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Shorts

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A community approach to climate change

A biology team is scaling up to understand the ecological effects of climate change.

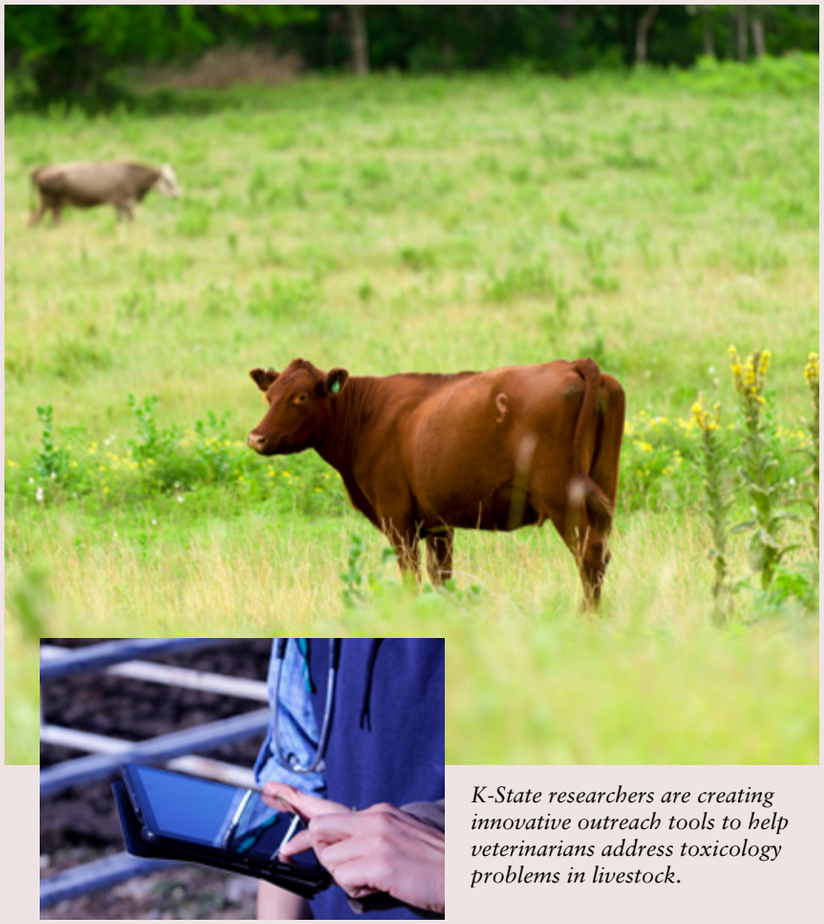
Climate change continues to affect individual organisms, populations of plants and animals, and ecological communities, but we don't yet know if these effects will be larger in tropical or temperate areas, said Allison Louthan, assistant professor in the Division of Biology in the Kansas State University College of Arts and Sciences.

Louthan and collaborators from the University of Georgia and the University of Wyoming have outlined a series of mechanisms that might modulate the effect of climate change across latitudes.

While tropical organisms are strongly affected by even small increases in temperature, climate change predictions indicate that the temperature will not warm much in the tropics — and the exact opposite is true in temperate areas. Louthan and her collaborators outline how the degree of climate change and temperature sensitivity might interact with other factors that vary across latitudes, such as the impact of species interactions, to modulate effects of climate change on populations and communities.

"Our work tries to exhaustively outline all the factors that could possibly generate latitudinal variation in climate change impacts, which I think is a step forward from just thinking about individual organisms' temperature responses," Louthan said.

The study has been published in the journal Trends in Ecology and Evolution. The research was supported by the National Science Foundation and the U.S. Department of Agriculture National Institute of Food and Agriculture.



K-State researchers are creating innovative outreach tools to help veterinarians address toxicology problems in livestock.

New K-State hotline helps diagnose toxic animal emergencies

Rapid response to animal health emergencies has prompted the creation of a new veterinary toxicology training program at Kansas State University. A $248,000 U.S. Department of Agriculture grant is enhancing the ability of researchers in the College of Veterinary Medicine to answer calls for help.

The goal of the program, developed by Steve Ensley, clinical veterinary toxicologist, and Bob Larson, professor of production medicine, is to create innovative outreach tools. This will better enable livestock veterinarians to recognize and address toxicology problems in food animal species, especially cattle, small ruminants and pigs.

The project uses veterinary telemedicine and other distance-based education resources, including a toxicology call-in hotline for practicing veterinarians called CONSULT — Collaborative, Online, Novel, Science-based, User-friendly, Learning Tool — for common livestock toxicology problems, and YouTube training videos.

Developing adolescent social media citizenship

A Kansas State University researcher is providing school teachers and administrators with tools to help youth become good social media citizens.

Jana Thomas, professor of practice in the A.Q. Miller School of Journalism and Mass Communications, studies media usage among 10- to 18-year-olds. She has partnered with K-State Research and Extension to measure middle school and high school students' social media citizenship behaviors and to provide learning resources for the classroom.

Students in seventh to 12th grades from five Kansas school districts participated in a pilot study through an anonymous online survey. The survey scored students in eight areas of social media citizenship behavior: digital harassment, psychological health and well-being, security and safety, misuse of technology, communication and conflict management, problem-solving and collaboration, media literacy and digital identity management.

Preliminary survey results among the schools vary. Each school has a unique combination of social media citizenship behaviors where students excel and other behaviors where students can improve. That shows the need for relevant and student-centered citizenship education.

Once students have taken the survey, the researchers share the results and customized educational resources with school administrators and educators to identify educational opportunities related to students' social media use.

"The popularity of social media like Instagram, Snapchat, YouTube and TikTok among today's youth fuels the need for technology and citizenship education that helps students navigate potential risks and prioritizes skills in digital communication and content creation," Thomas said.

See page 16 to read more about research related to digital literacy.

K-State Salina leads national first responder UAS challenge

The Kansas State University Salina Aerospace and Technology Campus continues to be a national leader in unmanned aircraft systems, or UAS. K-State Salina has been selected to lead the third UAS prize competition by the U.S. Department of Commerce National Institute of Standards and Technology, or NIST.

Named the First Responder UAS Triple Challenge, this prize competition will focus on the advancement of UAS technology to support first responders and to help them save lives more quickly. The competition is comprised of three challenges where participants use their UAS ingenuity to deliver creative solutions to advance first responder operations.

K-State Salina is coordinating the UAS Triple Challenge in partnership with Mississippi State University and live competitions will be in Starkville, Mississippi, and Salina in spring/summer 2022.

"This project has been a long time in the making for our team at K-State," said Kurt Barnhart, professor of aviation and lead of the K-State grant team. "We are privileged to partner with the challenge team at NIST in its ongoing effort to push innovative technologies forward for all first responders, providing life-saving help when needed the most. We're also excited to be working with the excellent team at Mississippi State University's Raspet Flight Laboratory to jointly develop and deliver this competition."

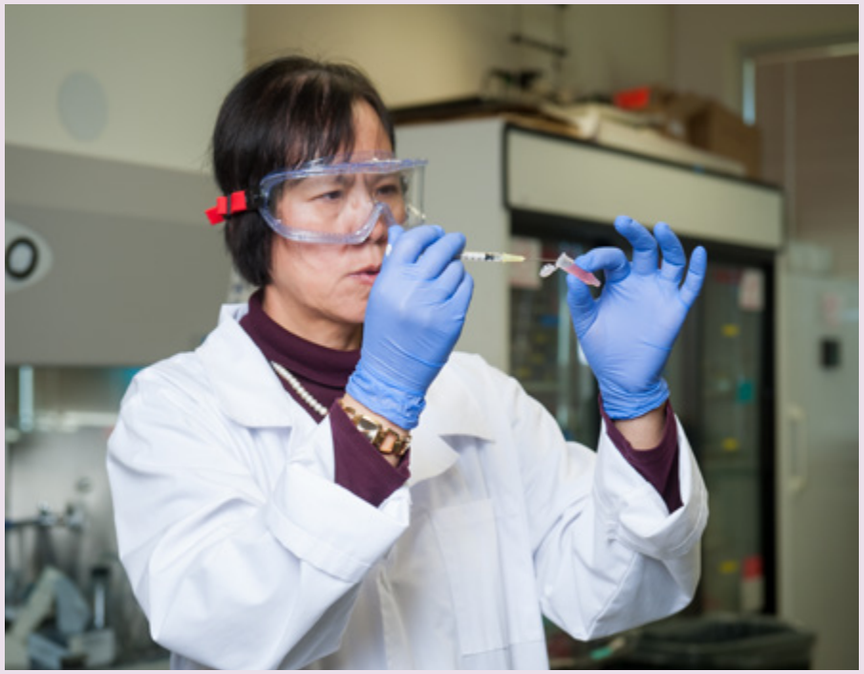
State gains first aerospace and technology campus with rebranding of Salina campus

With a focus on national expansion, meeting the demands of the aerospace industry and a recognition of the niche mission of the campus, Kansas State University's Polytechnic Campus is rebranding to be Kansas State University Salina Aerospace and Technology Campus.

"This change establishes the first aerospace and technology campus in Kansas and shows our Salina campus is ready to take on the accelerating needs of the aerospace and advanced manufacturing industries," said Richard Myers, K-State president. "The Aerospace and Technology Campus will be a national leader in advanced aviation and aerospace training, education and engineering through research, innovation and instruction."

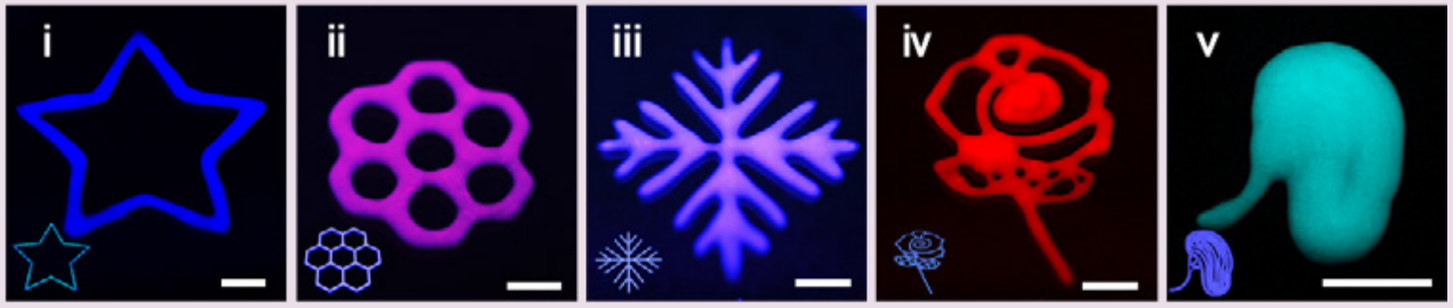
Since joining the Kansas State University system in 1991, the campus has housed the university's aviation and engineering technology programs. These are niche programs, separate from any programs offered on the other K-State campuses. The historical lineage of the campus — a two-year technical institution that merged with a public university — uniquely positions it to serve all career-entry points into the aerospace and advanced manufacturing industries.

K-State Salina will continue its focus on research programs that build the aerospace and technology industries. Through the Global Aeronautics Initiative, K-State Salina is advancing global aviation through research, innovation and training. The Applied Aviation Research Center is a national leader in unmanned aircraft systems research and training. The Bulk Solids Innovation Center is one of the only facilities in the world to handle bulk solids materials, testing and training.



Left: Xiuzhi "Susan" Sun, university distinguished professor of grain science and industry, and a collaborative team have developed a universal peptide hydrogel.

Below: These images show how the universal peptide hydrogel can be 3D-bioprinted into different patterns, from a simple star, far left, to a kidney-like organ, far right. (Image credit: Susan Sun)



Building a better stem cell gel

Kansas State University researchers have developed a universal peptide hydrogel that can help improve 3D bioprinting and stem cell research. The collaborative work is providing powerful biotools for drug discovery and disease modeling and is improving platforms for regenerative medicine and stem cell therapeutics.

"Stem cells can self-renew indefinitely in theory and differentiate into almost all somatic cell types and have huge potential to improve human health," said Xiuzhi "Susan" Sun, university distinguished professor of grain science and industry in the College of Agriculture.

Sun and collaborators recently published their work in the journal Advanced Functional Materials.

For more than a decade, human-induced pluripotent stem cells, or hiPSCs, have been cultured as single layers on flat surfaces in 2D form. That often leads to problems, such as poor maintenance of pluripotency, which is the stem cell's ability to develop into different cell types, Sun said.

The K-State-developed universal peptide hydrogel enables researchers to scale the physiological formation of stem cells and to 3D-bioprint hiPSC patterns, such as spheroids and organoids. These spheroids have better performance and integrity than existing 3D technologies.

The universal peptide hydrogel has valuable properties — tunable gel strength, viscosity and self-healing kinetics — that make it suitable for either pipetting or bioprinting without additional chemicals or cross-linking agents.

The work has involved other K-State researchers in the College of Agriculture, the Carl R. Ice College of Engineering and the College of Veterinary Medicine. Other collaborators include Harvard Medical School, Harvard University, Applied StemCell Inc., Wake Forest University and Virginia Tech.