



IANR

**Institute of Agriculture and Natural Resources
University of Nebraska – Lincoln**

**Year in Review
2017**

IANR 2017 – Year in Review

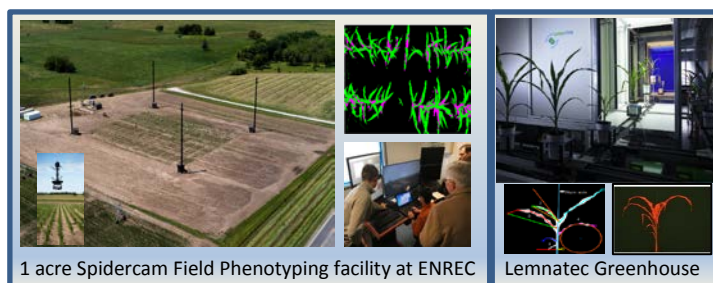
Agricultural Research Division

Leading the Development of Resilient Food Production Systems for a Growing Global Population

The Agricultural Research Division is dedicated to the support of Teams and Centers executing the innovative science that propels the University of Nebraska to a global leadership position in food security, and partnerships with the private-sector to create translational value and meet workforce needs, thereby fueling the economy of Nebraska. Towards those aims, ARD Faculty Teams continue to leverage the critical state and institutional support that they receive to achieve success in an extremely competitive external funding environment. Expenditures from externally-funded IANR research have increased by >22% from FY14 to FY17 to a new high of \$53.5M. Externally-sponsored research expenditure per faculty FTE has reached an all-time high of >\$172,000.

Building the Future for Crop Production –

A new \$5.78M grant from the National Science Foundation will support the study of crop responses to high nighttime temperatures in Nebraska and across the central US, and a new award of \$3M from NSF will fund innovation in graduate student research and education in areas of agricultural resilience. Another example in 2017 of the exceptional competitiveness of ARD faculty was the success of three UNL teams in a single USDA competition receiving awards totaling \$1.5M to develop smart technologies to maximize efficiencies, including water and fertilizer use, in the production of nutritious food, new biofuels and bioproducts. These successes continue the funding by federal



agencies of UNL-led, trans-disciplinary, holistic studies of agricultural and natural systems important to Nebraska, and are underpinned by internal investments like those in our unique plant phenotyping platforms. In 2017, the new field facility featuring the Spidercam suspension system was opened at the Eastern Nebraska Research and Extension Center, complementing our NIC greenhouse system, and existing unmanned and conventional aerial systems, to give IANR unmatched capacity to link genomics to important crop traits, from the lab to the greenhouse, to fields and landscapes.

The Epicenter of Beef Systems Research –

Momentum continues to establish Nebraska as the epicenter of Beef Systems research through the Nebraska Beef Systems Research Initiative (NBSRI). The NBSRI Team has responded to the 2016 commitment of \$1.5M in IANR support by implementing a 5-yr plan that strategically integrates IANR state-wide facilities as well as partnerships with USMARC, and has begun to successfully leverage that commitment in competing for additional external support, most notably a \$1M grant from the federally-funded Foundation for Food and Agriculture Research to extend their studies of improved land use efficiency through integrated beef systems.

The Nebraska Food for Health Center – Envisioning Nebraska Agriculture 2.0 –

The Nebraska Food for Health Center (NFHC), located in the Food Innovation Center at NIC, has implemented a high-throughput approach to identifying unique plant-based components that can be used to promote human health through dietary modulation of the gut microbiome, and inform new-age breeding programs to add value to Nebraska crops. Initial institutional support has been leveraged by the Center to receive \$5M in grants from the Raikes and Gates Foundations. In January 2017, Dr. Andrew Benson was named the founding Director for NFHC. New faculty positions for the Center in Gastrointestinal Microbiology, Structural Glycobiology, and Protein Chemistry have now been filled, and an international search was begun in November for positions in Bioinformatics, Epidemiology and Human Genetics, the latter two with joint appointments at UNL and UNMC.

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College of Agricultural Sciences and Natural Resources (CASNR)

It is definitely an exciting time for CASNR! We kicked off the start of the 2017-2018 academic year with the Great American Eclipse, the opening of the Massengale Residential Center, and welcomed our largest freshman class in the history of the College. Now in its 145th year, the College is preparing today's students for tomorrow's greatest challenges. To do so in today's rapidly changing environment, CASNR is thinking bold when it comes to teaching and learning.

Among the Best -- Continued Excellence:

- The Soil Judging Team placed first overall at the 2017 Regional Soil Judging Contest, with three team members placing in the top 10 individually.
- The Graduate Student Weed Science Team took first place and the Undergraduate Team earned runner-up in the North Central Weed Science Society Student Weed Contest. Combined, the team brought home 16 team and individual plaques.
- CASNR has the highest 10-year average graduation rate among UNL's colleges. Our – focus is not only on preparing students for their first job, but positioning them to have a lasting and impactful career that aligns with their passion.

Continued Enrollment Growth Aligned with Career Opportunities:

- Total number of CASNR undergraduate, graduate and professional students increased to 3,094.
 - 491 incoming freshman students, which is a 1.9 percent increase from fall 2016;
 - 131 transfer students enrolled for the fall 2017 semester, representing an increase of 4.8 percent from 2016;
 - 700 CASNR graduate students working side-by-side with faculty recognized worldwide for innovation and creativity; and
 - Welcomed the 11th class to the Professional Program in Veterinary Medicine; an estimated two-thirds of Nebraska graduates return to Nebraska.

Partnerships in Nebraska and Beyond:

- Agricultural Education faculty were instrumental in launching 10 new agriculture high school programs in Nebraska, increasing the number of schools providing agricultural education programming to 185.
- Streaming Science – an innovative approach utilizing electronic field trips showcasing agricultural and natural resources systems in Nebraska to engage K-12 audiences in science literacy education.
- Continuing to strengthen programming with NCTA to provide a seamless educational continuum from associate to bachelor to graduate degrees in food, energy and water systems.
- The Bachelor of Science in Applied Science online degree completion option jumped from 86th in the rankings by the U.S. News Best Online Education Programs to 36th in 2017. The College continues to offer a number of online education programs that increase access to site-bound learners in Nebraska and beyond.
- A global student body enriches the learning environment for all and allows students to establish relationships, increase understanding, and build partnerships with peers from around the world. The new 3+1 dual degree program with Northwest Agricultural and Forestry University (NWAUFU) is the first of its kind in the world. The 3+1 model provides an excellent opportunity for students to learn and engage with world leaders in Food Science from both institutions.

Continuing to Create Innovative and Transformative Educational Experiences: Recent Examples

- Faculty in the School of Natural Resources and Department of Agronomy and Horticulture are launching an interdisciplinary graduate training program focused on understanding resilience and vulnerability in agricultural landscapes through combined research on agricultural resilience and food, energy, and water systems. This project is supported through a USDA-NIFA grant.
- A new USDA-NIFA project led by the Department of Agronomy and Horticulture aims to prepare students to address the challenges of food production and the environment through hands-on learning experience and peer interaction.
- The Cultivating ACCESS program seeks to increase participation of women and underrepresented minorities from rural Nebraska in STEM-related agricultural careers through a holistic mentoring and development program that engages high school youth (scholars), parents, college students (ambassadors), and career professionals (mentors). Funding support is provided through USDA-NIFA.

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College of Education and Human Sciences (CEHS)

2017 was a year of leadership transition in CEHS. The college's first dean, Marjorie Kostelnik, completed a tenure that began in 2003 when the college was formed by combining Teachers College with the College of Human Resources and Family Sciences. Kostelnik took a position July 1, 2017 with the University of Nebraska as senior associate to President Hank Bounds. She has been coordinating the budget reduction teams across four campuses, to meet the challenges of state budget cuts. A celebration of Dr. Kostelnik's accomplishments as dean was held on August 30, and the Marjorie Kostelnik Fund has been established with the University of Nebraska Foundation, in her honor.

Beth Doll was named interim dean after serving as associate dean for academic affairs since 2011. She has been professor of educational psychology since 2000. Previously, Doll served as an associate professor and director of the School Psychology Program at the University of Colorado-Denver and was a clinical faculty member at the University of Wisconsin-Madison. Doll is a graduate of Michigan State University (B.A.), Eastern Michigan University (M.S.) and the University of Kentucky (Ph.D.).

Linda Boeckner was named interim chair of Nutrition and Health Sciences. She is a long-standing professor in NHS and a former extension nutrition specialist for Nebraska Extension at the Panhandle Research and Extension Center. Boeckner replaces Tim Carr who was named dean of Graduate Studies.

A number of CEHS faculty and staff affiliated with IANR were honored in 2017. They include:

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| Holly Hatton-Bowers, CYAF | Innovative New Employee Award | Extension |
| Dipti Dev, CYAF | Dinsdale Family Faculty Award | IANR |
| Jean Ann Fischer, NHS | Omtvedt Innovation Award for Extension | IANR |
| Catia Guerrero, CYAF | Outstanding Employee Award | IANR |
| Dipra Jha, NHS | Smooth Sailing Award | UNL Education Abroad |
| Sheree Moser, CYAF | Reg. V Postsecondary Teacher of the Year | Assoc. for Career & Tech. Ed. |
| Helen Raikes, CYAF | Grace Abbott Award | Neb. Children & Families Fnd. |
| Mona Schoenrock | Nebraska Teacher Educator of the Year | Assoc. for Career & Tech. Ed. |
| Natalie Sehi, NHS | Mid-Career Leadership Award | Epsilon Sigma Phi |
| Yan Ruth Xia, CYAF | Felix Berardo Award for Mentoring | NCFR\\ |

Paul Springer, acting associate dean of academic affairs, and **Rich Bischoff**, chair of Child, Youth and Family Studies, **presented research at the Second Global Mental Health Conference in Jordan** Oct. 5-7. They were two of seven American researchers invited. Their presentation focused on their model of engaging people in rural and underserved communities to address mental health disparities.

CYAF professor Tori Molfese delivered the Nebraska Lecture April 3 "Learning to Read: Making Sense of the Evidence." She spoke about her research on newborn language development. Molfese is an expert in cognitive development of infants, children and adults.

TMFD graduate students Wei Li and Bingnan Mu were awarded American Association of Textile Chemists and Colorists Foundation Student Research Grants. Li's research involves development of 100% regenerated keratin fibers of high quality from waste wool and poultry feathers, and Mu's grant was for a dual-phase solvent system for sustainable reactive dyeing of cotton using soybean oil.

Under the direction of assistant professor **Kelley Buchheister, CYAF hosted Full STEAM Ahead, an interactive workshop for young children and families.** It featured hands-on activities in science, technology, engineering, the arts and mathematics using nature and the outdoors. Education abroad students from East China Normal University shared their culture while facilitating STEAM activities.

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Nebraska College of Technical Agriculture (NCTA)

NCTA Academic Quality Receives National Recognition:

NCTA continues to draw national attention for its affordable workforce development, graduate success, competitive cost of education, and skilled graduates working in agricultural professions.

- WalletHub.com ranked NCTA as the #1 U.S. two-year college for graduate career outcomes in evaluating starting salary compared to cost of education
- Zippia.com ranked NCTA #11 in graduate salary with earnings with salaries at \$49,800 10 years post-graduation using data from IPEDS and College Scorecard
- Zippia.com also ranked NCTA #7 in U.S. two-year colleges for graduate career success with 92 percent of graduates employed 10 years post-graduation
- NCTA was named a Top 30 trade school by Forbes when evaluating graduate success and return on educational investment. NCTA was the only agricultural college identified
- NCTA was named to Top 50 by *Community College Week* for number of graduates from two-year programs in Agriculture, Agricultural Operations and Related Sciences

NCTA Enhances Academic Programming:

- Established one tuition rate of \$127.50 per credit hour for all resident and non-resident students
- NCTA strengthened its *A to B Transfer Agreement* with IANR, and saw 14 students last fall making a seamless transfer from NCTA to CASNR in animal science, agriculture education and veterinary science
- NCTA was approved to offer a 16-hour, online undergraduate certificate in agriculture
- Heifer Link program for student cattle ownership transferred six donated heifers to graduates
- Certified the first student NCTA welding certificate students through the American Welding Society
- Enrolled first student in the collaborative Dairy Science Program with South Dakota State University
- NCTA Urban Agriculture program in Omaha hired John Porter in collaboration with University Extension, Sarpy County
- NCTA Crops Judging Team won the national championship contest at NACTA. NCTA also won many top awards in agricultural computing, livestock judging, livestock management, and horse and dairy judging
- Initiated a new poultry science associate degree program with Mississippi State University



NCTA Engages Students, Faculty, Staff and Alumni:

- Fall 2017 full-time, on-campus enrollment of 255 students, a 19% cumulative increase since 2013
- Judy Bowmaster-Cole, associate professor in Veterinary Technology, was awarded the inaugural faculty recognition established as the Bruntz Family Teaching Award
- Seven faculty were saluted by the UNL Parents Association for outstanding service
- Mary Rittenhouse and Douglas Smith were promoted from assistant to associate professor rank
- Recognized NCTA graduates and stakeholders in annual alumni banquet, June 2017 in Broken Bow
- Established new student and faculty awards established by alumni friends, families and foundations

AG BUILDERS HIGHLIGHTS - 2017

INNOVATIVELY EMPOWERING NEBRASKANS TO BE SUCCESSFUL TODAY AND TOMORROW

Through innovative programs, Nebraska Extension strives to empower Nebraskans achieve their goals for their lives, their businesses and their communities. These programs demonstrate the meaningful impact that Nebraska Extension is having in their local communities and statewide. To learn more about our impact, visit: extension.unl.edu/impact.



RURAL MAKERSPACE LABS

The Maker Movement has been successful in urban centers but what does that look like in rural settings? Nebraska 4-H aims to find the answer with a National Science Foundation grant that has created a makerspace in Sidney, Nebraska. A makerspace is a site that provides hands-on, creative ways to encourage students to design, experiment, build and invent while engaging in science and engineering. Sidney Create! allows experts from Nebraska Innovation Studio and Nebraska Extension to provide youth and adults with hands-on opportunities in electronics, textiles, computers, digital media creation, music technology and digital fabrication. This model will soon be replicated across the state in other rural communities with the intent is to provide an economical and sustainable

delivery vehicle that enables learning communities regardless of distance and encourages innovation in youth and community. The greatest benefit will be in helping youth find a place in their community using their creativity and innovation. *Learn more at go.unl.edu/maker-labs*

PROJECT SENSE

Over the last 40 years, producers have greatly increased fertilizer efficiency, but that gain in efficiency may be starting to plateau. This points to the need to adopt new technologies to reach efficiency increases producers are used to seeing. Through Project SENSE, (Sensors for Efficient Nitrogen Use and Stewardship of the Environment) Nebraska Extension along with partners at the Nebraska Corn Board, NRD and USDA are working directly with producers to



conduct almost 20 research trials on their own fields. Using sensor based technology, we can improve fertilizer efficiency, increase profit per acre and reduce nitrate loss through ground water. *Learn more at cropwatch.unl.edu/projectsense*

INVENTURE DAY

Nebraska is full of creative and innovative young people. Nebraska Extension is working to stimulate their entrepreneurial thinking and innovation by connecting youth with local entrepreneurs and community opportunities. With the help of community and business mentors, middle school youth form teams and develop a unique business around a given product. As teams build on their product idea, they rotate through the INVENTURE Factory to learn about finance,

target market, and branding. By the end of the day long workshop, youth leave with entrepreneurial skills such as risk-taking, creativity and analyzing. *Learn more at go.unl.edu/inventure-day*

WEATHER READY FARMS

Extreme weather like drought and hail are a harsh reality for many Nebraska farmers. Through programs and resources that focus on identifying vulnerabilities and prioritizing actions, Nebraska Extension is committed to helping agricultural producers, businesses and communities increase resiliency in the face of hard times. Programs like weather scenario planning, certificate program and the Hail Know project are designed to increase the preparedness for, resiliency to, and recovery from extreme weather and climate events. *Learn more at weather-ready.unl.edu*

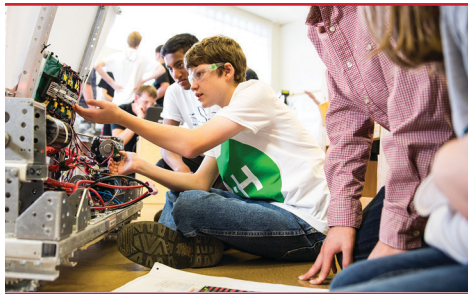


Across 7 program areas and 18 issue teams, Nebraska Extension continues to build on sound accomplishments and innovate for the future.

From youth, to communities, to agriculture and food, Nebraska Extension looks forward; facing the grand challenges and making the lives of Nebrakans better.

The impacts here give a greater glimpse into the accomplishments of 2017 that will compound into the achievements of tomorrow.

To learn more about our impact, visit: extension.unl.edu/impact



4-H YOUTH DEVELOPMENT

College and Career Success programs held across the state empowered over 10,000 Nebraska youth to make decisions about their future.



BEEF SYSTEMS

Through the Strengthening Nebraska's Ag Economy initiative benefits the beef industry, which contributes \$12 billion annually to the state's economy.



COMMUNITY ENVIRONMENT

Over 200,000 people benefited from infographics and videos produced to help battle the large influx of Japanese beetles in Eastern Nebraska.



COMMUNITY VITALITY

Approximately 41 communities impacted, over 3,447 community members engaged, 32 action plans in progress, and 50 business start ups created.



CROPS AND WATER

The UNL-TAPS program engaged farmers in friendly competition to increase profitability through improved water and nitrogen use efficiency.



FOOD, NUTRITION & HEALTH

42,000+ Nebraska youth & adults statewide made changes or reinforced knowledge based on Nebraska Extension programming.



THE LEARNING CHILD

4,810 adults, caring for 56,658 children & youth participated in Nebraska Extension programs with empowering professionals & families.