



## 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 [nc@nitrd.gov](mailto:nc@nitrd.gov) and voilà they will receive the news brief with the cool technology articles each week!

### Breaking News: New AI Institutes

#### Background Press Call on New Artificial Intelligence Announcements

...Artificial intelligence has been part of our lives for year and the pace of innovation is accelerating, and the applications are getting broader and broader. As new tools hit the market, the extraordinary opportunities that AI presents are coming more into focus. But as is true with all technologies, we know there are some serious risks. Last fall, we released the landmark Blueprint for an AI Bill of Rights. At a time of rapid innovation, it was essential that we make clear the values we must advance and the commonsense rights we must protect. We've also released the AI Risk Management Framework. And with this and the Blueprint for an AI Bill of Rights, we've given companies and policymakers and the individuals building these technologies some clear ways that they can mitigate the risks. To further the President's vision on AI, we're making new announcements: we're investing an additional \$140 million to stand up seven new National AI Research Institutes. That will bring the total 25 National AI Research Institutes across the country, with half a billion dollars of funding to support responsible innovation that advances the public good...

The White House - May 4, 2023

### **NSF Announces Seven New National Artificial Intelligence Research Institutes**

...The U.S. National Science Foundation, in collaboration with other federal agencies and higher education institutions and other stakeholders, announced a \$140 million investment to establish seven new National Artificial Intelligence Research Institutes (AI Institutes) to advance a cohesive approach to AI-related opportunities and risks. The new AI Institutes are interdisciplinary collaborations among top AI researchers and are supported by co-funding from the U.S. Department of Commerce's National Institutes of Standards and Technology (NIST); U.S. Department of Homeland Security's Science and Technology Directorate (DHS S&T); U.S. Department of Agriculture's National Institute of Food and Agriculture (USDA NIFA); U.S. Department of Education's Institute of Education Sciences (ED IES); U.S. Department of Defense's Office of the Undersecretary of Defense for Research and Engineering (DoD OUSD R&E), and IBM Corporation (IBM). The new AI Institutes focus on six research themes: \* Trustworthy AI \* Intelligent Agents for Next-Generation Cybersecurity \* Climate Smart Agriculture and Forestry \* Neural and Cognitive Foundations of Artificial Intelligence \* AI for Decision Making \* AI-Augmented Learning to Expand Education Opportunities and Improve Outcomes...

National Science Foundation - May 4, 2023

### **NSF AI Institutes continue creating groundswell of innovation**

...The U.S. is leading the world in AI advancements because of investments made and sustained by NSF, the nation's primary non-defense federal funder of fundamental AI research. The NSF-led National AI Research Institutes – or AI Institutes – program is the foundation's flagship program for use-inspired AI research, and it is the nation's largest AI research ecosystem funded through partnerships with other federal governments and industry leaders. The program, a defining part of NSF Director Sethuraman Panchanathan's tenure, launched with a cohort of seven Institutes in 2020, and 11 more were announced in 2021. In 2023, NSF announced seven new Institutes, bringing the total investment in these AI Institutes to \$500 billion and a network of over 500 funded and collaborative institutions across the U.S. and around the world. The topical themes, or tracks, covered by the AI Institutes span critical pillars of our societal and economic development like agriculture and food security, health care, weather forecasting, education, trustworthy AI, supply chain management, and cybersecurity, among other fields. The AI Institute for Foundations of Machine Learning (IFML) and the AI Institute for Research on Trustworthy AI in Weather, Climate and Coastal Oceanography, are examples of how NSF investments are transforming AI...

National Science Foundation - May 4, 2023

### **DoD Co-funds Institute to Research the Neural, Biological, and Cognitive Foundations of Artificial Intelligence**

...The Department of Defense announced the award of \$10 million for the establishment of an institute dedicated to advancing unified research in artificial and natural intelligence. Co-funded with the National Science Foundation (NSF) as part of its National Artificial Intelligence (AI) Research Institutes program, the new institute will improve understanding of how the brain functions and pursue designs of more capable and trustworthy AI. The program includes a DoD-sponsored focus area on the neural and cognitive foundations of AI...

U.S. Department of Defense - May 5, 2023

### **GW to Co-Lead New \$20 million NSF Artificial Intelligence Institute in Law & Society**

...The George Washington University is co-leading a multi-institutional effort supported by the National Science Foundation (NSF) that will develop new artificial intelligence (AI) technologies designed to promote trust and mitigate risks, while simultaneously empowering and educating the public. The NSF Institute for Trustworthy AI in Law & Society (TRAILS) unites specialists in AI and machine learning with systems engineers, social scientists, legal scholars, educators and public policy experts. The multidisciplinary team will work with impacted communities, private industry and the federal government to determine how to evaluate trust in AI, how to develop technical solutions and processes for AI that can be trusted and which policy models best create and sustain trust. Funded by a \$20 million award from NSF, the new institute is expected to transform the practice of AI by encouraging new innovations that foreground ethics, human rights and input and feedback from communities whose voices have previously been marginalized...

The George Washington University - May 4, 2023

### **U of I to lead National Artificial Intelligence Research Institute focused on STEM learning**

...Scientists at the University of Illinois Urbana-Champaign will lead a national Artificial Intelligence Research Institute focused on developing learning technologies that accelerate young people's achievement in science, technology, engineering and math. The National Science Foundation announced today it is awarding \$20 million over five years to establish the Inclusive and Intelligent Technologies for Education (INVITE) Institute. A key purpose of the INVITE research is to broaden engagement with and learning of STEM among historically marginalized groups at the prekindergarten-12th-grade levels by investigating emerging AI techniques and building intelligent technologies. More than 96,000 youths across 24 school districts will be engaged in enhanced STEM learning using INVITE platforms designed to promote persistence, academic resilience and collaboration, qualities that research has shown are critical to academic achievement. Schools, universities, community organizations and museums will provide formal and informal learning opportunities – emphasizing hands-on activities related to real-world challenges. INVITE is among seven national AI Institutes established this year – and it marks the third of these under the direction of U. of I. scientists since the NSF-led AI Institutes Program was launched in 2020. The NSF's funding partners include the U.S. Department of Defense Office of the Under Secretary of Defense for Research and Engineering; the U.S. Department of Education Institute of Education Sciences; the U.S.

Department of Homeland Security; the National Institute of Standards and Technology; the U.S. Department of Agriculture's National Institute of Food and Agriculture; and IBM... News Bureau - May 4, 2023

### **Colorado State University partners in \$20M AI Institute focusing on climate-smart agriculture and forestry**

...Colorado State University researchers will play a key role in a new research institute that will leverage artificial intelligence to create more sustainable farms and forests. The University of Minnesota will lead the new National Artificial Intelligence Research Institute funded by a \$20 million grant over five years from the National Science Foundation and the USDA National Institute of Food and Agriculture. Researchers at the AI Institute for Climate-Land Interactions, Mitigation, Adaptation, Tradeoffs and Economy (AI-CLIMATE) aim to use artificial intelligence (AI) to create more climate-smart practices that will absorb and store carbon while simultaneously boosting the economy in the agriculture and forestry industries. The institute is one of seven new NSF- and USDA-funded AI Institutes announced today and is part of a larger federal initiative — totaling nearly half a billion dollars — to bolster collaborative AI research across the country. Using new AI techniques like deep learning and knowledge-guided machine learning, researchers at the AI-CLIMATE Institute will improve accuracy and lower the cost of accounting for carbon and greenhouse gases in farms and forests, ultimately making the process more accessible for more people. Foundational AI research will be directed toward the development of “digital twins” that meld simulation and observational data sets, down to the level of farms, ranches and forest stands, to evaluate management, policy and economic interactions for different adaptation and mitigation options. The twin is an AI-guided digital representation of the farm that encapsulates the factors that influence the farm, a history of grower-specified management decisions, and the impact of these management decisions that account for GHG emissions, crop yields and economics...

Colorado State University - May 4, 2023

## **Federal Agency Funding Opportunities**

### **US Department of Labor announces funding opportunity for employer-focused disability policy, technical assistance center**

...The U.S. Department of Labor announced today the availability of \$2 million in funds for the first year of a cooperative agreement for an employer-focused, disability policy development and technical assistance center. The announced funding availability is a re-competition of an existing cooperative agreement to manage the Employer Assistance and Resource Network on Disability Inclusion. The center aims to build upon EARN's previous work by engaging with employers, labor-management partners, and intermediaries representing employers and historically underserved communities to identify and understand challenges to workplace disability inclusion. The deadline for application is June 23, 2023...

U.S. Department of Labor - May 9, 2023

## **Artificial Intelligence / Machine Learning**

### **FACT SHEET: Biden-Harris Administration Announces New Actions to Promote Responsible AI Innovation that Protects Americans' Rights and Safety**

...Today, the Biden-Harris Administration is announcing new actions that will further promote responsible American innovation in artificial intelligence (AI) and protect people's rights and safety. These steps build on the Administration's strong record of leadership to ensure technology improves the lives of the American people, and break new ground in the federal government's ongoing effort to advance a cohesive and comprehensive approach to AI-related risks and opportunities. The Administration is also actively working to address the national security concerns raised by AI, especially in critical areas like cybersecurity, biosecurity, and safety. This includes enlisting the support of government cybersecurity experts from across the national security community to ensure leading AI companies have access to best practices, including protection of AI models and networks...

The White House - May 4, 2023

### **NSF/IARPA-funded research uses reflections to see the world from new points of view**

...Researchers from MIT and Rice University have created a computer vision technique that leverages reflections to image the world. Their method uses reflections to turn glossy objects into “cameras,” enabling a user to see the world as if they were looking through the “lenses” of everyday objects like a ceramic coffee mug or a metallic paper weight. Using images of an object taken from different angles, the technique converts the surface of that object into a virtual sensor which captures reflections. The AI system maps these reflections in a way that enables it to estimate depth in the scene and capture novel views that would only be visible from the object's perspective. This method could be especially useful in autonomous vehicles. For instance, it could enable a self-driving car to use reflections from objects it passes, like lamp posts or buildings, to see

around a parked truck. Their technique, known as ORCa (which stands for Objects as Radiance-Field Cameras), works in three steps. First, they take pictures of an object from many vantage points, capturing multiple reflections on the glossy object. Then, for each image from the real camera, ORCa uses machine learning to convert the surface of the object into a virtual sensor that captures light and reflections that strike each virtual pixel on the object's surface. Finally, the system uses virtual pixels on the object's surface to model the 3D environment from the point of view of the object. The research was supported, in part, by the Intelligence Advanced Research Projects Activity and the National Science Foundation.

MIT News - May 10, 2023

### **NIH funds artificial intelligence platform that could run a million microbial experiments per year**

...An artificial intelligence system enables robots to conduct autonomous scientific experiments—as many as 10,000 per day—potentially driving a drastic leap forward in the pace of discovery in areas from medicine to agriculture to environmental science. That artificial intelligence platform, dubbed BacterAI, mapped the metabolism of two microbes associated with oral health—with no baseline information to start with. We know almost nothing about most of the bacteria that influence our health. Figuring out the combination of amino acids that bacteria like is tricky. BacterAI was able to discover the amino acid requirements for the growth of both *Streptococcus gordonii* and *Streptococcus sanguinis*. To find the right formula for each species, BacterAI tested hundreds of combinations of amino acids per day, honing its focus and changing combinations each morning based on the previous day's results. Within nine days, it was producing accurate predictions 90% of the time. BacterAI creates its own data set through a series of experiments. By analyzing the results of previous trials, it comes up with predictions of what new experiments might give it the most information. As a result, it figured out most of the rules for feeding bacteria with fewer than 4,000 experiments. The research was funded by the National Institutes of Health...

University of Michigan News Service - May 4, 2023

### **NSF/U.S. Air Force fund training machines to learn more like humans do**

...MIT researchers have discovered that a specific training method can help computer vision models learn more perceptually straight representations, like humans do. Training involves showing a machine-learning model millions of examples so it can learn a task. The researchers found that training computer vision models using a technique called adversarial training, which makes them less reactive to tiny errors added to images, improves the models' perceptual straightness. The team also discovered that perceptual straightness is affected by the task one trains a model to perform. Models trained to perform abstract tasks, like classifying images, learn more perceptually straight representations than those trained to perform more fine-grained tasks, like assigning every pixel in an image to a category. One of the take-home messages here is that taking inspiration from biological systems, such as human vision, can both give you insight about why certain things work the way that they do and also inspire ideas to improve neural networks. ... Most models they tested didn't straighten. Of the few that did, those which straightened most effectively had been trained for classification tasks using the technique known as adversarial training. Adversarial training involves subtly modifying images by slightly changing each pixel. The research is funded, in part, by the National Science Foundation, the U.S. Air Force Research Laboratory, and the U.S. Air Force Artificial Intelligence Accelerator.

MIT News - May 9, 2023

### **\$20 million NSF investment will change health care with the use of AI. Clemson to lead five-year ADAPT-SC project**

...A Clemson-led coalition of South Carolina researchers has formed to modernize health care diagnostics and treatment in South Carolina with the use of AI. The National Science Foundation announced a \$20 million, five-year investment in a multi-institutional project called Artificial Intelligence-Enabled Devices for the Advancement of Personalized and Transformative Health Care in South Carolina or ADAPT-SC. Funding comes from the National Science Foundation's Established Program to Stimulate Competitive Research (NSF EPSCoR) Research Infrastructure Improvement Track-1 Award. The project has three primary goals...

Clemson University - May 4, 2023

## **Robotics / Autonomous Vehicles**

### **Oregon State University leading \$5M NSF-funded effort to accelerate robotics research via standardized robot**

...Researchers at Oregon State University are part of a \$5 million National Science Foundation effort to accelerate robotics research by making standardized humanoid robots available to the scientific community. The project involves building and distributing 50 Quori robots to serve as a standardized hardware and software platform for researchers. Quori robots have an expressive face, gesturing arms and a bowing spine and are designed for experimentation in the lab and also "in the wild," i.e. real-world types of settings...

Oregon State University - May 8, 2023

## **Cybersecurity / Privacy**

### **Being a Mom Helps Me Protect Our Communication Infrastructure**

...As scientists, we tend to look very closely and deeply at one aspect of something and then ignore others because of specific metrics and reasoning. There's a danger with this approach in cybersecurity because hackers are opportunists. Government and technology organizations are working to protect this infrastructure, through encryption and other security measures. Everyone is working to harden the target of wireless communication networks. We can now measure the signal not just at one point but at multiple points as it moves through the local communication infrastructure. This allows us to have a better view of what's happening overall. If there's a security breach in one part of the infrastructure, we can detect it elsewhere because we have greater visibility overall from measuring these signals. That's exactly what we're trying to accomplish with our cybersecurity project. We're measuring the activity in the wireless signals to detect unusual or nefarious signs that the networks we rely on could be compromised. In our NIST project, Device-level Anomaly Framework (DARE), my team and I are looking at those signals that radiate out from our devices using a commercial-grade telecommunication network, known as a radio access network (RAN). We have experts from advanced wireless communications, cybersecurity and applied mathematics, including machine learning...

National Institute of Standards and Technology - May 10, 2023

### **NIST Revises SP 800-171 Guidelines for Protecting Sensitive Information**

...The National Institute of Standards and Technology (NIST) has updated its draft guidelines for protecting sensitive unclassified information, in an effort to help federal agencies and government contractors more consistently implement cybersecurity requirements. The revised draft guidelines, Protecting Controlled Unclassified Information in Nonfederal Systems and Organizations (NIST Special Publication [SP] 800-171 Revision 3), will be of particular interest to the many thousands of businesses that contract with the federal government. Federal rules that govern the protection of controlled unclassified information (CUI), which includes such sensitive data as health information, critical energy infrastructure information and intellectual property. NIST also anticipates releasing at least one more draft version of SP 800-171 Rev. 3 before publishing the final in early 2024. ... NIST is planning a webinar for June 6, 2023, to introduce the changes made to SP 800-171...

National Institute of Standards and Technology - May 10, 2023

### **DOE CESER Helps Fortify the Energy Sector's Digital Supply Chain with GE Gas Power**

...The U.S. Department of Energy (DOE) Office of Cybersecurity, Energy Security, and Emergency Response (CESER) announced a collaboration with GE Gas Power to test one of the company's critical infrastructure systems used in gas, steam, and wind applications. CESER Acting Principal Deputy Director Monica Neukomm said, "By working collaboratively to test critical operational components of our energy infrastructure for potential points of weakness, we are leveraging the best that both the private and public sector have to offer. As cybersecurity threats to our nation's energy infrastructure continue to increase and evolve, we are pleased to work with GE Gas Power and other major industry players to stay ahead of our cyber adversaries." Through CyTRICS, DOE connects equipment manufacturers, vendors, and utilities with state-of-the-art, intelligence-informed analytic capabilities at its National Laboratories and tests operational technology components voluntarily submitted by the participating companies. As testing expands, CyTRICS is expected to identify systemic supply chain vulnerabilities and to aid engineering out cyber weaknesses in next-generation systems, strengthening the security and resilience of software and hardware in the energy sector...

Department of Energy - May 9, 2023

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

### **NASA, Rocket Lab Launch First Pair of Storm Observing CubeSats**

...Two NASA CubeSats designed to study tropical cyclones, including hurricanes and typhoons, are in orbit after successfully launching. TROPICS is a constellation of four identical CubeSats designed to observe tropical cyclones in a unique, inclined low Earth orbit over Earth's tropics – an orbit that allows them to travel over any given storm about once an hour. Current weather tracking satellites have a timing of about once every six hours. "Providing more frequent imaging will not only improve our situational awareness when a hurricane forms," said Karen St. Germain, director, Earth Science Division at NASA Headquarters in Washington. "The data will provide information to models that help us determine how a storm is changing over time, which in turn helps to improve forecasts from our partners like the National Hurricane Center and Joint Typhoon Warning Center."...

National Aeronautics and Space Administration - May 8, 2023

### **NASA and university scientists begin to unravel global role of atmospheric dust in nourishing oceans**

...New research led by an Oregon State University scientist begins to unravel the role dust plays in nourishing global ocean ecosystems while helping regulate atmospheric carbon dioxide levels. Researchers have long known that phytoplankton – plantlike organisms that live in the upper part of the ocean and are the foundation of the marine food



web – rely on dust from land-based sources for key nutrients. But the extent and magnitude of the impact of the dust – particles from sources such as soil that are lifted by the wind and impact the Earth’s climate – have been difficult to estimate globally. The ocean plays an important role in the carbon cycle; carbon dioxide from the atmosphere dissolves in surface waters, where phytoplankton turn the carbon into organic matter through photosynthesis. Some of the newly formed organic matter sinks from the surface ocean to the deep sea, where it is locked away, a pathway known as the biological pump. Scientists from Oregon State; University of Maryland; and NASA estimate deposition of dust supports 4.5% of the global annual export production, or sink, of carbon. Regional variation in this contribution can be much higher, approaching 20% to 40%. Oregon State scientists focused their efforts on using satellite data to examine changes in ocean color following dust inputs. Ocean color imagery is collected across the global ocean every day and reports changes in the abundance of phytoplankton and their overall health. The scientists at UMBC and NASA focused their efforts on modeling dust transport and deposition to the ocean surface. The UMBC team used observations to confirm a NASA global model before incorporating its results into the study. The research team is continuing this research, bringing in improved modeling tools and preparing for more advanced satellite data from NASA’s upcoming Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) satellite mission...

Oregon State University - May 4, 2023

### **NSF/DOT/AFOSR/ONR fund research that develops an algorithm to make satellite signals act like GPS**

...Researchers have developed an algorithm that can “eavesdrop” on any signal from a satellite and use it to locate any point on Earth, much like GPS. The study represents the first time an algorithm was able to exploit signals broadcast by multi-constellation low Earth orbit satellite (LEO) satellites. The researchers did not need assistance from the satellite operators to use the signals, and they emphasized that they had no access to the actual data being sent through the satellites – only to publicly available information related to the satellites’ downlink transmission frequency and a rough estimate of the satellites’ location. From transportation to communication systems to the power grid and emergency services, nearly every aspect of modern society relies on positioning, navigation and timing data from global navigation satellite systems (GNSS), or GPS, that orbit the Earth. Despite this, because GPS system signals are weak and susceptible to interference. GNSS signals are spoofable, which poses serious security risks in safety-critical applications. What also makes the study so different from all other attempts at creating an alternative to GPS is, unlike previous studies, this algorithm doesn’t reverse engineer the signal. His work suggests utilizing signals from LEO satellites as an alternative for humans’ positioning, navigation and timing needs, as they reside about 20 times closer to Earth compared to GNSS satellites, which reside in medium Earth orbit – a little more than 20,000 kilometers above the planet. The work was supported by the Office of Naval Research, the Air Force Office of Scientific Research, the Department of Transportation and the National Science Foundation...

Ohio State News - May 5, 2023

### **UC Irvine, NASA JPL researchers use satellite data and discover a cause of rapid ice melting in Greenland**

...Researchers at the University of California, Irvine and NASA’s Jet Propulsion Laboratory uncovered a previously unseen way in which the ice and ocean interact. The glaciologists said their findings could mean that the climate community has been vastly underestimating the magnitude of future sea level rise caused by polar ice deterioration. Using satellite radar data from three European missions, the UCI/NASA team learned that Petermann Glacier’s grounding line – where ice detaches from the land bed and begins floating in the ocean – shifts substantially during tidal cycles, allowing warm seawater to intrude and melt ice at an accelerated rate. The new study shows that warm ocean water intrudes beneath the ice through preexisting subglacial channels, with the highest melt rates occurring at the grounding zone. ... “Petermann’s grounding line could be more accurately described as a grounding zone, because it migrates between 2 and 6 kilometers as tides come in and out,” said lead author Enrico Ciraci who was supported by the NASA Postdoctoral Program at the Jet Propulsion Laboratory...

UCI News - May 8, 2023

## **Advanced Manufacturing**

### **FACT SHEET: Vice President Harris Celebrates Small Business and Manufacturing Boom**

...The White House released a report card demonstrating across-the-board progress on commitments designed to maintain the nation’s historic momentum in fostering new business creation and leading to the small business boom seen over the last two years. The report illustrates how the Biden-Harris Administration’s historic SSBCI, authorized by the American Rescue Plan and administered by the U.S. Treasury Department, is providing small businesses with access to capital to invest in critical manufacturing equipment and assets. Small businesses are the backbone of the manufacturing sector. Nearly 75% of the U.S. manufacturing sector is made up of companies with fewer than 20 employees. Small to medium-size manufacturers generate half of all industrial output and employ close to 9% of the U.S. workforce. Already, nearly 800,000 manufacturing jobs have been created since President Biden took office...

The White House - May 4, 2023

### **NSF awards Iowa researchers \$20 million to build advanced biomanufacturing capacity**

...The National Science Foundation’s program to build research capacity across the country has awarded a five-year, \$20 million grant to support Iowa researchers working to

make the state a leader in advanced biomanufacturing. The researchers will use microbes and other biological systems to produce plastics for 3D printing, fibers for flexible and rigid materials and proteins for medical diagnostics and therapeutics. The researchers call their project, "Building Capacity across Iowa to Meet Human Needs from Things that Grow." They've dubbed it "Chemurgy 2.0." Chemurgy 2.0 will use microbes and other biological systems as the factories that produce some of the molecules that manufacturers need. The project will also build the state's research capacity by supporting equipment purchases such as high-performance computers at Northern Iowa, bioprocessing equipment at Iowa, polymer characterization equipment at Central and fiber-production equipment at Iowa State. The project will also support new faculty hires, including a data science position at Northern Iowa, a microbial engineering position at Iowa and a biomanufacturing technology position at Iowa State...

Iowa State University News Service - May 9, 2023

### **DOT awards UB \$1.6 million to add new tech to precast concrete**

...The new Transportation Infrastructure Precast Innovation Center (TRANS-IPIC), a Tier 1 University Transportation Center funded by the U.S. Department of Transportation, was awarded \$10 million over a five-year period, of which UB will receive \$1.6 million. Precast concrete is higher quality, requires less maintenance and can last longer, compared to the typical concrete cast at construction sites. Precast concrete elements are built off site, at a plant. This controlled environment is ideal for researchers to implement new technologies into the precast concrete. One of the center's aims is to advance the additive manufacturing technology for bridge construction around two main pillars: materials and manufacturing. Additive manufacturing involves 3D printing an object from a computer-aided design or 3D model...

University at Buffalo - May 9, 2023

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

### **FACT SHEET: Biden-Harris Administration Announces Key Infrastructure Funding to Electrify Ports**

...America's ports play a central role in our supply chains and affordable goods movement, are important providers of good jobs, and are key to our global competitiveness. To strengthen our supply chains, reduce costs for the American people, and position the U.S. for economic success, the Biden Administration announced investments. Recognizing the vital role of modern, resilient infrastructure in reducing costs for American families and businesses, President Biden secured an unprecedented \$17 billion investments through the Bipartisan Infrastructure Law to improve the country's ports and waterways – critical arteries in our supply chains. This builds on previous port electrification announcements made by the Department of Transportation's Federal Highway Administration to improve port efficiency and air quality, reducing local pollution and greenhouse gas emissions. US DOT has also awarded grants for ports electrification in other programs...

The White House - May 5, 2023

### **Biden-Harris Administration Invests \$26 Million to Support a Modern, Reliable, and Resilient American Clean Energy Grid**

...The U.S. Department of Energy (DOE) today announced \$26 million for eight selected projects to demonstrate how solar, wind, storage, and other clean energy resources can support a reliable and efficient U.S. power grid. The Solar and Wind Grid Services and Reliability Demonstration program will fund eight projects at 15 sites in 13 states and Puerto Rico. Research teams consisting of utilities, laboratories, universities, and industry will test how wind and solar plants can more reliably transmit clean energy and protect against disruptions to the network of high-voltage power lines that carry electricity from centralized generation sources, known as the bulk power system. DOE's National Renewable Energy Laboratory found that wind and solar energy could provide as much as 80% of generation on a grid run on 100% clean electricity...

Department of Energy - May 10, 2023

### **Viruses Could Reshuffle the Carbon Cycle in a Warming World**

...This study creates a roadmap for understanding the many different ways that viruses could modify the effects of warming on communities of microbes. Viruses likely have strong effects on processes with microbes and the ways ecosystems function. Incorporating these previously ignored effects into ecosystem models will help scientists improve their predictions of how ecosystems could respond to climate change. Warming likely affects several different stages of the viral infection cycle, as well as virus-host dynamics. The researchers' preliminary models show that viruses could potentially tip the scales on natural carbon balances, causing some ecosystems to switch from being net carbon sources to being net carbon sinks. This study shows how incorporating viruses into predictive models can lead to new and unexpected effects on ecosystems in response to climate change...

Department of Energy - May 8, 2023

### **NSF/NOAA/DOE-Funded Atmospheric Research Provides Clear Evidence of Human-Caused Climate Change Signal Associated with CO2 Increases**

...New research provides clear evidence of a human "fingerprint" on climate change and shows that specific signals from human activities have altered the temperature structure of Earth's atmosphere. Differences between tropospheric and lower stratospheric temperature trends have long been recognized as a fingerprint of human effects on

climate. Enhanced detectability occurs because the mid to upper stratosphere has a large cooling signal from human-caused CO<sub>2</sub> increases, small noise levels of natural internal variability, and differing signal and noise patterns. Extending fingerprinting to the upper stratosphere with long temperature records and improved climate models means that it is now virtually impossible for natural causes to explain satellite-measured trends in the thermal structure of the Earth's atmosphere. A natural explanation is virtually impossible in terms of what we are looking at here: changes in the temperature structure of the atmosphere. Earlier modeling found a very distinctive feature: an increase in CO<sub>2</sub> levels led to more trapping of heat in the troposphere and less heat escaping higher up into the stratosphere. This prediction of tropospheric warming and stratospheric cooling in response to increasing CO<sub>2</sub> has been confirmed many times by more complex models and verified by comparing model results with global-mean atmospheric temperature observations from weather balloons and satellites. The new research is the first to search for human-caused climate change patterns – also called “fingerprints” – in the middle and upper stratosphere and can be better studied now because of improved simulations and satellite data. Funding for the study was provided by National Science Foundation, National Oceanic and Atmospheric Administration, U.S. Department of Energy...  
The Woods Hole Oceanographic Institution - May 8, 2023

## Digital Health

### **NIH researchers identify large genetic changes that contribute to dementia risk using computer algorithms and machine learning**

...Scientists at the National Institutes of Health have identified new genetic risk factors for two types of non-Alzheimer's dementia. The team discovered several structural variants that could be risk factors for Lewy body dementia (LBD) and frontotemporal dementia (FTD). Structural variants have been implicated in a variety of neurological disorders. By combining cutting-edge computer algorithms capable of mapping structural variations across the whole genome with machine learning, the research team analyzed whole-genome data from thousands of patient samples and several thousand unaffected controls. By looking at a group of 50 genes implicated in inherited neurodegenerative diseases, the investigators were able to identify additional rare structural variants, including several that are known to cause disease. The analyses also identified two well-established risk factors for FTD changes in the C9orf72 and MAPT genes. These proof-of-concept findings bolstered the strength of the study's new findings by demonstrating that the algorithms were properly working. Because reference maps for currently-available structural variants are limited, the researchers generated a catalog based on the data obtained in these analyses. The analysis code and all the raw data are now available to the scientific community for use in their studies. An interactive app also allows investigators to study their genes of interest and ask which variants are present in controls vs. LBD or FTD cases...  
National Institutes of Health - May 8, 2023

### **New NIH-funded center aims to spur research on climate change and health**

...Harvard T.H. Chan School of Public Health and Boston University School of Public Health (BUSPH) have been awarded a \$6.7 million, three-year grant from the National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health (NIH), to create a Research Coordinating Center (RCC) on climate change and health. The new center will be called the CAFÉ, serving as an acronym for the center's main objectives: to Convene, Accelerate, Foster, and Expand, in the context of climate change and health research. The RCC will serve as a vehicle to create an inclusive, diverse community of practice that will work collaboratively to share data and conduct innovative solutions-driven research to reduce the health impacts of climate change, especially working with communities most affected by adverse weather-related events...  
Harvard Public Health Review - May 9, 2023

### **NIH/VA/DOD-funded Research Using AI Predicts Future Pancreatic Cancer in Patients**

...Pancreatic cancer is one of the deadliest cancers in the world, and its toll projected to increase. An artificial intelligence tool has successfully identified people at the highest risk for pancreatic cancer up to three years before diagnosis using solely the patients' medical records. The research suggests that AI-based population screening could be valuable in finding those at elevated risk for the disease and could expedite the diagnosis of a condition found all too often at advanced stages when treatment is less effective and outcomes are dismal. The AI algorithm was trained on two separate data sets totaling 9 million patient records from Denmark and the United States. The researchers “asked” the AI model to look for telltale signs based on the data contained in the records. Based on combinations of disease codes and the timing of their occurrence, the model was able to predict which patients are likely to develop pancreatic cancer in the future. The researchers tested different versions of the AI models for their ability to detect people at elevated risk for disease development within different time scales — 6 months, one year, two years, and three years. One particular advantage of the AI tool is that it could be used on any and all patients for whom health records and medical history are available, not just in those with known family history or genetic predisposition for the disease. ... The work was supported by the National Institutes of Health, the VA Cooperative Studies Program, and the Department of Defense...  
Harvard Medical School - May 8, 2023

### **Change in breast density over time linked to cancer risk**

...A study by researchers at Washington University School of Medicine in St. Louis indicates that previous mammograms hold underutilized data that could help identify women



at high risk of breast cancer and even reveal which breast is likely to be affected. When doctors read mammograms, they assess breast density along with signs of cancer, but some changes are difficult to detect by eye. Researchers used a mathematical model to monitor changes in breast density over the course of a decade in almost 1,000 women and found that the rate of change differed significantly between the nearly 300 women who were later diagnosed with cancer and those who were not. By adding the change in density over repeated images to models for risk classification in each breast, we set the stage for a better risk estimation with each updated mammogram. This work was supported by the National Cancer Institute...

The Source - Washington University in St. Louis - May 5, 2023

## Other IT Related

### **FACT SHEET: Biden-Harris Administration Announces National Standards Strategy for Critical and Emerging Technology**

...The Biden-Harris Administration released the United States Government's National Standards Strategy for Critical and Emerging Technology (Strategy), which will strengthen both the United States' foundation to safeguard American consumers' technology and U.S. leadership and competitiveness in international standards development. This Strategy will renew the United States' rules-based approach to standards development. It also will emphasize the Federal Government's support for international standards for critical and emerging technologies (CETs), which will help accelerate standards efforts led by the private sector to facilitate global markets, contribute to interoperability, and promote U.S. competitiveness and innovation. The National Institute of Standards and Technology (NIST) coordinates Federal Government engagement in standards activities...

The White House - May 4, 2023

### **DoD Releases National Defense Science and Technology Strategy**

...The Department of Defense released the National Defense Science and Technology Strategy, or NDSTS, today. Guided by the National Defense Strategy, the NDSTS articulates the science and technology priorities, goals, and investments of the Department and makes recommendations on the future of the defense research and engineering enterprise. The NDSTS will continue to emphasize the 14 Critical Technology Areas detailed in the DoD CTO's Strategic Vision. The Department will continue to leverage the broad innovation ecosystem across academia, Federally-funded research and development centers (FFRDCs), university affiliated research centers (UARCs), DoD laboratories, national laboratories, non-profit entities, commercial industry, and other Government departments and agencies...

U.S. Department of Defense - May 9, 2023

### **NSF announces 6 new EPSCoR Track-1 awards to expand the geography of innovation across the nation**

...The U.S. National Science Foundation has awarded six jurisdictions \$20 million each through ESPCoR, the Established Program to Stimulate Competitive Research, a program that aims to build and bolster infrastructure to advance scientific progress and elevate discovery nationwide. NSF Director Sethuraman Panchanathan said, "This year's EPSCoR awards will serve individual states and the country as a whole with critical research on wildfire management, climate change resilience, biomanufacturing and advanced biomedical devices, and data science in the service of all disciplines." The five-year Research Infrastructure Improvement Track-1 awardees will pursue ambitious research that addresses the impact of climate change on energy-water systems, biomanufacturing, wildfire management, using artificial intelligence to revolutionize health care and transdisciplinary research into transformative language-based data science...

National Science Foundation - May 8, 2023

### **U.S. Department of Energy Announces \$40 Million for More Efficient Cooling for Data Centers**

...The U.S. Department of Energy (DOE) announced \$40 million in funding for 15 projects that will develop high-performance, energy efficient cooling solutions for data centers. Used to house computers, storage systems, and computing infrastructure, data centers account for approximately 2% of total U.S. electricity consumption while data center cooling can account for up to 40% of data center energy usage overall. Supported by DOE's Advanced Research Projects Agency-Energy (ARPA-E), the projects have been selected as part of the Cooling Operations Optimized for Leaps in Energy, Reliability, and Carbon Hyperefficiency for Information Processing Systems (COOLERCHIPS) program. ARPA-E projects are unique because they are developing entirely new ways to generate, store, and use energy. Just last month, ARPA-E announced a new effort focused on evaluating the feasibility of extracting rare earth and other high-value trace critical minerals from macroalgae. Earlier this year, ARPA-E unveiled two new programs aimed at improving the reliability, resilience, and security of the power grid...

Department of Energy - May 9, 2023

## STEM / Workforce & IT

### **CyberWolves rank 7th nationally during National Cyber League Team Game Playoffs April 14-16, Shu ranks in the top 20 in individual games**

...The CSU Pueblo CyberWolves Red Team finished in 7th place in the Experienced Bracket at the Spring 2023 National Cyber League (NCL) Team Playoffs held April 14-16. The results are based on the Cyber Skyline Power Rankings, which are a comprehensive measure of NCL Individual and Team performance that considers a school's top performing team, their top performing students, and the number and performance of each of the participating students from each school. Cyber challenges require problem-solving skills that force us to think outside of the box and change what we have only known. "These top NCL rankings by our 'scrappy' CIS-Cyber Security students attest to the rigor of our U.S. National Security Agency-Center for Academic Excellence designated cyber security program and the quality and discipline of our amazing CSU Pueblo Students," said Dr. Roberto Mejias, Associate Professor of Computer Information Systems, Director for the Center for Cyber Security Education & Research (CCSER) and Head CSU Pueblo NCL Coach. Dr. Mejias serves as the principal investigator for two externally funded National Science Foundation (NSF) grants...

CSU-Pueblo: Colorado State University-Pueblo - May 4, 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 - Apr 13, 2023

### **NIST: U.S. Government National Standards Strategy**

...Standards are essential to commerce, allowing technology to work seamlessly and business to operate smoothly. They provide industries and innovators with a common language that facilitates trade, simplifies transactions, and enables people to work together toward greater common goals that cut across disciplines and borders. The U.S. Government will strengthen its support for standards development in order to promote standards that are technologically sound and help American industry compete on a level playing field...

National Institute of Standards and Technology - May 11, 2023

## **Upcoming Conferences / Workshops / Webinars**

### **DARPA Brings 2023 ERI Summit to Seattle**

...The Defense Advanced Research Projects Agency (DARPA) will host the Electronics Resurgence Initiative (ERI) Summit August 22-24, 2023, in Seattle, convening top experts in microelectronics and semiconductors for crucial conversations and a robust showcase. The summit provides a central platform for discussing ERI 2.0, which aims to further advance ERI's foundational thrusts while additionally pursuing future-focused manufacturing capabilities for complex, 3D microsystems, and hardened electronics for extreme environments. The summit will highlight ERI's major thrusts and technological progress, and will promote dialogue, the exchange of ideas, and direction for future R&D goals and investments. Panel discussions, workshops, and live poster and demonstration sessions further round out the conference programming. Registration for the 2023 event will open May 15. Early registration is strongly recommended...

DARPA - May 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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