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An eye for cattle facial recognition technology

If you've stared one cow in the face, you've seen them all ... right?

New technology being developed at Kansas State University is debunking that thought and capitalizing on the power of artificial intelligence to build a database of facial recognition technology for the cattle industry.

Just like humans, each cow has a set of unique facial features that modern technology can scan and later use to track the animal throughout its life. Several K-State researchers from the College of Agriculture, the College of Veterinary Medicine and the Carl R. Ice College of Engineering are developing an artificial intelligence network for cattle that is based on human facial recognition technology.

“Our thinking is, ‘Why can’t we have something like that for beef cattle, which could then be used to create a national animal disease traceability system?’” said KC Olson, beef cattle scientist with K-State Research and Extension, who has helped to develop the idea. “The need for such a system has never been greater. We need this extra layer of protection for our industry against a foreign animal disease or possible malfeasance by somebody who’s an enemy of this nation.”

K-State has worked with Kansas City-based company Black Hereford Holdings Inc. to build a smartphone app called CattleTracs, which allows producers to submit pictures of their cattle.

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Watch a video that explains how the cattle facial recognition technology works.

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Engaging the nonprofit workforce

Leadership development can help engage employees of nonprofit organizations, according to Kansas State University collaborative research.

Third Floor Research — the research partnership between the Kansas Leadership Center and K-State’s Staley School of Leadership Studies — recently released a report that investigated the influence a leadership development program has on employee leadership behaviors and organizational outcomes in a nonprofit organization.

The result: Widespread leadership development up and down the organizational chart contributes to a more engaged workforce in the nonprofit sector.

“From the front desk to the C-suite, it’s encouraging to see the difference leadership training can have on employees and the nonprofits where they work,” said Tim Steffensmeier, K-State professor and director of the leadership communication doctoral program at the Staley School and director of research at the Kansas Leadership Center. “With organizational missions expanding and workloads increasing throughout the sector, employees at all levels are taking on more, often with less support. These findings and recommendations can really make a difference on burnout across the board.”



Students and faculty members in the interior architecture & industrial design program meet with Sloan executives to review their commercial restroom product designs. (Photo credit: Mekin Elcioglu)

Designing a new studio experience

Interior architecture & industrial design students are building backgrounds in research, design and development, thanks to a new partnership with Sloan.

Sloan Valve Co., based in Chicago, is sponsoring two College of Architecture, Planning & Design classes: an undergraduate class for third-year students and a masters-level class for fifth-year students. Mekin Elcioglu, assistant professor of interior architecture & industrial design, is teaching both courses, which help students learn and innovate the future of interior restroom design as they enter the workforce.

“Benefiting from both academia and industry experiences, the research and resources can give the young designers and engineers an upper hand in the development of new concepts and solutions, and generate added value in tackling the issues brought up by global challenges,” Elcioglu said.

In the courses, students delve into topics such as design research, idea conceptualization, human-centered design, market research trend analysis and innovation in the plumbing industry.

“We have found this partnership to be mutually beneficial in combining our 100 years of expertise in the plumbing industry with K-State’s amazing creativity in design,” said Jim Allen, Sloan co-president and CEO.

Konza Prairie continues decades of research success

The National Science Foundation has awarded a \$7.12 million grant renewal to Kansas State University's Konza Prairie Biological Station to support the next six years of long-term ecological research. The grant is the eighth consecutive NSF grant renewal for Konza Prairie and marks more than 40 years of the Konza Prairie Long-Term Ecological Research, or LTER, program.

Since 1980, the Konza Prairie LTER program has supported a comprehensive ecological research, education and outreach program. The program centers on one of the most productive, yet endangered grasslands in North America: the tallgrass prairie.

With the recent NSF grant renewal, Konza Prairie has received a total of nearly \$40 million in LTER funding and leveraged an additional \$60 million of federally funded research.

Konza Prairie, an 8,600-acre native tallgrass prairie research station, is co-owned by the Kansas State University Foundation and The Nature Conservancy. Faculty in the K-State Division of Biology in the College of Arts and Sciences manage Konza Prairie as a world-class platform for education and scientific investigation of grassland ecology.

“The Konza Prairie Biological Station is an amazing and critical resource for K-State,” said Chris Culbertson, associate dean for research in the College of Arts and Sciences. “The recent renewal of the NSF LTER grant for an unprecedented eighth time will allow the critical long-term research underway there to continue and will allow for several new research directions to be pursued.”

The Konza Prairie Biological Station is an 8,600-acre native tallgrass prairie where researchers conduct long-term ecological research.



These bottles are used as chemical references when sensory analysis panelists evaluate the smell and taste of products.

The nose knows

Odor can be complicated. It is a key component in the flavor of food, the smell of nature and perfumes, and products such as shampoos and deodorants.

But the problem with understanding smell is that small changes in chemical structure can cause large changes to odors. Even further, food products with multiple chemical compounds may taste nothing like any single chemical compound.

Researchers with the Kansas State University Center for Sensory Analysis and Consumer Behavior want to know why.

Two researchers in the food, nutrition, dietetics and health department in the College of Health and Human Sciences — Kadri Koppel, associate professor and co-director of the Center for Sensory Analysis and Consumer Behavior, and Edgar Chambers IV, university distinguished professor — are using machine learning to better understand and predict smells.

The machine learning involves a mathematical and statistical tool to understand and predict how changes can affect smell.

The K-State work is supported by a five-year \$550,000 grant from the National Institutes of Health. The project is a collaboration with Monell Chemical Senses Center at the University of Pennsylvania.



Researchers Bret Flanders, left, and Paul Smith have received a prestigious W.M. Keck Foundation award.

Big support for a big idea

A Kansas State University-led collaboration has received a \$1 million grant from the William M. Keck Foundation for research on stochastic heating and how it can accelerate chemical reaction rates. It is the first W.M. Keck Foundation award to a K-State-led research initiative.

The collaboration involves College of Arts and Sciences researchers Bret Flanders, professor of physics, and Paul Smith, professor of chemistry, as well as research partner Christine Orme, senior staff physicist from Lawrence Livermore National Laboratory.

The research focuses on understanding electrochemical, biomineralization and biochemical reactions. It aligns with the Rules of Life — part of the 10 Big Ideas that the National Science Foundation uses as a road map for future funding.

The W.M. Keck Foundation limits awards to a few projects each year and focuses on distinctive and novel approaches to medical research, science and engineering.

“The physics of living systems is a physics frontier,” said Flanders, the project lead investigator. “This award will initiate a new avenue of biophysical research in the physics and chemistry departments at K-State and through the collaboration at Lawrence Livermore National Laboratory. The W.M. Keck award and the research it will fund are significant steps forward.”

Based in Los Angeles, the W.M. Keck Foundation was established in 1954 by the late W.M. Keck, founder of the Superior Oil Company. The foundation’s grant making is focused primarily on pioneering efforts in the areas of medical research, science and engineering. The foundation also maintains a Southern California Grant Program that provides support for the Los Angeles community, with a special emphasis on children and youth.

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Learn more about the project and the W.M. Keck Foundation.

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