ARTIFICIAL INTELLIGENCE / MACHINE LEARNING | ROBOTICS / AUTONOMOUS VEHICLES | QUANTUM | CYBERSECURITY / PRIVACY | 5G, WIRELESS SPECTRUM, NETWORKING & COMMUNICATIONS | MICROELECTRONICS | CLIMATE CHANGE / GREEN ENERGY & IT | DIGITAL HEALTH | OTHER IT RELATED | STEM / WORKFORCE & IT | STEM / WORKFORCE RESOURCES & OPPORTUNITIES | NITRD NEWS | UPCOMING CONFERENCES / WORKSHOPS / WEBINARS

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!

Artificial Intelligence / Machine Learning

NIST Risk Management Framework Aims to Improve Trustworthiness of Artificial Intelligence

...The U.S. Department of Commerce's National Institute of Standards and Technology (NIST) has released its Artificial Intelligence Risk Management Framework (AI RMF 1.0), a guidance document for voluntary use by organizations designing, developing, deploying or using AI systems to help manage the many risks of AI technologies. It is intended to adapt to the AI landscape as technologies continue to develop, and to be used by organizations in varying degrees and capacities so that society can benefit from AI technologies while also being protected from its potential harms. The AI RMF provides a flexible, structured and measurable process that will enable organizations to address AI risks. Following this process for managing AI risks can maximize the benefits of AI technologies while reducing the likelihood of negative impacts to individuals, groups, communities, organizations and society.

The framework is part of NIST's larger effort to cultivate trust in AI technologies. The AI RMF is divided into two parts. The first part discusses how organizations can frame the risks related to AI and outlines the characteristics of trustworthy AI systems. The second part, the core of the framework, describes four specific functions — govern, map, measure and manage — to help organizations address the risks of AI systems in practice. In addition, NIST plans to launch a Trustworthy and Responsible AI Resource Center to help organizations put the AI RMF 1.0 into practice...
National Institute of Standards and Technology - Jan 26, 2023

NSF-led National Artificial Intelligence Research Resource Task Force Releases Final Report

...The National Artificial Intelligence Research Resource (NAIRR) Task Force released its final report, a roadmap for standing up a national research infrastructure that would democratize access to the resources essential to artificial intelligence (AI) research and development. "Implementing the recommendations of this report will enable the development of AI for years to come," said NAIRR Task Force co-chair and NSF Office Director of the Office of Advanced Cyberinfrastructure Manish Parashar. "NSF is proud to support this task force and help lead our Nation's AI-related research and development towards a more equitable future." ...
National Science Foundation - Jan 24, 2023

First Commercial Company Leverages DAF-MIT Maneuver ID Challenge to Advance AI

...The Department of the Air Force-MIT Artificial Intelligence Accelerator (AIA) announced that Crowdbotics, a Small Business Innovation Research (SBIR) company, is the first company to successfully leverage the Maneuver Identification Challenge to advance the field of AI. AI challenges are critical for advancing AI into new areas. The DAF-MIT AIA Maneuver ID Challenge is an open challenge designed to enable AI coaching and automatic maneuver grading in pilot training. The challenge utilized a recently released dataset of U.S. Air Force pilots and trainees using virtual reality flight simulators at Air Education and Training Command's Pilot Training Next (PTN)...
Air Force Link - Jan 18, 2023

Northeastern professor headed to White House, will oversee implementation of AI 'bill of rights'

...Northeastern University professor Alan Mislove is headed to the White House as he recently accepted a temporary position as assistant director for data and democracy in the White House's Office of Science and Technology Policy. Mislove will focus on issues affecting automated systems and practices related to technology, data and privacy. The appointment in the federal office is for one year. Mislove's research interests have focused primarily on algorithmic auditing—the practice of, broadly speaking, "assessing, mitigating, and assuring an algorithm's legality, ethics and safety." He's previously alluded to the inherent difficulty of creating algorithms with an eye toward fairness—something articulated by the Biden White House in recent months. A response to the complicated, evolving technology-privacy landscape, the White House unveiled a policy framework, called the AI "bill of rights," that provides a set of principles and best practices to help make algorithmic systems safe and effective, defend user privacy and provide safeguards against algorithmic discrimination. Released to the public in October, the White House's AI bill of rights is one of the first documents of its kind to address AI-based tools. In it, five basic principles are outlined: safe and effective systems, algorithmic discrimination protections, data privacy, notice and explanation and human alternatives, consideration, and fallback...
Northeastern News - Jan 19, 2023

UAB secures National Science Foundation grant to help sustain artificial intelligence

...The National Science Foundation has awarded the University of Alabama at Birmingham a more than $250,000 RII Track-4 grant that will allow researchers to look into neuromorphic computing to help sustain artificial intelligence. Xue's research hopes to expand what people know about neuromorphic computing so it can keep energy limitations from hindering AI usage...
UAB - Jan 23, 2023

Robotics / Autonomous Vehicles

NSF-funded wearable sensor can help unlock the potential of exosuits in real-world environments

...Wearing an exosuit could help people recover from an injury or give extra help for carrying heavy loads. Creating the desired effect on an individual wearer was challenging — there wasn't a good way to directly measure the changes in loading on muscle and tendon tissue that occur when a person uses an exosuit. The research team has met that challenge, employing a unique wearable sensor called a shear wave tensiometer. The simple, noninvasive device is easily mounted on the skin over a tendon. The tensiometer enables researchers to directly assess tendon force by looking at how the vibrational characteristics of the tendon change when it undergoes loading, as it does during movement. The study was supported by two grants from the U.S. National Science Foundation Graduate Research Fellowship Program and two grants from NSF's Disability and Rehabilitation Engineering program...

National Science Foundation - Jan 23, 2023

UMD Receives ARL Funding Renewal Focused on AI and Autonomy

...The University of Maryland recently received the third-year installment in a five-year cooperative agreement between the U.S. Army Research Laboratory (ARL) and multiple academic institutions. The AI and Autonomy for Multi-Agent Systems (ArtIAMIS) agreement incentivizes research and innovation focused on robotics, systems, and smart devices that work intelligently in cooperation with each other and human actors across multiple domains. Dinesh Manocha's research group has developed several new technologies and integrated them with the ARL Autonomy Stack, which is a program to develop a prototype “brain” for unmanned vehicles. Other topics being explored by UMD researchers and ARL scientists include AI and machine learning for situational awareness; individual and collective behavioral and physiological health assessments; explainable AI for the battlefield use; perception-based interactions; forensics for human-machine teaming; metareasoning to improve team performance; and human-machine teaming and effective aggregation of information in complex systems...

UMIACS - Jan 23, 2023

US ARO/NASA-supported research found new method to determine forces to push, wiggle, or drill an object through sand

...Predicting what it takes to push through sand, gravel, or other soft media can help engineers drive a rover over Martian soil, anchor a ship in rough seas, and walk a robot through sand and mud. But modeling the forces involved in such processes is a huge computational challenge that often takes days to weeks to solve. Engineers at MIT and Georgia Tech have found a new method that quickly maps the forces it would take to push, wiggle, and drill an object through granular material in real-time. The method can apply to objects and grains of any size and shape, and does not require complex computational tools. Resistive Force Theory (RFT), works by considering an object’s surface as a collection of small plates. As an object moves through a fluid, each plate experiences a force, and RFT claims that the force on each plate depends only on its local orientation and movement. The researchers adapted RFT to 3D by adding a plate’s twist angle, measuring how plate orientation changes as the entire object is rotated. When they incorporated this extra angle, in addition to a plate’s tilt and direction of motion, the team had enough information to define the force acting on the plate as it moves through a material in 3D. ... This research was supported, in part, by the Army Research Office, the U.S. Army DEVCOM Ground Vehicle Systems Center, and NASA.

MIT News - Jan 19, 2023

DARPA/NSF-funded click beetle-inspired robots jump using elastic energy

...Researchers, funded by Defense Advanced Research Projects Agency and the National Science Foundation, have made a significant leap forward in developing insect-sized jumping robots. A series of click beetle-sized robots are small enough to fit into tight spaces, powerful enough to maneuver over obstacles, and fast enough to match an insect’s rapid escape time. Tawfick and his team used tiny coiled actuators – analogous to animal muscles – that pull on a beam-shaped mechanism, causing it to slowly buckle and store elastic energy until it is spontaneously released and amplified, propelling the robots upward. The team envisions these robots accessing tight spaces to help perform maintenance on large machines like turbines and jet engines, for example, by taking pictures to identify problems...

News Bureau - Jan 23, 2023

Quantum

NSF/DARPA/ARO/DOE-supported research shows can determine accuracy of quantum simulator that probe the strange behavior of atomic-scale systems

...Physicists from MIT and Caltech report a new quantum phenomenon - a certain randomness in the quantum fluctuations of atoms which exhibits a universal, predictable pattern. The team confirmed that certain random fluctuations can indeed follow a predictable, statistical pattern. The researchers have used this quantum randomness as a tool to characterize the fidelity of a quantum analog simulator. They showed through theory and experiments that they could determine the accuracy of a quantum simulator by analyzing its random fluctuations. The team developed a new benchmarking protocol that can be applied to existing quantum analog simulators to gauge their fidelity based on their pattern of quantum fluctuations. The protocol could help to speed the development of new exotic materials and quantum computing systems. ... This research was funded, in part, by the U.S. National Science Foundation, the Defense Advanced Research Projects Agency, the Army Research Office, and the Department of Energy.
MIT News - Jan 18, 2023

Cybersecurity / Privacy

Maryland First in the Air National Guard to Certify a Cyber Protection Team on Live Network

...Members of the Maryland Air National Guard's 275th Cyberspace Operations Squadron recently became the first cyber operators in the Air National Guard to certify a Cyber Protection Team using their weapon system on a live base network during real-world missions. As a part of the U.S. military's Cyber Mission Force, CPTs are defensive in nature. These teams were created to hunt existing network threats and defend against attacks by finding and mitigating potential vulnerabilities in critical infrastructure, systems, or platforms. "We operate the cyber vulnerability assessment hunter weapon system," said U.S. Air Force Capt. Ashley Oates, 275th Cyberspace Operations Squadron flight commander and the mission element lead for the certification event. According to Oates, during this certification event, her Airmen were able to see both "human-to-human information flow" and any "machine interaction" occurring on the network, which helped her team develop better tactics, techniques, and procedures...
Air Force Link - Jan 20, 2023

AFRL infrastructure projects boost readiness, security

...A series of projects at the Air Force Research Laboratory (AFRL) are modernizing infrastructure and strengthening science and technology capabilities for national defense. These projects include new rocket fabrication machines in California, increased security measures in New York, a new radiation tolerance facility in New Mexico, facility renovations in Ohio and a new munitions facility in Florida. At AFRL's Information Directorate in Rome, New York, the Army Corps of Engineers led military construction for the directorate's complex modernizing security infrastructure. The Information Directorate is the DAF's and the nation's premier research organization for command, control, communications, computers and intelligence and cyber technologies. AFRL leaders at Kirtland Air Force Base in New Mexico, broke ground for the new Facility for Radiation Tolerance Research on Electronics for Space and Strategic Systems, a 6,200-square-foot, $4.5 million facility. The new facility enables researchers to investigate and develop solutions for trusted, high-performance electronic components...
Air Force Link - Jan 20, 2023

Is your digital footprint safe? Reservists learned more about the safety of their online data

...Presenters from the 426th NWS explained the importance of the Digital Force Protection program and educated Airmen on the vulnerabilities inherent in digital information. “Good digital hygiene requires us to think about our digital footprint,” said Col. Matthew M. Fritz, commander of the 419th FW. With nearly 85% of the U.S. population logging onto the internet daily, Airmen must become hardened against digital threats to preserve force readiness. Navigating new technologies requires users to develop a deeper understanding of how applications work...
10th Air Force - Jan 24, 2023

Identifying a Vulnerability in Critical Spacecraft Networks

...When NASA docks two spacecraft in orbit, timing is critical. Their movements must be precisely synchronized to prevent catastrophic failure, which means the computer networks that control their thrusters must not be disrupted for even a split second. Linh Thi Xuan Phan at Penn Engineering’s department of computer and information science, has collaborated with a team of researchers at the University of Michigan and NASA to identify a critical security flaw in the networking approach used in these and other safety-critical systems. Known as Time-Triggered Ethernet, or TTE, this approach has been used for more than a decade in aerospace, aviation and heavy industry applications. Time-Triggered Ethernet guarantees that the most critical signals get priority, removing the need for separate network hardware dedicated to them. Having multiple types of signals on the same physical network via TTE is especially important for NASA, which must account for every ounce of weight on a spacecraft. However, the research team was the first to show that TTE’s safety guarantees could be compromised via electromagnetic interference, disrupting the timing of the high-priority signals enough to cause critical failure on a simulated docking procedure...
The University of Pennsylvania Almanac - Jan 24, 2023

5G, Wireless Spectrum, Networking & Communications

NIST Joins Alliance to Promote Open Wireless Technologies and Supply Chains

...The U.S. Department of Commerce’s National Institute of Standards and Technology has joined the O-RAN Alliance, a nonprofit organization made up of mobile network operators, vendors, and academic and government institutions working to make radio access network (RAN) technologies more open, intelligent and interoperable. RAN technologies allow devices to communicate using radio waves and are used in cell towers, mobile phones and internet-connected devices. The O-RAN Alliance develops hardware and software specifications that allow manufacturers and network operators to mix and match products from different vendors. This reduces reliance on single vendors and makes it easier for new businesses and products to enter the marketplace. 5G, or fifth-generation wireless technology, provides the high speed and responsiveness needed for emerging, data-intensive applications such as autonomous vehicles, telemedicine and the Internet of Things...
National Institute of Standards and Technology - Jan 24, 2023

NOAA satellites helped save 397 lives in 2022

...NOAA’s polar-orbiting and geostationary satellites are part of the global Search and Rescue Satellite Aided Tracking system, or COSPAS-SARSAT, which uses a network of U.S. and international spacecraft to detect and locate distress signals sent from emergency beacons from aircraft, boats and handheld Personal Locator Beacons (PLBs) anywhere in the world. Since its start in 1982, COSPAS-SARSAT has been credited with supporting more than 50,000 rescues worldwide, including more than 10,100 in the U.S. and its surrounding waters. When a NOAA satellite pinpoints the location of a distress signal in the U.S., the information is relayed to the SARSAT Mission Control Center at NOAA’s Satellite Operations Facility. From there, the information is sent quickly to Rescue Coordination Centers, operated either by the U.S. Air Force for land rescues, or the U.S. Coast Guard for water rescues. NOAA also supports rescues globally by relaying distress signal information to international SARSAT partners...
National Oceanic and Atmospheric Administration - Jan 23, 2023

Data in Demand: How the U.S. Navy’s Bandwidth Can Boost Your Data Speed

...It’s hard to imagine (or remember) a world without Wi-Fi. Wireless communications — cellular, Wi-Fi, Bluetooth — all of which require a radio-frequency spectrum to function. The radio-frequency spectrum is a spectrum of invisible light. Think of the spectrum as being like an invisible highway where our wireless communication travels. There is a limited amount of space. The radio-frequency spectrum is divided into bands of different frequencies. Why can’t we just make more radio-frequency lanes? We don’t have more radio-frequency spectrum to develop. It’s a natural resource, and we have to share it. Since the need for wireless communication keeps growing, we need to make sure we can continue to share this spectrum. If the priority users like the Navy have a problem, or if commercial users can’t use it, then sharing this spectrum won’t work. That requires unbiased, reliable and accurate data. That’s where the National Advanced Spectrum and Communications Test Network (NASCTN) comes in. NASCTN is a multi-agency partnership, hosted at NIST. It provides testing, modeling and analysis of spectrum-sharing technologies. The NASCTN team includes staff from NIST, the Department of Defense, NASA, the National Oceanic and Atmospheric Administration, the National Science Foundation, and the National Telecommunications and Information Administration...
National Institute of Standards and Technology - Jan 25, 2023

NASA Measures Underground Water Flowing From Sierra to Central Valley

...The Central Valley encompasses only 1% of U.S. farmland but produces 40% of the nation’s table fruits, vegetables, and nuts annually. That’s only possible because of intensive groundwater pumping for irrigation and river and stream flow captured in reservoirs. Scientists found that a previously unmeasured source – water percolating through soil and fractured rock below California’s Sierra Nevada mountains – delivers an average of 4 million acre feet (5 cubic kilometers) of water to the state’s Central Valley each year. This underground source accounts for about 10% of all the water that enters this highly productive farmland each year from every source. NASA's Donald Argus estimated that the Central Valley lost about 1.8 million acre feet (2.2 cubic kilometers) of groundwater per year between 2006 to 2021. Satellites of the Gravity Recovery and Climate Experiment (GRACE) and GRACE Follow-On (GRACE FO) missions can accurately measure how much that volume changes from month to month. Argus and colleagues have been working for several years to combine such GRACE data with observations from a GPS research network that measures how land surfaces rise and subside...
National Aeronautics and Space Administration - Jan 23, 2023

DARPA/AFOSR-funded research shows how a 3 cm glass sphere could help scientists understand space weather

...Solar flares and other types of space weather can wreak havoc with spaceflight and with telecommunications and other types of satellites orbiting the Earth. New DARPA/AFOSR-funded research could be a big step toward safeguarding humans (and equipment) during space expeditions, and to ensuring the proper functioning of satellites. UCLA researchers used microwaves to heat sulfur gas to 5,000 degrees Fahrenheit inside the glass sphere. The sound waves inside the ball acted like gravity, constraining movement of the hot, weakly ionized gas, known as plasma, into patterns that resemble the currents of plasma in stars. The ability to control and manipulate plasma in ways that mirror solar and planetary convection will help researchers understand and predict how solar weather affects spacecraft and satellite communications systems. ... The study was funded in part by the Defense Department’s Defense Advanced Research Projects Agency, or DARPA, and by the Air Force Office of Scientific Research.
UCLA Newsroom - Jan 23, 2023

Microelectronics

NSF announces nearly $50 million partnership with Ericsson, IBM, Intel, and Samsung to support the future of semiconductor design and manufacturing

...The U.S. National Science Foundation today announced a cross-sector partnership with Ericsson, IBM, Intel, and Samsung to support the design of the next generation of semiconductors as part of its Future of Semiconductors (FuSe) initiative. Through this partnership activity, NSF will team with Ericsson, IBM, Intel, and Samsung to invest in projects that cultivate a broad coalition of science and engineering researchers to pursue holistic, “co-design” approaches. By intentionally supporting researchers who are integrating materials, devices, architectures, systems, and applications, new semiconductor technology is designed and developed in an integrated way. Co-design approaches simultaneously consider the device/system performance, manufacturability, recyclability, and impact on the environment...
National Science Foundation - Jan 26, 2023

NSF/NIH funds project: Microelectronics give researchers a remote control for biological robots

...The hybrid “eBiobots” are the first to combine soft materials, living muscle and microelectronics. Integrating microelectronics allows the merger of the biological world and the electronics world, both with many advantages of their own, to now produce these electronic biobots and machines that could be useful for many medical, sensing and environmental applications in the future. To give the biobots the freedom of movement required for practical applications, the researchers set out to eliminate bulky batteries and tethering wires. The eBiobots use a receiver coil to harvest power and provide a regulated output voltage to power the micro-LEDs. The researchers used computational modeling to optimize the eBiobot design and component integration for robustness, speed and maneuverability. The design allows for possible future integration of additional microelectronics, such as chemical and biological sensors, or 3D-printed scaffold parts for functions like pushing or transporting things that the biobots encounter. The integration of electronic sensors or biological neurons would allow the eBiobots to sense and respond to toxins in the environment, biomarkers for disease and more. The National Science Foundation and the National Institutes of Health supported this work...

News Bureau - Jan 18, 2023

Two technical breakthroughs make high-quality 2D materials possible

...Researchers have been looking to replace silicon in electronics with materials that provide a higher performance and lower power consumption while also having scalability. An international team is addressing that need by developing a promising process to develop high-quality 2D materials that could power next-generation electronics. The work is the first to report that their method to grow semiconductor materials, known as transition metal dichalcogenides (TMD), would make devices faster and use less power. They designed a geometric-confined structure that facilitates kinetic control of 2D materials so that all grand challenges in high-quality 2D material growth are resolved. ... This research was supported by DARPA...

The Source - Washington University in St. Louis - Jan 18, 2023

Climate Change / Green Energy & IT

Biden-Harris Administration Celebrates Groundbreaking of New Transmission Line, Delivering Clean, Reliable, Affordable Energy to Millions of Americans

...Through robust engagement with states, cities and Tribes, the Biden-Harris administration is committed to diversifying the nation’s renewable energy portfolio while at the same time combatting climate change and investing in communities. They celebrated the groundbreaking of Ten West Link, a new 500kV high voltage transmission line that will connect Southern California and Central Arizona and deliver clean, reliable, affordable electricity. The Ten West Link route traverses a region with some of the highest potential for utility-scale solar photovoltaic energy development in the nation. The project will provide critical transmission infrastructure to support the development of future utility-scale solar energy resources and will boost the reliability of the bulk power system for millions of customers in Central Arizona and Southern California. The project will have a conductor capacity to transmit 3,200 megawatts (MW) of solar capacity and provide interconnection capability for new energy projects located in the region. It is expected to be operational by the end of 2023. The project will have a conductor capacity to transmit 3,200 megawatts (MW) of solar capacity and provide interconnection capability for new energy projects located in the region. It is expected to be operational by the end of 2023. Additionally, the BLM is currently processing 64 utility-scale onshore clean energy projects proposed on public lands in the western United States. This includes solar, wind and geothermal projects, as well as interconnected gen-tie lines that are vital to clean energy projects proposed on non-federal land. These projects have the combined potential to add over 41,000 megawatts of renewable energy to the western electric grid...

U.S. Department of the Interior - Jan 20, 2023

Clean Energy to Communities Program Launches: Stakeholder-Informed Program Meets Communities Where They Are

...Local governments glimpsed a world of possibilities when the National Renewable Energy Laboratory (NREL) released its Los Angeles 100% Renewable Energy Study (LA100) in 2021. It revealed possible pathways to achieve the city’s goal of 100% renewable energy by 2045 and the implications of these pathways for the people who live and work in LA. Across the United States, communities large and small, urban and rural—or somewhere in between—need similar support: tailored solutions to help them achieve their clean energy

goals at a rapid pace. What emerged is a cross-sectoral program—spanning power, mobility, and buildings technologies—that lets local leaders see a virtual model of their community shift over time as it interacts with clean energy infrastructure and devices. This C2C program feature is made possible by NREL's Advanced Research on Integrated Energy Systems (ARIES)—the nation's most advanced research platform for clean energy systems integration research and validation. ARIES simulates and visualizes how different clean energy technologies will impact a community's entire energy system over a period of time...
National Renewable Energy Laboratory - Jan 18, 2023

FSU climate scientists receive Department of Energy funding to study greenhouse gas emissions from peatlands

...A team of researchers from Florida State University, Georgia Institute of Technology, Oak Ridge National Lab and the University of Arizona received a $3.2 million grant from the U.S. Department of Energy to investigate the status of carbon stored in peatlands, environments that are at risk of carbon release due to climate change. The funding is part of a wider $178 million effort to advance breakthroughs in sustainable technology to improve industries such as public health and food production and to address climate change. The FSU team aims to uncover the relationship between carbon dioxide and methane production in peatlands that can be directly applied to climate models to better predict future warming. The three-year grant will provide support as the researchers delve deeper into the mechanistic controls of the below-ground carbon cycle and greenhouse gas production from peatlands by monitoring environmental changes at the Spruce and Peatland Responses Under Changing Environments, or SPRUCE, research facility in northern Minnesota...
Florida State University News - Jan 19, 2023

Digital Health

NIH-Funded Team Takes An Unprecedented Look at Colorectal Cancer Using Large-Scale Spatial Maps and Machine Learning

...A National Institutes of Health-funded team at Harvard Medical School has combined histology with cutting-edge single-cell imaging technologies to create large-scale 2D and 3D spatial maps of colorectal cancer. The maps showed that a single tumor can have more and less invasive sections, and more or less malignant-looking regions — resulting in histological and molecular gradients where one part of a tumor transitions into the next. The maps showed that immune environments varied dramatically within a single tumor. They were as different across a single tumor as among tumors — which is important because tumor-immune interactions are what you are trying to target with immunotherapy. The maps also provided new insights into the architecture of the tumors. For example, scientists had previously identified what they thought were 2D pools of a mucus-like substance called mucin with clusters of cancer cells floating inside. However, in the new study, the 3D reconstruction revealed that these mucin pools are, in fact, a series of caverns interconnected by channels, with finger-like projections of cancer cells. The maps are part of the team's broader efforts to create atlases for different cancer types that will be freely available to the scientific community as part of the National Cancer Institute's Human Tumor Atlas Network. The project represents an unusual collaboration between pathologists, engineers, and computational scientists: As the imaging data rolled in, the computational scientists used machine learning to identify interesting findings that they presented to the pathologists, and the pathologists flagged key features to be parsed with machine learning...
Harvard Medical School - Jan 19, 2023

Northeastern leads $1M NSF-funded study to disrupt illegal medications trade with the power of AI

...Northeastern University professor Nikos Passas and his colleagues from two other universities have secured $1 million from the National Science Foundation to research the illegal medical products trade and develop tools that would help disrupt it. There are different types of misconduct that involve illegal medical products. Substandard and falsified medical products constitute the biggest and most straightforward category identified by the national and international agencies. Falsified, inauthentic medicines and medical supplies are intentionally manufactured out of the wrong ingredients. Medical products get diverted from their original declared destination, for example, when cargo gets stolen, and ends up illegally on formal or informal markets. Packaging can also be used to disguise illegal medication. Counterfeit packaging might be easier to spot, but fakes can also come in original packaging or vials. Using the data provided by one of the large pharmaceutical companies and AI, the researchers were able to visualize information scraped online to see clusters of online sellers and find connections between different players. The software allows to see that seemingly unconnected cases may have the same players in the background and then they can be potentially identified...
Northeastern News - Jan 19, 2023

Researchers Use ORNL's Summit Supercomputer to Identify Potential New Treatments for Coronaviruses

...Coronavirus surfaces are mostly coated with sugars or glycans. Researchers have learned that glycans offer coronaviruses camouflage protection from antibodies, which are proteins that protect you when a potentially harmful substance enters your body. Antibodies need an exposed beachhead for an assault on a coronavirus, but glycans conceal landing areas (epitopes) and help thwart attacks. To simulate un-sugared locations exposed on opening and closing spike proteins, the team used the fastest computer available in the United States to model the corona of the novel coronavirus SARS-CoV-2—the virus which caused COVID-19. The supercomputer, Summit, is housed at Oak Ridge National Laboratory in Tennessee. The team used this 'computational microscope' to look at atomistic details of the entire route as the spike opens and how antibodies can play a role by attacking this gateway when that happens...

Syracuse University News - Jan 19, 2023

Other IT Related

Request for Information: Digital Assets Research and Development

...The White House Office of Science and Technology Policy (OSTP)—on behalf of the Fast Track Action Committee (FTAC) on Digital Assets Research and Development of the Subcommittee on Networking and Information Technology Research and Development (NITRD) of the National Science and Technology Council, the National Science Foundation, and the NITRD National Coordination Office—requests public comments to help identify priorities for research and development related to digital assets, including various underlying technologies such as blockchain, distributed ledgers, decentralized finance, smart contracts, and related issues such as cybersecurity and privacy, programmability, and sustainability as they relate to digital assets. Interested individuals and organizations are invited to submit comments on or before 5 p.m. ET on March 3, 2023...

Federal Register - Jan 25, 2023

How the Baldrige Framework Can Help You Improve DEIA

...Would you like to learn how to use the Baldrige framework to address cultural diversity, equity, inclusion, and accessibility (DEIA) in your workforce and improve your organization's results? Lisa Tabor from CultureBrokers, LLC, a company that works with organizations to help them improve equity highlighted how the Baldrige framework is a tool that can help organizations look at their structural influences on DEIA in their culture so that negative influences can be removed. "Baldrige is a … framework that talks about functions … that interact with different stakeholder groups; functions that leaders … perform; functions that are related to clients or customers; functions that are related to your workforce; functions related to measurement, knowledge management, and results." She called the Baldrige framework a very good way to approach improvement in structure...

National Institute of Standards and Technology - Jan 24, 2023

NASA, DARPA Will Test Nuclear Engine for Future Mars Missions

...NASA and the Defense Advanced Research Projects Agency (DARPA) announced a collaboration to demonstrate a nuclear thermal rocket engine in space, an enabling capability for NASA crewed missions to Mars. NASA and DARPA will partner on the Demonstration Rocket for Agile Cislunar Operations, or DRACO, program. Using a nuclear thermal rocket allows for faster transit time, reducing risk for astronauts. Reducing transit time is a key component for human missions to Mars, as longer trips require more supplies and more robust systems. Maturing faster, more efficient transportation technology will help NASA meet its Moon to Mars Objectives. Other benefits to space travel include increased science payload capacity and higher power for instrumentation and communication...

National Aeronautics and Space Administration - Jan 24, 2023

Webb Unveils Dark Side of Pre-stellar Ice Chemistry

...An international team of astronomers using NASA's James Webb Space Telescope has obtained an in-depth inventory of the deepest, coldest ices measured to date in a molecular cloud. In addition to simple ices like water, the team was able to identify frozen forms of a wide range of molecules, from carbonyl sulfide, ammonia, and methane, to the simplest complex organic molecule, methanol. This research forms part of the Ice Age project, one of Webb's 13 Early Release Science programs. These observations are designed to showcase Webb's observing capabilities and to allow the astronomical community to learn how to get the best from its instruments. The Ice Age team has already planned further observations, and hopes to trace out the journey of ices from their formation through to the assemblage of icy comets...

National Aeronautics and Space Administration - Jan 23, 2023

STEM / Workforce & IT

U.S. Air Force Selects Howard University for Science Research Partnership

...The Department of the Air Force has selected Howard University as the first Historically Black College or University to lead a University Affiliated Research Center. The center will be focused on tactical autonomy technology for military systems and Howard University will receive $12 million per year for five years to fund research, faculty, and students. The Department of Defense currently has 14 university affiliated research centers. Such centers are responsible for providing dedicated facilities and sharing space with Defense Department officials and industrial participants to conduct basic, applied and technology demonstration research...

U.S. Department of Defense - Jan 23, 2023

DOE Announces $32 Million in Research Opportunities for Underrepresented Groups

...The U.S. Department of Energy (DOE) announced 41 awards totaling $32 million to 37 institutions to support historically underrepresented groups in science, technology, engineering, and mathematics (STEM) and diversify American leadership in the physical sciences, including energy and climate. The funding, through the DOE Office of Science's Reaching a New Energy Sciences Workforce (RENEW) initiative, will support internships, training programs, and mentor opportunities at Historically Black Colleges and Universities (HBCUs), other Minority Serving Institutions (MSIs), and other research institutions. Ensuring America's best and brightest students have pathways to STEM fields will be key to achieving President Biden's energy and climate goals, including achieving a net-zero carbon economy by 2050. Selected projects include: * Training a diverse STEM workforce to measure and model energy, water, and carbon budgets; * Investing in regional networks to prepare students to enter the quantum computing and networking workforce...

Brookhaven Lab - Jan 23, 2023

Computer Science Department Awarded NSF Grant Funding For Scholarships

...National Science Foundation CyberCorps Scholarship for Service in Interdisciplinary Cyber Security and Cyber Forensics awarded $2.8 million to Sam Houston State University of which a majority of the fund will be used to pay student stipend, tuition, laptop, textbooks and research related activities in the next five years. Also SHSU was named a National Center of Academic Excellence in Cyber Defense Education by the National Security Agency and the Department of Homeland Security...

Sam Houston State University - Jan 19, 2023

STEM / Workforce Resources & Opportunities

R&D WORKFORCE TRAINING: FEDERAL AGENCIES' STEM INTERNSHIPS, SCHOLARSHIPS, AND TRAINING OPPORTUNITIES

...Increasing the availability of STEM opportunities is a priority in the Biden-Harris Administration. To help facilitate this, the team at NITRD developed a STEM Portal that allows anyone to search for internships and other training opportunities at Federal agencies. The NITRD STEM PORTAL is a searchable database that includes a description, link, and contact information for each program listing. Government-sponsored internships and training programs are competitive, but there are many Federal opportunities and the NITRD STEM Portal is here to help...

The Networking and Information Technology Research and Development (NITRD) Program - Dec 29, 2022

NSF 101: High school students, undergraduate and post-baccalaureate scholar funding opportunities

...The U.S. National Science Foundation supports multiple programs for high school, undergraduate and post-baccalaureate students to help fund research opportunities. High school students: * High School Student Research Assistantships (MPS-High) * Research Assistantship for High School Students (RAHSS) | Undergraduate students: * Research Experience for Undergraduates (REU) and Supplemental Awards * Robert Noyce Teacher Scholarship Program | Post-baccalaureate: * Computer and Information Science and Engineering Graduate Fellowships (CSGrad4US) * Geoscience Research Experiences for Post-Baccalaureate Students (GEO-REPS) Supplemental Funding Opportunity * Research and Mentoring for Post-Baccalaureates in Biological Sciences (RaMP) * Post-Baccalaureate Research Experiences for LSAMP Students (PRELS) Supplemental Funding Opportunity...

National Science Foundation - Jan 20, 2023

NITRD News

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; middleware, Grid, and cloud research and infrastructure; implementing or operating Grids and clouds; and users of Grids, clouds, and middleware...

Networking and Information Technology Research and Development (NITRD) Program - Jan 13, 2023

Upcoming Conferences / Workshops / Webinars

Journey to the NIST Cybersecurity Framework (CSF) 2.0 | Workshop #2 Feb 15

...Join NIST and expert panelists and leaders on February 15, 2023, for this second virtual workshop to discuss potential updates to the Cybersecurity Framework. This event will discuss potential significant changes to the Framework as outlined in the CSF Concept Paper, as well as build on feedback from the 2022 NIST Cybersecurity Request for Information (RFI) and the first workshop. February 15, 2023 9:00am - 5:30pm EST Virtual Only.

National Institute of Standards and Technology - Jan 17, 2023

Journey to the NIST Cybersecurity Framework (CSF) 2.0 | In-Person Working Sessions Feb 22 & 23

...Register to join an in-person working session to discuss potential updates to the CSF. At these half-day events, attendees will participate in working sessions to discuss the potential significant changes as outlined in the CSF 2.0 Concept Paper. These sessions will build on the February 15, 2023, virtual CSF 2.0 Workshop #2. Space is very limited. Please select only one half-day working session. February 22, 2023 (9:00 AM – 1:00 PM EST) or February 23, 2023 (1:00 PM – 5:00 PM EST). Registration for in-person attendance closes on February 15, 2023

National Institute of Standards and Technology - Jan 23, 2023

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

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

National Institute of Standards and Technology - Jan 9, 2023

Innovation Through NITRD Coordination