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!

Federal Agency Funding Opportunities

Biden-Harris Administration announces up to $7 million through Investing in America agenda to improve weather predictions

...The Department of Commerce and NOAA announced a $7 million funding opportunity through President Biden's Investing in America agenda to establish a new multi-university Data Assimilation Consortium that will improve weather predictions. Funded by President Biden's Inflation Reduction Act, this award will provide up to $7 million over three years beginning in fiscal year 2024 for a new consortium focused on numerical weather prediction. This new consortium will bolster NOAA forecast models, provide strategic workforce development in data assimilation and enhance long-term partnerships between NOAA and those working in academia, government and the broader weather enterprise. NOAA is currently soliciting collaborative proposals for the project. This new funding will aid in the strategic partnership between NOAA and the broader weather

enterprise to develop the Unified Forecast. This comprehensive, open source Earth modeling system accelerates the transition of research successes to operations by incorporating innovations from across the enterprise and across several independent forecast models into a single seamless system. The multi-university consortium will also advance data assimilation research and education, and foster collaboration, student training and exchange of experts between NOAA and the the Joint Center for Satellite Data Assimilation, academic partners including minority-serving institutions and international institutions...
National Oceanic and Atmospheric Administration - Jul 27, 2023

Biden-Harris Administration Invests $20 Million to Optimize Lifecycle of Solar Energy Systems and Minimize Technology Waste

...As part of Bidenomics and President Biden's Investing in America agenda, the U.S. Department of Energy (DOE) today announced $20 million, including $8 million from the Bipartisan Infrastructure Law, to minimize the use of solar energy system materials, improve installation quality and resilience of photovoltaic (PV) systems, and streamline the reuse and recyclability of solar panels. This funding opportunity will also set up a Solar Partnership to Advance Recycling and Circularity to improve materials recovery and develop safe end-of-life practices for PV system components. ... Prior to submitting a full application for this opportunity, applicants must submit a letter of intent by September 6 at 5 p.m. ET and a concept paper by September 13 at 5 p.m. ET.
Department of Energy - Jul 21, 2023

HPC

NSF's $10 Million Award Brings New Stampede3 to Advance Supercomputing Ecosystem

...Stampede3, a powerful new supercomputer that will enable groundbreaking open science research projects in the U.S and leverage previous high performance computing investment funds, is coming to the Texas Advanced Computing Center (TACC) at The University of Texas at Austin. For over a decade, the Stampede systems — Stampede (2012) and Stampede2 (2017) — have been flagships in the National Science Foundation's (NSF) scientific supercomputing ecosystem. Made possible by a $10 million award for computer hardware from the NSF, Stampede3 will be the newest strategic resource for the nation's open science community when it enters full production in early 2024. It will enable thousands of researchers nationwide to investigate questions that require advanced computing power. "The best way to make the case for the science and engineering need and promise of Stampede3 is to look at the success of the current Stampede2, which is nearing the end of its production life," said Dan Stanzione, executive director of TACC...
UT News - The University of Texas at Austin - Jul 24, 2023

Artificial Intelligence / Machine Learning

FACT SHEET: Biden-Harris Administration Secures Voluntary Commitments from Leading Artificial Intelligence Companies to Manage the Risks Posed by AI

...President Biden convened seven leading AI companies at the White House today – Amazon, Anthropic, Google, Inflection, Meta, Microsoft, and OpenAI – to announce that the Biden-Harris Administration has secured voluntary commitments from these companies to help move toward safe, secure, and transparent development of AI technology. The announcement is part of a broader commitment by the Biden-Harris Administration to ensure AI is developed safely and responsibly, and to protect Americans from harm and discrimination. These seven leading AI companies are committing to: * Ensuring Products are Safe Before Introducing Them to the Public * Building Systems that Put Security First * Earning the Public's Trust ...
The White House - Jul 21, 2023

Research Rooted in Machine Learning Challenges Conventional Thinking About the Pathways to Violent Extremism

...Researchers have developed a new analytical method to better understand how individuals move toward violent extremism. Using machine learning, a form of artificial intelligence, the method reveals clusters of traits associated with possible pathways to terrorist acts. The resource may improve our understanding of how an individual becomes radicalized toward extremist violence. The study departs from the research community's common use of demographic profiles of extremist individuals to predict violent intentions. Researchers scanned large datasets to spot traits or experiences that are collectively associated with terrorist trajectories employing a process that blends machine learning and an evidence-based behavioral model of radicalization associated with violence and other terrorism-related activities...
Office of Justice Programs - Jul 24, 2023

NSF $424K grant to better predict weather, climate through machine learning, AI

...Improved weather and climate forecasting using machine learning and artificial intelligence is the focus of a new University of Hawai‘i at Mānoa project. Results are expected to have a major impact in Hawai‘i and other tropical climate areas around the world. Associate Professor Peter Sadowski from the Information and Computer Sciences Department in the College of Natural Sciences earned a five-year, $424,293 CAREER grant from the National Science Foundation (NSF). Sadowski’s project will develop machine-learning methods to predict the risk of adverse weather and climate events. AI will be used to develop new data-driven computational methods for modeling risk and apply these methods to weather applications. In particular, these models will be applied to forecasting solar irradiance and precipitation, two areas that are particularly important for tropical islands such as the Hawaiian Islands. Estimating the risk of rapid changes in solar power generation is necessary for managing energy grids that are seeing a rapid increase in variable renewable sources, and floods claim hundreds of lives and billions in property damage each year in the U.S. alone...
The Magazine of the University of Hawaii - Malamalama - Jul 24, 2023

NSF/ARO-funded research finds future AI algorithms have potential to learn like humans

...To help understand why artificial agents develop holes in their own cognitive processes, electrical engineers at The Ohio State University have analyzed how much a process called “continual learning” impacts their overall performance. Continual learning is when a computer is trained to continuously learn a sequence of tasks, using its accumulated knowledge from old tasks to better learn new tasks. Yet one major hurdle scientists still need to overcome to achieve such heights is learning how to circumvent the machine learning equivalent of memory loss – a process which in AI agents is known as “catastrophic forgetting.” As artificial neural networks are trained on one new task after another, they tend to lose the information gained from those previous tasks. Researchers found that in the same way that people might struggle to recall contrasting facts about similar scenarios but remember inherently different situations with ease, artificial neural networks can recall information better when faced with diverse tasks in succession, instead of ones that share similar features. While it can be challenging to teach autonomous systems to exhibit this kind of dynamic, lifelong learning, possessing such capabilities would allow scientists to scale up machine learning algorithms at a faster rate as well as easily adapt them to handle evolving environments and unexpected situations. ... The study was supported by the National Science Foundation and the Army Research Office.
Ohio State News - Jul 20, 2023

Robotics / Autonomous Vehicles

NSF funds microrobots inspired by insects and these bugbots could achieve big things

...Sawyer Buckminster Fuller, entomologist and assistant professor of mechanical engineering at the University of Washington, Seattle is director of the Autonomous Insect Robotics Laboratory, where he and his students brainstorm and tinker to engineer autonomous robots that resemble bees, flies and gnats, among other bugbots. Scaling down robotics poses serious challenges, including finding or devising sensor and controller hardware teeny and lightweight enough for stable flight and navigation. With support from the U.S. National Science Foundation, Fuller and his students came up with a breakthrough flight control and wind sensing system using accelerometers. The AIR Lab has gone from successful simulations to building a 100-milligram robofly for real-world experiments. In a year or so, once they get the robofly hovering autonomously, they expect to start tackling the robognat. Their bugbots even resemble the insects that inspired them, with black carbon-fiber bodies and flapping wings made of a clear, thin polyester material kept rigid by carbon-fiber "veins." Other nature-inspired robotics, include the RoboBee, funded by NSF through the Expeditions in Computing program. A new RoboBee was shown to be able to swim and burst out of the water into the air to fly, making it the first microrobot to repeatedly move in and out of complex environments...
National Science Foundation - Jul 20, 2023

How NAU is making self-driving cars safer and smarter

...NAU researcher Truong Nghiem, an assistant professor in the School of Informatics, Computing, and Cyber Systems, received an NSF CAREER grant, which aims to develop a comprehensive and flexible framework for effective and efficient machine learning with physical constraints. It can fundamentally change how we apply machine learning to complex systems like smart energy systems, industrial automation systems and autonomous robots and cars. Nghiem's approach is to tightly integrate machine learning and physical principles. The framework developed in this project will be a foundation for such an integration and will be a stepping stone toward solving the challenge. It will help make future autonomous cyber-physical systems reliable and safe...
Northern Arizona University - Jul 24, 2023

Cybersecurity / Privacy

A defense against attacks on unmanned ground and aerial vehicles

...A University of Texas at Arlington engineering researcher is working on defenses that could thwart cyberattacks against networks of self-driving cars and unmanned aerial vehicles. Animesh Chakravarthy, associate professor in the Department of Mechanical and Aerospace Engineering (MAE), is the principal investigator on an approximately $800,000 U.S. Department of Defense grant titled “Resilient Multi-Vehicle Networks.” Chakravarthy and his colleagues also will attempt to determine costs associated with cyberattacks on automated vehicles, including how much time and money are wasted in traffic or in waiting for accidents to clear...
The University of Texas at Arlington - Jul 21, 2023

5G, Wireless Spectrum, Networking & Communications

Crews Head Down River, Out to Sea to Prep New SWOT Water Satellite

...In mid-June, a team of freshwater researchers spent their nights drifting down Alaska’s Yukon River in an area that straddles the Arctic Circle. The hydrologists were using a GPS unit installed on their boat to measure the slope of the river at the same time that the Surface Water and Ocean Topography (SWOT) satellite passed overhead, collecting its own data on the waterway. The midnight rendezvous were part of a larger effort by ocean and freshwater scientists to validate the measurements from the recently launched spacecraft, which begins science operations Tuesday, July 25. SWOT is measuring the height of nearly all water on Earth’s surface and will provide one of the most detailed, comprehensive views yet of the planet’s ocean and fresh water. The mission will address some of the most pressing climate change questions of our time, offering insights into areas including how a warming world is accelerating Earth’s water cycle, leading to more volatile precipitation patterns. SWOT will also help researchers better understand how climate change affects water storage in lakes, rivers, and reservoirs, and how communities can better manage water resources and prepare for floods and other disasters. Researchers used two approaches to measure sea levels: airborne- and ship-deployed sensors. Using an airplane-mounted lidar instrument, the team collected sea level information in a manner similar to how SWOT takes measurements. This provided the most direct comparison between data from the field and the satellite. The team also collected temperature and salinity data that can reveal ocean features – like internal waves and currents – that drive sea level changes. They deployed temperature and salinity sensors on 11 moorings roughly 200 miles (300 kilometers) off California’s central coast. And they used 11 autonomous underwater robots – some of which were also collecting data for a separate NASA project called the Sub-Mesoscale Ocean Dynamics Experiment...
National Aeronautics and Space Administration - Jul 20, 2023

Joint U.S. Department of Energy and Department of Defense project: How new atomic clocks could help in search for dark matter — and beyond

...In the search for dark matter — the mysterious, invisible substance that makes up more than 80% of matter in our universe — scientists and engineers are turning to a new ultra-sensitive tool: the optical atomic clock. These clocks, which measure time by using an ultra-stable laser to monitor the resonant frequency of atoms, are now precise enough that if they ran for the age of the universe, they would lose less than one second. That stability also enables these devices to act as extremely sensitive quantum sensors that could be deployed into space to search for dark matter. The equipment required to operate such ultra-precise clocks — including lasers, electronics and coolers — can fill a large table or even a room. Scientists working on a joint U.S. Department of Energy and Department of Defense project aim to miniaturize these elements to the size of a shoebox. MIT LL’s optical atomic clock uses an ion trap as a sensor — in this case, a Strontium ion that is confined by an electrical field. A laser acts as the clock’s oscillator, measuring the oscillation frequency of the ion’s transition between two quantized energy levels. This sort of compact atomic clock could be ideal for deployment to space to search for ultralight dark matter, which is theorized to cause oscillations in the masses of electrons. If several atomic clocks traveled through a clump of dark matter in space, the dark matter could increase or decrease the photon energy measured by each clock, changing how it “ticks.” The clocks would desynchronize as the dark matter passes and resynchronize thereafter. Researchers conducted these experiments with GPS satellites...
Fermilab - Jul 24, 2023

With a new NSF-funded app, smart devices can have GPS underwater

...A team at the University of Washington has developed the first underwater 3D-positioning app for smart devices. When at least three divers are within about 98 feet (30 meters) of each other, their devices’ existing speakers and microphones contact each other, and the app tracks each user’s location relative to the leader. Mobile devices today can work nearly anywhere on Earth but one place where we still hadn’t made mobile devices work was underwater. It’s kind of the final frontier. With the app, if the dive leader has at least one other diver visible, the group’s devices can send acoustic signals to each other through their microphones and speakers and use the timestamps to estimate each diver’s distance. A device that also tracks depth, as sport monitors like the Apple Watch Ultra or the Garmin Descent do, can locate divers in 3D. To get actual GPS coordinates, instead of tracking locations relative to the dive leader, the leader needs to be wirelessly connected to a surface device on a boat with GPS capabilities. ... This research was funded by the National Science Foundation...
College of Arts and Sciences - Jul 24, 2023

Microelectronics

Next-Generation Microelectronics Manufacturing Aims to Sustain R&D Ecosystem

...DARPA has selected 11 organizations to begin work on the Next-Generation Microelectronics Manufacturing (NGMM) program. The Phase 0 effort will establish foundational research to inform next steps toward creating a domestic center for fabricating 3D heterogeneously integrated (3DHI) microsystems. This is a high-risk mission to reimagine manufacturing science and create the U.S. infrastructure for tomorrow's microelectronics by addressing the associated thermal, electrical, mechanical, and design challenges. NGMM's Phase 0 performers are working to define, analyze, and make expert recommendations for representative 3DHI microsystems. They are identifying the equipment, processes, hardware and software tools, and facility requirements to manufacture these microsystems. ... DARPA's 2023 ERI Summit in Seattle, Aug. 22-24, will offer a forum for further discussion. The registration deadline is July 31, 2023...
DARPA - Jul 20, 2023

New research explores durability of 2D hybrid materials

...New research has unveiled the fatigue resistance of 2D hybrid materials. These materials, known for their low cost and high performance, have long-held promise across semiconductor fields. This new generation of semiconductors holds great potential in nearly the whole spectra of semiconductor applications, including photovoltaics, light-emitting diodes and photosensors, among others. The application of repeated or fluctuating stresses below the material's strength, known as fatigue loading, often leads to failure in 2D hybrid materials. The researchers are focusing on a new generation of low-cost, high-performance semiconductor material with hybrid bonding features. This is the first study of fatigue behavior on the semiconductor material called 2D hybrid organic-inorganic perovskites (HOIPs) in practical applications. Researchers discovered that 2D HOIPs can survive over one billion cycles, which outperforms most polymers under similar loading conditions and suggests that 2D HOIPs are fatigue robust. The work is partially supported by the National Science Foundation...
Texas A&M University College of Engineering - Jul 21, 2023

Climate Change / Green Energy & IT

FACT SHEET: Biden-Harris Administration Hosts White House Methane Summit to Tackle Dangerous Climate Pollution, while Creating Good-Paying Jobs and Protecting Community Health

...The Biden-Harris Administration will convene the first ever White House Methane Summit around the urgent need to dramatically reduce methane emissions, especially from leaks in the oil and gas sector. Methane, a powerful greenhouse gas, is 80 times more potent than carbon dioxide and can lead to serious public health impacts, from asthma to cancer to premature deaths. Methane is responsible for one-third of the warming impacts millions of Americans are experiencing right now – from record heat waves to smoke-filled skies to flash flooding and more intense hurricanes. Methane leaks amount to billions of dollars' of wasted natural gas every year. In the United States, 30 percent of methane emissions come from the oil and gas sector, which increasingly has tools to slash leaks. The Administration is prioritizing the full use of the latest and most innovative technologies and tools available: * Through the National Aeronautics and Space Administration (NASA) EMIT instrument on the International Space Station, hundreds of methane super-emitter events associated with oil and gas infrastructure were identified over the last year. These findings were released publicly via the EMIT open data portal. * National Institute of Standards and Technology's (NIST) Urban GHG Measurement Testbed System measures and makes public methane and carbon dioxide concentrations in the three urban areas. * In January 2023, NOAA and NIST launched the Greenhouse Gas and Air Pollutants Emissions System (GRAAPES) with the long-term goal to measure and model greenhouse gas emissions, including methane emissions from the oil and gas sector. GRAAPES will launch a mobile laboratory to conduct urban and other emissions measurements relevant to oil and gas...
The White House - Jul 26, 2023

FACT SHEET: Bidenomics is Boosting Clean Energy Manufacturing for Offshore Wind and Creating Good-Paying American Union Jobs

...President Biden's economic agenda—Bidenomics— is fueling America's clean energy future, creating American-made products in American factories with American workers, and attracting more than $500 billion in private sector manufacturing and clean energy investments, including in the offshore wind industry. Under President Biden's leadership, the American offshore wind industry is rapidly expanding...
The White House - Jul 20, 2023

Device makes hydrogen from sunlight with record efficiency

...Rice University engineers can turn sunlight into hydrogen with record-breaking efficiency thanks to a device that combines next-generation halide perovskite semiconductors with electrocatalysts in a single, durable, cost-effective and scalable device. The new technology is a significant step forward for clean energy and could serve as a platform for a wide range of chemical reactions that use solar-harvested electricity to convert feedstocks into fuels. The device is known as a photoelectrochemical cell because the absorption of light, its conversion into electricity and the use of the electricity to power a chemical reaction all occur in the same device. Until now, using photoelectrochemical technology to produce green hydrogen was hampered by low efficiencies and the high cost of semiconductors. The challenge they had to overcome was that halide perovskites are extremely unstable in water and coatings used to insulate the semiconductors ended up either disrupting their function or damaging them. ... The research was supported by the Department of Energy...
RICE NEWS - Jul 20, 2023

NASA funds project to map the global wildland-urban interface

...Researchers led by a team at the University of Wisconsin–Madison have created the first tool to map and visualize the areas where human settlements and nature meet on a global scale. The tool could improve responses to environmental conflicts like wildfires, the spread of zoonotic diseases and loss of ecosystem biodiversity. These areas where people and wildlands meet are called the wildland-urban interface, or WUI for short, and is an area that has at least one house per 40 acres and is also 50% covered by wildland vegetation such as trees, shrubland, grassland, herbaceous wetland, mangroves, moss and lichen. These areas are also hot spots for environmental conflicts like wildfires, the spread of diseases from animals, habitat fragmentation and loss of biodiversity. After setting up the computer program, it took three months to run through all the data, flagging the regions that qualify as WUI. The land cover and building data they fed the computer was sourced from publicly available databases and stored on large servers. As the climate changes, some of these biomes will see more wildfires, more people and animals coming into contact with each other for the first time and more opportunities for the spread of disease and ecosystem disruption. This project was funded by the NASA Land Cover and Land Use Change Program...
University of Wisconsin - Madison News - Jul 20, 2023

Digital Health

As Part of President Biden’s Unity Agenda, Cancer Moonshot Announces Launch of New ARPA-H Program to Develop Novel Technologies for More Precise and Accurate Cancer Tumor Removal

...The Biden Cancer Moonshot announced a first-of-its-kind Advanced Research Projects Agency for Health (ARPA-H) program to develop novel technologies that will allow surgeons to remove cancerous tumors with more precision and accuracy, resulting in better health outcomes for Americans facing cancer. The launch of this program—ARPA-H’s first program targeting cancer and second program overall—represents a major milestone for ARPA-H. Surgical procedures are often the first treatment option for the approximately 2 million Americans diagnosed with cancer each year. However, current surgical technologies do not allow doctors to easily and fully distinguish cancer cells from normal surrounding tissue in the operating room. This can lead to repeat surgeries, a more difficult recovery, and cancer recurrence, as well as higher health care costs. ARPA-H’s new Precision Surgical Interventions (PSI) program aims to deliver groundbreaking new tools to enable surgeons to successfully remove cancer for patients through a single operation by better identifying and differentiating between healthy and cancer tissue...
The White House - Jul 27, 2023

FTC and HHS Warn Hospital Systems and Telehealth Providers about Privacy and Security Risks from Online Tracking Technologies

...The Federal Trade Commission and the U.S. Department of Health and Human Services' Office for Civil Rights (OCR) are cautioning hospitals and telehealth providers about the privacy and security risks related to the use of online tracking technologies integrated into their websites or mobile apps that may be impermissibly disclosing consumers’ sensitive personal health data to third parties. The two agencies sent the joint letter to approximately 130 hospital systems and telehealth providers to alert them about the risks and concerns about the use of technologies, such as the Meta/Facebook pixel and Google Analytics, that can track a user’s online activities. These tracking technologies gather identifiable information about users, usually without their knowledge and in ways that are hard for users to avoid, as users interact with a website or mobile app. HHS highlighted these concerns in a bulletin it issued late last year that reminded entities covered by the Health Insurance Portability and Accountability Act (HIPAA) of their responsibilities to protect health data from unauthorized disclosure under the law. The FTC has put companies on notice that they must monitor the flow of health information to third parties that use tracking technologies integrated into websites and apps. The unauthorized disclosure of such information may violate the FTC Act and could constitute a breach of security under the FTC’s Health Breach Notification Rule...
Federal Trade Commission - Jul 20, 2023

NSF-funded research designs new sensor mimics cell membrane functions

...Drawing inspiration from natural sensory systems, an MIT-led team has designed a novel sensor that could detect the same molecules that naturally occurring cell receptors can identify. In work that combines several new technologies, the researchers created a prototype sensor that can detect an immune molecule called CXCL12, down to tens or

hundreds of parts per billion. This is an important first step to developing a system that could be used to perform routine screens for hard-to-diagnose cancers or metastatic tumors, or as a highly biomimetic electronic “nose." The device draws inspiration from the membrane that surrounds all cells. The MIT team modified some of these proteins so that they could survive outside the membrane, and anchored them in a layer of crystallized proteins atop an array of graphene transistors. When the target molecule is detected in a sample, these transistors relay the information to a computer or smartphone. This type of sensor could potentially be adapted to analyze any bodily fluid, such as blood, tears, or saliva. The research was funded by the National Science Foundation...
MIT Media Lab - Jul 21, 2023

Genes That Shape Bones Identified, Offering Clues About Our Past and Future

...Using artificial intelligence to analyze tens of thousands of X-ray images and genetic sequences, researchers from The University of Texas at Austin and New York Genome Center have been able to pinpoint the genes that shape our skeletons, from the width of our shoulders to the length of our legs. Their research is a powerful demonstration of the impact of AI in medicine, particularly when it comes to analyzing and quantifying imaging data, as well as integrating this information with health records and genetics rapidly and at large scale. The researchers used deep learning models to perform automatic quantification on 39,000 medical images to measure distances between shoulders, knees, ankles and other points in the body. By comparing these measurements to each person’s genetic sequence, they found 145 points in the genome that control skeletal proportions. ... The research was funded by the National Institutes of Health, with graduate student fellowship support provided by the National Science Foundation..
UT News - The University of Texas at Austin - Jul 20, 2023

Other IT Related

Alondra Nelson Wins 2023 Champions of Freedom Award

...Alondra Nelson has won a 2023 Champions of Freedom Award from the Electronic Privacy Information Center (EPIC) for her work safeguarding privacy, open government, and democratic values. Nelson, one of three winners of this year’s award, recently concluded her term in the White House Office of Science and Technology Policy (OSTP), where she was first Principal Deputy Director for Science and Society at OSTP, before being appointed to perform the duties of director of the OSTP and as Deputy Assistant to the President. EPIC cites the OSTP’s creation of the “Blueprint for an AI Bill of Rights” as an example of her protection of civil rights in the digital age...
Institute for Advanced Study - Jul 24, 2023

Former NIST Director Lewis Branscomb Connected the Curiosity of Scientists With the Needs of the Nation

...Lewis Branscomb, the director of the National Bureau of Standards (NBS) from 1969 to 1972, died in May at 96 years old. He led teams of scientists to pioneering discoveries, and when he left the agency, now known as National Institute of Standards and Technology (NIST), he was only 45, yet he had already clocked more professional achievements than most experience in a lifetime. He joined NBS in 1951 and immediately set out to prove a theory about the Sun. That theory had been derived from mathematical and physical principles, but no one had yet succeeded in making the difficult measurements needed to prove it. In the roiling atmosphere of the Sun, the theory held, charged atoms, or ions, of hydrogen absorbed some of the Sun’s radiation, changing the wavelengths of light that reach us here on Earth. To prove the theory, Branscomb would have to measure the absorption of light by hydrogen ions in the lab. This would have been relatively easy a decade later, when he could have used a laser as a light source. But lasers hadn’t been invented yet, so Branscomb built a complex measurement apparatus that at one point combined the arc lamp of a cinema projector with the red and green lenses of a traffic light. It took Branscomb three years to make the measurement, and he did confirm the theory about the Sun AND he developed new ways to measure the fundamental properties of ions and how they behave in atmospheric gases...
National Institute of Standards and Technology - Jul 26, 2023

NSF in Greenland: Promoting novel research, improving infrastructure, growing international partnerships

...In 1989, the U.S. National Science Foundation launched the Greenland Ice Sheet Project 2, and a summit "camp" was established. This effort succeeded the original multinational Greenland Ice Sheet Project in a better glaciological location near the apex of the Greenland ice sheet. In 1993, researchers retrieved the deepest ice core in the world at that time, obtaining over 3 kilometers of ice and 1.55 meters of bedrock. One multidisciplinary NSF-funded project currently operating out of Summit Station is the Integrated Characterization of Energy, Clouds, Atmospheric state, and Precipitation at Summit. Researchers take observations of the atmosphere to advance understanding of cloud properties, radiation and surface energy, and precipitation processes over the Greenland ice sheet. Summit Station has become the only high-altitude, high-latitude, year-round inland research platform not influenced by local air pollution, collecting the highest quality observations to answer key questions about climate processes in the Northern Hemisphere. Summertime researchers and staff traditionally slept in tents, but as the sea ice changes, more polar bears are making their way onto the ice sheet. For these reasons and to update the station to be more efficient and sustainable, plans are underway to transform the infrastructure. The new Summit Station will be energy efficient and will incorporate renewable energy and autonomous systems where possible. The station will be capable of being unmanned at times if needed and reoccupied later without damaging infrastructure...

National Science Foundation - Jul 21, 2023

65 Years Ago: The National Aeronautics and Space Act of 1958 Creates NASA

...On April 2, 1958, in a letter to Congress President Eisenhower called for the creation of a civilian National Aeronautics and Space Agency (NASA), based on the existing NACA, to oversee the U.S. space program. Although a former military commander, Eisenhower believed a civilian agency would be more effective than assigning space to the military, where inter-service rivalries had already demonstrated a lack of results in launching a satellite. As Congress drafted the legislation, Galloway successfully lobbied to designate the new organization an administration instead of an agency to give it broader authority to coordinate with other government entities. Bipartisan agreement between a Republican President and a Democrat-controlled Congress led to the drafting of legislation to create a civilian agency to oversee America's non-military space activities. President Eisenhower signed the National Aeronautics and Space Act of 1958 into law on July 29, creating NASA. The agency opened for business on Oct. 1, 1958...
National Aeronautics and Space Administration - Jul 26, 2023

Hubble Sees Evaporating Planet Getting the Hiccups

...Located 32 light-years from Earth, the parent star AU Microscopii (AU Mic) hosts one of the youngest planetary systems ever observed. The star is less than 100 million years old (a tiny fraction of the age of our Sun, which is 4.6 billion years old). The innermost planet, AU Mic b, has an orbital period of 8.46 days and is just 6 million miles from the star (about 1/10th the planet Mercury's distance from our Sun). The bloated, gaseous world is about four times Earth's diameter. AU Mic b was discovered by NASA's Spitzer and TESS (Transiting Exoplanet Survey Satellite) space telescopes in 2020. It was spotted with the transit method, meaning telescopes can observe a slight dip in the star's brightness when the planet crosses in front of it...
National Aeronautics and Space Administration - Jul 27, 2023

STEM / Workforce & IT

USNA CYBER OPERATIONS PROGRAM GRANTED NSA DESIGNATION IN CYBER DEFENSE

...The Naval Academy cyber operations program was recently granted the National Security Agency (NSA) designation as a Center of Academic Excellence in Cyber Defense. The Naval Academy's cyber operations program is one of only 20 colleges and universities nationwide to hold the NSA CAE-CO and 366 that hold the cyber defense (CD) designation. The Cyber Operations major is also accredited by ABET, placing the Naval Academy as one of the few schools in the U.S. with all three program designations. The Naval Academy's Center for Cyber Security Studies supports internships in cyber and related studies including close cooperation with the National Security Agency (NSA), U.S. Cyber Command, Fleet Cyber Command, Marine Forces Cyber Command, and the Naval Cyber Warfare Development Command. The Naval Academy was the first institution of higher learning in the U.S. to require cyber security classes for all students...
U.S. Naval Academy - Jul 21, 2023

NSF awards grant of $1 million to bring quantum physics to high school classrooms

...Nearly 70 high school students and science teachers gathered at Arlington Martin High School to learn about quantum physics, thanks to a first-of-its-kind national pilot program called Quantum for All. Although quantum physics is used for everything from cellphones to computers and MRI machines to cybersecurity, most students do not receive any education on its principles until late into their college careers. Matsler's program aims to fill this learning gap by providing training and curriculum tools for high school science teachers, with assistance from a nearly $1 million grant from the National Science Foundation...
The University of Texas at Arlington - Jul 20, 2023

New cybersecurity department and degree names align with evolving industry

...RIT's computing security degrees and department have adopted new names. The transition from "computing security" to "cybersecurity" will help RIT align with the ever-changing demands of the cybersecurity industry. The newly named Department of Cybersecurity in RIT's Golisano College of Computing and Information Sciences houses the Bachelor of Science in cybersecurity and the cybersecurity master's degree program. In 2020, RIT opened the ESL Global Cybersecurity Institute—a new facility for cybersecurity training, education, and research. In addition to state-of-the-art computer labs, teaching spaces, and a conference center, the institute is home to the Cyber Range and Training Center. The Cyber Range is a virtual and physical lab that allows people to simulate network cyberattacks and problem-solving scenarios. RIT is nationally recognized for its cybersecurity undergraduate and graduate degrees, having been designated as National Centers of Academic Excellence in Cyber Defense Education and in Research by the National Security Agency and the Department of Homeland Security...
Rochester Institute of Technology - Jul 24, 2023

NASA selects Casper College and KWHS to participate in eclipse project

...NASA has selected Casper College and Natrona County School District #1 to participate in the Nationwide Eclipse Ballooning Project for an annular solar eclipse on Oct. 14, 2023, and a total solar eclipse on April 8, 2024. On Friday, the students launched their first test balloon. Much of the hardware for the launches was built during the spring 2023 semester to allow for the summer test launches. NEBP payloads focus on either atmospheric science or engineering. Casper College is participating in the engineering category. For engineering projects, each team will launch one balloon during each eclipse, floating its 12-pound payload, which includes livestreaming cameras, at about 70,000 feet or higher. According to NASA, NEBP payloads focus on either atmospheric science or engineering. All teams will participate in both eclipses, and the resulting data will be analyzed and made publicly available...

Casper College - Jul 21, 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 facilita te 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

NASA Space Apps Challenge: BE A PART OF THE LARGEST ANNUAL GLOBAL HACKATHON!

...The NASA International Space Apps Challenge is a hackathon for coders, scientists, designers, storytellers, makers, builders, technologists, and innovators around the world to come together and use open data from NASA and its Space Agency Partners to create solutions to challenges we face on Earth and in space. Space Apps provides a platform for problem solvers worldwide to use free and open data from NASA and its Space Agency Partners. The NASA International Space Apps Challenge will be held October 7-8, 2023. Registration is now open!

spaceappschallenge.org - Jul 25, 2023

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