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K-State unveils plan to increase jobs, investments in Kansas

You can plan on it: Kansas State University is launching a new strategic initiative to help people and businesses in Kansas.

The university's [Economic Prosperity Plan](#) will add thousands of jobs and billions of dollars into the Kansas economy by leveraging K-State's strengths in four key areas: food and agriculture systems innovation; digital agriculture and advanced analytics; biosecurity and biodefense; and extension and outreach.

"As the country's first operational land-grant institution, K-State has always focused on excellent teaching, research and service that advance the well-being and economic prosperity of our state," said Richard Myers, university president. "This new initiative has the potential for significant economic growth for the region and state but will require many dedicated partnerships and support from the state to be successful. The university will continue to work vigorously to build those partnerships to make this plan a reality."

Two focus areas in the plan center around food and agriculture. The food and agriculture systems innovation area will ensure Kansas retains greater value-added opportunities throughout the food system value chain. The plan also will leverage K-State's deep strengths across crops, livestock and natural resources research and innovation to attract outside investment and help Kansas become the global leader in digital agriculture and advanced analytics

"The resulting competitive advantages for Kansas within five to 10 years include economic growth and job creation; profitable, regenerative and sustainable food and agriculture systems; new technologies and innovation; and better health for Kansas citizens through nutritional security," said Ernie Minton, dean of the College of Agriculture and director of K-State Research and Extension.

K-State's plan also will focus on using university strengths in biosecurity and biodefense to attract new companies and partnerships to the state.

A biotechnology development module within the university's Biosecurity Research Institute will allow corporate partners to develop diagnostic, therapeutic and preventive countermeasures for a broad range of emerging zoonotic diseases while addressing scalable production. This secure space also will enable emergency rapid manufacturing to protect the nation's animal and food supply during a crisis.

The College of Veterinary Medicine will also focus significant efforts on keeping graduates in Kansas.

"In addition to making it easier for companies to partner with K-State researchers, we are increasing our efforts to keep our graduates in the state," said Bonnie Rush, dean of the College of Veterinary Medicine. "Kansas veterinarians contribute about a half a billion dollars to the economic development of the state, so the more veterinarians we can keep in the state, the stronger the economic prosperity of producers."

A final area of focus in the plan is an initiative called K-State 105: Every Town to Gown, which leverages K-State's statewide extension presence to assist businesses and communities in all of the state's 105 counties to access K-State innovation, talent and training through local liaisons and coordinated resources.

"Our Economic Prosperity Plan will allow K-State to create 3,000 new jobs and \$3 billion in additional investments into the state of Kansas in the next 10 years," said David Rosowsky, vice president for research. "This new initiative will allow K-State to truly demonstrate the value that universities provide to local, state and national economies through job growth and job creation, as well as retaining and attracting talent in the state."

University announces research collaboration to improve COVID-19 vaccine stability

Researchers at Kansas State University are expanding on an industry partnership to increase stability in mRNA vaccines — including those against COVID-19 — during transport and storage.

The agreement, coordinated by K-State Innovation Partners, is an exclusive license and option agreement and research collaboration with [Tonix Pharmaceuticals](#).

Through the partnership, researchers will develop zinc nanoparticle, or ZNP, mRNA vaccines that replace the lipid nanoparticle, or LNP, technology in current COVID-19 vaccines. The new zinc nanoparticle technology confers increased stability to mRNA vaccines over a wide range of temperatures in model systems. The temperature-sensitive nature of zinc nanoparticle mRNA formulations limit vaccine shipping and storage to ultralow temperatures, which limits rapid global deployment. Under the research agreement, K-State will advance preclinical development of a new zinc nanoparticle mRNA vaccine to protect against COVID-19 based on the spike protein from SARS-CoV-2.

"The LNP technology of current mRNA COVID-19 vaccines limits our ability to deploy these vaccines in many parts of the world," said Robert DeLong, associate professor at the [Nanotechnology Innovation Center of Kansas State](#). "The technology we have developed uses zinc to replace LNPs and results in more temperature stable mRNA vaccines."

DeLong said that zinc nanoparticles, unlike lipid nanoparticles, are stable over a range of temperatures, including room temperature. Eliminating the need for lipid nanoparticles in mRNA vaccines could speed deployment of new vaccines and make them more available globally. At scale, zinc nanoparticle-based mRNA vaccines may also be less expensive to manufacture.

DeLong will lead the vaccine research, along with colleagues Waithaka Mwangi, professor of diagnostic pathobiology in the K-State [College of Veterinary Medicine](#), and Juergen Richt, director of the [Center of Excellence for Emerging and Zoonotic Animal Diseases](#) and director of [Center on Emerging and Zoonotic Infectious Diseases](#).

"Our goal in utilizing a new mRNA formulation technology is to vaccinate people all over the world to save lives globally and reduce the emergence of variants of COVID-19 that can evade vaccine immunity," Mwangi said.

According to the Center for Disease Control and the Food and Drug Administration, the mRNA vaccines developed by Pfizer/BioNTech and Moderna based on lipid nanoparticles have been shown to prevent COVID-19 for up to six months after two doses and for longer with a booster. Because of the limitations of lipid nanoparticle technology, these mRNA vaccines require ultra-cold storage and transport because they are unstable at room temperature or even in standard refrigerators or freezers.

"The Pfizer/BioNTech and Moderna vaccines against COVID-19 have shown that mRNA technology is rapidly deployable and is likely to be one of the first lines of defense for future pandemics," said Seth Lederman, M.D., chief executive officer of Tonix. "The ZNP technology invented and developed by scientists at K-State has the potential to make mRNA vaccines that are free from LNPs, which could improve the stability of mRNA vaccines at room temperature and facilitate their deployment in places without ultra-cold chain supply systems."

KANSAS RECOVERY RESOURCES



K-State football team shows support for wildfire recovery with special helmet decal at bowl game

The Kansas State football program wore a special decal on the back of its helmets when the Wildcats took the field for the TaxAct Texas Bowl in support of Kansans who were affected by last week's wildfires.

Many K-Staters and fellow Kansans in Western Kansas were dealt a devastating blow on December 15 when fires fueled by 100-plus mile an hour winds burned over 400,000 acres of pasture, destroying homes, vehicles, barns, equipment, pets and killing thousands of head of cattle.

"Our thoughts and prayers are with the many Kansans who were affected by the recent storms and wildfires," Athletics Director Gene Taylor said. "This helmet sticker is a small department-wide gesture that will let all K-Staters and those effected by this storm know that we are with them as they rebuild their lives and their livelihoods."

Kansas State beat LSU 42-20 in the TaxAct Texas Bowl on January 4, 2022.

University launches Cancer Research Collaboration of Excellence in Tumor Microenvironment Studies

The [Johnson Cancer Research Center](#) at Kansas State University has launched a [Cancer Research Collaboration of Excellence in Tumor Microenvironment Studies](#). The multidisciplinary collaboration will examine how environmental conditions within tumors impact their development, growth and aggressiveness, and apply the findings to improve cancer therapies.

The collaboration is made possible with a two-year, \$100,000 award from the cancer research center. Brad Behnke, professor of kinesiology and associate dean of research and graduate studies for the College of Health and Human Sciences, leads the collaboration. The members are investigating changes in the tumor microenvironment due to exposure to different levels of radiation, oxygen pressures and vitamin D.

"Many conventional cancer therapies fail due to factors related to the tumor's environment," Behnke said. "We want to identify microenvironment changes that cause cancer growth and therapy resistance, and devise methods to combat them."



Post-Harvest Loss Innovation Lab kicks off \$1M Food for Education project in Malawi

The College of Agriculture's Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss has signed a \$1 million subaward agreement with Nascent Solutions for a U.S. Department of Agriculture-funded [McGovern-Dole International Food for Education](#) and Child Nutrition project in Malawi. The lab and the Malawi project are led by Jagger Harvey of Kansas State University's plant pathology department.

A USDA-Foreign Agricultural Service program, the McGovern-Dole International Food for Education and Child Nutrition Program helps support education, child development and food security in low-income, food-deficit countries around the globe. The program provides for the donation of U.S. agricultural commodities, as well as financial and technical assistance, to support school feeding and maternal and child nutrition projects. USDA, similar to USAID, is a Feed the Future [implementing agency](#) of the U.S. government.

Nascent Solutions [was awarded \\$22 million](#) as the lead on this overall program in 2019, paving the way for the innovation lab to enter the project after two years of impactful work and discovery. With a program goal of reaching 65,000 students and 498,000 indirect beneficiaries in Malawi, it has so far reached and benefited 61,860 learners — more than half of which are young girls — in six districts and established 61 school gardens and three communal gardens. The overarching program objectives are to improve literacy of school-age children and increase the use of positive health and dietary practices. The K-State-led team now builds upon successes of the first two years of the project and can enhance in-country research capacity, characterize postharvest loss drivers, fast track any technologies and extension materials to reach target beneficiaries.

The Innovation Lab for the Reduction of Post-Harvest Loss team will lead a set of postharvest and school feeding improvement activities that address key components in the McGovern-Dole Results framework and USDA's learning agenda. Expert collaborators from across multiple disciplines and institutions will contribute to this work.

The innovation lab project activities include:

1. Establishing a mycotoxin — toxic fungal metabolites contaminating food supplies — research platform at LUANAR.

The collaboration's four main research projects aim to answer the following questions. What DNA mutations occur in response to radiation? Does exercise increase oxygen in breast tumors and thus improve response to chemotherapy and radiation? Does nitrate supplementation increase tumor oxygenation and thus decrease tumor growth? And how do ovarian tumors respond to different levels of vitamin D?

"This research collaboration is an exciting step forward in helping to understand the basic mechanisms underlying cancers and identifying strategies for novel therapies," said Beth Montelone, senior associate vice president for research. "We look forward to the outcomes of this work and the follow-on projects that could result from it."

This is the Johnson Cancer Research Center's second Cancer Research Collaboration of Excellence. The first was for pancreatic cancer studies. This program supports multidisciplinary teams fighting cancer synergistically in a focused area of cancer research.

The Johnson Cancer Research Center, in the College of Arts and Sciences, supports and advances cancer research and education at Kansas State University. Its programs are made possible by private funding. Information about the center is at cancer.k-state.edu.

DID YOU KNOW?

The northwest side of Memorial Stadium on the Manhattan campus is being renovated to house K-State's marching band. The new space will be named the Tracz Family Band Hall in honor of Dr. Frank Tracz, professor of music and director of bands.

2. Conducting a baseline assessment to identify postharvest issues along the Food for Education in-country value chain, related to proper drying and storing of stored product crops — e.g., maize, soy, sorghum, pigeon pea, etc.
3. Identifying and sensitizing key stakeholders on evidence-based mitigation strategies, handed over as integrated intervention packages — technologies and training programs — through extension support to students, PTA members, farmers, government and other stakeholders.
4. Enhancing capacity of the local university partner and rallying national stakeholders around these solutions.

The project is quickly gaining momentum, with a positive, forward-looking meeting with the Malawi Ministry of Agriculture in late November. The U.S.-based project team is poised to conduct site visits as soon as possible, with Professor Matumba pushing forward in the meantime.

K-State professor receives prestigious CPS grant

The Center for Produce Safety (CPS) has funded 12 new research projects to help answer the industry's most urgent produce food safety questions. K-State's Valentia Trinetta, associate professor in Animal Science & Industry, received one of the awards for her research [Validation study for the tree-fruit industry: effective strategies to sanitize harvest bins and picking bags](#). All projects will begin in January 2022.

First-time CPS-funded scientist, Kansas State University Associate Professor Valentina Trinetta, Ph.D., shared, "Our research aims to develop science-based recommendations that will help improve cleaning and sanitation practices for harvesting operations while managing food safety risks tied to the sanitation of picking bags and harvesting bins for the tree fruit industry. Our team is excited to get started!"



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