AGU23 tipsheets

- **California**
- **Climate**
- **Hard-core rocks**
- **Hazardous Earth**
- **Life**
- **People and the Anthropocene**
- **Pollution and public health**
- **Space**
- **Storms and extreme weather**
- **Wildfire**

CALIFORNIA

TOP TIP: **Storms like 2023's "snow deluge" less likely due to climate change**
Parts of California experienced extreme snowfall in the winter of 2023. Research shows that this once-in-a-lifetime event is likely to become even less common under future climate scenarios.
Friday, 2:23 PM *3011 - West*

Do Santa Ana winds whip up health problems?
The strong Santa Ana winds that come from the desert to the east may be stirring up respiratory problems, especially when pollen counts are seasonally high. Researchers examined how the combination of winds and pollen counts may affect hospitilizations for respiratory issues.
Wednesday, 8:30 AM *Poster Hall A-C - South*

Disadvantaged communities in US breathe 8.5% more fine particulate pollution
Disadvantaged communities have long felt the effects of poorer air quality due to pollution. But how much fine pollution is in the air of these communities, on average, and what pollutants are the cause of it, both in Californian cities and in the U.S. at large.
Friday, 8:30 AM *Poster Hall A-C - South*

Air quality monitoring may have an ammonium nitrate blind spot
Ammonium nitrate is one of the key causes of pollution and smog. Researchers have found that the traditional tools used to monitor air quality in Los Angeles may be missing large quantities of this pollutant due to its nature.
Thursday, 10:40 AM *3001 - West*

State-level tool makes CMIP6 climate data available to Californians
Climate science is complicated, often a requiring highly specialized focus. The

accessibility of tools tracking climate data might be improved by increasing transparency for users.
Tuesday, 9:13 AM *2020 - West*

How did does house construction affect the damage risk from California fires?
Can past fires inform the future damage risk to infrastructure? Researchers used historical information from big fires that have hit towns in California to find what construction features like roofs, walls and window panes contribute to higher risk of damage.
Thursday, 8:30 AM *Poster Hall A-C - South*

Heat waves cause uptick in emergency hospital visits for California infants
The hottest heat waves result in the most emergency hospital visits in infants less than one year old in California. Analysis shows that heat exposure most affected term infants and those with lower parental education.
Tuesday, 2:27 PM *eLightning Theater VI, Hall D - South*

How can California adapt to recurring droughts?
Recurring droughts cause an ongoing risk of water shortages and fires in California. Cases studies of severe droughts reveal ways that the state can better prepare for future problems through sustainable water management and climate change adaptation.
Thursday, 10:30 AM *2016 - West*

Did the snowpoacalypse of 2023 replenish ground water supplies?
The drought of 2012-2016 severely depleted California aquifers for years afterward. The massive snowfall in the winter of 2023 may have replenished some of this water supply, but the effects are uncertain. New techniques harnessing satellite date aims to tackle that issue.
Wednesday, 11:05 AM *3020 - West*

Stream restoration is for the rich
Stream restoration in urban areas brings benefits to urban ecosystems. But many of these projects may focus on more affluent parts of the city.
Friday, 8:30 AM *Poster Hall A-C - South*

Poor neighborhoods may have a higher risk of warehouse and transportation pollution
Researchers examined data from NASA to find how pollution originating from high concentrations of warehouses and transportation might affect different neighborhoods in Southern California. They found that socially disadvantaged or historically marginalized communities were disproportionately affected.
Thursday, 8:30 AM *Poster Hall A-C - South*

Improving the risk assessment of wildfires to homes using fine-scale mapping in California
Towns and other human areas close to wildlands experience a high wildfire risk, but they aren't all the same. Researchers used landsat mapping to come to a finer scale

understanding of the site-specific risk towns and other human areas experience from fire.
Tuesday, 8:30 AM *Poster Hall A-C - South*

AI can predict wildfire risk from energy infrascture in Northern California
Equipment failure in energy infrastructure can cause wildfires in California. Machine learning could help predict where these problems might occur.
Tuesday, 8:30 AM *Poster Hall A-C - South*

Wildfires could suck the air from California lakes
Prolonged, dense smoke can affect the primary ecosystem production and ecosystem respiration in California lakes. But research shows this effect is highly variable depending on the amount of smoke cover, and the individual characteristics of lakes.
Friday, 11:12 AM *3016 - West*

Progress on restoring large wetland near Lake Tahoe
A majority of the Sierra Nevada's high-elevation wetlands have been degraded by activities such as logging and grazing. An effort is ongoing to restore the 485-acre Van Norden Meadow near Lake Tahoe; one year in, the team is providing the first updates on the meadow's hydrologic health.
Friday, 4:52 PM *2001 - West*

Checking for microplastics in Lake Tahoe and Monterey Bay
Researchers test for microplastics in two locations that may be perceived as "clean" natural environments.
Tuesday, 8:30 AM *Poster Hall A-C - South*

CLIMATE

TOP TIP: **Atmospheric rivers responsible for 100% of Arctic extreme winter warm spells since 1980**
Atmospheric rivers have driven 100% of Arctic extreme wintertime warming since 1980, new research finds. Over the past 40 years, the frequency, duration, and magnitude of these warm spells have increased and will continue to do so as temperatures rise.
Thursday, 2:10 PM *Poster Hall A-C - South*

TOP TIP: **El Niño could become more predictable as temperatures rise**
Under warm, greenhouse climates, the El Niño phenomenon becomes fully oscillatory, with both El Niño and La Niña events triggered by a preceding event of the opposite phase, a striking departure from current dynamics.
Monday, 8:30 AM *Poster Hall A-C - South*

TOP TIP: **Hoar today, gone tomorrow?**
Hoar frost, 1-10mm crystals that form on the snow's surface, is a major contributing factor to avalanche risk that could be substantially impacted by changing climate. This study examines what will happen to hoar frost as the climate warms and the larger implications for avalanches and snow-energy balance. Will it go extinct?
Monday, 8:30 AM *Poster Hall A-C - South*

Climate data used by insurers and private industry should be public and transparent
Investors, insurers and more rely on local climate risk information to make economic decisions. But many climate service providers make it difficult to oversee their scientific rigor, which could obscure uncertainties. Risk assessments lacking a scientific basis can lead to economic maladaptation; therefore, such data should be public and transparent.
Tuesday, 8:33 AM *2020 - West*

Evapotranspiration rivals precipitation for cause of drought in western US

Historically, precipitation deficit has been the main cause of drought in the western U.S. However, evapotranspiration has caused more than half of the region's drought since 2000. By the late 21st century, severe droughts akin to the one from the early 2020s will likely occur once every three years.
Thursday, 8:30 AM *Poster Hall A-C - South*

Greenland and Antarctica's peripheral glaciers have shrunk significantly since 2003

Greenland and Antarctica’s peripheral glaciers contribute to sea-level rise, but they are rarely considered separately from central glaciers. New research finds that Greenland’s peripheral glacier mass loss has increased by 50% since 2003, and in Antarctica, some peripheral glaciers have experienced losses as great as 94%.
Wednesday, 8:30 AM *Poster Hall A-C - South*

American Samoa's infrastructure at major risk of permanent floods from sea level rise

The island of Tutuila, American Samoa is experiencing sea level rise at a rate five times higher than the global average, making climate adaptation critical for the region. New research reveals that, under a moderate climate emission scenario, around 45% of known buried water, electrical and sewer lines will be permanently flooded.

Wednesday, 8:30 AM *Poster Hall A-C - South*

Will cleaner snow mitigate climate woes and conserve water?

Light absorbing particles, such as black carbon and dust, can mix with snow, resulting in snow darkening, snowmelt and regional climate change. A new study finds that radiative forcing caused by dark particles will decrease by the end of the century, bringing cleaner snow and benefits to future water availability.

Friday, 8:30 AM *Poster Hall A-C - South*

Planes burning 100% sustainable fuel produce fewer contrails

Sustainable aviation fuels produce little to no soot, which is the primary core for contrail ice. Therefore, lower soot emissions should lead to less contrail ice particles. Across two field campaigns, scientists studied the exhaust of planes using 100% sustainable fuels and found a significant reduction in soot.

Wednesday, 8:30 AM *Poster Hall A-C - South*

How high can a ice cliff be before catastrophic collapse?

How tall can an ice cliff get before it collapses? While scientists theorize the limit is around 90 meters, this theory has yet to be tested against a large, diverse set of ice cliffs. Scientists are currently mapping ice cliffs and their stabilities around the West Antartctic Ice Sheet and Greenland for answers.

Wednesday, 8:50 AM *2004 - West*

How the rebound of Antarctica from the melting ice could feed back on sea level rise

After glacial retreat, the newly exposed land slowly rebounds, or lifts back up, because of the lost weight. In Antarctica, this process may reduce the continent's contribution to sea level rise under low warming scenarios or amplify it under high warming scenarios.

Wednesday, 11:20 AM *2004 - West*

Coast of West Antarctica retreated and readvanced 250 km inland since the last ice age

Scientists sampled a lake beneath the Antarctic Ice Sheet and find that the Siple-Gould Coast of West Antarctica retreated more than 250 kilometers (155 miles) inland during the mid-Holocene prior to re-advancing to its modern position.

Wednesday, 9:20 AM *2004 - West*

Continued ozone depletion over Antarctica

In the past three years, scientists have witnessed record-large Antarctic ozone holes, despite expected ozone recovery since the Montreal Protocol. In this study, they use

satellite observations and climate simulations and find that recovery of the Antarctic ozone hole is presently limited to certain months and stratospheric layers. They also report evidence for regions of continued decline within the polar stratosphere.
Tuesday, 8:30 AM *Poster Hall A-C - South*

Why has ozone recovery been pushed back by 17 years?
Has the 17 year delay in expected ozone recovery been a result of underestimating global production of ozone depleting substances or due to changes in the scientific understanding and representation of atmospheric processes? Scientists investigate this question by identifying the primary drivers that have delayed the expected ozone recovery date from 2006 to 2022.
Wednesday, 4:22 PM *3011 - West*

Changes in farming could reduce greenhouse gases
Cover cropping and no-till management have been touted for their conservation benefits, but previous research has yielded mixed results regarding greenhouse gas emissions. This study conducted observations at three farm sites in Indiana, and the preliminary results indicate that no till + cover cropping led to higher carbon dioxide flux than no-till + conventional tillage practices.
Friday, 4:36 PM *2008 - West*

Climate-smart irrigation can reduce greenhouse gas emissions
Irrigation makes crops less vulnerable to climatic extremes, but also produces greenhouse gas emissions from energy use. Thus, irrigation expansion for the sake of climate adaptation has the potential to trigger a reinforcing feedback loop, exacerbating climate change.
Friday, 3:13 PM *2008 - West*

Future ammonia use to reduce carbon footprint could exacerbate warming
Despite research documenting the harmful impacts of nitrogen pollution, an emerging decarbonization initiative proposes using ammonia as an energy carrier. Leaked ammonia would cause more nitrous oxide, a greenhouse gas with 273x the warming potential of carbon dioxide. If even a small fraction of the 8x increase in ammonia is leaked from facilities worldwide, the increased nitrous oxide emissions would more than erase any decarbonization gains.
Tuesday, 9:00 AM *3008 - West*

Hawai'i's most heavily used aquifer at risk from sea level rise
This study focuses on sea-level rise and its implications on sustainable groundwater management for the Pearl Harbor aquifer in Hawai'i, which supports a significant portion of Hawai'i's population.
Wednesday, 9:00 AM *3014 - West*

Fans will be ineffective as it gets hotter
As temperatures rise, people turn up their fans to stay cool. But in the last two decades, people in the U.S. have been exposed to double the number of hours with outdoor temperatures too hot for fan use than before — and it's only getting warmer.
Friday, 8:30 AM *Poster Hall A-C - South*

Blooms in spring: How ice melt is increasing Arctic phytoplankton production
Sea ice melt may be driving increased and earlier spring algae blooms in the Arctic Ocean. This study takes a closer look at this phenomenon with particular focus on the record spring bloom of May 2019.
Monday, 8:30 AM *Poster Hall A-C - South*

Extreme droughts expected to triple, drastically reducing global crop production by the end of the century
With global food demand expected to double by 2050, it is critical to have a better understanding of how drought will impact future crop production. This study finds that extreme droughts are projected to increase up to three-fold by the end of the century, and crop production will experience a seven-fold decrease at the same time.
Wednesday, 2:10 PM *Poster Hall A-C - South*

Drylands are becoming less resilient to hot drought events
Co-occurring drought and heatwave events can be more dangerous for ecosystems than drought alone. In this study, scientists found that dryland ecosystems are becoming less resilient to hot droughts, likely leading to mass degradation by the end of the century.
Wednesday, 2:10 PM *Poster Hall A-C - South*

IODP Expedition 400: preliminary results from the Greenland Ice Sheet
The overarching goal of this expedition is to understand the long-term behavior of the northern Greenland Ice Sheet and its responses to past global change, including time periods when climate was warmer than present. Scientists will present preliminary results from onboard research.
Tuesday, 4:32 PM *3022 - West*

How do images of changing glaciers make Americans feel about climate change?
Pictures of glaciers are often used to demonstrate climate change's impacts because they're easy to understand. However, this approach can reinforce the idea that climate change only impacts remote places. This study examines how images of glacier change shape Americans' views about climate change, emotional response and psychological distance.
Monday, 8:45 AM *eLightning Theater IV, Hall D - South*

Weather and climate in the Pra River Basin: knowledge from Indigenous communities
Using citizen science, this study collects weather and seasonal climate forecasts from indigenous communities in the Pra River Basin of Ghana to enhance climate information services for climate change adaptation.
Thursday, 2:10 PM *Poster Hall A-C - South*

Reducing global warming by 0.5°C drastically reduces temperature extremes at the poles
The three poles, the Arctic, Antarctica, and the Tibetan Plateau, are particularly sensitive to climate change. But if global warming could be limited to 1.5°C instead of

2°C above pre-industrial levels, how would that affect the poles? This study finds that a 0.5°C decrease in global warming reduces the risk of extreme temperature events at the poles by up to 71%.
Monday, 8:30 AM *Poster Hall A-C - South*

Entombing trees in an underground vault to reduce CO_2
Trees absorb carbon dioxide from the atmosphere via photosynthesis and store it. This study discusses how wood from these trees could be sustainably harvested and stored in subterranean burial chambers, or wood vaults, to reduce atmospheric carbon dioxide and combat climate change.
Thursday, 8:30 AM *Poster Hall A-C - South*

Calculating the costs of climate change in Alaska
Alaska is more vulnerable to climate change than most other U.S. states, facing threats such as fires, extreme snowfall, fisheries collapse, and more. This project aims to track the current cost of climate disasters in Alaska and estimate futures costs as well.
Wednesday, 8:30 AM *Poster Hall A-C - South*

Percieved vs. real risk of future climate change hazards in the US
At the county level, this study compares the public's perception of climate disasters with actual projected future climate risks across the United States to identify areas where local risk is high but perception is low, highlighting gaps in the public's understanding of future risk in their county.
Tuesday, 8:30 AM *Poster Hall A-C - South*

Vast US cornfields bring summer rain and cooler temperatures
In the U.S. Corn Belt, local evapotranspiration from croplands and irrigation contributes to precipitation. This study took a closer look at this process and found that croplands cool air temperatures and increase summer rainfall from 15% to 22%. The impacts are more evident during drought years.
Friday, 2:10 PM *Poster Hall A-C - South*

Tracking unusual weather in the rings of Himalayan cedar trees
The Himalayan Mountains have experienced an unprecedented increase in the frequency and intensity of weather and climatic extremes. Using tree ring data, this study developed a 214 year chronology of climate data for the region which could help researchers understand abrupt and unusual climatic fluctuations from a long-term perspective.
Friday, 11:22 AM *3024 - West*

Biomass burning releases nearly 23 trillion grams of global methane every year
Wildfires and biomass burning emit large amounts of greenhouse gases into the atmosphere, especially carbon dioxide and methane. As wildfires increase with climate change, it's crucial to have a quantitative estimate of these emissions. This study estimates the temporal and geographic distribution of methane emissions from burning using satellite observations.
Thursday, 8:30 AM *Poster Hall A-C - South*

The collapse of the Soviet Union didn't slow down methane emissions. It sped them up

Global atmospheric methane concentrations rose in the 1980s before abruptly slowing in the early 1990s. This methane slowdown has been attributed to the collapse of the former Soviet Union (USSR) in 1992. The results from this study contradict that theory and instead find that the USSR collapse may have led to an increase in methane emissions.

Thursday, 11:10 AM *3004 - West*

Trends in African Great Lakes since 1992

The African Great Lakes, which provide drinking water for tens of millions of Africans, have experienced rapid changes in water level and storage volume in the past decades. This study examines these long-term trends and discusses the underlying drivers for the temporal dynamics of the African Great Lakes, particularly Lake Victoria.

Thursday, 2:10 PM *Poster Hall A-C - South*

Himalayan tree rings hold more than 400 years of rainfall and crop history

In the Himalayas, extreme climatic events have increased in the last few decades. But limited records make it difficult to examine long-term climate variability in the region. Using tree rings, this study reconstructs precipitation from the 1500s until present and finds a strong correlation between tree growth and crop production.

Thursday, 8:30 AM *Poster Hall A-C - South*

Mapping renewable energy infrastructure worldwide

Tracking renewable energy infrastructure exists is necessary for measuring progress made toward global renewable energy goals. This study uses PlanetScope basemap imagery to detect solar farms and wind turbines around the world.

Friday, 4:50 PM *2014 – West*

Aerosol injection could make Arctic shipping more costly

Stratospheric aerosol injections could help combat climate change, but for some spots in the Arctic, deploying the method could result in thicker sea ice than before. This could make the Northwest Passage less navigable and therefore more costly.

Tuesday, 2:10 PM *Poster Hall A-C - South*

Climate messaging should be hopeful, new survey finds

A NOAA-led survey of more than 700 people reveals a broad consensus that climate-literate messaging should be “hopeful, action-focused, impact-aware, justice-based, and interdisciplinary.”

Thursday, 2:31 PM *eLightning Theater IV, Hall D - South*

Climate could make lake-effect snow storms 14% wetter

Under a high-emissions scenario, lake-effect snow storms could deliver 14% more precipitation by 2100, with a tradeoff between snow and rainfall making dangerous ice-on-snow events more likely.

Friday, 2:22 PM *3016 - West*

HARD CORE ROCKS

Lifting the veil on early Earth environments: The role of impact processes
Impacts and impact-related processes could have played a vital role in the evolution of early Earth, setting the stage for life.
Monday, 11:15 AM *213-214 - South*

Origin of life molecules in the atmosphere after big impacts on the Early Earth
An "RNA World" on early Earth would have needed lots of nitriles (the building blocks of RNA), but volcanism alone couldn't provide enough. Impacts, however, could have helped send essential nitriles into the atmosphere.
Monday, 11:40 AM *213-214 - South*

The effect of the giant 3.26 Ga meteorite impact on the early surface environment and life
A large impactor hit Earth around 3.26 billion years ago. The impact could have caused mixing in the early oceans critical for circulating iron, an essential nutrient.
Monday, 11:30 AM *213-214 - South*

Prebiotic chemistry and the planetary environment: current status and future directions
An overview of what we know about prebiotic chemistry — and what we still have to learn.
Monday, 10:20 AM *213-214 - South*

Archaean stromatolites on modern Earth with implications for Mars
Modern stromatolites in the saline lagoons of Argentina seem to be a dead ringer for their Archean cousins, offering an ideal site to study early Earth and Mars.
Monday, 2:10 PM *Poster Hall A-C - South*

Airborne microdroplets as a source for prebiotic condensation reactions under plausible subaerial early Earth conditions
Wind and wave action on early Earth's oceans would have produced tiny, airborne liquid droplets, providing a mechanism for the oceans and atmosphere to mix. This could help explain prebiotic molecules, but the idea remains little explored.
Monday, 2:10 PM *Poster Hall A-C - South*

Debates over a 3.5Ga hematite and oxygen in early, shallow oceans
Hematite, an iron oxide mineral, is present in a 3.5 billion-year-old rock from northwestern Australia. It could suggest some oxygen was present in waters previously thought to be oxygen-free.
Monday, 9:40 AM *152 - South*

Today's continental layout may be too weird
The present-day configuration of continents may be highly unusual and therefore serve as a poor basis for modeling of potentially habitable, Earth-like planets.
Monday, 2:10 PM *Poster Hall A-C - South*

Subduction on Earth could have begun around 200 million years after giant impact, making Earth habitable

The earliest record that scientists have of Earth's subduction points to 4.3 billion years ago. However, scientists still don't know how subduction could begin so soon after Earth's formation (the Moon-forming giant impact). The results of this study suggests that subduction could have begun around 200 million years after the giant impact, and that the impact and subduction could be linked.

Thursday, 8:30 AM *Poster Hall A-C - South*

Pacific Ocean is not closing to form Earth's next supercontinent

Scientists disagree about which oceans will close to create Earth's next supercontinent. While some believe the Pacific Ocean could close, this study finds that stronger thermal upwelling in the Pacific rules that option out.

Monday, 3:10 PM *205-206 - South*

HAZARDOUS EARTH

The magmatic system under Hunga volcano before and after the Jan. 2022 eruption

The magma plumbing system under Hunga volcano is unexplored due to difficulties caused by its submarine setting. This study uses marine gravity data and finds that less than 30% of the existing melt was evacuated by the main eruptive phases. Understanding the conditions and configuration of melt storage under Hunga is crucial to better assess volcanic hazards in the Tonga archipelago and will eventually help provide a more accurate forecast of the size and likelihood of future eruptions.

Thursday, 8:30 AM *158 – South*

Sifting through ash for rare earth elements.

Sourcing rare earth elements from coal fly ash is nontraditional, but it can yield high recovery.

Thursday, 8:30 AM *Poster Hall A-C - South*

Famine early warning system for drought-stricken communities

Relief agencies responding to food insecurity emergencies need early warnings of climate extremes, but most of these regions have limited scientific resources to create early response systems. The Famine Early Warning Systems Network (FEWS NET) Land Data Assimilation System (FLDAS) fills this data gap, providing simulations of the terrestrial hydrology of the most food insecure regions globally and products that monitor and forecast climatic extremes.

Monday, 4:00 PM *2007 - West*

An unstable slope in Alaska could cause a tsunami. Could monitoring tools predict it?

This study focuses on an unstable slope in Barry Arm, a small fjord in Alaska that has been gradually moving since the early 1900s as the Barry Glacier retreated, raising concerns about a catastrophic failure that could generate a tsunami and impact communities nearby. Since 2020, Barry Arm has experienced two landslide-wide slow movements. In this study, scientists focus on those episodes and search for any precursory activity to the slow movements.

Monday, 8:30 AM *Poster Hall A-C - South*

AI to assess damaged buildings after catastrophic earthquake in Turkey and Syria

The earthquakes that struck Turkey and Syria in February led to the collapse of 160,000 buildings. However, interpretation of earthquake-triggered building damage is limited by accessibility to the sites and availability of images. In this study, scientists propose a model leveraging artificial intelligence to identify different damage levels in the earthquake.

Tuesday, 4:12 PM *eLightning Theater V, Hall D - South*

Seismic fingerprint predicts ground motions during the 2018 Kilauea collapse

Acoustic emissions from laboratory earthquakes faults contain information about

future fault characteristics, in particular, the near future fault friction. In this study, scientists show that seismic emissions from fault slip associated with the 2018 caldera collapse at the Kīlauea volcano in Hawaiʻi also contain signatures informing of instantaneous displacement and time-to-failure of the upcoming slip event. This suggests a potential path to characterizing the instantaneous and future behavior of earthquake faults.
Thursday, 2:30 PM *152 - South*

Is there a second, more dangerous, shallow slow slip zone in Cascadia?
Slow slip events have been recognized in Cascadia for over 20 years, but in a region unlikely to trigger large earthquakes. Scientists hypothesize that a second, more dangerous slow slip zone could exist, but previous efforts to detect it have been unsuccessful. In this session, scientists discuss the most recent efforts to detect the second slow slip zone and the implications for earthquake hazards in the Cascadia region.
Thursday, 4:00 PM *151 - South*

LIFE

TOP TIP: **Invasive jumping earthworms are causing chaos in US soils**
Invasive Asian jumping earthworms are changing the biochemistry of soil and the carbon cycle in North America. Researchers tested to see what areas they were most abundant and found they had were correlated with inavsive plants in a forest in New York state.
Friday, 8:30 AM *Poster Hall A-C - South*

Llama poop helps landscapes recover after glaciation
Llamas deliver nutrients and seeds through their waste products. A study in the Peruvian Andres found that plots with llamas had more than 50% more vegetation than plots without llamas after just two years, and the vegetation was more diverse. This could help inform camelid rewilding and conservation efforts as glaciers retreat.
Thursday, 2:10 PM *Poster Hall A-C - South*

Underground sounds: How listening in on earthworms can indicate emerald ash borer presence
Detecting the presence of pests such as the emerald ash borer before they damage trees is difficult. By installing sensitive microphones underground, researchers could track how deeply earthworms burrowed; deeper burrows meant borers were nearby.
Thursday, 8:30 AM *Poster Hall A-C - South*

Lemmings: small but mighty Arctic ecosystem engineers
Studies of herbivory in the Arctic often focus on larger animals, such as caribou, but small animals such as lemmings can serve as critical drivers of nutrient cycling and vegetation change.
Friday, 2:10 PM *Poster Hall A-C - South*

Lake Superior beavers reuse old dams
On Isle Royale and the Apostle Islands of Lake Superior, beavers are busy. Thirty years of remotely sensed beaver activity show that beavers there often repair older dams rather than build new dams in new areas.
Friday, 2:20 PM *3016 – West*

Beavers moving into the Arctic change the environment
Rapid warming in the Arctic has made the tundra more habitable for beavers, but these aquatic mammals are known as ecological engineers for a reason. As they migrate into the Arctic, beavers are changing the temperatures and dissolved oxygen levels of small bodies of water.
Wednesday, 2:10 PM *Poster Hall A-C - South*

Drought-stressed trees too sluggish to fend off bark beetles
Trees can send out chemical defenses against harmful bark beetles, but drought could hamper their ability to do so.
Wednesday, 4:28 PM *3008 - West*

A disturbance in the forests
More than half of forests in the western U.S. experienced either wildfire or bark beetle outbreak between 1999 and 2020. Over the same time period, 25% of western forests had multiple such disturbances within five years of each other.
Thursday, 8:30 AM *Poster Hall A-C - South*

In the Namib Desert, fog means life for plants
Fog is more important than rainfall for plants trying to grow in the sweeping Namib Desert.
Monday, 2:10 PM *Poster Hall A-C - South*

Fish are shrinking in the Lower Mekong Basin
Fishing practices, along with land-use pressures, have led to a decrease in average fish size in the that the heavily fished Lower Mekong Basin in southeast Asia.
Friday, 9:15 AM *2006 - West*

Unique deep-sea gastropod community discovered
Scientists have discovered a unique, new community of tiny gastropods dwelling on an inactive hydrothermal vent.
Thursday, 2:10 PM *Poster Hall A-C - South*

Leaf-cutter ants impact soil carbon cycling
Leaf-cutter ants are among the most abundant and industrious ecosystem engineers on land. A study of the ants in a Costa Rican forest found they could move thousands of pounds of soil in a year.
Thursday, 2:10 PM *Poster Hall A-C - South*

Rising seas are revealing ghost forests on East Coast
Coastal forests are important carbon sinks and provide protection from flooding and storm surge, but rising sea levels are killing many off. Researchers found 530 hectares of ghost forests in North Carolina.
Friday, 3:10 PM *3008 - West*

An ancient drowned cypress forest is teaching us about past environmental conditions
A bald cypress forest that was flooded by the ocean and covered in silt for roughly 50,000 years is revealing data about past environments. The forest, which was uncovered in the Gulf of Mexico by hurricanes, can teach scientists about past coastal environments and glacial periods.
Monday, 8:30 AM *Poster Hall A-C - South*

Pine death in the Anthropocene
Earth's oldest living organisms are pine trees, yet pines may be one of the most vulnerable types of trees to climate change. This study takes a big picture look at how pines around the world respond to temperature and precipitation extremes, and the implications for the fate of pines on our warming planet.
Wednesday, 8:30 AM *Poster Hall A-C - South*

PEOPLE and the ANTHROPOCENE

TOP TIP: **US dams could lose 47 million cubic meters of storage by 2050**
Sedimentation, or the accumulation of sand and fine particles in dammed reservoirs, can lead to a loss of storage capacity. An analysis of 840 sites found that sedimentation could lead to a loss of 47 million cubic meters of storage, negatively impacting dam functioning.
Monday, 4:45 PM *2002 - West*

TOP TIP: **Legends, politics, and technology in Chinese river engineering history**
Geoengineering played a vital role in shaping empires in premodern China. Similar methods—flood management, dam construction, and water transfer—happen today at greater scales, while the nation seeks to shift to more ecologically minded development.
Thursday, 5:04 PM *3016 – West*

TOP TIP: **Hidden in plain site: Long-term research reveals 23 million acres of US Midwest croplands ripe for biodiversity conservation**
Letting more than 20 million acres of US Midwest farmland may be their best use, according to a study that identifies consistently under-yielding fields. Doing so could lead to higher biodiversity and ecosystem services.
Thursday, 8:50 AM *2014 – West*

TOP TIP: **Library spaces as liminal spaces**
Libraries are critical third places, unique environments of seeming limitless inquiry, and purposeful centers of learning, recreation, and exploration. This presentation will offer a nuanced and expanded understanding of the library as place (physical) and space (psychological), and will explain how libraries are much more than housing for physical collections.
Tuesday, 11:20 AM *2014 - West*

Water as a weapon in the Russia-Ukraine War
Consequences of the Russia-Ukraine war for the major water systems in Ukraine - Dnipro (Dnieper) River and major tributaries, up to and including the destruction of the Kakhovka Dam in June 2023.
Tuesday, 2:32 PM *2006 - West*

Greenland's Inuit have diverse and innovative pastoral practices
The Inuit in Greenland began practicing pastoralism around 100 years ago. Since then, the practice has diversified, and there exists an innovative spectrum of wild to fully domestic pastoralism. That diversity could help pastoralism be resilient to a rapidly changing climate.
Wednesday, 8:30 AM *Poster Hall A-C - South*

Proposed Arctic railway could impact Sámi reindeer husbandry
The Sámi people, indigenous to modern Norway and Finland, maintain reindeer herds that rely on consistent snowpack and snow cover. A proposed railway across Norway and Finland could decrease days with icy snowpack and the presence of

deep snowpack in regions important for Sámi reindeer husbandry.
Friday, 2:10 PM *Poster Hall A-C - South*

Community-led efforts to ensure cultural harvest in Alaska
Trees, subsistence plants, and fungi are of cultural importance in southeast Alaskan forests and surrounding communities. Students, community members and scientists bring traditional knowledge and other ways of knowing to study the resilience of berries and other significant plants.
Friday, 10:56 AM *2018 - West*

Across boundaries: Exploring the roles of boundary spanners within Alaska Native communities
Thursday, 2:10 PM *Poster Hall A-C - South*

Shrinking forests led to a decline tribal wild rice harvest
Wild rice is sacred to many Indigenous Peoples, including the Ojibwe who migrated to the Upper Great Lakes for it generations ago, but it's been in decline since the start of Euro-American colonization.
Friday, 5:16 PM *2001 - West*

Historical land cover maps developed from African photo archive
The maps, developed using a collection of 1.6 million aerial photographs from dozens of developing African countries, provide land cover change over the 20th century in many data-scarce regions of Africa.
Tuesday, 4:30 PM *3009 - West*

Where there's (gun)smoke, there's fire? exploring the conflict–fire nexus and its implications for land systems in the Middle East.
Highlights the potential role of armed conflicts in exacerbating fire risks and the use of fire as conflict tool.
Tuesday, 2:42 PM *2006 - West*

Forensic geophysics: Using geoscience tools to identify buried evidence
In the late summer of 2018, the FBI Laboratory designated a small section of land to bury a set of targets for repeated imaging experiments including buried animal remains, closed-cell foam packaging to simulate a void, and steel objects.
Thursday, 8:30 AM *Poster Hall A-C - South*

Investigating a ~4500 year old Native American shell ring
The ring, found on St. Catherines island off the coast of Georgia, was intentionally built from oyster shells.
Thursday, 3:10 PM *2018 - West*

Crops have spread >100M hectares but lost diversity since 1850
Cropping diversity significantly decreased in the recent six decades because of the increased planting area of corn and soybean and the decreased cultivated area of other crop types.
Tuesday, 11:00 AM *3009 - West*

Opening of Japan West recorded in palace moat sediment core
Tuesday, 8:30 AM *Poster Hall A-C - South*

Settlement trailed groundwater at the end of the Green Sahara
The presence of a bedrock high separating Middle Wadi Howar from Lower Wadi Howar could have forced groundwater to rise to near the surface at the downstream end of Middle Wadi Howar, providing a relatively resilient water source to settlements.
Thursday, 8:30 AM *Poster Hall A-C - South*

Landbanking and speculation for palm oil drive deforestation in Indonesia
The palm oil industry's impact on forests extends beyond the area converted immediately after forest clearing.
Tuesday, 8:30 AM *Poster Hall A-C - South*

Mapping agricultural expansion in Alaska with warming climate
Agriculture in Alaska has grown by 74% between 1982 and 2017. This work presents a preliminary map of farm fields.
Friday, 2:10 PM *Poster Hall A-C - South*

How does a changing climate shape domestic violenece in two sub-Saharan countries?
Wednesday, 8:30 AM *Poster Hall A-C - South*

Twitter data reveals how hot weather affects sleep
Heatwaves in major cities across the United States elevate temperatures, making it challenging for people to fall asleep or maintain sleep. The study analyzes Twitter data to assess these factors.
Tuesday, 2:10 PM *Poster Hall A-C - South*

Early-warning smartphone app developed to safeguard villages
Using publicly available humanitarian datasets on water and health risks, this project aims to help disenfranchised and vulnerable grassroots populations build resilience to environmental injustices.
Thursday, 8:30 AM *Poster Hall A-C – South*

POLLUTION AND PUBLIC HEALTH

TOP TIP: **Air pollution can limit the wafting of floral scents**
Pollinators, including bees, use floral scents to find their favorite flowers and navigate. But in polluted air, scent molecules can quickly react with pollutants and dissipate, making it harder for pollinators to find flowers.
Wednesday, 10:47 AM *3014 – West*

TOP TIP: **Backup generators as stopgaps for poor electrical infrastructure**
About 1.5 billion people in low- to middle-income countries rely on diesel and gasoline generators when the electrical grid fails. A new survey of these generators in 167 countries finds they provide 350 to 500 gigawatts annually—at great cost to poor families. Replacing generators with clean, affordable alternatives is paramount.
Tuesday, 8:30 AM *Poster Hall A-C – South*

TOP TIP: **Hurricanes may be a major mover of microplastics across the Atlantic**
Next year will be the 20th anniversary of "microplastic" being used in a research paper. Atmospheric samples from Hurricane Larry in Newfoundland (2021) contained microplastics that may have been pulled from the North Atlantic garbage patch.
Friday, 9:30 AM *3018 - West*

TOP TIP: **Evidence of microplastics migrating through mammalian tissues**
Microplastics get around; they are now found in nearly every environment on Earth, and they've been shown to move between types of tissues in living organisms (called translocation). Translocation in marine mammals is shown for the first time.
Friday, 10:20 AM *2002 - West*

How will we track ozone depletion without Canada's ACE-FTS and the US NASA Aura MLS?
The world's knowledge of factors responsible for altering the thickness of the protective ozone layer will soon be greatly diminished, because of the cessation of data from two instruments (the Canadian SCISAT ACE-FTS and the US NASA Aura MLS), with no comparable replacements on the horizon.
Tuesday, 8:30 AM *Poster Hall A-C - South*

Decarbonization will drastically improve asthma cases in the US by 2040
Under the decarbonization policy, nearly 250,000 asthma cases will be avoided, with the most drastic difference seen in the health of low-income and Black families.
Wednesday, 2:25 PM *2020 - West*

Accurate estimates of vehicle pollution with growing car ownership in India
Thursday, 4:50 PM *3001 - West*

Diwali fireworks raise fine particulate pollution
Friday, 4:00 PM *eLightning Theater I, Hall D - South*

How climate shaped the course of the Black Death
An unparalleled view of how climate impacts vector-borne disease over the long term, offering valuable insights for future public health planning and preparedness

strategies in the face of rapidly accelerating global climate change.
Monday, 4:15 PM *2020 - West*

Exposure to PM 2.5 increases hypertension
Long-term exposure to PM 2.5, dust and black carbon can significantly increase hypertension in Indian women.
Wednesday, 8:30 AM *Poster Hall A-C - South*

Disparities of decarbonization across the US
Minority and low-income counties may still experience higher particulate matter concentrations, though ozone concentrations could be lower with domestic efforts.
Wednesday, 8:30 AM *Poster Hall A-C – South*

Addressing volatile organics and odors from Korean BBQ
Who knew BBQ was such a health problem? A new hybrid system adresses the pitfalls of Korean BBQ by removing PMs, odors and volatile organic compounds.
Friday, 8:30 AM *Poster Hall A-C - South*

The contamination costs of exploiting aquifers
Overpumping may be causing irreversible harm to global aquifers. In two examples, widespread arsenic contamination in shallow aquifers has forced Bangladesh to rely on deeper stores, while irrigation pumping in Mexico has lowered their water table to dangerously low levels.
Wednesday, 8:50 AM *3014 - West*

Global aerosols: a decade of dust and smoke
Among the many sources of aerosols, outbreaks of smoke from fires and dust storms are evolving as major sources for poor air quality; they are becoming more frequent because of the increased warming and drying climate.
Thursday, 8:30 AM *Poster Hall A-C - South*

Disparities in harmful emissions exposure caused by international trade
More than 2.4 billion people — primarily in sub-Saharan Africa, Eastern Europe, and Southeast Asia — live in countries with more than half of their deaths from PM 2.5 caused by exports to countries with more than double their per-capita economic demand.
Wednesday, 2:10 PM *Poster Hall A-C - South*

Microplastics can accumulate at engineered logjams
Without proper placement, the nature-based solution could be detrimental to river restoration projects as deposition hotspots accumulate more than just organic matter.
Tuesday, 8:38 AM *eLightning Theater IV, Hall D - South*

Plastic pollution is worse in some lakes than in ocean hotspots
Across the globe, some freshwater lakes in densely populated regions and large depositional reservoirs exhibit high concentrations of plastic pollution, highlighting the need for mitigation strategies.
Friday, 8:30 AM *3018 - West*

Searching for the warning signs after two catastrophic dam failures in Brazil
In the wake of the Fundão dam disaster (2015) and the Córrego do Feijão dam disaster (2019), InSAR is used to observe ongoing surface deformation and identify potential risk factors in the hopes of preventing future catastrophes.
Tuesday, 2:10 PM *Poster Hall A-C - South*

Airport noise and car pollution linked to risks of Alzheimer's and other dementias
Observation of nearly five million older adults living near airports over an 18 year period show an increased risk of dementias in the U.S.
Thursday, 8:30 AM *Poster Hall A-C - South*

How to improve air quality in São Paulo schools
A call for change as elevated levels of PM 2.5 are found in five São Paulo schools. Concentrations often exceed WHO safety limits and are linked to heavy traffic and garbage and biomass burning.
Friday, 8:30 AM *Poster Hall A-C - South*

Particle pollution in underground stations of the Seoul Metro
High PM 2.5 concentrations are drastically reducing air quality in Seoul's underground stations, with exposure about 1.5 to 7 times worse than outdoor areas.
Friday, 8:30 AM *Poster Hall A-C - South*

100 and 1 Rivers: Monitoring global patterns of microplastic pollution
The 100 Plastic Rivers Programme set out to provide the first global baseline assessment of microplastic concentrations and dominant polymer types in river networks.
Friday, 11:30 AM *3018 - West*

The first Korean microsatellite for methane monitoring: NarSha Project
Nara Space Technology, Climate Technology Center of Seoul National University and Korea Astronomy and Space Science Institute present the NarSha Project for near real-time global methane source monitoring.
Thursday, 2:10 PM *Poster Hall A-C - South*

Drought linked to cholera outbreaks in arid and semi-arid regions of Africa
The past two decades of cholera outbreaks in Sub-Saharan Africa have been linked to a reduction in water reserves, which increases the chances of exposure to contaminated water supplies.
Tuesday, 2:30 PM *eLightning Theater VI, Hall D - South*

Long-term drought increases the risk of infant mortality in Africa
Infants born in rural, low-income households are at high risk as climate change increases the frequency and severity of long-term droughts in Africa.
Tuesday, 2:21 PM *eLightning Theater VI, Hall D - South*

SPACE

TOP TIP: **First results from OSIRIS-REx sample return**
Dante Lauretta will present the first analytical results from the samples returned from the asteroid Bennu.
Tuesday, 4:05 PM *201-202 - South*

TOP TIP: **Dead satellites leave behind vaporized metals in Earth's atmosphere**
In 2023, NOAA's Stratospheric Aerosol Budget and Radiation Experiment (SABRE) measured aluminum and other metals traced to "destructive reentry" of decommissioned satellites and rocket boosters. What will this mean for Earth's second atmospheric layer?
Wednesday, 10:20 AM *3001 - West*

TOP TIP: **First impact crater discovered on Jupiter's Io**
Researchers may have discovered the first known impact crater on Jupiter's volanic moon Io. Until now, the high rate of tidally-influenced volcanism was thought to be the reason, as it causes a high rate of surface change.
Wednesday, 2:10 PM *Poster Hall A-C – South*

TOP TIP: **Mining with microbes on the Moon**
Some mining companies use microbes to extracts valuable materials, such as copper and aluminum. Researchers conducted experiments in zero gravity to find whether these biochemical processes might help mine on the moon.
Wednesday, 11:40 AM *215 - South*

Solar wind as planets align reveals Martian electron secrets
A low density solar wind stream hit the Earth then Mars in December 2022. By reading instruments on the Red Planet and comparing them to Earth, scientists are learning more about the ionospheric and magnetospheric states there.
Monday, 9:00 AM *216 - South*

Uranus' moons have wild seasonal fluctuations
The extreme seasonal fluctuations of Uranus' moons cause temporary exospheres that may be driven by polar cold trapping. A spacecraft flight timed to pass in 2050 could witness equinox at these moons, when gas density in these exospheres is highest.
Wednesday, 2:10 PM *Poster Hall A-C - South*

Space weather could delay trains or cause accidents
Rail circuit signalling systems that use electricity to detect train positions could be negatively affected by space weather. Models reveal how this could delay trains or even cause accidents.
Thursday, 3:02 PM *205-206 - South*

Two geomagnetic storms reveal how these events affect the Earth
Two interplanetary coronal mass ejections that hit Earth's magentosphere in the spring of 2023 caused geomagnetic storms. A comparison of these two has revealed

how they can affect Earth systems.
Monday, 2:10 PM *Poster Hall A-C - South*

What future Uranus missions could teach us about the planet's atmosphere
Future missions to Uranus could teach us more about the ionosphere and atmosphere of Uranus by using radio occultations.
Tuesday, 8:30 AM *Poster Hall A-C - South*

A new satellite system could warn us better about approaching solar shockwaves
A network of several satellite may more accurately predict the arrival of potentially harmful shockwaves from other bodies in the Solar System. Researchers outline how such a system would work.
Wednesday, 8:30 AM *Poster Hall A-C - South*

How Mars dust may have worked with water on the Red Planet
Simulations reveal how the early Mars dust cycle might have worked with a water cycle. A first-ever study of the early Mars dust cycle seeks to find what the distribution of cloud condensation nuclei may have been on early Mars and how this might have impacted cloud formation.
Thursday, 9:35 AM *216 - South*

Researchers highlight ongoing discoveres about Titan via JWST and Keck Telescope
The James Webb and Keck telescopes are helping researchers learn more about Titan, the only moon in the Solar System with a thick atmosphere.
Wednesday, 10:35 AM *eLightning Theater V, Hall D - South*

JWST sets focus on Saturn's rings and moons

The James Webb Space Telescope is bringing more knowledge to light about the rings and moons of Saturn.
Wednesday, 10:29 AM *eLightning Theater V, Hall D - South*

First discoveries of the Solar Orbiter space craft
A summary of some of the early discoveries made by the Solar Orbiter mission launched in 2020 by the ESA and NASA. This instrument can analyze the Sun's corona in an unprecedented level of detail.
Wednesday, 4:15 PM *211 - South*

Presenting the upcoming radar missions to Venus
The NASA VERITAS and ESA EnVision will analyze Venus in new ways. These complementary missions will investigate the surface and near surface of the planet.
Friday, 10:40 AM *211 - South*

A potential sample return mission from Io
Scientists propose a mission to collect and return pyroclastic debris from volcanic plumes on Io, one of Jupiter's moons.
Wednesday, 4:20 PM *216 - South*

STORMS AND EXTREME WEATHER

TOP TIP: **Superbolt lightning's relationship to cosmic rays**
This study will present evidence that superbolt lightning striking at lower latitudes follows the Earth's magnetic equator. Furthermore, the study finds that superbolt occurrence is correlated with sunspot activity, and inversely correlated with cosmic ray flux at Earth.
Monday, 3:15 PM *216 - South*

TOP TIP: **Reading the "footprints" left by tornadoes**
Surface marks left behind by tornadoes contain information about the winds that created them, but deciphering tornado marks is complicated. This study uses computer simulations to study surface mark creation and determine how unique the marks are to any given tornado and its environment.
Wednesday, 2:10 PM *Poster Hall A-C - South*

TOP TIP: **Category 6: Have tropical cyclones reached a new level?**
Climate change is increasing the wind speeds of the most intense hurricanes. Three separate lines of evidence suggest that the addition of a sixth category to the Saffir-Simpson hurricane wind scale is necessary to convey this increased tropical cyclone danger.
Wednesday, 8:30 AM *Poster Hall A-C - South*

The global economic impact of El Niño under climate change
Under a high-emission scenario, this study finds that changes in El Niño will cause an economic loss potentially as large as $374 trillion, but achieving the Paris Agreement could reduce the additional loss by half—an incentive for mitigation.
Monday, 4:00 PM *2008 - West*

El Niño intensifies coastal fog in the Namib Desert
Coastal fog plays a crucial role in supplying water to dryland ecosystems, yet there are no studies that investigate the long-term effect of the El Niño on fog formation. This study finds that the El Niño-intensified northwestern wind can transport more oceanic vapor from the Atlantic Ocean inland, leading to a net increase in the intensity of ocean-derived fog.
Monday, 10:50 AM *3010 - West*

Low-income and disadvantaged populations slow to recover after major hurricanes in the US
Using NASA nighttime light data, this study finds that Black, low-income and disadvantaged populations are most vulnerable to prolonged and stagnant hurricane recovery. These findings highlight the need for improved and more equitable after-hurricane recovery efforts in the United States, with mitigations required to further prevent exacerbating social inequality.
Tuesday, 2:10 PM *Poster Hall A-C - South*

WILDFIRE

Pacific Northwest has most carbon-dense forests, but they face new wildfire threats

Forests in the Pacific Northwest are the most carbon-dense of the West and have increased their carbon storage, followed by forests in California and the Rockies, which are decreasing. But the productive PNW forests face emerging wildfire threats.

Friday, 8:30 AM *Poster Hall A-C - South*

Fungi spring up in burned tundra areas, but with less diversity

Wildfires are increasing in the Arctic, where fungi play critical roles as food sources, symbionts, and decomposers. Burned areas in this experiment had greater mushroom density but lower diversity, revealing another way wildfires are reshaping the fragile Arctic.

Wednesday, 2:10 PM *Poster Hall A-C - South*

Valuable pinon-juniper forests may be unable to fully cover from wildfire

Piñon-juniper woodlands are key ecosystems in much of the intermountain West. Research reveals that these ecosystems don't fully recover after fires.

Friday, 2:30 PM *3008 - West*

California fires correlated with mental health, pregnancy problems

A study of the aftermath of the fires in California in 2020 revealed that lingering pollution may be correlated with emergency hospital visits due to pregnancy complications and mental health problems.

Wednesday, 8:30 AM *Poster Hall A-C - South*

Fire fuel produces varying types of toxic pollution

Wildfire smoke can cause lasting air pollution, but not all fires cause the same type of smoke. Research reveals how the material burned by fires can affect the toxicity of pollution later on.

Tuesday, 4:00 PM *2020 - West*

Canadian wildfires pushed fine particulate pollution over EPA limits daily

Local particulate pollution monitors can help comminities determine the health risk from fires such as the Canadian blazes that sent smoke over many parts of the U.S. in the summer of 2023.

Friday, 8:30 AM *Poster Hall A-C - South*

AI is helping to reveal the factors that affect wildfire risk in parts of Hawaii

Researchers used alorithms and deep learning to determine the factors that most affected fire risk on Maui and Oahu. The distance to roads is the most effective factor detecting wildfire-prone areas, followed by temperature, slope and elevation.

Thursday, 8:30 AM *Poster Hall A-C - South*

Wildfire pollution may reverse declines in other types of air pollution in continental US

Some kinds of pollution have been decreasing in the U.S. due to regulation. But research reveals that fires have reversed these trends in the western U.S., where fine particles and premature deaths have increased.
Wednesday, 5:18 PM *3003 - West*

Wildfire suppression funding may incentivize development in high risk areas
Wildfire suppression funding by governments is derived by taxpayer dollars and distributed widely across the U.S. But development in some areas brings much larger fire risks than others. Researchers examined whether federal funding may unintentionally incentivize development in these ares.
Tuesday, 2:10 PM *Poster Hall A-C - South*