts (NIAC) program fosters innovation by funding early-stage studies to evaluate technologies that could support future missions. The program sits within NASA's Space Technology Mission Directorate (STMD) and explores technically credible, early-stage aerospace concepts. Under their NIAC awards, the fellows investigate the physics of their concepts, roadmap necessary technology development, identify potential limitations, and look for transition opportunities to bring these concepts to reality. The latest round of awards will provide \$175,000 grants to 14 visionaries from nine states. Ten of the selected researchers are first-time NIAC recipients. The new Phase I projects include innovative sensors and instruments, manufacturing techniques, power systems, and more. Mary Knapp from the Massachusetts Institute of Technology (MIT) in Cambridge proposed a new kind of space observatory comprised of thousands of identical small satellites. Precisely positioned in deep space, they could

work together to detect radio emissions at low frequencies from the earliest epochs of the universe and measure magnetic fields of terrestrial exoplanets, helping identify planets outside the solar system that are rocky like Earth and Mars...  
National Aeronautics and Space Administration - Jan 9, 2023

### **NASA's Webb Telescope Reveals Links Between Galaxies Near and Far**

...A new analysis of distant galaxies imaged by NASA's James Webb Space Telescope shows that they are extremely young and share some remarkable similarities to "green peas," a rare class of small galaxies in our cosmic backyard. Green pea galaxies were discovered and named in 2009 by volunteers taking part in Galaxy Zoo, a project where citizen scientists help classify galaxies in images, starting with those from the Sloan Digital Sky Survey. Peas stood out as small, round, unresolved dots with a distinctly green shade, a consequence of both the colors assigned to different filters in the survey's composite images and a property of the galaxies themselves. Green pea galaxy colors are unusual because a sizable fraction of their light comes from brightly glowing gas clouds. The gases emit light at specific wavelengths – unlike stars, which produce a rainbow-like spectrum of continuous color. Peas are also quite compact, typically only about 5,000 light-years across or about 5% the size of our Milky Way galaxy. Webb did more than image the cluster – its Near-Infrared Spectrograph (NIRSpec) instrument also captured the spectra of selected galaxies in the scene. The Webb spectra made it possible to measure the amount of oxygen in these cosmic dawn galaxies for the first time...

National Aeronautics and Space Administration - Jan 9, 2023

### **NSF Convergence Accelerator Program Sponsors Workshop to Advance Nature-Inspired Designs That Could Offer Solutions for Global Challenges**

...Bioinspired research draws from the natural world to develop solutions for global challenges. Examples of bioinspired designs include hybrid biomaterials that can stimulate wound healing and serve as scaffolds for engineered tissues, climate-friendly manufacturing of cells and proteins, color-changing materials inspired by butterfly wings, systems for energy harnessing and storage that are inspired by living systems, and autonomous robot swarms modeled after schools of fish that can be used for environmental and infrastructure monitoring, like engine inspections and tidal patterns. Bioinspired design has many applications across a wide range of industries including medicine, manufacturing, energy and sustainability. To help address the nationwide need for translatable outcomes from basic research, the National Science Foundation sponsored a workshop as part of its Convergence Accelerator program, which funds interdisciplinary collaboration—or convergence—to advance innovative solutions for the most pressing issues. NSF identified bioinspired design as a promising candidate for this program and tapped Lisa Manning, director of the BioInspired Institute at Syracuse University, to lead a workshop to explore its potential. Manning will be lead author on a national report that will outline why bioinspired design is an ideal field to advance through this program. If successful, bioinspired design would be named into the next cohort of Convergence Accelerator tracks. There's a large group of scientists and engineers that are already working in this space but rarely interact with one another—and it's clear that convergent interactions between these groups could drive innovation. NSF will select its next cohort of Convergence Accelerator tracks and if bioinspired design becomes a Convergence Accelerator track, research teams will be able to apply for NSF grants and participate in programming to learn how to bring products to market...

Syracuse University News - Jan 5, 2023

## **STEM / Workforce & IT**

### **NOAA 2022: The year in photos of the NOAA Education community**

...Each year since 2018, we have asked members of the NOAA Education community to share their most memorable photos of the year. These images highlight program successes and challenges while honoring the dedication of teachers, educators, and NOAA staff across the country. The photos from 2022 show us what life looked like as NOAA Education programs opened up to in-person events again and students and teachers got back inside (and outside!) the classroom. Take a look at our favorite photos from the past year, such as: \* Teacher at Sea alumnus Jeff Miller solders a remotely operated vehicle (ROV) control box circuit board during the Teacher at Sea Alumni Association; \* NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) strives to make information accessible to everyone. One way this is done is by giving people the option to translate web pages into Spanish. By providing all of AOML's important information to non-English speakers, more people can immerse themselves in the valuable research NOAA does...

National Oceanic and Atmospheric Administration - Jan 6, 2023

### **NSF provides scholarships supporting education and professional development for next generation cybersecurity experts and professionals**

...The U.S. National Science Foundation CyberCorps® Scholarship for Service program is providing more than \$29 million in new funding to nine universities in 2023. CyberCorps® SFS supports the development of a robust and resilient cybersecurity workforce and addresses the unique challenges of recruiting and retaining cybersecurity professionals for careers serving in local, state, federal or tribal governments. The CyberCorps® SFS program plays a critical role in the U.S. national strategy for the cybersecurity workforce. Since the program's inception, more than 4220 students have graduated from the program and have gone on to become experts in cybersecurity.

Awardees will focus on interdisciplinary cybersecurity, ethics and strategy, developing the cybersecurity workforce of tomorrow, and emerging disciplines like artificial intelligence and next generation wireless. The ambitious projects these awardees undertake will shape the current and future cybersecurity workforce and landscape...  
National Science Foundation - Jan 11, 2023

### **NSF announces new AI institute**

...The U.S. National Science Foundation announced a new artificial intelligence institute to focus on the speech language pathology needs of children. The need for speech and language services has been exacerbated during the COVID-19 pandemic due to a widening gap in services available to children. The AI Institute for Exceptional Education aims to close this gap by developing advanced AI technologies to scale availability of speech language pathology services so every child in need has access. The institute is supported by a \$20 million grant from NSF and the Department of Education's Institute of Education Sciences to the University at Buffalo. The institute will work toward universal speech and language screening for children. The framework, the AI screener, will analyze video and audio streams of children during classroom interactions and assess the need for evidence-based interventions tailored to individual needs of students. The institute will serve children in need of ability-based speech and language services, advance foundational AI technologies and enhance understanding of childhood speech and language development...

National Science Foundation - Jan 9, 2023

### **Program teaches US Air Force personnel the fundamentals of AI**

...A new academic program developed at MIT aims to teach U.S. Air and Space Forces personnel to understand and utilize artificial intelligence technologies. The project, which was funded by the Department of the Air Force–MIT Artificial Intelligence Accelerator, seeks to contribute to AI educational research, specifically regarding ways to maximize learning outcomes at scale for people from a variety of educational backgrounds. Experts in MIT Open Learning built a curriculum for three general types of military personnel — leaders, developers, and users — utilizing existing MIT educational materials and resources. They also created new, more experimental courses that were targeted at Air and Space Forces leaders. Ultimately, the researchers found that the military personnel responded positively to hands-on learning; appreciated asynchronous, time-efficient learning experiences to fit in their busy schedules; and strongly valued a team-based, learning-through-making experience but sought content that included more professional and soft skills. Learners also wanted to see how AI directly applied to their day-to-day work and the broader mission of the Air and Space Forces...

MIT News - Jan 11, 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 - Dec 29, 2022

### **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 - Jan 9, 2023

### **NSF-funded Akamai Summer Internship Program: Applications open for paid summer STEM-focused work**

...The Akamai Summer Internship program, which offers college students an opportunity to gain paid summer work experience at an observatory, company or scientific/technical facility on Hawai'i Island or Maui and earn course credit from the University of Hawai'i at Hilo, is seeking applicants. The program seeks to develop a skilled STEM workforce to meet the needs of the state's growing tech industry. The eight-week internship, part of the Akamai Workforce Initiative, runs from Sunday, June 11 through Saturday, August 12. Applications are due on February 14, 2023. This year the Akamai Internship Program is funded by the National Science Foundation...

## Upcoming Conferences / Workshops / Webinars

### **NIST: Providing Timely and Clear Data to Support Federal Cybersecurity Workforce Needs: Jan 24th**

...This webinar will showcase some existing data sources as well as identify opportunities for future improvements that will help the federal government take a data-driven approach to improving the impact of human resources, talent management, and workforce development efforts to recruit, hire, develop, and retain a skilled workforce. January 24, 2023 1:30 - 3:00pm EST

National Institute of Standards and Technology - Dec 19, 2022

### **NICE Webinar: Optimizing Your LinkedIn Profile for Your Cybersecurity Career: Jan 26th**

...During this webinar, LinkedIn pros will share tips and tricks on how to optimize your LinkedIn profile – “rock your profile” -- so that employers, recruiters and other professionals can easily find you and help you grow your network with the goal of advancing you in your career. Attendees will also hear about the latest labor market trends in cybersecurity as seen through LinkedIn’s unique data. January 26, 2023 2:00 - 3:00pm EST

National Institute of Standards and Technology - Jan 9, 2023

### **Named Data Networking Community Meeting 2023: Mar 2-3**

...The Named Data Networking Community Meeting 2023 will be hosted by the National Institute of Standards and Technology (NIST) as a hybrid meeting on March 02-03, 2023. NDNComm is an annual event that brings together a large community of researchers from academia, industry, and government, as well as users and other parties interested in the development of the Named Data Networking (NDN) technology. NDN is an architectural realization of the broad Information Centric Networking (ICN) vision that enables communications by named, secured data at the network layer. By aligning the network service with application needs, NDN offers many advantages, including stronger security and trustworthiness, enhanced network usability, as well as scalability and resiliency in network communication. In particular, NDN is especially suitable for emerging applications environments that include mobile edge computing, Internet of Things (IoT), and Low Latency Applications such as interactive AR/VR...

National Institute of Standards and Technology - Jan 9, 2023

### **NIST: 3rd High-Performance Computing Security Workshop: Mar 15-16**

...NIST HPC Security Working Group (WG) has been leading the effort to create a comprehensive and reliable security guidance for HPC systems. As part of the Working Group mission and to reach greater HPC scientific community, NIST, in collaboration with National Science Foundation (NSF), will host the 3rd High-Performance Computing Security Workshop on March 15-16, 2023. The workshop aims to listen to community’s needs and feedbacks, report and reflect on the ongoing activities at HPC Security WG, and define and discuss future directions with stakeholders from industry, academia, and government.

National Institute of Standards and Technology - Jan 9, 2023

## **Innovation Through NITRD Coordination**

Networking and Information Technology Research and Development

National Coordination Office, Washington, DC USA

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