



NITRD News Brief

We are pleased to continue NITRD's News Brief that offers insight into the activities NITRD's member agencies are conducting to achieve the Nation's priorities through the lens of the public-facing news sources. These are divided into networking and information technology topics that have been identified as of great importance for improving Americans' daily lives.

For ease of access, under NITRD's logo, the title of each section is listed as a link to that section. The titles of the articles under the section's heading are links that provide immediate access to the news article listed. We hope you find this informative and helpful in your daily activities.

Do you know someone who would like to receive NITRD's weekly news brief? They can email NITRD's IT aficionados at nco@nitrd.gov and voilà they will receive the news brief with the cool technology articles each week!

Looking Back on 2023 & Forward to 2024

Building a Thriving Clean Energy Economy in 2023 and Beyond

...In 2021 and 2022, President Biden signed into law his Investing in America agenda, a series of strategic public investments in industries critical for the long-run economic growth of the United States. This included the largest investment in reducing carbon emissions in American history. The clean energy investments in the agenda include incentives for manufacturing across the clean energy supply chain, investments in demonstration projects, loans and loan guarantees for a variety of technologies, and production and investment tax credits for clean energy generation. This brief highlights progress-to-date towards deploying these clean energy technologies. It describes how the President's Investing in America agenda is translating into tangible outcomes and progress towards the President's climate goals, and it outlines how the deployment of clean energy technologies will lower greenhouse gas emissions, improve energy security, and spur economic growth...

The White House - Dec 19, 2023

2023: A tremendous year for science that sets stage for an exciting 2024 and beyond

...In 2023, the U.S. National Science Foundation accelerated its mission of driving discoveries and advances across all scientific disciplines. Through NSF's strategic investments, it has been another tremendous year for science, technology and innovation across the United States. Artificial Intelligence models are accelerating scientific

progress, and NSF is one of the largest federal government investors in AI. NSF expanded its flagship National AI Research Institutes program in 2023, bringing the total to 25. NSF investments are also focused on areas such as AI security. A \$10.9 million investment through the Safe Learning-Enabled Systems program will support research to develop responsible AI technologies. A key program is NSF's Regional Innovation Engines (NSF Engines), which will address pressing national and societal challenges by advancing critical technologies like semiconductors, AI, advanced wireless and biotechnology. Innovation ecosystems. NSF is establishing a Research Security and Integrity Information Sharing and Analysis Organization. This will establish an innovative entity that will build the capacity of the research community. NSF is partnering with industry and other like-minded international partners to rapidly scale ideas and talent development and build the industries of the future...

National Science Foundation - Dec 14, 2023

Driving Innovation and Discovery: DOE's Office of Science 2023 Year in Review

...DOE's Office of Science has made incredible headway over the course of 2023 and here is a summary of some of our most notable accomplishments this year. Congratulations to the Energy Exascale Earth System Model (E3SM) team, led by researchers and computational scientists across eight DOE national laboratories for being awarded the Gordon Bell Prize for Climate Modelling for its groundbreaking work, "The Simple Cloud-Resolving E3SM Atmosphere Model Running on the Frontier Exascale System." The Muon g-2 collaboration at DOE's Fermi National Accelerator Laboratory achieved the world's most precise measurement of the magnetic moment of the muon, a fundamental particle whose behavior might indicate the existence of new particles or forces. One of DOE's National Quantum Information Science (QIS) Research Centers, Argonne Quantum Foundry was launched to provide the nation's QIS research community with high-quality, standardized semiconductor materials, tools, and data, offering end-to-end solutions for design, testing, fabrication, and integration of new materials into quantum systems. And more! ...

Department of Energy - Dec 20, 2023

Year in review: Argonne highlights from 2023

...Some of the work happening today at the U.S. Department of Energy's (DOE) Argonne National Laboratory can already be felt in the form of new vaccines, accessible climate models and big steps toward quantum computing. Other efforts — less tangible but no less crucial — lay the groundwork for scientific advances that are just glimmers on the horizon. Here are a few key moments from 2023. An exciting new generation of battery types for electric vehicles beyond lithium ion is on the horizon. Research demonstrated a battery electrolyte, which is the liquid through which lithium ions move to charge and discharge, containing a type of fluoride — the same compound that goes into toothpaste. That could aid in the effort to use clean electricity rather than fossil fuels. The report "AI for Science, Energy, and Security," lays out a comprehensive vision to expand DOE's scientific use of AI by building on existing strengths in world-leading high performance computing systems and data infrastructure. At the Argonne Quantum Foundry, scientists develop the materials and data needed for quantum information technology. Such technology will power ultrasensitive sensors, computers handling calculations that far exceed the capabilities of current machines and extremely secure communication networks...

Argonne National Laboratory - Dec 18, 2023

Federal Agency Funding Opportunities

DOD Releases Microelectronics Commons FY24 Call for Projects to Catalyze U.S. Microelectronics Innovation

...As part of the implementation of the CHIPS and Science Act and President Biden's Investing in America agenda, the Department of Defense today announced the Microelectronics Commons FY24 Call for Projects, which provides up to \$280 million to projects that support the domestic prototyping and fabrication of microelectronics. The Commons CFP underscores the Department's focus on delivering advanced technologies to the warfighter and developing the U.S. microelectronics manufacturing industry to bolster our nation's military technological advantage. The Department anticipates project awards to occur in the third quarter of FY24. This Call for Proposals is the next step in our effort to bridge the valley of death from 'lab-to-fab,'" said Deputy Under Secretary of Defense for Research and Engineering Dr. David Honey...

U.S. Department of Defense - Dec 18, 2023

AI Cyber Challenge Opens Registration, Adds \$4 Million in Prizes, Shows Scoring Algorithm and Challenge Exemplar

...DARPA seeks participants for upcoming competitions to develop artificial intelligence-enabled cyber reasoning systems that can automatically find and fix software vulnerabilities in real-time and at scale in widely used, critical code. Registration for DARPA's AI Cyber Challenge (AIxCC) is now open. The Small Business Track submission deadline is January 15, 2024 and the Open Track submission deadline is April 30, 2024. To ensure competitors develop a CRS that can successfully integrate into the real world, DARPA created a scoring system based on four key metrics to assess each competitor's system fairly. Each metric measures performance in specific areas of excellence selected for the competition...

DARPA - Dec 14, 2023

NOAA seeks applications for 2024 urban heat island initiative

...NOAA's National Integrated Heat Health Information System (NIHHIS), in partnership with CAPA Strategies LLCoffsite link, is now accepting applications from organizations interested in participating in the 2024 Urban Heat Island (UHI) mapping campaign program. This year, NIHHIS will be partnering with additional agencies on this effort, including the Department of Health and Human Services (HHS) and the Department of Housing and Urban Development (HUD). NOAA's Urban Heat Island mapping program is a fantastic way for communities to use science to identify the hottest neighborhoods and tailor solutions including planting more trees, increasing access to cooling resources, and directing outreach with health tips during heat waves. The campaigns rely on community scientist volunteers to drive around the city using sensors attached to cars to collect data on temperature, humidity, time and GPS location. This data is used to create maps which provide a detailed analysis of the distribution of heat in the morning, afternoon and evening. The maps and reports reveal temperature differences across neighborhoods, and also allow communities to understand how factors such as lack of green space or concentrated areas of pavement can contribute to hotter neighborhoods. The UHI mapping program is part of the Biden Administration's Justice40 initiative, and applicants will be asked to describe how their work will further environmental justice initiatives in their community. Applications are due by 5 PM EDT on Wednesday, January 31, 2024...
National Oceanic and Atmospheric Administration - Dec 19, 2023

U.S. Department of Transportation Announces New Rural Autonomous Vehicle Research Program

...The U.S. Department of Transportation announced a \$25 million funding opportunity for its Rural Autonomous Vehicle research program. Accredited universities are eligible to apply for this competitive, six-year cooperative agreement program. Recipients will use RAV program funding to conduct research regarding the benefits and responsible application of automated vehicles and associated mobility technologies in rural and Tribal communities. One \$15 million award will focus on passenger transportation, and a separate \$10 million award will focus on movement of freight to support and enable automated freight and delivery vehicles serving rural areas. The RAV program funds collaborative research and pilot deployment activities to support a future rural transportation system. An informational webinar on the U.S. DOT Rural Autonomous Vehicle Program Funding Opportunity will be held in January 2024...
Intelligent Transportation Systems - Dec 14, 2023

HPC

NSF CAREER award funds high-performance computing research

...Computer science and engineering Professor Xiaoyi Lu has received a CAREER award from the National Science Foundation (NSF) for his research into high-performance computing (HPC) cyberinfrastructure systems. Lu will receive \$500,000 over the next five years for the project titled "Heterogeneity-Enriched Communication for Advancing HPC Systems and Applications." Lu and his lab specialize in HPC systems that incorporate multiple types of computing processors...
UC Merced News - Dec 14, 2023

Artificial Intelligence / Machine Learning

NIST Calls for Information to Support Safe, Secure and Trustworthy Development and Use of Artificial Intelligence

...The National Institute of Standards and Technology (NIST) has issued a Request for Information (RFI) that will assist in the implementations of its responsibilities under the recent Executive Order on Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence (AI). The order directs NIST to develop guidelines for evaluation, red-teaming and more; facilitate development of consensus-based standards; and provide testing environments for the evaluation of AI systems. The RFI specifically calls for information related to AI red-teaming, generative AI risk management, reducing the risk of synthetic content, and advancing responsible global technical standards for AI development. Other assignments to NIST in the Executive Order related to cybersecurity and privacy, synthetic nucleic acid sequencing, and supporting agencies' implementation of minimum risk-management practices are being addressed separately from this RFI. Responses will be accepted until Feb. 2, 2024, and will be posted to www.regulations.gov...
National Institute of Standards and Technology - Dec 19, 2023

Trust, Responsibility at Core of DOD Approach to AI

...William Streilein, chief technology officer for DOD's Chief Digital and Artificial Intelligence Office, said his office has launched a department-wide effort focused on understanding how the DOD can accelerate the adoption of generative AI to support the warfighter. Streilein explained that critical importance is establishing trust in each application of the technology, meaning the confidence that the AI algorithm produced the intended result. The DOD places special emphasis on key tenants underpinning the

ethical principles of AI: responsibility, reliability, equitability, governability and traceability. Last month, the DOD released its strategy to accelerate the adoption of advanced artificial intelligence capabilities to ensure U.S. warfighters maintain decision superiority on the battlefield for years to come. The 2023 Data, Analytics and Artificial Intelligence Adoption Strategy, which was developed by the Chief Digital and AI Office, builds upon and supersedes the 2018 DOD AI Strategy and revised DOD Data Strategy, published in 2020, which have laid the groundwork for the department's approach to fielding AI-enabled capabilities...
U.S. Department of Defense - Dec 15, 2023

Leveraging Artificial Intelligence Is Smart for Explosive Detection

...Harnessing the power and possibilities of artificial intelligence (AI) and machine learning (ML) and applying these emerging capabilities to the Department of Homeland Security (DHS) mission has been, and will continue to be, a high priority for the Science and Technology Directorate (S&T). One way S&T is demonstrating this commitment to applying emerging technologies to pressing national threats is by investing in the development of AI/ML technologies. The funding is directed at AI/ML that could soon be used to identify dangerous compounds, like those found in explosives and narcotics. When the DHS Small Business Innovation Research (SBIR) Program released a solicitation back in FY2020, under the topic "Machine Learning Module for Detection Technologies," the goal was to develop innovative solutions that would ultimately provide DHS operational components with an enhanced ability to identify new threats at aviation checkpoints. In the spring of 2021, following their 6-month Phase I awards to demonstrate concept feasibility, Physical Sciences Inc. (PSI) and Alakai Defense Systems, Inc. (Alakai) were each awarded a \$1 million, 24-month SBIR Phase II contract. The challenge S&T posed with this funding award is to see if an AI/ML solution can significantly expedite the process of updating a detection library, without the intensive human labor. One of the ways that dangerous compounds are identified at checkpoints is with Raman Spectroscopy...
Homeland Security - Dec 14, 2023

Notice to research community: Use of generative artificial intelligence technology in the NSF merit review process

...Generative artificial intelligence¹ (GAI) systems have great potential to support the U.S. National Science Foundation's mission to promote the progress of science. They could facilitate creativity and aid in the development of new scientific insights and streamline agency processes by enhancing productivity through the automation of routine tasks. To safeguard the integrity of the development and evaluation of proposals in the merit review process, this memo establishes guidelines for its use by reviewers and proposers: * NSF reviewers are prohibited from uploading any content from proposals, review information and related records to non-approved generative AI tools. * Proposers are encouraged to indicate in the project description the extent to which, if any, generative AI technology was used and how it was used to develop their proposal. NSF will update the 2025 PAPPG to align with the requirements stipulated in this memorandum or with additional guidance and requirements as necessary. NSF will also continuously evaluate future applications of generative AI technology for use by staff and the research community...
National Science Foundation - Dec 14, 2023

How Gray Boxes and a Jellyfish Could Help Advance Wave Energy

...Waves carry enough energy to meet about 34% of the United States' electricity needs. We cannot capture all that power, but this largely untapped resource could still pair up with other renewable energy sources to power offshore activities. But before these technologies can join the fight against climate change, technology developers must design devices that can generate hearty amounts of energy while surviving a ferocious, salty ocean. The team's new testing platform blends the playful freedom of theoretical models with the stark reality of a physical generator or subsystem. The design, called a variable-geometry wave energy converter, can inflate and deflate to avoid potentially destructive extreme waves. This and other variable-geometry designs could help wave energy technologies generate more energy, survive longer, and cost less. Researchers feed live data from physical hardware, like a generator, back into their virtual model, the Wave Energy Converter SIMulator (WEC-Sim). With that extra data loop, WEC-Sim, which is an open-source code developed by NREL and Sandia National Laboratories, can collect even more accurate results. The team hope to pair the platform with machine learning algorithms. With machine learning, the platform could help identify optimal ways to control how much energy a generator produces as waves swell from small to big to extreme. All this precise data and control could accelerate technology development and help get wave energy technologies out in the water. This project was funded, in part, by the U.S. Department of Energy...
National Renewable Energy Laboratory - Dec 13, 2023

Robotics / Autonomous Vehicles

450 million-year-old organism finds new life in Softbotics

...Researchers at Carnegie Mellon University, in collaboration with paleontologists from Spain and Poland, used fossil evidence to engineer a soft robotic replica of a pleurocystitid, a marine organism that existed nearly 450 million years ago and is believed to be one of the first echinoderms capable of movement using a muscular stem. The U.S. National Science Foundation-supported research seeks to broaden modern perspective of animal design and movement by introducing a new a field of study — paleobionics — aimed at using Softbotics, robotics with flexible electronics and soft materials, to understand the biomechanical factors that drove evolution using extinct

organisms. Softbotics is another approach to inform science using soft materials to construct flexible robot limbs and appendages. The researchers are building robot analogues to study how locomotion has changed. The researchers determined that wide sweeping movements were likely the most effective motion and that increasing the length of the stem significantly increased the animals' speed without forcing it to exert more energy...
National Science Foundation - Dec 14, 2023

NSF funds drones that capture new clues about how water shapes mountain ranges over time

...The National Science Foundation supported research using drones flying along miles of rivers in the steep, mountainous terrain of central Taiwan and mapping the rock properties that revealed new clues about how water helps shape mountains over geological time. In Taiwan, the scientists found the main signature of rock strength of the mountains was the size of boulders in rivers, which were larger and stronger in locations where rocks had been buried deeper in Earth's crust. And the size of boulders correlated with the steepness of the rivers, which must be powerful enough to move these boulders downstream before eroding the mountain. The larger the boulders in the channel, the steeper the channel needs to be to move them. The researchers turned to drones to avoid obstacles like hazardous river crossings and waterfalls to collect data. As you travel toward the older sections, the boulders increase to a median size of more than six feet. These boulders aren't sitting in the rivers waiting to be broken down over time, according to the researchers. Instead, boulders in each of the sections of rivers were close to the threshold of mobility — meaning the water was nearly powerful enough to move them downstream. During high flows after storms, these boulders may be fully mobile, and as they move, they help incise the river...
Pennsylvania State University - Dec 14, 2023

Quantum

Self-correcting quantum computers within reach?

...Quantum computers, unlike classical ones, cannot correct errors by copying encoded data over and over. Because of this inability to self-correct, the technology hasn't seen much scale-up and commercialization. An effort spanning the last several years, the Harvard platform is built on an array of very cold, laser-trapped rubidium atoms. Each atom acts as a bit, a "qubit," which can perform extremely fast calculations. The team's chief innovation is configuring its "neutral atom array" to change its layout by moving and connecting atoms, called "entangling." Operations that entangle pairs of atoms, called two-qubit logic gates, are units of computing power. The researchers demonstrated the ability to entangle atoms with error rates below 0.5%. In terms of operation quality, that puts the technology's performance on par with other leading types of quantum computing platforms, like superconducting qubits and trapped-ion qubits. One of the paper's authors, Harvard's Dolev Bluvstein, was a recent U.S. National Science Foundation Graduate Research Fellow. The research is also supported through NSF's Physics Frontiers Center for Ultracold Atoms...
National Science Foundation - Dec 14, 2023

Utility-Scale Quantum Program Advances Toward Prototyping

...DARPA's Underexplored Systems for Utility-Scale Quantum Computing (US2QC) program seeks to determine whether an underexplored approach to quantum computing can achieve utility-scale operation – meaning its computational value exceeds its cost – faster than conventional predictions. In the initial phase, each company presented a design concept describing their plans to create a utility-scale quantum computer. In the follow-on phase, selected performers aim to take their concepts to the next level. Now, US2QC's key goal centers on developing and defending a system design for a fault-tolerant prototype, a smaller-scale quantum computer demonstrating that a utility-scale quantum computer can be constructed as designed and operated as intended. DARPA has selected Microsoft Corporation and PsiQuantum to move to the next phase of US2QC...
DARPA - Dec 15, 2023

AFRL provides US with robust future quantum computing, networking capabilities

...The Air Force Research Laboratory has partnered with quantum technology companies like IonQ, Rigetti, IBM and PsiQuantum to utilize unique systems that explore quantum technologies from sensing to computing, all using fundamental principles of quantum mechanics to process data. Researchers are advancing quantum technologies from the individual quantum bit, or qubit, level to the system level, to potentially connect different qubit types together in a network which could provide the U.S. Air Force with ultra-secure quantum communications with military applications. Commercial sector support is providing infrastructure that can assist AFRL research in quantum networks to realize distributed quantum computing. AFRL is consistently seeking industry and academic partners to work with in the quantum space to expand the research capacity. Working together with industry AFRL researchers can identify and address gaps in technology, standards and workforce development through collaboration to benefit the U.S. Department of the Air Force and the warfighter...
Air Force Link - Dec 14, 2023

Cybersecurity / Privacy

Joint Statement of the Quad Senior Cyber Group

...At the Quad Senior Cyber Group 3rd In-person Meeting of Principles, the head of delegation of each country issued the following Joint Press Release of the Quad Senior Group. We reaffirm our steadfast commitment to an Indo-Pacific that is resilient and equipped to detect and deter cyber attacks. Quad countries are among the world's leaders in advancing digital technology, connectivity, and resilience and are undertaking efforts to provide capacity building in the Indo-Pacific region to strengthen the ability to defend their government networks and critical infrastructure from cyber disruptions. We reaffirmed the application of international law to cyberspace and expressed serious concern about cyber attacks in the region on critical infrastructure...

The White House - Dec 15, 2023

NSA Issues Recommendations to Protect Software Defined Networking Controllers

...The National Security Agency has released the Cybersecurity Information Sheet (CSI), "Managing Risk from Software Defined Networking Controllers." The report provides recommendations to help National Security Systems, Department of Defense, and Defense Industrial Base network administrators mitigate the risks associated with software driven network management solutions, such as Software Defined Networking Controllers (SDNC). SDNCs allow enterprises to configure networking and security policies and control access to applications from a centralized location. SDNCs enable dynamically pushing configurations out to network devices within the Software Defined Networking (SDN) environment, greatly reducing the number of separate devices an administrator must access to keep them updated. If these functions are compromised by malicious cyber actors, they can access the SDNC and perform management functions. The CSI indicates that a typical SDNC communicates across two separate types of network flows, one for managing the SDNC and the other for configuring network devices. For both flows, the network traffic contains authentication and configuration information which could be vulnerable to man-in-the-middle techniques or passive viewing if the information is not adequately protected...

National Security Agency/Central Security Service - Dec 13, 2023

5G, Wireless Spectrum, Networking & Communications

Driving Scientific and Technological Innovation in Space

...We can explore the depths of our universe using advanced technologies with telescopes that can show us stellar nurseries and 13.5-billion-year-old galaxies. Our nation's capacity for innovation is a phenomenally powerful engine that can improve the outcomes for the greatest challenges of our time. To accelerate innovation in support of the Biden-Harris Administration's United States Space Priorities Framework, OSTP has worked to: * Ensure the United States remains resilient to the effects of space weather through improved forecasting. * Monitor and stabilize our climate through Earth observations from satellites and increased access to space data. * Accelerate innovation in space technologies such as in-space servicing, assembly, and manufacturing capabilities...

The White House - Dec 20, 2023

Biden-Harris Administration Approves Louisiana's "Internet for All" Initial Proposal

...The Department of Commerce's National Telecommunications and Information Administration (NTIA) has approved Louisiana's Initial Proposal for the Broadband Equity, Access, and Deployment (BEAD) program, a cornerstone of the Biden-Harris Administration's "Internet for All" initiative. Louisiana is the first state to reach this important milestone, which will enable the state to move from the planning phase to the implementation phase for the BEAD program—a major step towards closing the digital divide in Louisiana and meeting the President's goal of connecting everyone in America with affordable, reliable, high-speed Internet service. The BEAD program is a \$42.45 billion state grant program authorized by President Biden's Bipartisan Infrastructure Law. States and territories will use the funding to deploy or upgrade broadband networks to ensure that everyone has access to reliable, affordable, high-speed Internet service. BEAD-eligible entities—the 56 states, territories, and the District of Columbia—are required to submit for NTIA's approval an Initial Proposal detailing how they plan to spend their BEAD allocation to deliver high-speed Internet access to all unserved and underserved locations within their borders. All states must submit Initial Proposals by December 27, 2023...

National Telecommunications and Information Administration - Dec 15, 2023

NSF-funded researchers use satellite data, paleoclimate simulations, and climate models to find tropical ice cores that offer deeper insights into Earth's temperature record

...A new study suggests ice recovered from high tropical mountains can reveal key insights about Earth's past climate changes. Led by scientists at The Ohio State University, the study showed that oxygen-stable isotope records stored in tropical mountain glacier ice cores can be used to provide scientists with a distinct paleoclimate history of the

planet's middle and upper troposphere. By combining ice core proxy records, paleoclimate simulations and modern satellite measurements and comparing the results to those from previous climate models, they found that the temperature in this region of the atmosphere cooled by 7.35 degrees Celsius during the Earth's glacial period, which for many researchers illuminates new theories about climate dynamics throughout the ages. Ice from tropical regions provides a happy medium, and holds evidence that is "just right" for measuring Earth's mean temperature throughout the ages. The study's conclusions also shed light on a decades-old scientific debate on how oxygen-stable isotopes in tropical ice cores can be used to interpret climate variations over time. This study suggests the tropical ice cores serve as a recorder of air temperature in the mid-upper troposphere across tropics, and more interestingly, as a recorder of global mean surface temperature during Earth's last glacial period. This work was supported by the National Science Foundation...

Ohio State News - Dec 14, 2023

NSF funds satellite-based method that measures carbon in peat bogs

...Peat bogs in the tropics store vast amounts of carbon, but logging, plantations, road building, and other activities have destroyed large swaths of these ecosystems in places like Indonesia and Malaysia. Peat formations are essentially permanently flooded forestland, where dead leaves and branches accumulate because the water table prevents their decomposition. Determining how much carbon is contained in each pileup of organic material formation has required laborious on-the-ground sampling. Researchers from MIT and Singapore have developed a mathematical analysis of how peat formations build and develop, that makes it possible to evaluate their carbon content and dynamics mostly from simple elevation measurements. These can be carried out by satellites, without requiring ground-based sampling. This analysis, the team says, should make it possible to make more precise and accurate assessments of the amount of carbon that would be released by any proposed draining of peatlands. Through years of on-the-ground sampling and testing, and detailed analysis comparing the ground data with satellite lidar data on surface elevations, the team was able to figure out a kind of universal mathematical formula that describes the structure of peat domes of all kinds and in all locations. The work was supported by the U.S. National Science Foundation...

MIT News - Dec 13, 2023

Advanced Manufacturing

Point-of-Need Manufacturing Challenge Demonstrates Technologies for Cold Weather Combat Effectiveness

...The Office of the Secretary of Defense Manufacturing Technology Program showcased technologies that will keep servicemembers combat effective in extreme temperatures. The event, which ManTech held with support from the Army Combat Capabilities Development Command, featured technologies generated by the U.S. Department of Defense's Manufacturing Innovation Institute member companies that won the Point-of-Need Manufacturing Challenge held in March by proposing solutions to the Department's operational constraints in extreme cold temperatures. The technologies were tested by members of the U.S. Army, U.S. Marine Corps, and Army National Guard. The Point of Need challenge winners have proven to be champions of research and innovation and are helping to maintain the United States military's technological advantage...

U.S. Department of Defense - Dec 15, 2023

3D-Printed Alloys Offer Improved Strength and Ductility

...Researchers make a type of material called durable high-entropy alloys (HEAs) by combining several elemental metals. HEAs have potential uses in applications involving severe wear and tear, extreme temperatures, radiation, and high stress. They can be made using 3D-printing, also known as additive manufacturing (AM), but this usually results in poor ductility. Scientists have now used laser-based AM to form HEAs that are stronger and much more ductile. Industry could one day use stronger and more easily shaped HEAs in manufacturing. This would benefit consumers and industry, for example, by enabling the production of safer and more fuel-efficient vehicles, stronger products, and longer lasting machinery...

Department of Energy - Dec 18, 2023

Microelectronics

Third Meeting of the Semiconductor Informal Exchange Network

...The Organization for Economic Cooperation and Development's (OECD) Committee on Industry, Innovation, and Entrepreneurship (CIIE) and its Committee on Digital Economy Policy (CDEP) held the third meeting of the Semiconductor Informal Exchange Network virtually, with the U.S. and over 40 economies participating. Launched with support from the Department of State's International Technology Security and Innovation (ITSI) Fund, the Semiconductor Informal Exchange Network convenes officials involved

in industrial policymaking to exchange information on the current state of the semiconductor ecosystem and recent public and private industry initiatives in their respective countries. The Network also includes leading experts from private industry, semiconductor associations, and labor unions. The delegations to the Network's third meeting participated in exercises on semiconductor supply chain resilience to identify challenges and explore solutions...
U.S. Department of State - Dec 15, 2023

NIST Awards Nearly \$3 Million to Small Businesses to Advance Semiconductor Manufacturing, Drug Development and More

...The National Institute of Standards and Technology (NIST) has awarded nearly \$3 million to 15 small businesses in nine states under the Small Business Innovation Research (SBIR) Program. The funding will go to research and development and commercialization projects to support a variety of technology-based programs such as advances in semiconductors, drug development and flexible electronics manufacturing. The competitively selected proposals were submitted in response to a call for innovative products addressing specific technical needs in NIST areas of research including advanced communications, cybersecurity and privacy, health and biological systems measurements, advanced manufacturing and more. SBIR Phase I awardees will receive up to \$100,000 to establish the merit, feasibility and commercial potential of the proposed research and development. After completing their Phase I projects, awardees are eligible to apply for Phase II funding of up to \$400,000 to continue their efforts. Phase III relies on non-SBIR funds for technology commercialization...

National Institute of Standards and Technology - Dec 19, 2023

DOE funds new research to advance computer chip technology

...The Department of Energy (DOE) has selected a multidisciplinary team that includes Cornell to advance a superconducting approach to advanced computer chip technology. The team will explore ways to use new superconducting materials and structures in ultra-energy-efficient Superconducting Digital (SCD) electronics aimed at emerging artificial intelligence and quantum computing technologies. Their project, "Advanced superconducting integration process enabling sustainable hardware for AI and quantum computing," is one of 11 multidisciplinary peer-reviewed projects selected by DOE to receive a total of \$73 million in investments to accelerate new technologies from discovery to commercialization. The project is being funded through the Accelerate initiative through DOE's Offices of Advanced Scientific Computing Research and Nuclear Physics...
Cornell University - Dec 13, 2023

Wei Du Receives NSF Award to Research Development of Semiconductor Lasers

...Dr. Wei Du has been granted \$300,000 by the National Science Foundation (NSF EPSCoR). The grant will help Dr. Du's research in the development of semiconductor lasers and passive devices on a singular sapphire platform for integrated microwave photonics (IMWP). Du said, "The long-term goal is to cultivate photonic integrated circuits with high-performance attributes on sapphire platforms, offering advantages such as miniaturization, high speed and wide dynamic range. The unique properties of the sapphire platform, including high yield, volume manufacturing and cost-effectiveness, position it as a pivotal element in revolutionizing various industries, from data communications and sensing to automotive applications." Key advantages of the platform include its inability to conduct current, mitigating parasitics, a substantial optical index contrast leading to minimal optical power loss, a unique thermal expansion coefficient matching III-V materials and ensuring high operating reliability...

News - University of Arkansas - Dec 18, 2023

Climate Change / Green Energy & IT

ICYMI: White House Office of Science and Technology Policy Advances Biden-Harris Administration Climate Agenda During COP28

...The Biden-Harris Administration's Investing in America agenda has already led to more than \$350 billion in private investment commitments in electric vehicle and battery manufacturing, clean power plants, and clean energy supply chains that will help deliver a decarbonized future in the United States. After spearheading the most significant climate action in history and leading efforts to tackle the climate crisis head on with partners around the globe, the United States deployed a coalition of leaders to the 28th UN Climate Change Conference (COP28) to demonstrate how the Biden-Harris Administration is delivering on its commitment for the United States to lead the global response to combatting the climate crisis. OSTP and the National Security Council, in coordination with the Department of State, Department of Energy, and other federal agencies, launched an international strategy to help support the timely development, demonstration, and deployment of commercial fusion energy. OSTP announced enhanced information resources to help communities plan for, and act on, climate change. This included newly launched features in the Climate Mapping for Resilience and Adaptation portal that provides enhanced connectivity to U.S. federal funding opportunities and programs, including for nature-based solutions. New functions in the interactive Atlas of the Fifth National Climate Assessment provide the most up-to-date climate knowledge and allow users to visualize and use future climate data at decision-relevant scales...

The White House - Dec 15, 2023

3 Microreactor Experiments to Watch Starting in 2026

...DOE recently selected three companies to conduct activities that will support microreactor experiments. Westinghouse Electric Company is developing this transportable microreactor with support from DOE's Advanced Reactor Demonstration Program (ARDP) that will use advanced heat pipe technology and TRISO fuel to help expand access to clean energy to communities across the world. Westinghouse's eVinci microreactor passive cooling design uses hundreds of heat pipes made of a specialized iron, chromium, and aluminum alloy to draw heat away from the reactor's fuel. It doesn't need water for cooling, so it can go places other water-cooled reactors can't, and eliminates the risk of loss-of-coolant accidents. The microreactor will be able to generate up to five megawatts of electricity and operate for eight years or longer without refueling. Ultra Safe Nuclear is developing Pylon — a 1-megawatt, 10-ton-class microreactor that can generate electrical and thermal power on earth and in space. Pylon is a compact high-temperature gas-cooled reactor that uses helium to transport heat away from its robust TRISO nuclear fuel. The reactor's low mass and volume will make it easily transportable to remote locations or for off-planet bases, satellites, and electric propulsion engines. Radiant is developing Kaleidos, a portable 1.2-megawatt gas-cooled microreactor, as a potential replacement for diesel generators...

Department of Energy - Dec 13, 2023

Using a fiber optic cable to study Arctic seafloor permafrost

...The Arctic is remote, with often harsh conditions, and its climate is changing rapidly — warming four times faster than the rest of the Earth. Scientists at Sandia National Laboratories are using an existing fiber optic cable off Oliktok Point on the North Slope of Alaska to study the conditions of the Arctic seafloor up to 20 miles from shore. Their goal is to determine the seismic structure of miles of Arctic seafloor. Using an emerging technique, they can spot areas of the seafloor where sound travels faster than on the rest of the seafloor, typically because of more ice. The scientists also used the cable to determine temperatures over the stretch of seafloor and monitored temperature changes over seasons. These data, unlike any collected before, were inserted into a computer model to infer the distribution of submarine permafrost. To study permafrost on the Arctic seafloor, the researchers used pulses of laser light shot down a submarine telecommunications fiber optic cable buried off the coast of Alaska, running north from Oliktok Point. Tiny imperfections in the cable caused light to bounce back to a sensor system. By capturing this light at two wavelengths, or colors, and comparing them, the researchers could determine the temperature of the cable every yard. This is called distributed temperature sensing...

Sandia National Laboratories - Dec 15, 2023

Digital Health

Delivering on the Promise of AI to Improve Health Outcomes

...As President Biden has said, artificial intelligence (AI) holds tremendous promise and potential peril. The Administration is pulling every lever it has to advance responsible AI in health-related fields. Leading healthcare providers and payers have today announced voluntary commitments on the safe, secure, and trustworthy use and purchase and use of AI in healthcare. These voluntary commitments build on ongoing work by the Department of Health and Human Services (HHS), the AI Executive Order, and earlier commitments that the White House received from 15 leading AI companies to develop models responsibly. The commitments received today will serve to align industry action on AI around the "FAVES" principles—that AI should lead to healthcare outcomes that are Fair, Appropriate, Valid, Effective, and Safe. Under these principles, the companies commit to inform users whenever they receive content that is largely AI-generated and not reviewed or edited by people. As long as we can mitigate risks—AI carries enormous potential to benefit patients, doctors, and hospital staff. By one estimate, AI's broader adoption could help doctors and health care workers deliver higher-quality, more empathetic care to patients in communities across the country while cutting healthcare costs by hundreds of billions of dollars annually...

The White House - Dec 14, 2023

NIH/DOE supported research on deep neural networks that show promise as models of human hearing

...Computational models that mimic the structure and function of the human auditory system could help researchers design better hearing aids, cochlear implants, and brain-machine interfaces. A new study from MIT has found that modern computational models derived from machine learning are moving closer to this goal. In the largest study yet of deep neural networks that have been trained to perform auditory tasks, the MIT team showed that most of these models generate internal representations that share properties of representations seen in the human brain when people are listening to the same sounds. The researchers found that models trained on auditory input including background noise more closely mimic the activation patterns of the human auditory cortex. The researchers analyzed nine publicly available deep neural network models that had been trained to perform auditory tasks, and they also created 14 models of their own, based on two different architectures. The researchers found that models that had been trained on different tasks were better at replicating different aspects of audition. The research was funded by the National Institutes of Health and a Department of Energy Computational Science Graduate Fellowship...

MIT News - Dec 13, 2023

NIH funded brain imaging technique that allows researchers to achieve more with less data

...Magnetic resonance imaging (MRI) uses magnetic fields to create images of the body that allow doctors to diagnose injury or illness more accurately. Susceptibility tensor

imaging (STI), a specialized MRI technique, measures the magnetic susceptibility of different tissues in the brain by quantifying how they become magnetized when exposed to the MRI scanner's magnetic field. Johns Hopkins researchers described a new algorithm, DeepSTI, that takes data from multiple individual scans and provides a "super-scan" of the brain that includes precise brain tissue susceptibility information. Their method requires fewer images taken in fewer positions compared to traditional STI, making the process faster and more pleasant for patients. STI imaging excels in uncovering neurodegenerative processes that affect specific structures in the brain, such as the myelin sheath that surrounds axons and plays a central role in the transmission of information in the brain. DeepSTI uses machine learning with an approach called regularization that narrows down the number of possible solutions to focus on the most accurate ones. This project is funded by National Institutes of Health...
Hub - Johns Hopkins University - Dec 14, 2023

Other IT Related

FACT SHEET: Biden-Harris Administration Announces New Initiative to Advance the Frontiers of Benefit-Cost Analysis and Strengthen Government Decision Making

...The Biden-Harris Administration is releasing the first annual report from the Frontiers of Benefit-Cost Analysis initiative, a new, whole-of-government effort to improve policymaking by catalyzing collaboration between the Federal government and the research community. By strengthening the exchange of knowledge between Federal analysts and the research community, we can create better analytical tools, better understand and eliminate gaps in analysis, and, as a result, improve policymaking and returns to the American people. The Frontiers initiative is introducing new ways for the research community to engage with agencies. The Frontiers initiative and report complement the broad-based effort by the Biden-Harris Administration to modernize and improve regulatory review. The report identifies a range of effects where better analysis would meaningfully improve government decision making, including: wildfires and extreme weather; the effects of public benefit programs; evaluation of non-fatal health effects; the effects on ecosystem services; and the value of information and transparency...
The White House - Dec 14, 2023

Notice of Open to the Public Meetings of the Networking and Information Technology Research and Development (NITRD) Program

...The NITRD Program holds meetings that are open to the public to attend. The Joint Engineering Team (JET) and Middleware And Grid Interagency Coordination (MAGIC) Team provide an opportunity for the public to engage and participate in information sharing with Federal agencies. The JET and MAGIC Team report to the NITRD Large Scale Networking (LSN) Interagency Working Group (IWG). The Joint Engineering Team (JET), established in 1997, provides an opportunity for information sharing among Federal agencies and non-Federal participants who have an interest in high-performance research and engineering or research and education networking and networking to support science applications. The MAGIC Team, established in 2002, provides for information sharing among Federal agencies and non-Federal participants with interests and responsibility for middleware, Grid, and cloud projects. The JET and MAGIC Team meetings are hosted by the NITRD NCO with Zoom participation available for each meeting...
NITRD - Dec 15, 2023

A Scientific Christmas Tale

...'Twas the night before Christmas; NIST staff had gone home. Our director was left to reflect all alone. She thought about NIST and the breadth of its work, from AI to fire to even the quark. Our impact, she knew, was broad and widespread, and triumphs of measurement danced in her head. Examples abounded of great innovation spurred by NIST work for the good of the nation. When people pump gas or buy food at the store, NIST helps to ensure they get what they paid for. And when they're online and making transactions, NIST-backed encryption means safer interactions. There are frameworks that help with cyber hygiene. And something we call the million-pound deadweight machine. What else to her adoring eyes should appear, but a Lego watt balance and a weathering sphere. [Keep reading! ...]
National Institute of Standards and Technology - Dec 19, 2023

STEM / Workforce & IT

CSM Partners with Local Universities and the National Science Foundation to Make Students' Microelectronic DREEMs Come True

...The the College of Southern Maryland (CSM) is partnering with regional institutions and the National Science Foundation (NSF) to ensure the next diverse generation of electrical and computer engineering employees have the skills they need. CSM has joined the University of Maryland, College Park (UMD) and Montgomery College in the Democratizing Research and Experiential Education for Microelectronics (DREEM), a three-year, \$300,000 NSF grant to offer project-based, experiential learning to sophomore community college students interested in, well – 'tiny' electronics and electronic systems. The DREEM program is also set to equip participants with industry-ready skills and

facilitate a smoother transition to either a four-year degree program or a career in the microelectronics industry. The eight-month curriculum includes a design skills workshop, a research project under faculty from the participating institutions, and a summer internship with industry partners, focusing on emerging technologies like biosensor manufacturing, signal processing, and machine learning. The new funding is part of NSF's new \$18.8M Experiential Learning for Emerging and Novel Technologies (ExLENT) program for developing a strong workforce in key technologies...

College of Southern Maryland, La Plata - Dec 14, 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 - Sep 20, 2023

FEDERAL HIGH END COMPUTING INFORMATION PORTAL

...Networking and Information Technology Research and Development (NITRD) has a portal that provides information about U.S. Federal government high performance computing activities, including available computing resources; relevant publications; fellowship and training opportunities; and technology transfer, licensing, and industry engagement opportunities. The High End Computing (HEC) Interagency Working Group (IWG) agencies provide the information contained in this portal. HEC IWG agencies are involved in various Federal activities in the HEC area including R&D and providing infrastructure and application. Take a look at it!

Networking and Information Technology Research and Development - Dec 19, 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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