

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!

Upcoming Conferences / Workshops / Webinars

NITRD & NNCO Co-Host the CHIPS R&D Standards Summit Sept 26-27

...The CHIPS R&D Standards Summit will bring together thought leaders within the semiconductor industry and academia to shape the future of semiconductor and microelectronics standards and drive innovation. The summit will have sessions that facilitate consensus building on the top priority areas within industry, ways to accelerate strategic efforts across these priority areas, and cover concepts from incubators and accelerators as practiced in the technology sector that might be adapted for use in standards development and enabling a diverse, standards-capable workforce. Participants will explore ways to improve the agility and efficiency of the standards process, ensuring its continued growth in the rapidly evolving semiconductor industry. The scope of the Summit includes the full range of standards types, including best practices, de facto, and formal standards, while spanning the semiconductor and microelectronics sector, from materials and design to fabrication, packaging, and testing and certification. Co-hosted by the CHIPS Research and Development Office the Networking and Information Technology Research and Development Program (NITRD), the National Nanotechnology Coordination Office (NNCO), and others. The CHIPS Research and Development Office's Standards Summit will be held as an in-person and virtual event on September 26 and 27, 2023, from 8:30 a.m. to 5:30 p.m. Eastern Time...

National Institute of Standards and Technology - Aug 9, 2023

Federal Agency Funding Opportunities

Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (SCH)

...The purpose of this interagency program solicitation is to support the development of transformative high-risk, high-reward advances in computer and information science, engineering, mathematics, statistics, behavioral and/or cognitive research to address pressing questions in the biomedical and public health communities. Transformations hinge on scientific and engineering innovations by interdisciplinary teams that develop novel methods to intuitively and intelligently collect, sense, connect, analyze and interpret data from individuals, devices and systems to enable discovery and optimize health. Solutions to these complex biomedical or public health problems demand the formation of interdisciplinary teams. Projects will be funded for up to four years for a total of \$1,200,000 (\$300,000 per year). Deadline date for full proposal: November 9 2023...

National Science Foundation - Aug 10, 2023

Artificial Intelligence / Machine Learning

Department of Energy Announces \$16 Million for Research on Artificial Intelligence and Machine Learning (AI/ML) for Nuclear Physics Accelerators and Detectors

...The U.S. Department of Energy (DOE) announced \$16 million for fifteen projects that will implement artificial intelligence methods to accelerate scientific discovery in nuclear physics research. These projects will use AI/ML tools and methods for nuclear physics experiments, simulation, theory, and accelerator operation to expand and accelerate scientific reach. Projects will include the development of deep learning algorithms to identify a unique signal for studying physics of fundamental symmetry in extremely rare nuclear decays that if observed would demonstrate how our universe could have become dominated by matter rather than antimatter. Supported efforts also include AI-driven detector design for the Electron-Ion Collider (EIC) accelerator project...

Department of Energy - Aug 17, 2023

ARO/DOD/NSF sponsor a machine-learning system based on light that could yield more powerful, efficient large language models

...A MIT-led team reports a system that could lead to machine-learning programs several orders of magnitude more powerful than the one behind ChatGPT. The system they developed could also use several orders of magnitude less energy than the state-of-the-art supercomputers behind the machine-learning models of today. With the new system, the team reports a greater than 100-fold improvement in energy efficiency and a 25-fold improvement in compute density, a measure of the power of a system, over state-of-the-art digital computers for machine learning. The technique "opens an avenue to large-scale optoelectronic processors to accelerate machine-learning tasks from data centers to decentralized edge devices." In other words, cellphones and other small devices could become capable of running programs that can currently only be computed at large data centers. Using light rather than electrons to run DNN computations has the potential to break through the current bottlenecks. Computations using optics have the potential to use far less energy than those based on electronics. This work was sponsored by the U.S. Army Research Office, the U.S. National Defense Science and Engineering Graduate Fellowship Program, and the U.S. National Science Foundation...

MIT News - Aug 22, 2023

Robotics / Autonomous Vehicles

NSF funds human-robot interactions research

...The Living and Working With Robots project began in 2021 on the UT Austin campus and was recently expanded with a grant from the U.S. National Science Foundation. The objective is to look beyond the technology to study how robots integrate with society and how communities might react. Spot, which has roots in NSF-powered research in the mid-1990s by Boston Dynamics founder Marc Raibert, will make deliveries to university libraries and other facilities. While performing their jobs, the robots will be walking several miles per day and encountering potentially hundreds of pedestrians. A pair of robot dogs will work together, but they will not be "off leash." Observers will monitor them as they move around the campus, using virtual reality headsets. Collecting data on the community encounters and reactions to the robots is one of the core research goals...

National Science Foundation - Aug 21, 2023

NASA Armstrong Supports Wind Study

...A new NASA flight campaign studying wind aims to gather information to enhance air taxi safety. Researchers measured wind at altitudes below 2,000 feet using drones, sensors, weather balloons, and other technology during the Advanced Exploration of Reliable Operation at Low Altitudes: Meteorology, Simulation and Technology campaign. The goal of this campaign is to fill knowledge gaps to resolve wind and weather unknowns that could hinder Advanced Air Mobility (AAM) flights. The campaign's first flight was also the first mission for NASA Armstrong's Alta-X quad rotor, remotely piloted drone. The Alta-X flew to predetermined altitudes and hovered while mounted sensors obtained data on temperature, pressure, relative humidity, and three-dimensional wind data. To simplify use of the sensors on Alta-X, the ground station is the same one meteorologists use...

National Aeronautics and Space Administration - Aug 22, 2023

Quantum

Quantum-scale sensors to yield human-scale benefits with new backing from NSF

...A new breed of sensors may one day allow doctors to pinpoint infections inside individual cells, or geologists to find subterranean mineral deposits without lifting a shovel. Bringing such innovations to fruition is the goal of 18 research teams backed by a \$29 million investment from the U.S. National Science Foundation. The aim is to harness the infinitesimal — and sometimes counterintuitive — quantum-scale properties of nature to create new opportunities at the human scale. The 18 teams are comprised of researchers at universities across the U.S. who competed for and won funding from NSF's Quantum Sensing Challenges for Transformational Advances in Quantum Systems program. Each team will receive \$1 million-\$2 million over four years to conduct research that uses quantum phenomena to create sensors which can do things that would otherwise be impossible. Collectively, the teams will conduct a broad range of exploratory research activities, from measuring the height and density of mountains with an ultraprecise atomic clock to revealing the inner functions of living cells with quantum-entangled particles of light...

National Science Foundation - Aug 22, 2023

Voices from DARPA Episode 71: The Quantum Mechanic

...In popular culture, quantum is a descriptive term often added to various technical topics and projects to make them sound cool. But what is quantum mechanics, really, and how do we know whether quantum technologies will transform computing, communications, sensing, and a host of other fields? To find answers, join us for a new episode of the Voices from DARPA podcast series, where we hear from Dr. Joe Altepeter, a quantum physicist in DARPA's Defense Sciences Office (DSO). Altepeter helps clarify what for most of us is a complicated subject, providing a basic understanding of quantum and describing his two DARPA programs focused on quantum computing...

DARPA - Aug 18, 2023

NSF-funded researchers grow precise arrays of nanoLEDs

...Halide perovskites are a family of materials that have attracted attention for their superior optoelectronic properties and potential applications in devices such as high-performance solar cells, light-emitting diodes and lasers. NSF-funded researchers at MIT created a technique that allows individual halide perovskite nanocrystals to be grown on-site where needed with precise control over location, to within less than 50 nanometers. The size of the nanocrystals can also be precisely controlled through this technique, which is important because size affects their characteristics. Since the material is grown locally with the desired features, conventional lithographic patterning steps that could introduce damage are not needed...

National Science Foundation - Aug 17, 2023

Bigger and better quantum computers possible with new ion trap, dubbed the Enchilada Trap

...Sandia National Laboratories has produced its first lot of a new world-class ion trap, a central component for certain quantum computers. The new device, dubbed the Enchilada Trap, enables scientists to build more powerful machines to advance the experimental but potentially revolutionary field of quantum computing. An ion trap is a type of microchip that holds electrically charged atoms, or ions. With more trapped ions, or qubits, a quantum computer can run more complex algorithms. With sufficient control hardware, the Enchilada Trap could store and transport up to 200 qubits using a network of five trapping zones inspired by its predecessor, the Roadrunner Trap. Duke University and Sandia are research partners through the Quantum Systems Accelerator, one of five U.S. National Quantum Information Science Research Centers funded by the Department of Energy's Office of Science...

Sandia National Laboratories - Aug 17, 2023

Cybersecurity / Privacy

Post-Quantum Cryptography: CISA, NIST, and NSA Recommend How to Prepare Now

...The National Security Agency (NSA), Cybersecurity and Infrastructure Security Agency (CISA), and National Institute of Standards and Technology (NIST) warned that cyber actors could target our nation's most sensitive information now and leverage future quantum computing technology to break traditional non-quantum-resistant cryptographic algorithms. This could be particularly devastating to sensitive information with long-term secrecy requirements. The joint Cybersecurity Information Sheet (CSI), "Quantum-Readiness: Migration to Post-Quantum Cryptography," helps the Department of Defense, National Security System (NSS) owners, the Defense Industrial Base (DIB), and others proactively protect the confidentiality, integrity, and authenticity of sensitive information. The report contains recommendations for organizations to develop a quantum-readiness roadmap and prepare for future implementation of the post-quantum cryptographic (PQC) standards, which NIST expects to publish in 2024, including steps to effectively prioritize migration efforts...

National Security Agency/Central Security Service - Aug 21, 2023

CISA and Election Security Partners Hold Tabletop the Vote Election Security Exercise

...The Cybersecurity and Infrastructure Security Agency (CISA) hosted the nation's largest annual election security exercise this week in close coordination with the National Association of Secretaries of State (NASS) and the National Association of State Election Directors (NASED). The annual exercise gives participants the opportunity to share practices around cyber and physical incident planning, preparedness, identification, response, and recovery. In addition to CISA, federal participants included the U.S. Election Assistance Commission, Department of Homeland Security (DHS) Office of Intelligence and Analysis, the Department of Justice, the Federal Bureau of Investigation, the Office of the Director of National Intelligence, the National Security Agency, U.S. Cyber Command, the National Guard Bureau, and the U.S. Postal Inspection Service. State and local election officials participated virtually...

CISA - Aug 17, 2023

NSF-funded research hack reveals call security risk in smartphones

...Advanced smartphone features attract users who want more from their devices, but do these features create a security risk when making or receiving actual calls? A National Science Foundation funded team of academic researchers from Texas A&M University and four other institutions created malicious software, or malware, to answer that question. The researchers' malware, called EarSpy, used machine learning algorithms to filter a surprising amount of caller information from ear speaker vibration data recorded by an Android smartphone's own motion sensors—and did so without overcoming any safeguards or needing user permissions. Ear speakers' vibrations improve clarity when the phone is pressed against the user's ear. The speakers are not considered a good source for audible eavesdropping because of their size and how they function. Yet some manufacturers are replacing these small speakers with bigger ones to create the stereo sounds needed for videos and streaming. The researchers found that EarSpy could identify if the speaker was a repeat caller with 91.6% accuracy and determine the gender of the speaker with 98.6% accuracy. The malware also recognized spoken digits, specifically numbers from zero to nine, with 56% accuracy...

Texas A&M University College of Engineering - Aug 17, 2023

5G, Wireless Spectrum, Networking & Communications

Biden-Harris Administration Announces Nearly \$700 Million to Connect People in Remote and Rural Areas to High-Speed Internet

...U.S. Department of Agriculture announced nearly \$700 million in grants and loans to connect thousands of rural residents, farmers and business owners in 22 states and the Marshall Islands to reliable, affordable high-speed internet through the ReConnect Program, funded by President Biden's Bipartisan Infrastructure Law. This program is uniquely designed to fund the most difficult high-speed internet projects in the nation, which are the most rural, remote and unserved communities. The high-speed internet investments are part of the fourth funding round of the ReConnect Program. Many residents and businesses in rural areas would not have high-speed internet service without the ReConnect Program, as the program is a key part of the Administration's Internet for All initiative to connect everyone in America to high-speed internet by 2030...

USDA APHIS - Aug 21, 2023

NOAA, LLNL & academic institutions find stratospheric cooling - the concerning flip side of global warming

...Human-driven climate change has caused large and concerning temperature decreases in the stratosphere since at least 1986. The research confirms the effects of human causes on the overall climate: The temperature changes in the stratosphere were 12 to 15 times greater than what could have been caused by nature. Researchers from UCLA, NOAA/NESDIS Center for Satellite Applications and Research, Lawrence Livermore National Laboratory, and other academic institutions searched for human-caused climate change patterns in the middle and upper stratosphere. Previous research projected that as carbon dioxide trapped heat in the troposphere, which is the lowest level of the atmosphere, the stratosphere above it would cool down. Recent improvements in satellite data and computer model simulations have enabled researchers to search for that predicted cooling pattern in the middle and upper stratosphere, and to see how it affects efforts to identify human fingerprints on climate. The new research shows that from 1986 to 2022, the human-produced greenhouse gases that caused warming of the Earth's surface and the troposphere also led to a mean cooling of about 1.8 to 2.2 degrees Celsius in the middle and upper stratosphere globally. The findings are a direct rebuttal to disinformation efforts that have blamed climate change on natural factors... UCLA Newsroom - Aug 21, 2023

Digital Health

NSF-funded researchers develop a dissolving cardiac device that monitors and treats heart disease

...U.S. National Science Foundation-supported researchers at Northwestern and George Washington universities have developed a new device to monitor and treat heart disease and dysfunction in the days, weeks or months following such events. And, after the device is no longer needed, it harmlessly dissolves inside the body, bypassing the need for extraction. About the size of a postage stamp, the soft, flexible device uses an array of sensors and actuators to perform more complicated investigations than traditional devices, such as pacemakers, can accomplish. The transient electronic device can map electrical activity from numerous locations on the atria and then deliver electrical stimuli from many locations to stop atrial fibrillation as soon as it starts...

National Science Foundation - Aug 17, 2023

NIH and CDC study finds telehealth associated with increased likelihood of receiving evidence-based standard of care

...In 2021, an estimated 2.5 million people aged 18 years or older in the U.S. had opioid use disorder in the past year, yet only 1 in 5 of them (22%) received medications to treat it. Researchers at the National Institute of Health and the Centers for Disease Control and Prevention found that those receiving substance use treatment via telehealth were approximately 38 times more likely to receive medications for opioid use disorder compared to those who did not receive treatment via telehealth. This study adds to the growing evidence that telehealth services are an important strategy that could help us bridge this gap, supporting the delivery of safe, effective, and lifesaving care for people with opioid use disorde...

National Institutes of Health - Aug 18, 2023

Advancing Genomic Data-Sharing for Research and Patient Care: Sync for Genes Project Delivers Final Report and Toolkit

...Genomic variations can affect a patient's risk for cancer, response to medications, and numerous other vital health outcomes. In fact, nine of the ten leading causes of death in the U.S. are influenced by genomic factors. The need for systems that help clinicians integrate genomics into care decisions has grown in importance. Recognizing this need, in 2017 ONC launched Sync for Genes, a project that sought to advance standards and tools to effectively integrate genomic information into clinical workflows. In May 2023, the project delivered its final report, including a robust toolkit that highlights resources to help advance genomic data-sharing for research and patient care. Here are some of the key takeaways from Sync for Genes project...

Health IT - Aug 21, 2023

NIH establishes Maternal Health Research Centers of Excellence

...The National Institutes of Health has awarded \$24 million in first-year funding to establish Maternal Health Research Centers of Excellence. Part of NIH's Implementing a Maternal Health and Pregnancy Outcomes Vision for Everyone (IMPROVE) initiative, the centers will develop and evaluate innovative approaches to reduce pregnancy-related complications and deaths and promote maternal health equity. The grants are expected to last seven years and total an estimated \$168 million. The centers of excellence include 10 research centers, a data innovation and coordinating hub and an implementation science hub. Together, these institutions will work to design and implement research projects to address the biological, behavioral, environmental, sociocultural and structural factors that affect pregnancy-related complications and deaths...

National Institutes of Health - Aug 17, 2023

NIH-supported MIT researchers combine deep learning and physics to fix motion-corrupted MRI scans

...Compared to other imaging modalities like X-rays or CT scans, MRI scans provide high-quality soft tissue contrast. Unfortunately, MRI is highly sensitive to motion, with even

the smallest of movements resulting in image artifacts. Small movements can have dramatic effects on the resulting image, where motion in MRI often results in artifacts that can corrupt the whole image. Researchers at MIT may have developed a deep learning model capable of motion correction in brain MRI. The method computationally constructs a motion-free image from motion-corrupted data without changing anything about the scanning procedure by combining physics-based modeling and deep learning to get the best of both worlds. ... Research was supported by NIH...

MIT News - Aug 17, 2023

Other IT Related

EXECUTIVE OFFICE OF THE PRESIDENT:: Multi-Agency Research and Development Priorities for the FY 2025 Budget

...This memorandum outlines the Administration's multi-agency R&D priorities for formulating fiscal year (FY) 2025 Budget submissions to the Office of Management and Budget (OMB). These priorities should be addressed within the FY 2025 Budget guidance levels provided by OMB. Clear choices will be required given constrained discretionary funding caps. Agency budget submissions should include an addendum that details how each request level addresses these priorities. Agencies engaged in complementary activities are expected to consult with one another during the budget formulation process to maximize impact by coordinating resources and avoiding unnecessary duplication. * Advance trustworthy artificial intelligence (AI) technology that protects people's rights and safety, and harness it to accelerate the Nation's progress. * Lead the world in maintaining global security and stability in the face of immense geopolitical changes and evolving risks. * Step up to the global challenge of meeting the climate crisis by reimagining our infrastructures, renewing our relationship with nature, and securing environmental justice. * Achieve better health outcomes for every person. * Reduce barriers and inequities. * Bolster the R&D and industrial innovation that will build the Nation's future economic competitiveness from the bottom up and middle out. * Strengthen, advance, and use America's unparalleled research to achieve our Nation's great aspirations...

The White House - Aug 17, 2023

STEM / Workforce & IT

U.S. Department of Energy and U.S. National Science Foundation announce first cohort in the NSF INTERN program to support growth of the geothermal energy workforce

...The U.S. Department of Energy and the U.S. National Science Foundation announced the first cohort of geothermal interns in the NSF INTERN program. A diverse group of 14 students will work with geothermal companies, national laboratories or state agencies on projects that advance geothermal technologies. Work conducted under this new internship program will support the goals of DOE's Enhanced Geothermal ShotTM, which aims to bring enhanced geothermal systems to Americans nationwide. The NSF INTERN program offers invaluable on-the-job training and professional development for science and engineering graduate students, and, through this partnership with DOE. The students selected for this first Geothermal INTERN cohort represent 11 colleges and universities nationwide, including two Hispanic-serving institutions...

National Science Foundation - Aug 21, 2023

DOE Announces \$70 Million in Research Training Opportunities for Students and Faculty from Historically Underrepresented Institutions

...The U.S. Department of Energy (DOE) today announced \$70 million in funding to support research by historically underrepresented groups in science, technology, engineering, and mathematics (STEM) and to diversify leadership in the physical sciences. The funding, through DOE's Reaching a New Energy Sciences Workforce (RENEW) initiative, will support internships, training programs, and mentor opportunities at 65 different institutions, including 40 higher-learning institutions that serve minority populations. The RENEW initiative leverages DOE's unique National Laboratories, user facilities, and other research infrastructure to provide training opportunities for undergraduate and graduate students, postdoctoral researchers, and faculty at academic institutions currently underrepresented in the U.S. science and technology ecosystem... Department of Energy - Aug 18, 2023

Department of Defense-Sponsored Cyber Internship Offers Knowledge, Inspiration for College Students

...The Office of the Under Secretary of Defense for Research and Engineering-sponsored Cyber-Spectrum internship program, MAVEN, recently celebrated its second internship graduation. Part of the Virtual Cyber and Electromagnetic Spectrum Research and Employ (VICEROY) Program, MAVEN is an 8-week course that takes students through DoD mission-relevant research projects in cyber and electromagnetic spectrum operations, including cyber vulnerability assessment of the mission system, culminating with submissions of Institute of Electrical and Electronics Engineers conference-style papers on their research projects. This year's program included 45 undergraduate students from six VICEROY Cyber Institutes with support from 27 subject-matter experts across a variety of DoD Service and component organizations. VICEROY aims to become the

Department's leading mission-focused experiential cyber-spectrum operations workforce development program by preparing students to be job-ready leaders in military, civilian, and industrial base sectors...

U.S. Department of Defense - Aug 17, 2023

NERSC Summer Interns Feel the Thrill of HPC

...For a handful of the summer interns at the National Energy Research Scientific Computing Center (NERSC) at Lawrence Berkeley National Laboratory (Berkeley Lab), the story of their internship didn't begin as school was letting out. Through the STEM Core program at Laney College in Oakland, this group of interns has been working hard since last fall, preparing for summer work at employers like the Stanford Linear Accelerator, the Port of Oakland, and NERSC. Through a collaboration between NERSC Operations Technology (OTG) group lead Elizabeth Bautista and a group of Laney faculty, the STEM Core program connects Laney students to coursework, academic support, mentorship, and ultimately career opportunities in STEM, IT, and HPC. Aimed at students who may not have much exposure to the field, the program begins with a preselected first-year course load of math and science and ends its first year with an internship. The goal is to help students gain marketable skills and experience in the short term while also preparing them for long-term success – and providing an expanded pipeline for organizations looking for HPC and IT talent...

NERSC - Aug 22, 2023

NSF-funded UCR microchip manufacturing fellowship's decade of success

...UCR chemistry professor Ludwig Bartels co-founded the Materials Connection Research Experience for Undergraduates, or MacREU program. To date, 190 students have completed the nine-week summer program, which receives \$130,000 annually from the National Science Foundation. Essential courses in the program teach the science and engineering of semiconductors. Knowing how to deposit, modify and characterize layers of thin films is fundamental to making these devices, and that's a big part of what is taught. The participants' research opportunities span electrical, mechanical, and chemical engineering, as well as bioengineering, physics and chemistry. Guest speakers have included a previous MacREU fellow who is now a manager at Intel. Another MacREU graduate now supports startups from an incubator in San Diego. She teaches current students how to start a high-tech business, what's it like to work in a startup, and how to get funded from government Small Business Innovation Research grants. MacREU cultivates relationships with students at local community colleges in order to create a diverse cohort of participants. The 2023 group is predominantly local, female, and Latina... University of California, Riverside - Aug 17, 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 - Jun 21, 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; HEC relevant publications; fellowship and training opportunities; and technology transfer, licensing, and industry engagement opportunities. The HEC IWG (Interagency Working Group on High End Computing) 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 - Jun 14, 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

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