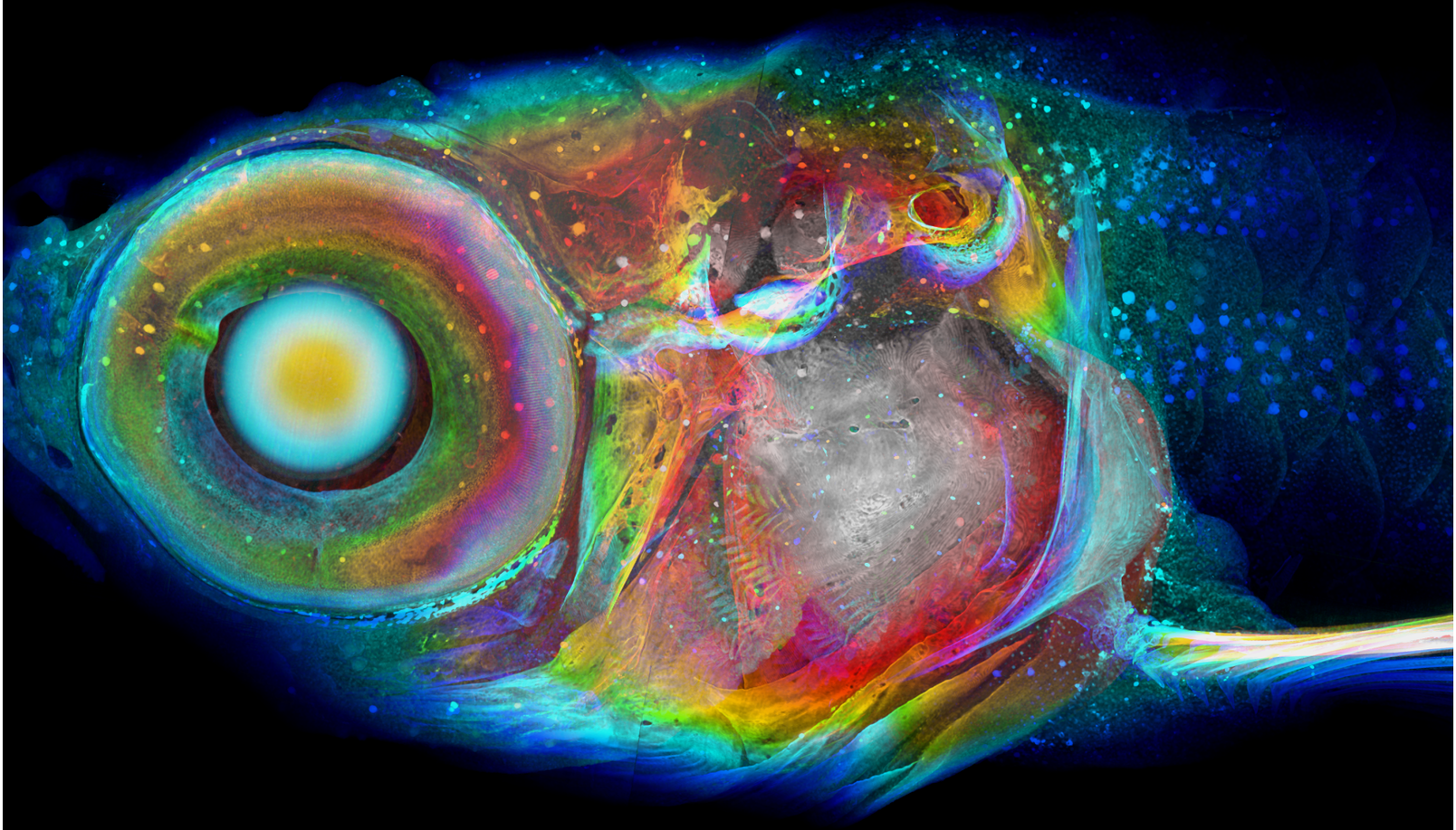
CASC

Coalition for Academic Scientific Computation

2026



Through the Eye of Discovery

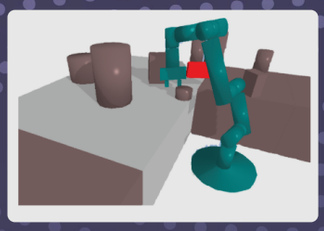
Why U.S. Dominance in Cyberinfrastructure Is Critical for America's Families, Businesses, and Future

Computational Excellence in Every Corner

Supercomputers are supercharging America's dominance in discovery and innovation. CASC is the organization that connects the people who power prosperity.

105+
member institutions in 40 states

35+
years of research leadership



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Training robots for any task

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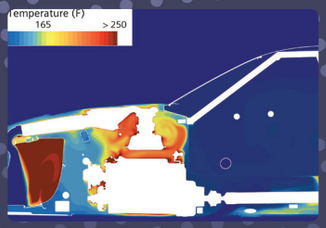
Real-time response to protect the public



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Our Mission

Advocate for public and private investment in research computing and data services.

Advise federal agencies on relevant funding programs.

Engage in policy discussions on research computing and data services.

Foster a diverse community of leaders in this field.

Provide a forum for sharing strategic ideas and best practices.

CASC Executive Committee

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Dear Colleagues,

The Coalition for Academic Scientific Computation (CASC) is proud to represent a community of professionals who are building the foundation for America's competitiveness in science, technology, and innovation. Our members provide the advanced cyberinfrastructure—high-performance computing, data management, and expertise—that enables America's greatest minds to tackle questions that matter for our future: from accelerating drug discovery, to advancing artificial intelligence (AI), to enabling more resilient supply chains.

The stakes have never been higher. Other nations, particularly China, are investing aggressively in research and technology with the clear intent to lead in areas like AI, advanced materials, robotics, and manufacturing. If the U.S. does not accelerate its investment in computational science and the workforce that supports it, we risk not only losing ground in global competitiveness but also a brain drain of our most talented scientists and engineers. Our loss would be their gain.

At CASC, we see every day the impact of computational science on American innovation. Our members serve as both the technical backbone and the intellectual drivers of progress in the fields that will fuel the future. We play a critical role in preparing the next generation of the AI workforce—students who will graduate with the skills needed to drive discovery, grow businesses, and strengthen our economy.

This brochure highlights CASC's role in amplifying those efforts. You will see examples of:

- **Public–private partnerships** that spur solutions and ensure discoveries move into practice.
- **The research ecosystem as a workforce engine**, providing the next generation with the experience they need to lead critical industries of the future economy.
- **The payoff of investment in computation** for national competitiveness, job creation, and a new future for U.S. manufacturing.

CASC members proudly serve our country by sustaining our nation's edge in science, technology, and workforce development. Our efforts not only maintain critical infrastructure but also shape the collaborative culture and expertise that make America's researchers the best in the world. The work we do today ensures that the U.S. remains at the forefront of global discovery, innovation, and economic vitality.

As you read through this brochure, I hope you will take away the urgency—and the opportunity—of continued investment in computational science. By strengthening our nation's commitment to cyberinfrastructure, research computing, and the workforce that supports them, we safeguard America's leadership in discovery and innovation.

Sincerely,
Richard Knepper
Chair, Coalition for Academic Scientific Computation

CASC members at the Spring 2025 member meeting
Photo by Jamie Christiani

Dynamic CASC member engagement
Photo by Jamie Christiani

Made in America

Training Tomorrow's Chipmakers

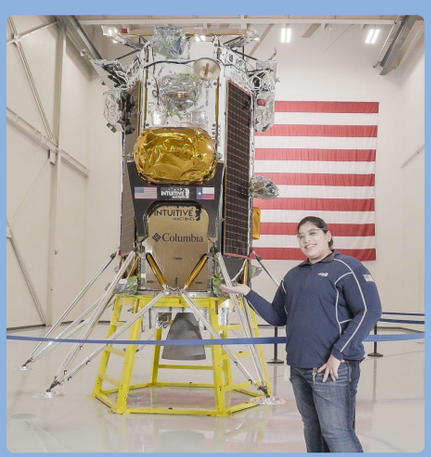
From smartphones to satellites, semiconductors power it all. Universities are building the workforce needed to make these essential chips on U.S. soil. For example, Purdue University's summer STARS program teaches college students skills in chip design and semiconductor manufacturing. Since its launch, the program's sponsors have grown to 20, highlighting its value to industry.

STARS uses cutting-edge tools to give trainees access to powerful chip design technologies online. In 2024, almost 60 STARS students used Purdue's Chipshub platform, an offshoot of the school's National Science Foundation (NSF)-funded nanoHUB web portal, to run thousands of simulations and chip design tasks simultaneously. Chipshub partnered with Purdue's Rosen Center for Advanced Computing to run the large-scale simulations on Anvil, the university's supercomputer. Now expanding beyond Purdue, Chipshub is projected to impact more than 40,000 U.S. engineering students by 2030, making it a critical resource in developing the nation's semiconductor workforce.

"We want to make more chips in the U.S. *We need to have more engineers, more technicians, more PhDs that are able to work in this field. Students need to be trained with cutting-edge tools, and this is what Chipshub can actually do, at scale."*

Alejandro (Ale) Strachan, Purdue University
Copyright Purdue University

The STARS program helps students develop the skills needed for the homegrown semiconductor industry. Copyright Kelsey Lefever, Purdue University



Through BRICCs, students at San Jacinto Community College, including Guadalupe Hurtado (pictured), engaged with high-performance computing in partnership with Intuitive Machines, a company that produces equipment for NASA and employs 250 people in the Houston area. Copyright Intuitive Machines

Taking Flight with Tech

Building a strong tech economy requires robust cyberinfrastructure and a skilled workforce, yet smaller institutions and community colleges don't always have the advanced tools, networks, and partnerships necessary to accomplish this. Two programs led by researchers at Texas A&M University are helping to bridge the gap. The NSF-funded SWEETER program helped build a network that connects 10 colleges and universities in Texas, New Mexico, and Arizona—ranging from research-intensive universities to community colleges—with non-profits and industry. The program provided training, tools, and a web platform to make it easier for low-resource institutions to access high-performance computing. Another NSF-funded program known as BRICCs aims to address the unique challenges smaller institutions and community colleges face in adopting cutting-edge cyberinfrastructure. By facilitating lasting partnerships, BRICCs is advancing practical solutions to help these institutions participate in large-scale computing.

"These programs help enable researchers to apply advanced cyberinfrastructure techniques in real-world environments. At the same time, we are ***building a stronger national AI/ML workforce*** *to accelerate U.S. innovation and entrepreneurship."*

Dhruva Chakravorty, Texas A&M University
Copyright Texas A&M University

Advancing America's Quantum Edge

Quantum technology has the potential to change everyday life—helping to develop new technologies that dramatically evolve medicine, science, computing, and communication. The Quantum Collaborative at Arizona State University aims to keep the U.S. at the forefront by tackling complex research challenges and training tomorrow's quantum workforce. With more than 40 partners from industry, academia, non-profits, and national labs, the collaborative invests in people and technologies to advance America's quantum ecosystem. It builds on the successes of the Quantum Innovation Center, an earlier three-year public-private partnership between Arizona State University and IBM, and has awarded over $800,000 to accelerate innovation in quantum technology.

*"There are so many different roles and opportunities within the realm of quantum. Over time, a **ton of jobs** are going to need to be created, and the workforce really needs to be catalyzed in order to take full advantage of quantum."*

Ken Durazzo, Dell Technologies

Partners in the Quantum Collaborative
Copyright Arizona State University Quantum Collaborative

STEM for a New Start

STEM careers fuel families and the economy by helping more Americans find impactful, future-focused work. With Princeton University's Prison Teaching Initiative, formerly incarcerated college students get a unique chance to make a new start with STEM. Each summer, students from across the country visit Princeton to explore engineering and computer programming through Princeton's NSF-funded Research Experiences for Undergraduates program (the only one of its kind focused on formerly incarcerated students) and the Coding Foundations of Research program, which teaches non-Princeton undergraduates the fundamentals of computer programming. Helping participants build the skills, experience, and professional network they need to succeed, the programs strengthen the STEM workforce while amplifying participants' positive impact on society.

*"These programs add onto your success level and put you in a position to go on to do better things, real things. **It bolstered my drive and desire to do great things** and to be impactful on others."*

Wali Palmer, summer intern at Princeton University

Source: NJ Advance Media. Copyright Sorat Tungkasiri

Interns tour Princeton's High-Performance Computing Research Center, which carries out complex computations such as modeling the formation of galaxies and the collisions of subatomic particles. Copyright Princeton University, Office of Engineering Communications, Sameer A. Khan/Fotobuddy (2023)

CASC Priority Area:
Workforce

Maintaining America's dominance in the global economy requires a workforce equipped to lead us into the future. CASC is committed to building the next generation of trailblazers—innovators, disruptors, and collaborators—who will build the industries of tomorrow.

Modeling the buildup of heat in NASCAR cabins, engineers redesigned exhaust panels for better air flow, keeping drivers cool under pressure. Copyright Greg Padgett, TotalSim

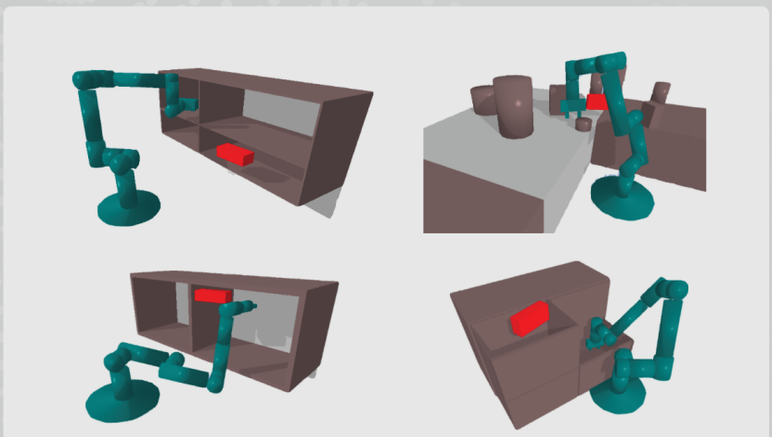
Moving Up

A Fast Fix for Cool Cars

When NASCAR introduced its NextGen racecars, the competition heated up—literally. With all that power churning under the hood, the new closed floor design caused cabin temperatures to soar, impeding driver comfort and endurance. To find a fix, NASCAR turned to TotalSim, an Ohio-based company specializing in computational fluid dynamics. With tight timelines and complex simulations to perform, TotalSim enlisted the nearby Ohio Supercomputer Center (OSC) for help. Thanks to OSC's world-class computing power, engineers validated an improved exhaust system in weeks, turning around a successful solution for cooler cabins—no sweat.

*"We needed hundreds of cores and a lot of storage space to run these simulations. The **computing power** OSC provided allowed us to process the results in **a fraction of the time** it would have taken in-house."*

Greg Padgett, TotalSim
Copyright Greg Padgett, TotalSim



Robots Ready for Anything

Imagine a robot that could step into a home, hospital, or construction site and get to work immediately, whether preparing dinner or laying bricks. New technology developed by Arizona State University could make this possible by enabling robots to move through dynamic environments without pre-programmed maps. With funding from the Air Force Office of Scientific Research, researchers taught 3.2 million virtual robotic manipulators how to move from one point to another by solving complex motion planning problems. They then transferred the skills learned during the simulated training to real robotic manipulators, which successfully demonstrated the ability to handle unfamiliar situations even with no additional real-world training. The method can speed the development of flexible, ready-to-use software for many different types of robots to make our lives safer, easier, and more efficient.

*"Our technology enables **safe and intelligent** motion planning for a range of robots, making them more **practical and effective** in real-world settings."*

Nakul Gopalan, Arizona State University
Copyright Nakul Gopalan

Skills developed through a simulated training program (left top) were transferred to real robots (left bottom), empowering robotic manipulators to navigate unfamiliar environments with ease. Copyright Arizona State University

AI Takes Aim at Roadside Hazards

Roadside objects such as signs, poles, and trees can turn a driver's mistake into a tragedy. A new AI-based approach aims to make it easier to spot and fix hazardous areas, especially in rural regions where identifying roadway risks requires costly fieldwork. Researchers at the University of North Carolina at Chapel Hill's Renaissance Computing Institute (RENCI) created a system that uses dashcam video and LIDAR data to automatically detect and analyze roadside objects, guardrails, and topographical features such as steep hills. The project, sponsored by the N.C. Department of Transportation in collaboration with the UNC Highway Safety Research Center and U.S. Department of Transportation, could make road maintenance planning more efficient and help protect everyone who travels on America's roads.

68% Rural areas account for 68% of our nation's roadway miles. The fatality rate on these roads is 40% higher than in urban areas, underscoring the need to improve rural road safety.

Source: U.S. Department of Transportation

A prototype system for assessing road safety successfully detected guardrails 90% of the time (shown here) and utility poles 88% of the time. Copyright RENCI at UNC-Chapel Hill

An Engine for America's Economy

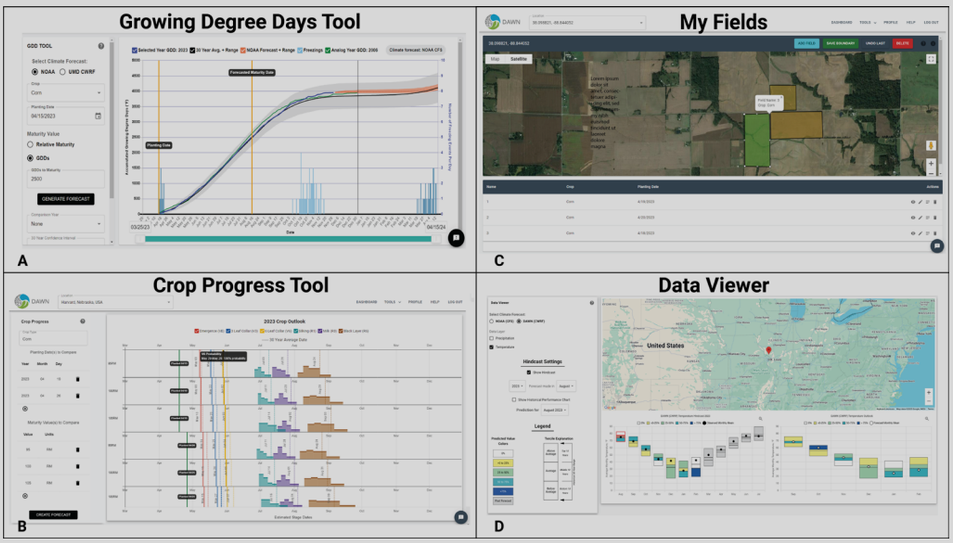
America's railways are an economic engine crucial to U.S. competitiveness. In addition to bringing high-wage railroad jobs to rural America, railways keep food and energy costs affordable and spur domestic job creation in manufacturing and logistics. One way the railroad industry can keep costs down is to use continuously welded rails, which are quicker and cheaper to install than conventional air-gapped rails. But this isn't safe to do everywhere, since continuous rails are more prone to failure in extreme temperatures. With the computational power of the Pittsburgh Supercomputing Center, researchers at the University of Pittsburgh are using AI to simulate the behavior of rail lines and predict when a given stretch of rail could generate dangerous buckling or breakage. The work, funded by the Federal Railroad Administration, can help railroads run more efficiently without raising the risk of delays or derailments.

At the University of Pittsburgh, researchers are using AI to predict where it's safe to deploy cost-saving continuously welded rails. Copyright MiguelMalo, iStock

Homegrown AgTech

DAWN of a New Era

When farmers succeed, we all benefit from healthy meals and stable food supplies. However, the cost and quality of each morsel we eat depend on farmers making the right choices at the right time. A team at the University of Maryland is using AI to inform decisions about what to plant, when to plant it, and how to optimize yields with water and fertilizer. Their tool, called DAWN, features a farmer dashboard that turns complex data—like temperature, rainfall, soil moisture, and runoff—into actionable information tailored to each farm's location and crops. Institutions across the Corn Belt collaborate closely with farmers for this USDA-funded project, which aims to support seasonal predictions for mid-range planning as well as short-term forecasts for real-time decision making. Supercomputers at the Pittsburgh Supercomputing Center and Johns Hopkins University handle the massive amounts of data necessary to run DAWN's AI algorithms and make predictions.



DAWN's dashboard turns complex data into actionable insights for smarter farming decisions. Copyright the DAWN Project

*"When completed, DAWN will assist our farms with crop rotation selection, timing of key activities, projecting harvest dates, and projecting potential yields for various weather scenarios, all of which will help us **increase yield while saving time and reducing costs**. The dashboard is being built with our farms' input and is **designed for farmers**."*

Harold Birch, UnCommon Farms
Copyright Harold Birch, UnCommon Farms LLC

Strengthening a Key Economic Sector

The North Carolina Agricultural Analytics Platform is tapping the power of data to help farmers boost productivity and build thriving businesses. Supported by this platform, NC State University researchers developed a web-based tool called BeanPACK to provide North Carolina's 5,000 soybean growers with site-specific planting recommendations to maximize yields. Launched in time for the 2025 growing season, BeanPACK saw over 1,000 unique visitors in its first year, reflecting farmers' strong enthusiasm for data-driven insights. Another project, called SweetAPPs, takes aim at the $45 million in annual losses North Carolina farmers suffer as a result of misshapen sweet potatoes — often left unharvested despite equal nutritional value. Researchers are using imaging data and AI to help growers make planting, harvesting, and packing decisions for prettier potatoes and less waste.

With funds appropriated by state lawmakers, the NC Agricultural Analytics Platform is a public-private partnership of NC State University, NC A&T State University, and SAS.


Copyright Marc Hall, North Carolina State University

*"We wanted to empower work that aims to unlock research insights for farmers and others who work in and support food production. With this ongoing project, we aim to **leverage the deep expertise** in analytics power and brainpower to **support a critical part of our economy.**"*

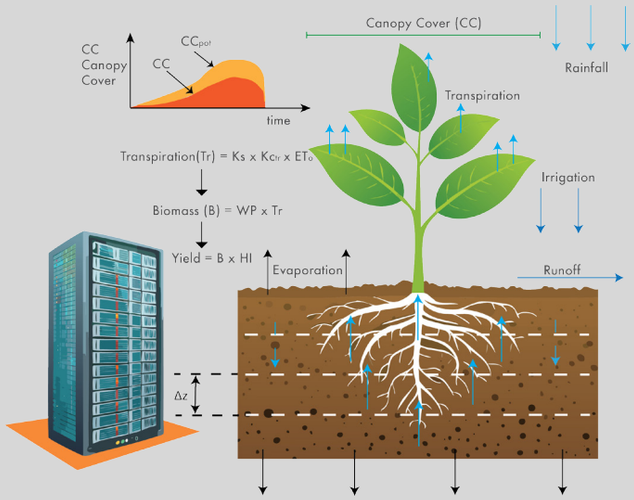
NC State Representative Jimmy Dixon

Taking the Irritation Out of Irrigation

As water becomes scarce in some areas of the country, growers must make the most of every drop to stay competitive. A team at Clemson University is using AI to help farmers optimize irrigation with funding from the USDA National Institute of Food and Agriculture. First, their system tests different irrigation strategies to learn which actions best balance water savings and crop yields under various conditions. Once trained, the system uses this information to make real-time decisions in the field, adapting irrigation scheduling to changes in soil moisture, rainfall, temperature, and water lost through evaporation. Tests conducted in partnership with the University of Georgia showed the approach to be feasible and effective in cotton and corn fields across the Southeast.

*"Traditional irrigation methods often fall short in adapting to dynamic environmental changes, leading to excess irrigation water and reduced crop yields. We're developing tools and algorithms for **practical optimization of irrigation** water use across diverse crops, soil types, and weather conditions."*

Vidya Samadi, Clemson University
Copyright Vidya Samadi



An AI model uses real-time data to adjust irrigation based on local conditions Copyright Krishna Panthi

Investing in the Future of Farm Economies

The AI-LEAF Institute, jointly funded by the USDA National Institute of Food and Agriculture and NSF, uses the latest AI technology to spur agriculture innovation and grow the next generation of AI, agriculture, and forestry professionals. One area of focus is tracking how regenerative farming and forestry practices improve soil health and strengthen our food supply. Combining machine learning with decision-support tools, the effort helps land managers understand which practices will deliver the greatest returns. The institute is also creating flexible, user-friendly interfaces to allow students, researchers, and decision makers to make use of a variety of types of farm data with powerful AI tools. AI-LEAF is led by the University of Minnesota in collaboration with Cornell University, Colorado State University, Purdue University, Delaware State University, NC State University, and the International Soil Resource and Information Centre.

AI-LEAF promotes careers in agricultural technology and AI by sponsoring activities like the Farm Robotics Challenge. In 2025, the University of Minnesota team (pictured) won an award for their drone-based deer deterrence system. Copyright Maria Gini, AI-LEAF

$124b

The U.S. soybean industry contributes an estimated $124 billion per year to the nation's economy. As a result, even a small increase in yields through tools like BeanPACK can have big economic impacts. Source: NOPA

Defending Our Nation

Modeling for a Mightier Military

Self-driving off-road vehicles offer many advantages for America's fighting forces. However, designers must account for a wide range of conditions that such vehicles might encounter—from traversing a treacherous mountain pass in the dead of night to navigating a dense forest in a downpour. To stay nimble, the U.S. Army DEVCOM Ground Vehicle Systems Center partnered with Clemson University to develop a digital twin framework for off-road autonomy experimentation. Running parallelized workloads of sophisticated simulations on Clemson's high-performance computers, engineers can digitally verify and validate autonomous systems so that only the best designs are prototyped for physical testing. Accelerating innovation in off-road autonomy for the Army can also unlock new opportunities for commercial transportation and other civilian applications to keep America moving forward.

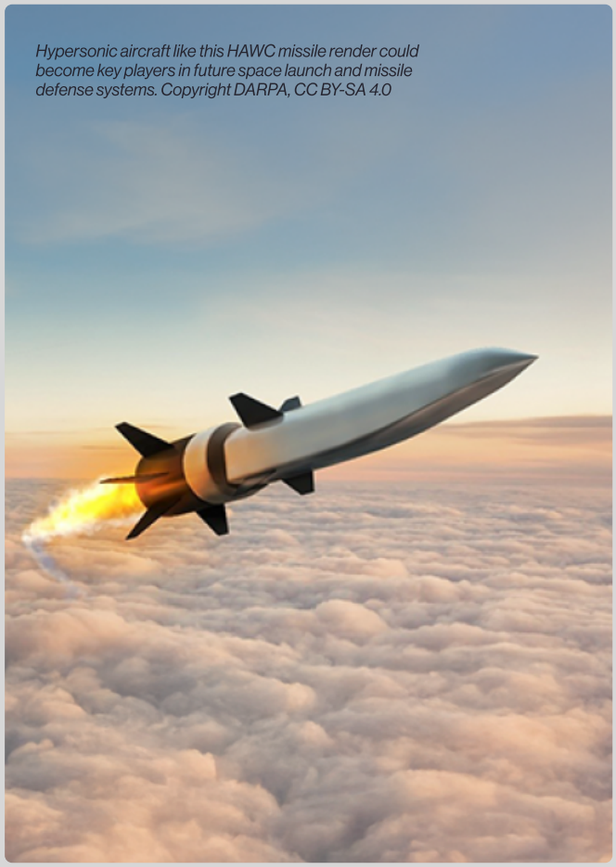
Clemson researchers use simulations to design self-driving off-road Army vehicles. Images copyright Chinmay Samak and Tanmay Samak, ARMLab CU-ICAR

Microscopic Threats to Hypersonic Flight

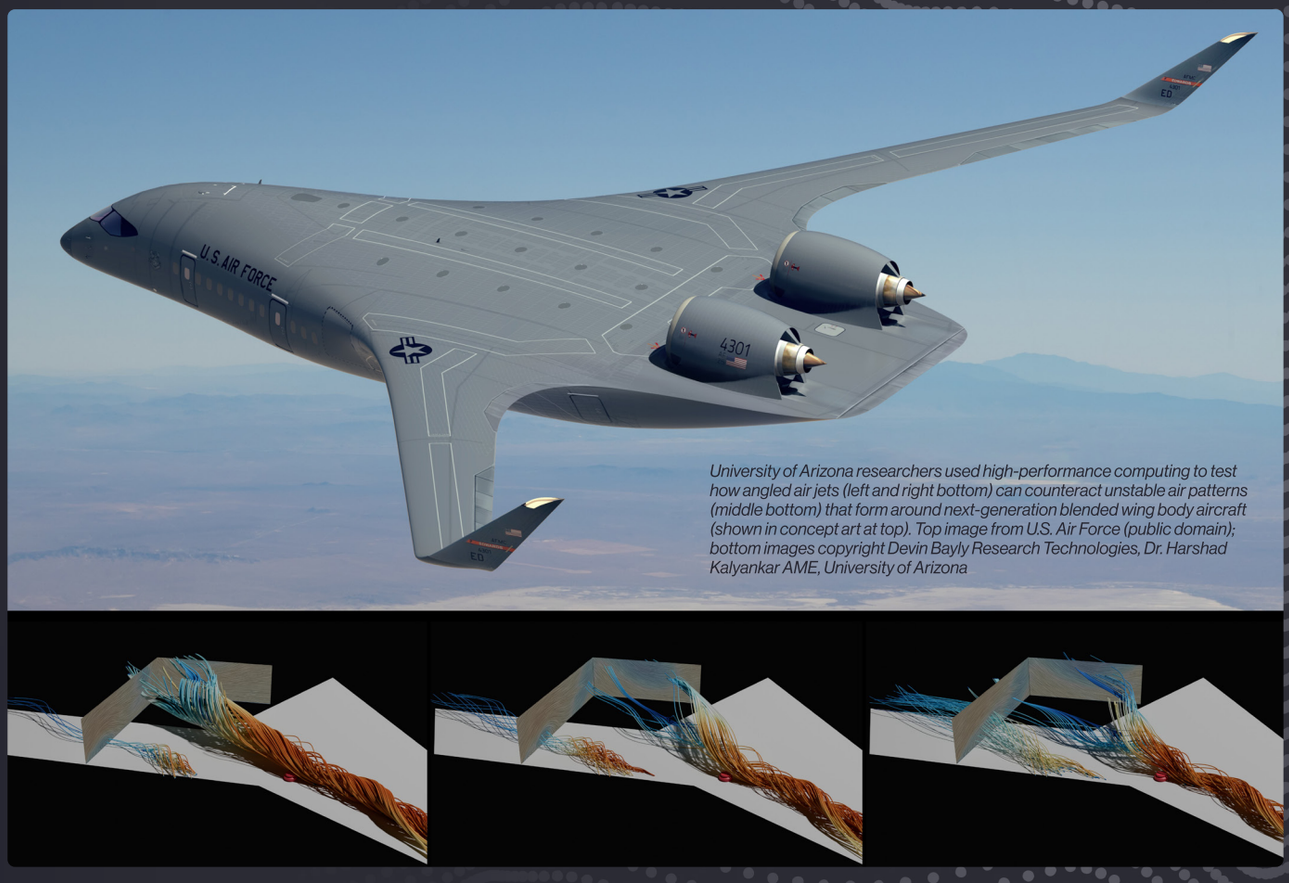
At hypersonic speeds, even a tiny speck of dust can cause big trouble. Researchers from New Mexico State University and the University of Illinois Urbana-Champaign are studying what happens when high-speed aircraft encounter airborne particles like those in air pollution or volcanic ash. Drawing on the power of Purdue University's Anvil supercomputer, they ran detailed 3D simulations of how particle-laden air interacts with the nose cone of a hypersonic vehicle at speed. They found that heavier and larger particles pose the greatest danger in terms of eroding surface coating and interrupting air flow. These insights could inform safer aircraft designs, flight paths, and maintenance strategies to ensure America's continued dominance in the skies.

*"The findings of this study have **important implications for designing and operating hypersonic vehicles** in particle-laden environments. They point to the need to protect impact-prone regions with erosion-resistant materials, optimize thermal protection systems, and strategically place sensors and instruments in low-risk zones."*

Qiong Liu, New Mexico State University
Copyright Qiong Liu, New Mexico State University



Hypersonic aircraft like this HAWC missile render could become key players in future space launch and missile defense systems. Copyright DARPA, CC BY-SA 4.0



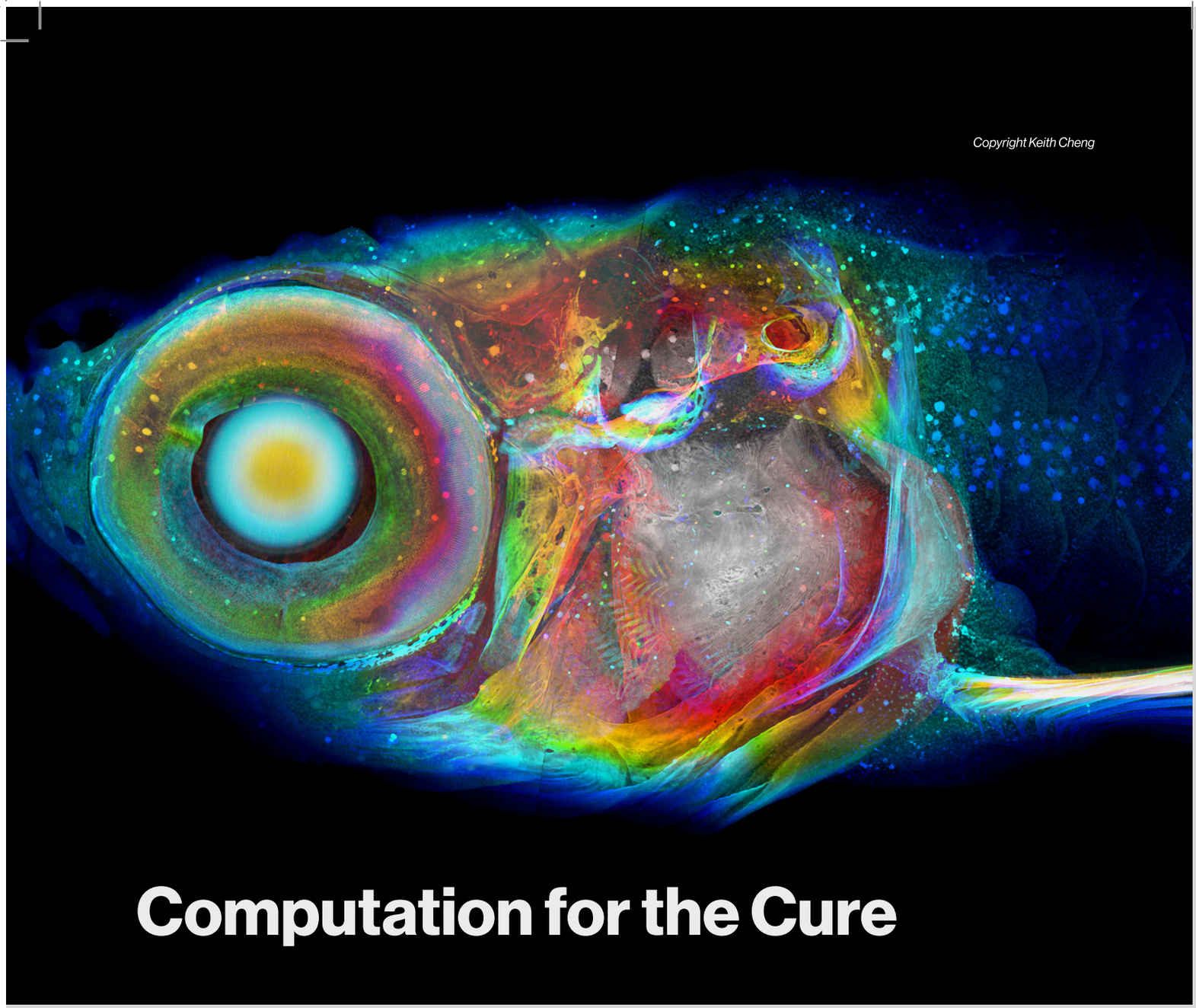
University of Arizona researchers used high-performance computing to test how angled air jets (left and right bottom) can counteract unstable air patterns (middle bottom) that form around next-generation blended wing body aircraft (shown in concept art at top). Top image from U.S. Air Force (public domain); bottom images copyright Devin Bayly Research Technologies, Dr. Harshad Kalyankar AME, University of Arizona

Taking the Fight to the Air

The sleek, tailless designs of blended wing body aircraft are moving closer to reality for both military and commercial applications. With a promise of cutting fuel consumption by up to half, these next-gen aircraft could pack a punch with incredibly long-range flights and more payload. But such a radical design change is not without challenges. One issue is air itself: swirling air patterns called leading edge vortices that develop around the body and wings of these aircraft lead to pressure oscillations that could cause instabilities during certain maneuvers. To find a fix, University of Arizona researchers tested a new design and visualized the experimental data on a platform hosted by Indiana University. Their solution? Fight air with air. Engineers designed a device that produces jets of air at specific angles to control the pressure oscillations. The device not only makes the aircraft safer but can also serve a dual purpose thanks to its ability to pitch the nose up or down. The improved aircraft design could boost endurance and reduce costs for these advanced aircraft.

CASC Priority Area:
Cybersecurity

Cyber vulnerabilities endanger us all, whether at the individual or national level. CASC advances cybersecurity best practices to support effective systems for protecting data, research, and internet safety.

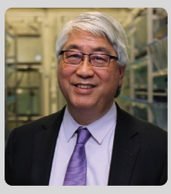


Copyright Keith Cheng

Computation for the Cure

Illuminating Cancer's Secrets in 3D

To study or diagnose cancer, scientists typically examine extremely thin slices of tissue that offer an up-close glimpse of each cell. However, this doesn't reveal how cancer cells interact within a tumor or how different parts of a tumor respond to treatment. A new method developed at Penn State College of Medicine with funding from the National Institutes of Health (NIH) allows researchers to image much larger samples—up to a centimeter in diameter—with unprecedented detail. The technique, called X-ray histotomography, uses X-ray beams to take 2D images at thousands of angles and then converts these into 3D reconstructions, using AI to increase image quality and accelerate analysis speeds. Researchers have demonstrated the method's ability to image entire small organisms, such as the zebrafish shown here, with a goal of eventually applying it to cancer tissue samples of a similar size. The ability to image an entire tumor biopsy in 3D would not only offer new insights into cancer and how to treat it but could also allow more precise diagnoses.

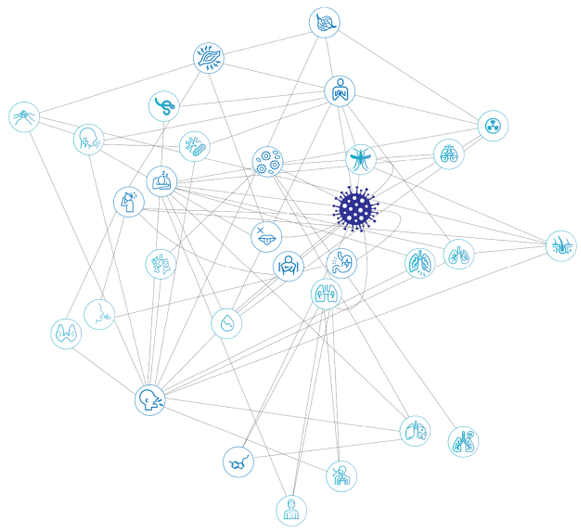


*"This is a dream interdisciplinary project with **applications across biology, medicine, agriculture, and AI**, and involves collaboration with industry and multiple government agencies. I love to keep asking, '**What of great importance can we accomplish together that none of us can do alone?**'"*

Keith Cheng, Penn State College of Medicine
Source: Penn State News
Copyright Penn State College of Medicine

Mining for Miracles

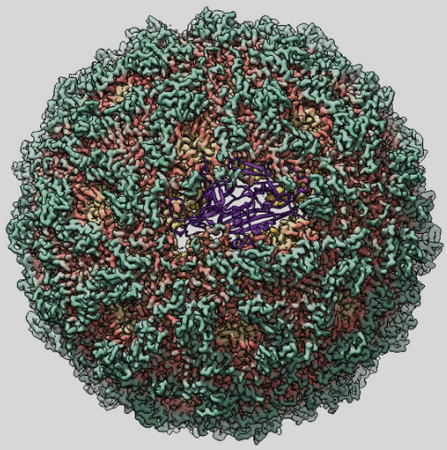
Millions of people with rare and under-researched diseases face limited treatment options. Could the answer already be sitting on pharmacy shelves? The MATRIX project, funded by ARPA-H and led by Every Cure, is using AI to find new uses for FDA-approved drugs. A critical component is the ROBOKOP knowledge graph, originally developed by researchers at University of North Carolina at Chapel Hill's Renaissance Computing Institute (RENCI) under the NCATS Biomedical Data Translator Program, and currently supported under NIH's Data Repositories and Knowledge Bases program. By structuring information from dozens of biomedical databases in a way that enables advanced queries and insights, ROBOKOP makes it possible for AI algorithms to mine for previously unrecognized links between drugs, genes, and disease processes. With a goal of exploring 18 million potential drug-disease connections, this work could open the door to treatments for 9,000 diseases that currently have no FDA-approved therapies.



Artistic rendering of the ROBOKOP knowledge graph helping to power the MATRIX project. Nodes (circles) represent biomedical entities like diseases, genes, or chemicals; edges (lines) represent the relationships between them. Created by Marcus Anderson; copyright RENCI at UNC-Chapel Hill

*"By integrating knowledge into graphs, we can **use AI to search for strong, testable links** between drugs and diseases that haven't been connected before. This could point to **promising new uses for existing drugs** that, with further research, might one day improve lives."*

Chris Bizon, RENCI at UNC-Chapel Hill



Solving the Superworm Mystery

For years, a stealthy pathogen has been devastating superworms—a type of beetle larvae raised as feed for reptiles, birds, and amphibians, and seen as a promising alternative protein source for humans. To hunt down the cause of this agricultural pandemic, researchers at Rutgers University used an unconventional tool: they zoomed in on the pathogen directly with high-powered cryoelectron microscopy. With NIH funding, they turned thousands of 2D microscopy images into a near-atomic-resolution 3D protein structure that revealed a previously unknown virus as the culprit. This impressive feat was made possible by using on-the-fly GPU-accelerated processing, which analyzes data as it's collected, drastically shortening the time from sample isolation to virus identification. Based on their discovery, scientists created a diagnostic test to survey superworms in pet stores and farms and have identified a non-pathogenic viral variant that appears to protect larvae from the dangerous strains—a promising step toward a vaccine to protect this important agricultural species.

This 3D virus structure was computed from thousands of 2D electron microscopy images. Copyright Prof. J.T. Kaelber, Rutgers University

CASC Priority Area:
Team Science

With AI, discoveries in one area can unlock applications in entirely different fields and industries. CASC supports collaborations that share data and build bridges to make the best possible use of the nation's research investments.

Respond and Recover

Fighting Fire with Precision

When the historic Palisades Fire broke out in Los Angeles, the WIFIRE team at the University of California San Diego responded within minutes of the first sign of smoke. Instead of hoses and helicopters, WIFIRE uses cameras, sensors, and algorithms to predict where fire is likely to spread and guide efforts to contain it. The fire—which raged for a grueling 24 days—was incredibly destructive, but it could have been far worse without the real-time information firefighters used to extinguish multiple blazes that ignited across the area at the same time. Producing high-precision maps with high-tech models at the San Diego Supercomputing Center, WIFIRE helps to identify ignition points, project fire spread, and assess damage. To make it useful for on-the-ground decision making, researchers collaborated with local fire departments, electric utilities, state agencies in California and Colorado, and the U.S. Department of Homeland Security.

*"WIFIRE started from federal funding and has become a **critical part of public safety**. It is a perfect example of how funding research **directly benefits the public good.**"*

Ilkay Altintas, San Diego Supercomputing Center
Copyright Erik Jepsen, UC San Diego Communications

CASC Priority Area:
Alignment

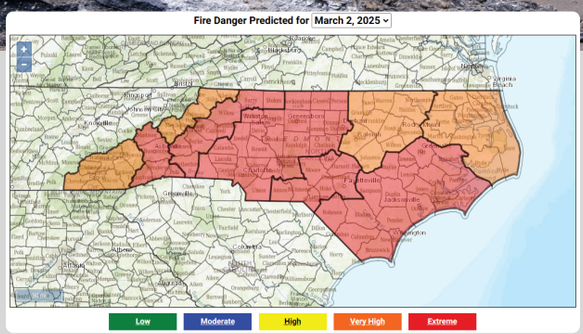
Aligning information, resources, and plans is crucial to areas like disaster preparedness and response. CASC facilitates productive dialogue to promote alignment among stakeholders in academia, industry, community organizations, and government agencies.

Responders mapped hotspots to guide firefighters during the January 2025 Palisades Fire. Copyright Erik Jepsen, UC San Diego Communications

Getting Weather-Wise to Save Lives

From sudden storms to wildfire threats, accurate forecasts can make a life-or-death difference for residents and responders. The North Carolina State Climate Office bridges the gap between scientists, decision makers, and communities to transform data into action. Through a network of 45 weather stations and accessible information portals, the office provides critical, real-time information that puts data to work where it matters most—like guiding weather-smart planning, informing evacuations, and forecasting farming conditions across the state.

A road destroyed by Hurricane Helene in 2024. The NC Department of Transportation is using precipitation data from the North Carolina State Climate Office to guide rebuilding efforts and ensure that new infrastructure can better handle future storms. Copyright NCDOTcommunications CC BY 2.0



*"The North Carolina State Climate Office is an **extraordinary asset to the state**. North Carolina State Parks uses a variety of its products on a regular basis. We distribute the weekly drought updates, use the Fire Weather Intelligence Portal tool to predict fire behavior and assess fire danger, share the fire danger prediction forecast to assist in preparing for the rapid deployment of staff, and plan prescribed fires based on the short-range outlooks."*

Thomas Crate, Fire Manager, NC State Parks

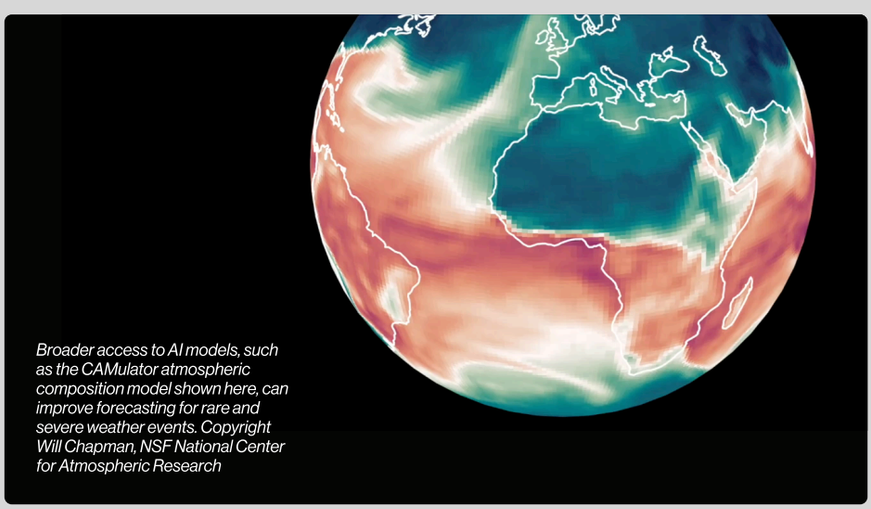
Snapshot of North Carolina's Fire Weather Intelligence Portal on a day when over 175 wildfires erupted across the Carolinas.

$1b

It pays to be prepared. In 2024, the U.S. sustained 27 weather disasters with losses exceeding $1 billion each. Every state in the country has been impacted by at least one billion-dollar disaster in the past 45 years. Source: NOAA National Centers for Environmental Information

AI Weather Modeling for All

AI-driven weather models can offer distinct advantages over traditional models, and they're getting better all the time. But using them has typically required a particular level of expertise, limiting their impact. Now, a new platform is putting the power of AI weather modeling into the hands of many more scientists and students. Known as CREDIT, the platform includes a library of AI models, high-quality datasets to train them, and access to the computational resources needed to run them. Created by the NSF's National Center for Atmospheric Research, CREDIT gives American researchers unprecedented access to use and improve cutting-edge weather-prediction technology for the benefit of all.



Broader access to AI models, such as the CAMulator atmospheric composition model shown here, can improve forecasting for rare and severe weather events. Copyright Will Chapman, NSF National Center for Atmospheric Research

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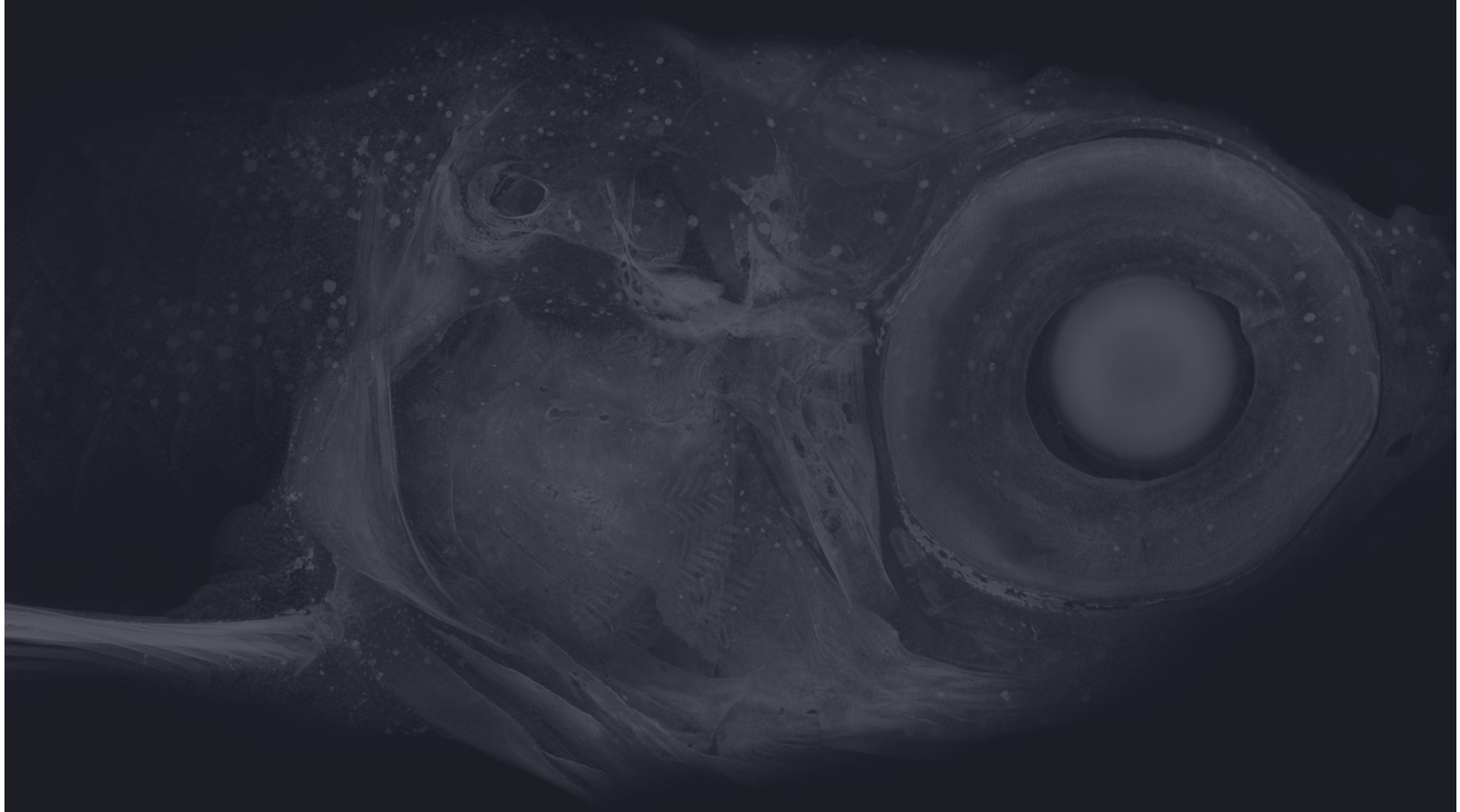

The Coalition for Academic Scientific Computation (CASC) is a nonprofit organization dedicated to the use of advanced computing technology to accelerate discovery. Through their role in sustaining a robust research ecosystem and expertly trained 21st-century workforce, our members support America's competitiveness, security, and economic growth.

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