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GENTLE.NEWS

In Today's Edition

"Have you ever noticed that anybody driving slower than you is an idiot, and anyone going faster than you is a maniac?"

— George Carlin

NASA’s Webb Finds Clues to Ancient, Distant Origin of Comet 3I/ATLAS

Explore Webb Science James Webb Space Telescope (JWST) NASA’s Webb Finds Clues to… Webb News Latest News Latest Images Webb’s Blog Awards X (offsite – login reqd) Instagram (offsite – login reqd) Facebook (offsite- login reqd) Youtube (offsite) Overview About Who is James Webb? Fact Sheet Impacts+Benefits FAQ Webb Timeline Science Overview and Goals Early Universe Galaxies Over Time Star Lifecycle Other Worlds Science/Engineering Explainers Observatory Overview Launch Deployment Orbit Mirrors Sunshield Instruments & ISIM Module Instrument: NIRCam Instrument: MIRI Instrument: NIRSpec Instrument: FGS/NIRISS Optical Telescope Element Backplane Spacecraft Bus Webb vs Hubble -> Multimedia About Webb Images Images Videos What is Webb Observing? 3d Webb in 3d Solar System Podcasts Webb Image Sonifications Webb’s First Images Team International Team People Of Webb More For the Media For Scientists For Educators For Fun/Learning 4 Min Read NASA’s Webb Finds Clues to Ancient, Distant Origin of Comet 3I/ATLAS Researchers used the NIRSpec (Near-Infrared Spectrograph) instrument on NASA’s James Webb Space Telescope to map specific chemical contents of comet 3I/ATLAS as it moved away from the Sun. Full image shown below. Credits: Image: NASA, ESA, CSA, STScI, Martin Cordiner (CUA, NASA-GSFC); Image Processing: Alyssa Pagan (STScI)

Source: NASA

As interstellar comet 3I/ATLAS began moving away from the Sun in December 2025, astronomers took the opportunity to turn NASA's powerful James Webb Space Telescope in its direction and capture detailed measurements of its chemical components. The comet was freshly warmed from its closest pass by the Sun, and its ancient ice had been converted to a bright coma of gas ideal for observation. Webb captured detailed data, including chemical ratios of carbon and deuterium, also known as heavy hydrogen, that are not found in solar system comets. The results surprised researchers. Working backward, astronomers used the components that make up comet 3I/ATLAS to understand the environment in which it formed. A paper detailing the findings published June 22 in the journal Nature . Image: Interstellar Comet 3I/ATLAS (NIRSpec IFU) Researchers used the NIRSpec (Near-Infrared Spectrograph) instrument on NASA's James Webb Space Telescope to map specific chemical contents of comet 3I/ATLAS as it moved away from the Sun. Image: NASA, ESA, CSA, STScI, Martin Cordiner (CUA, NASA-GSFC); Image Processing: Alyssa Pagan (STScI) The comet's name comes from its status as the third confirmed interstellar comet, meaning it originated outside the solar system, and the telescope that first spotted it, the NASA-funded ATLAS (Asteroid Terrestrial-impact Last Alert System). "This was a unique opportunity to study an ancient object from the distant galaxy, probably pre-dating our Sun and solar system," said astro-chemist Martin Cordiner of NASA's Goddard Space Flight Center in Greenbelt, Maryland, and lead author of the study. "On the one hand, we get direct insight into that

Source: NASA

distant time and place, and on the other, we learn something about how unusual our own solar system may be.” Cordiner and the research team joined astronomers from many sub-disciplines in taking the opportunity to get a look at 3I/ATLAS on its journey through the solar system. They received approval to interrupt Webb’s planned schedule of observations to make use of its NIRSpec (Near-Infrared Spectrograph) instrument to study the comet. NIRSpec revealed exceptionally high levels of deuterium, about 30 times more than seen in solar system comets. This implies that 3I/ATLAS may have originated in a very cold system much earlier in the history of our galaxy. During its formation, the material that became incorporated into 3I/ATLAS was likely exposed to plenty of radiation, but not any long-term warmth that would have reprocessed its “heavy water” ice, with deuterium, into the type of H 2 O ice we are familiar with on Earth. Image: 3I/ATLAS Compared to Solar System Comets These graphs lay out the significant difference in composition between the interstellar comet 3I/ATLAS and comets originating in our solar system. This very specific data helps researchers build a picture of the comet’s original planetary system. Illustration: NASA, ESA, CSA, Martin Cordiner (CUA, NASA-GSFC), Leah Hustak (STScI) Additionally, NIRSpec showed only traces of carbon-13 compared to lighter-weight carbon-12. This also points to a very old origin for 3I/ATLAS, as stellar systems become enriched with carbon-13 over time as generations of stars are born and die in the galaxy. That is why there are higher levels of carbon-13 in our system, around our Sun, which formed relatively recently, 4.5 billion years ago.

Source: NASA

The research team estimates that 3I/ATLAS could have formed as long as 10 to 12 billion years ago, during the universe's " cosmic noon ," when star formation was at its height. Its young origin system was likely ensconced in a relatively cold, dense cloud. The abundance of heavy water shows that 3I/ATLAS spent its formative years in a deeply frozen state. A separate study using the European Southern Observatory's Very Large Telescope, led by astronomer Cyrielle Opitom of the University of Edinburgh, complements Webb's findings with an analysis of 3I/ATLAS's carbon and nitrogen varieties in the form of the chemical cyanide. "For us as scientists, finding these rare isotopes is fascinating, but the bigger picture here is looking at the possibilities of prebiotic chemistry elsewhere in the galaxy," said Stefanie Milam of NASA Goddard and co-author of the study with Cordiner. "So far, we know of only one place in the vast cosmos where chemical ingredients led to life – our solar system, our Earth. Analysis of these interstellar objects is a major step towards learning how common, or uncommon, the conditions for the evolution of life are in the universe." The James Webb Space Telescope is the world's premier space science observatory. Webb is solving mysteries in our solar system, looking beyond to distant worlds around other stars, and probing the mysterious structures and origins of our universe and our place in it. Webb is an international program led by NASA with its partners, ESA (European Space Agency) and CSA (Canadian Space Agency). To learn more about Webb, visit: https://science.nasa.gov/webb Downloads & Related Information The following sections contain links to download this

Source: NASA

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Source: NASA

Protecting Oregon's rare butterflies and their host plants

Protecting Oregon’s rare butterflies and their host plants Jun 22, 2026 Written By Image Leah Schrodt Every June during Pollinator Week, we at the U.S. Fish and Wildlife Service shine a spotlight on the many pollinators that fertilize plants, sustain food webs, maintain biodiversity and keep our ecosystems thriving and healthy. These pollinators also sustain us by supporting our economies and ensuring we are all well fed with delicious fruits and vegetables. When thinking about pollinators, most people envision bees. Oregon’s 700+ native bees do play an essential role across our diverse landscapes, but there are many other types of pollinators. They include moths, beetles, flies, wasps, birds, rodents and butterflies. Many pollinators, including some of Oregon’s rare butterflies, have come to depend on specific host plants for their survival. Oregon’s rare butterflies This year, the Oregon Fish and Wildlife Office is highlighting four rare butterfly species we work to conserve and recover: the monarch butterfly (Danaus plexippus), the Taylor’s checkerspot butterfly (Euphydryas editha taylori), the Oregon silverspot butterfly (Speyeria zerene Hippolyta), and the Fender’s blue butterfly (Icaricia icarioides fenderi). All four have a unique life cycle that includes a necessary relationship with specific host plants during their larval stage. These plants provide the only food their caterpillars eat and are essential for reproduction and survival. Hidden defense mechanism Butterly host

Source: U.S. Fish & Wildlife Service

plants have a hidden secret: Every one of the host plants these butterflies depend upon also contain chemical compounds that are toxic to many animals. While these chemicals do not harm the chomping caterpillars, they do become stored up in their bodies. This powerful, hidden defense mechanism safeguards the caterpillars and makes them unpalatable or toxic to most potential predators. Monarch butterflies need milkweed Image Details The monarch butterfly, famous for its long-distance, three country spanning migration, is perhaps the most widely recognized butterfly in the United States. Monarch caterpillars feed exclusively on milkweed species. Although adult monarchs visit a variety of nectar-rich flowers, their populations cannot persist without milkweed. Monarch populations across the nation have declined significantly in recent decades, and the Service proposed to list the species under the Endangered Species Act in 2024. The monarchs that flutter around Oregon are part of the multi-generation western migratory population that primarily overwinters on the California coast. In Oregon, four native milkweed species grow in a variety of habitat types from the western valleys east to the sagebrush sagebrush The western United States' sagebrush country encompasses over 175 million acres of public and private lands. The sagebrush landscape provides many benefits to our rural economies and communities, and it serves as crucial habitat for a diversity of wildlife, including the iconic greater sage-grouse and over 350 other species. Learn more about sagebrush sea. They include heartleaf milkweed (Asclepias cordifolia), Davis' milkweed (Asclepias cryptoceras ssp. Davisii),

Source: U.S. Fish & Wildlife Service

narrowleaf milkweed (Asclepias fascicularis), and showy milkweed (Asclepias speciosa). All four milkweed species are critical to sustaining local breeding populations during the summer months and supporting the monarch’s migration. Monarch butterflies are typically present in Oregon from early May through September. We are working in partnership to conserve the western migratory population by implementing the priority actions in the Western Association of Fish and Wildlife Agencies 2025 update to the Western Monarch Butterfly Conservation Plan. The good news is, we all have an important role to play when it comes to monarch butterfly conservation! Everyone can help by planting nectar rich flowers that feed adult monarchs, planting milkweeds native to your region, protecting existing habitat in your community, and participating in community science like the Western Monarch Count and the Western Monarch Milkweed Mapper. Taylor’s checkerspot butterflies need plantain subspecies and golden and harsh paintbrush Image Details Taylor’s checkerspot butterfly, endemic to the Pacific Northwest, were once found throughout native prairies of western Washington, Oregon and southwest British Columbia. Historically found in Oregon’s grasslands and coastal prairies, this butterfly has declined along with the loss of prairie ecosystems due to development, invasive species invasive species An invasive species is any plant or animal that has spread or been introduced into a new area where they are, or could, cause harm to the environment, economy, or human, animal, or plant health. Their unwelcome presence can destroy ecosystems and cost millions of dollars. Learn more about

Source: U.S. Fish & Wildlife Service

invasive species and fire suppression, and is now limited to a small handful of sites in the state. To help protect this butterfly, it was listed as endangered in 2013. Taylor’s checkerspot butterfly larvae feed primarily on Golden paintbrush (Castilleja levisecta), Harsh paintbrush (Castilleja hispida) and Narrow-leaved plantain (Plantago lanceolata). Adult butterflies rely on a variety of nectar sources found in oak associated meadows and grasslands. Our collaborative conservation efforts aim to restore native prairie habitats. The Oregon Fish and Wildlife Offices has also been working with the Oregon Zoo since 2011 to raise these butterflies for future release into the wild. All these efforts are helping prevent extinction of the species and work toward recovery. Oregon silverspot butterflies need early blue violets Image Details The Oregon silverspot butterfly inhabits coastal grasslands and is closely tied to the early blue violet (Viola adunca), the sole host plant for their caterpillars. Adults feed on nectar from late-summer flowers such as yarrow and goldenrod, which help them build energy reserves for reproduction. Invasive species, fire suppression, development, and habitat changes along the coast have all contributed to the decline in the coastal habitat this butterfly needs, and their consequent declining population. They were listed as threatened in 1980. To foster suitable conditions for the Oregon silverspot butterfly to recover, the Oregon Fish and Wildlife Office and our many partners have been working to plant violets and nectar plants and manage and restore coastal meadows. Like Taylor’s checkerspot butterfly, we’ve also been partnering with the Oregon and Woodland Park Zoos to raise these

Source: U.S. Fish & Wildlife Service

butterflies for release to support the wild population and establish new populations. Thanks to this effort, about 2,000 butterflies are released each year at key sites along the Oregon Coast. Fender’s blue butterflies need Kincaid’s lupine Fender’s blue butterfly, at one time thought extinct, is now a conservation success story in Oregon’s Willamette Valley. Their caterpillars depend entirely on Kincaid’s lupine (Lupinus oreganus), a federally threatened native plant found in upland prairies. The adults feed on nectar from a range of prairie wildflowers, but the presence of Kincaid’s lupine is the key factor determining where the butterfly can breed because it is the only food source their caterpillars eat. Image Details Both the population of the plant and the butterfly have been impacted by their prairie habitat disappearing because of urbanization, conversion to agriculture, the spread of non-native plants, and the absence of wildfire. Due to these threats, the Kincaid’s lupine was listed as threatened in 2000 and the Fender’s blue butterfly was listed as endangered in 2003. Working with many partners, our species recovery efforts are focused on restoring Willamette Valley prairies and reestablishing Kincaid’s lupine to support Fender’s blue butterfly recovery. One of the sites key to our recovery efforts is William L. Finley National Wildlife Refuge where we are celebrating 10 years of successfully reintroducing Fender’s Blue Butterflies. Thanks to over 20 years of dedicated partner driven conservation, including working with private landowners and farmers, the Fender’s blue butterfly is on track to become a recovery success story and was downlisted from endangered to threatened in 2023.

Source: U.S. Fish & Wildlife Service

We remain dedicated to this butterfly thriving and someday no longer needing to be listed. Our work continues and you can play a roll Image Details Oregon’s rare butterflies illustrate the intricate connections between pollinators and plants. Protecting these species requires safeguarding their host and nectar plants and the habitats that support them. Through working with our partners and restoring native vegetation, controlling invasive species, preventing conifer encroachment in prairie environments, and protecting, propagating and planting their native host and nectar plants in essential habitats, we are working hard to recover these rare butterflies. Pollinator Week is more than a celebration — it’s a call to action. By learning about Oregon’s rare butterflies and the plants they depend on, we can all take meaningful steps to ensure these species survive for future generations. While the Oregon Fish and Wildlife Office’s work continues protecting these butterflies, everyone has a role to play in pollinator conservation. Whether you transform your yard into a pollinator haven, volunteer for a restoration project, work in your community to turn public spaces into pollinator habitats, get involved in community science to help monitor their populations, or simply spread the word about these rare butterflies, your actions will help all of Oregon’s pollinators. Learn more about each butterfly Monarch butterfly Taylor's checkerspot Oregon silverspot butterfly Fender’s blue butterfly Story Tags Insects Pollinators Rare species Wildlife restoration Wildlife viewing Recreational Activities Wildlife watching Written By Image Leah Schrodt Published Jun 22, 2026 Wildlife Management Facilities Oregon Fish and

Source: U.S. Fish & Wildlife Service

Wildlife Office Related Stories Endangered Species Act The Fairy of the Prairie: Fender’s Blue Butterfly is Fluttering Back from the Brink of Extinction Jan 11, 2023 Get Involved Backyard Insects and Pollinators Sep 16, 2021 Get Involved How to build a pollinator garden Mar 14, 2022 Latest Stories Wildlife Wonders Pollinator Bunch Go House Hunting Jun 22, 2026 Wildlife Wonders Our nation's nature Jun 22, 2026 Kuskokwim River Main Stem Fishing Opportunities Jun 18, 2026

Source: U.S. Fish & Wildlife Service

Magnitude-3.8 Earthquake Information Statement

Magnitude-3.8 Earthquake Information Statement By Hawaiian Volcano Observatory June 22, 2026 A magnitude-3.8 earthquake occurred 13 miles (21 km) south of Hōnaunau-Nāpōʻopoʻo on the Island of Hawaiʻi at a depth of 3 mi (6 km) below sea level at 6:20 a.m. HST on June 22, 2026. HAWAIIAN VOLCANO OBSERVATORY INFORMATION STATEMENT U.S. Geological Survey Monday, June 22, 2026, 7:19 AM HST (Monday, June 22, 2026, 17:19 UTC) Hawaiian Volcano Observatory Volcano Observatory Summary: A magnitude-3.8 earthquake occurred 13 miles (21 km) south of Hōnaunau-Nāpōʻopoʻo on the Island of Hawaiʻi at a depth of 3 mi (6 km) below sea level at 6:20 a.m. HST on June 22, 2026. On Monday, June 22, 6:20 a.m. HST, a magnitude-3.8 earthquake occurred 13 mi (21 km) south of Hōnaunau-Nāpōʻopoʻo on the Island of Hawaiʻi at a depth of 3 mi (6 km) below sea level. The earthquake had no apparent impact on the magmatic systems of either Mauna Loa or Kīlauea volcanoes. The depth, location, and recorded seismic waves of the earthquake suggest a source due to stress within the west flank of Mauna Loa volcano. This earthquake is probably not related to the magnitude-6 earthquake that occurred on May 22, which was related to stress from the weight of the island on the underlying rigid mantle. Weak shaking was reported during this event, which is not expected to cause significant damage. The USGS Hawaiian Volcano Observatory continues to

Source: U.S. Geological Survey

monitor Hawaiian volcanoes for any changes. EARTHQUAKE DESCRIPTION Magnitude: 3.8 Date and Time: June 22, 2026, at 6:20 a.m. HST Location: 13 mi (21 km) S of Hōnaunau-Nāpōʻopoʻo Depth: 3 mi (6 km) below sea level Aftershocks are possible in the coming days to weeks EARTHQUAKE INTENSITY AND AFFECTED AREA Potential Damage: No damage to buildings or infrastructure expected based on earthquake intensity Maximum Intensity, Modified Mercalli Scale (https://www.usgs.gov/natural-hazards/earthquake-hazards/science/modified-mercalli-intensity-scale) Community-reported: III - weak shaking Instrument-derived: III - weak shaking Felt Reports: More than 38 within the first hour (https://earthquake.usgs.gov/dyfi/) Felt Area: Widely on the southern and western areas of the Island of Hawaiʻi. Visit NOAA's Tsunami Warning Center website for updated information: https://www.tsunami.gov/ EARTHQUAKE MAPS AND ADDITIONAL INFORMATION USGS National Earthquake Information Center Maps and Reports for this Event: https://earthquake.usgs.gov/earthquakes/eventpage/hv74988627 USGS-HVO Interactive Earthquake Map of Hawaiʻi: https://www.usgs.gov/observatories/hawaiian-volcano-observatory/earthquakes
The Hawaiian Volcano Observatory is one of five volcano observatories within the U.S. Geological Survey and is responsible for monitoring volcanoes and earthquakes in Hawaiʻi and American Samoa. CONTACT INFORMATION: askHVO@usgs.gov Subscribe to these messages: https://volcanoes.usgs.gov/vns2/ Summary of volcanic hazards from eruptions: https://www.usgs.gov/observatories/hvo/hazards Recent earthquakes

Source: U.S. Geological Survey

in Hawai‘i (map and list): https://www.usgs.gov/observatories/hvo Explanation of Volcano Alert Levels and Aviation Color Codes: https://www.usgs.gov/programs/VHP/volcanic-alert-levels-characterize-conditions-us-volcanoes

Source: U.S. Geological Survey

USDA delivers more than $52 million to support rural communities across America

The U.S. Forest Service today announced it is distributing over $52 million to support local emergency services, schools and roads. In total, 65 counties will benefit from these funds under the Bankhead-Jones Farm Tenant Act. “These funds represent 25 percent of the revenue generated from management of federally administered grasslands in these communities. The payments help ensure local communities share in the economic benefits from the land,” said Forest Service Chief Tom Schultz. “The funds are used to support local schools and infrastructure like roads, while reinforcing the value these lands provide to the American people.” Funding breakdown: State Counties receiving payments Total payment North Dakota 9 $41,386,724 Colorado 4 $6,747,437 Wyoming 5 $2,488,079 Texas 5 $521,249 Kansas 2 $434,304 Oklahoma 1 $342,172 All other states 39 $104,283 Total 65 $52,024,248 A complete list of recipients is available at https://www.fs.usda.gov/working-with-us/secure-rural-schools/bankhead-jones-payments . Revenue was generated from receipts primarily consisting of mineral development collected by the Department of the Interior’s Office of Natural Resources Revenue and grazing revenues collected by the Forest Service during the 2025 calendar year. The Forest Service manages 20 national grasslands for multiple uses, including grazing, energy development and natural resource conservation.

Source: U.S. Forest Service

To learn more about these payments to counties, visit: https://www.fs.usda.gov/working-with-us/secure-rural-schools/bankhead-jones-payments . About the Forest Service: The Forest Service has brought people and communities together to answer the call of conservation for more than 100 years. Grounded in world-class science and technology—and rooted in communities—the Forest Service connects people to nature and recreation opportunities. The agency manages 193 million acres of public land, supports the nation’s forest industry and energy needs, and operates the largest and most respected wildland fire and forestry research organizations in the world. By providing assistance to state and private landowners and working with Tribes and other partners, the Forest Service also helps steward an additional 900 million forested acres within the U.S..

Source: U.S. Forest Service

Q&A with Melissa Cregger: From field to factory with precision crops

Inside the latest discoveries for fast-growing, resilient feedstock crops at DOE's Center for Bioenergy Innovation Published: June 22, 2026 Updated: June 22, 2026 Melissa Cregger, co-chief science officer for the Center for Bioenergy Innovation at ORNL. Credit: Carlos Jones/ORNL, U.S. Dept. of Energy As co-chief science officer for the Center for Bioenergy Innovation (CBI) at the Department of Energy’s Oak Ridge National Laboratory, Melissa Cregger helps guide research focused on developing and improving plant feedstocks to produce advanced chemicals and materials, strengthening U.S. supply chains. Cregger stewards the work of hundreds of scientists at CBI’s 18 research partners across the nation as they work on solutions for non-food plants that grow faster and larger, are resistant to drought and disease and are engineered to produce targeted end-products. She discussed recent CBI discoveries, why the center is expanding into new plant feedstocks like pine and eucalyptus, and how automation and AI can accelerate the path from genetic insight to factory-ready plants. The use of AI and robotics is a cornerstone of the DOE Genesis Mission, a national initiative to build the world's most powerful scientific platform to accelerate discovery science, strengthen national security, and drive energy innovation. Q: What is your focus at CBI as co-chief science officer? A: My focus is stewarding research for the development of plants that can reliably produce the fuels, chemicals

Source: Oak Ridge National Laboratory

and materials we need, while performing in real-world conditions on marginal lands not typically used to grow food. CBI has historically focused on poplar and switchgrass, two leading perennial biomass crops, while growing a broader portfolio of feedstocks and tools to improve performance and economic viability. CBI's goal isn't just higher yield crops — it's dependable yield in the places where these crops make the most sense to grow. We're identifying genes that control the traits that matter most in the field, such as the type and quantity of natural polymers they produce and their disease resistance and tolerance to stress such as drought, flooding and heat, so we can tailor feedstocks to different growing regions. Genetic resources, nationwide footprint key to success Q: What sets CBI apart in its research? A: What sets CBI apart is the scale of our genetic resources — large, diverse plant populations paired with our distinctive expertise in plant genetics, plant and microbial engineering, and biomass deconstruction. CBI's broad network of university, national lab and industry partners is a powerhouse of science and technology supporting the agricultural and manufacturing sectors. Q: How is CBI improving poplar as a bioenergy feedstock? A: We're working to get the best of both worlds in poplar: high biomass yield from one species, and stress tolerance from another — then using genomics to select hybrids that can deliver both. CBI recently expanded work into heat stress tolerance and other traits in Populus deltoides and is especially interested in hybridizing it with Populus trichocarpa , combining stress tolerance with high yield to create trees better suited for varied environments. Q: What

Source: Oak Ridge National Laboratory

discoveries are you most excited about right now? A: One of our biggest wins has been discovering the Booster gene — because it directly improves photosynthetic efficiency and biomass yield . In the greenhouse, it increased poplar biomass by about 200 percent. CBI researchers are also identifying genes tied to plant composition, stress tolerance and pathogen resistance — traits that can determine whether a feedstock thrives outside ideal greenhouse conditions. Q: CBI has added new feedstocks to its research portfolio recently. Why expand beyond poplar and switchgrass? We've onboarded two additional biomass feedstocks — pine and eucalyptus — each with different advantages for U.S. supply chains and product possibilities. Pine is exciting because there's a large standing stock in the southeastern U.S. that we can begin leveraging for advanced chemicals and materials. The Southeast has this historic quantity of pine that is mostly unused as traditional pulp and paper markets have shifted their sourcing overseas. Eucalyptus is a perennial crop that regrows every year in warmer regions and can offer both biomass and valuable extractable compounds. It opens a different door, because it's naturally high in terpenes, which can give us an expanded portfolio of chemicals, not just products from woody biomass alone. CBI is examining natural variation in terpene composition and abundance — traits that could expand the range of products made from plant feedstocks. Q: How does CBI's research support land use goals and feedstock economics? A: CBI aims to support biomass cropping systems that fit the landscape rather than compete with food production. The question isn't just 'Can we grow a biomass crop?'

Source: Oak Ridge National Laboratory

It’s ‘Can we match the right plant to the right environment?’ — such as pairing drought-tolerant trees with marginal lands where water is limited, a focus area that’s been very exciting to explore. CBI is also conducting techno-economic analysis of factors such as how plant traits relate to real logistical and cost impacts. One example is our work on wood density. We conducted a study on how denser plant materials can reduce transportation costs by allowing more biomass to be shipped per load. If you’ve got big, fluffy trees that are large but not really dense, you will end up spending more to transport them for processing versus a tree that produces a smaller log but contains just as much biomass. You can fit more of those smaller logs on the trucks, and that saves on fuel and other costs. AI and automation speed development of advanced feedstocks Q: What role will automation and AI play in the next phase of CBI feedstock development? A: CBI is leaning into automation and AI because we’ve become so effective at plant transformation that we created a bottleneck: validating performance traits fast enough for the large numbers of engineered or selected plant lines created, especially in poplar and switchgrass. Advanced phenotyping can help us move from experiment to insight much faster. We are leveraging capabilities like the Advanced Plant Phenotyping Laboratory at ORNL, a shared use facility that uses automation and AI to guide the imaging and analysis of plant structures. We’re developing machine learning methods and an AI vision transformer model that can quickly connect imaging data to physiological measurements — an approach aimed at increasing throughput from gene discovery to trait

Source: Oak Ridge National Laboratory

validation. Q: What's your personal goal for the program in the years ahead? A: Fostering collaboration is my favorite part of the job. The integration of many different science disciplines has had a profound influence on our success at CBI. We bring together everything from genetics to microbiome science, phenotyping, automation and techno-economic analysis to speed learning cycles and make bio-based production more viable at scale. I really like being able to think about the integration of all of these different disciplines and how we can leverage each of them better to solve really large problems. As we look to the future of CBI research, we are thinking about how we can expand our portfolio of end-products. By leveraging automation and AI with our range of disciplines, we can shorten the time from experiments to data processing and analysis that then guides our next set of iterative experiments. CBI's collaborative structure is key to that future. UT-Battelle manages ORNL for DOE's Office of Science, the single largest supporter of basic research in the physical sciences in the United States. DOE's Office of Science is working to address some of the most pressing challenges of our time. For more information, visit https://energy.gov/science . —Stephanie Seay Media Contact Kimberly A Askey , Communications Lead, Biological and Environmental Systems Science Directorate , 865.576.2841 | AS-KEYKA@ORNL.GOV

Source: Oak Ridge National Laboratory

Activity Time - Word Search

Find the words below in the puzzle. Words go across or down only.

Words to Find:

D	G	V	E	Y	E	D	T	E	A	X
E	V	G	U	L	N	J	L	Y	R	M
N	G	C	T	K	C	C	V	K	I	V
R	F	A	N	K	M	F	O	E	U	D
V	T	R	Z	L	P	B	Y	V	G	K
Z	P	U	M	Y	M	F	Q	I	Z	X
N	X	P	V	Y	V	Z	B	I	K	P
K	S	G	Q	W	T	J	X	P	A	N
A	W	G	I	X	X	X	R	T	R	N
T	H	B	F	M	E	H	G	H	R	U
B	J	Q	B	D	E	C	W	H	F	I