

Blizzard Watch

Message from the Department Head

Dr. Richard Horsley



As I look back at what I wrote last year for the *Blizzard Watch*, I started out by describing what we were doing at NDSU to mitigate the risk of the spread of COVID-19 and the possible legislative funding for the building that would replace Harris Hall. There is good news on both.

For COVID-19 mitigation, we were permitted to have 100% occupancy in our classrooms beginning fall semester 2021 and masks were made optional following the 2022 spring break.

The 2021 North Dakota Legislature appropriated \$70 million for the building that was formerly referred to as the Agricultural Product Development Center (APDC) but is now called the Peltier Complex. The Peltier Complex honors the family of one of the region’s longstanding supporters of teaching, research, and Extension. The Legislature also authorized us to raise \$15 million in contributions to go towards constructing the building. After a successful fundraising campaign by many, we now have nearly \$85 million for the construction of the Peltier Complex that will house the research and teaching activities currently in Harris Hall, the Cereal and Food Science activities in the Quentin Burdick Building and Loftsgard Hall, the meats lab in Shepperd Arena, the Northern Crops Institute, and the North Dakota Trade Office.

If you are familiar with Sugihara Hall, the new chemistry building on campus, the Peltier Complex will be about 50% bigger. In total it will be about 150,000 square feet in size. Construction will begin this spring and we should be able to move into the Peltier Complex in spring 2024. I can’t wait for all of you to see the building. The campus building committee has spent over 120 hours with the architectural design team and the building is absolutely gorgeous. The Peltier Complex will be kitty-

corner from the Wallman Wellness Center on 18th Street North and you should be able to easily see it from the 12th Avenue viaduct.

For NDSU Giving Day this year, we centered our department’s fundraising efforts to support the updating of the Plant Sciences Learning Center located on the lower level of Loftsgard Hall. After more than 25 years of heavy use by thousands of students, the Learning Center needs updating in technology, furnishings, lighting, and carpeting. What has been especially fun about developing the plans for the updated Learning Center is that the students, the primary users, have been instrumental in developing the design.

I can’t thank Dr. Ed and Brenda Deckard and Dr. Dwain and Gladys Meyer enough for their generous gifts that allowed the NDSU Foundation to establish the **“75 gifts for 75K” Challenge** on Giving Day to support the updating of the Learning Center. There were over 90 contributions and the Challenge was fulfilled shortly after 3:30 PM. This large outpouring of support for our department and the Plant Sciences Learning Center would not have been possible without their generous gifts. The entire updating project is estimated to cost about \$300,000 and we are about one-third of the way in raising sufficient funds to complete the project. Donations to support the project can be made to the NDSU Foundation any time of the year at <https://ndsufoundation.com>. Additionally, the Foundation can work with donors to spread out the payments of larger gifts over a five-year period. Let’s work together to raise the funds to complete the much needed updating of the Plant Sciences Learning Center sooner rather than later.

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Message from the Department Head (cont.)

(Continued from page 1)

Two of our alumni were honored in 2021 to recognize their accomplishments after leaving NDSU, and one of our faculty was honored following his retirement.

Dr. Marvin Boerboom was named the NDSU College of Agriculture, Food Systems, and Natural Resources 2021 Distinguished Alumnus. He worked nearly 40 years at Monsanto as a corn breeder, where enough seed of the corn hybrids he developed was sold to plant every corn acre in North Dakota for the next 66 years.

Dr. Magan Lewis, the Global Technology Adoption Lead at Corteva AgriScience, was featured on the CBS "Mission Unstoppable" program in November 2021. Furthermore, a life-size statue of Dr. Lewis was on display in Washington, D.C., in and around select Smithsonian Museums as part of "#IfThenSheCan - The Exhibit" for Women's History Month in March 2022. The exhibit included a collection of 120 statues of women in STEM to honor their work to shape a better world. The exhibit is the largest collection of statues of women ever assembled together.

Dr. Ted Helms, who retired in 2020 after leading the NDSU soybean breeding program for 33 years, had an endowed professorship established in his name. Joel Thorsrud, an NDSU alumnus and soybean producer from Hillsboro, provided the legacy gift to endow the Ted Helms Endowed Professorship in soybean breeding.

The year 2021 again was a year of accomplishments for the department's faculty, staff, and students. This year's *Blizzard Watch* contains over 16 pages of accomplishments and awards received by our undergraduate and graduate students, staff, and faculty. Each year I am especially touched by the work our faculty and students do to help those in need in our local community groups and internationally. The stories on page 13 highlight the service done by Dr. Esther McGinnis and the North Dakota Extension Master Gardeners, the Plant Sciences Graduate Student Association, and Dr. Hans Kandel.

In 2021, Dr. Juan Osorno was promoted to professor and Dr. Xuehui Li was promoted to associate professor with tenure. I congratulate them for their accomplishments and all they do for their students, stakeholders, and their colleagues.

We welcomed three new faculty into the department in 2021. Dr. Clair Keene is the agronomist for the Extension cereals and corn program formerly led by Dr. Joel Ransom. Dr. Quincy Law was hired to lead a new weed control program of invasive and noxious weeds in crop land. Dr. Minwei Xu was hired for a food processing position in our cereal and food science group.

Every year, we have retirements and resignations. In October, Dr. Paul Schwarz retired after leading the barley and malt quality laboratory for 33 years. There is a wonderful two-page write-up about Dr. Schwarz's career on pages five and six. Dr. Senay

Simsek resigned in July 2021 to accept the department head position of Food Science at Purdue University. Dr. Simsek led the wheat quality and carbohydrate laboratory at NDSU for 14 years. Dr. Xiwen Cai resigned in May 2021 to accept a position in wheat genetics with the USDA-ARS in Lincoln, Nebraska. Dr. Cai led the wheat cytogenetics project in the department for 19 years. Fortunately, we received permission to refill all three positions.

Dr. Shahidul Islam will be joining the department in June to lead the wheat quality lab. Dr. Islam is currently a faculty member at Murdoch University in Perth, Australia. We will begin searches shortly to refill the other two positions. Dr. Schwarz's former project will continue to focus mainly on barley and malt quality, while Dr. Cai's past position has been redirected to one that combines the disciplines of phenomics and genomics in wheat.

In memoriam, we honor the lives of five friends in our Plant Sciences family. Passing away in 2021 were Dr. Prem Jauhar, Dr. Art Boe, Neil Riveland, Donna Nalewaja, and Myron Thoreson.

The outputs from our department impact all four corners of the state. A very visible accomplishment each year is the release of new varieties and plant products from our breeding programs. In 2021, the Woody Plant Improvement Program led by Dr. Todd West had its 61st release, Hyland Guard™ Mountain Pine. Additionally, the durum wheat program led by Dr. Elias Elias released the low cadmium accumulating durum wheat variety ND Stanley, and the soybean program led by Dr. Carrie Miranda released two soybean varieties, ND21008GT20 and ND2108GT72. Both of the soybean varieties originated from crosses made by Dr. Ted Helms.

Each year in the *Blizzard Watch*, I report on the department's fall semester student enrollment numbers. In fall 2021, there were 96 students in the Crop and Weed Sciences (CWS) program, 53 students in the Horticulture program, and 15 students in the Food Science program. The numbers decreased from 2020 by 28 students in CWS and one student in Food Science, and increased by 21 students in Horticulture. The fall 2022 enrollment numbers for Horticulture continue to look strong.

In the department's graduate programs in fall 2021, there were 75 students (51 M.S. and 24 Ph.D.) in the Plant Sciences program, eight M.S. students in the Horticulture program, and 20 students (6 M.S. and 14 Ph.D.) in the Cereal Science program. The numbers increased from 2020 by nine students in Plant Sciences, five students in Horticulture, and one student in Cereal Sciences.

While I could keep going on, I think it is more important to leave space in the *Blizzard Watch* for all of the accomplishments of our students, staff, and faculty in Plant Sciences. To keep up with the latest news and photos, you can access our Web page at <https://www.aq.ndsu.edu/plantsciences>, our Facebook page at *NDSU Plant Sciences*, or Twitter page at *@NDSUPlantSci*.

Future Agricultural Products Development Center Breaks Ground

The vision for the NDSU Agricultural Products Development Center became reality when NDSU held a groundbreaking and naming ceremony for the facility on November 19.

Named the “Peltier Complex”, the facility will house NDSU’s food science, meat science and cereal science laboratories, along with the Northern Crops Institute and the North Dakota Trade Office, bringing together researchers, scientists, students, grower groups and producers. It will be NDSU’s largest academic facility and a hub for agricultural innovation, product development and advancing research and education.



“This will be a state-of-the-art learning facility that uniquely positions NDSU students for rapidly expanding career opportunities in the food industry,” said David Buchanan, NDSU associate dean, College of Agriculture, Food Systems and Natural Resources.

The Peltier Complex honors one of the region’s most longstanding supporters of teaching, research and extension in agriculture.

“For generations, members of the Peltier family have been actively involved in North Dakota agriculture,” said Greg Lardy, NDSU vice president for Agricultural Affairs. “The family shows their support for NDSU Agriculture in many ways, and we are thrilled the family chose to honor their legacy in this manner.”

Ana Magallanes López, Ph.D. candidate in the cereal science program, represented students as a speaker during the groundbreaking and naming ceremony. “As students, we will undoubtedly benefit from the hands-on experience and be empowered by the versatile, interdisciplinary and collaborative space that awaits us,” she said.

In 2021, the North Dakota Legislature approved \$70 million for the completion of the facility and authorized an additional \$15 million in fundraising.

The Peltier Complex will be located in the southwest corner of campus. Construction is estimated to begin in the late spring of 2022 and will take approximately 20-24 months to complete.

Learn more at <https://ndsufoundation.com/news/2021/09/peltier-complex>.

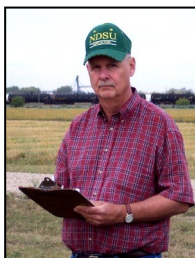
Source: NDSU News, 11/22/2021

Source: For the Land and Its People, November/December 2021



Magallanes López

Ted Helms Endowed Professorship Established



NDSU has created a new endowed professorship that honors former NDSU soybean breeder Ted Helms. Greg Lardy, NDSU vice president for Agricultural Affairs, announced the Ted Helms Endowed Professorship during the Northern Corn and Soybean Expo in February 2022.

Joel Thorsrud, Hillsboro, North Dakota, soybean farmer and NDSU alumnus, established a legacy gift to endow the soybean breeding position at NDSU in honor of Helms. The endowed professorship will allow NDSU to continue to build on the excellence in soybean breeding established by Helms and ensure that soybean breeding research continues to thrive in North Dakota.



“I saw how very important it was to develop these varieties that did well in North Dakota,” said Thorsrud. “NDSU has some wonderful ways [to support] the research that is needed to keep farmers productive and profitable.”

“I am very honored,” said Helms. “The most important thing is that this program is going to be supported and farmers are going to continue to be well-served by the NDSU research program.”

Helms was the NDSU soybean breeder for 33 years and retired in June 2020. Under his leadership, 40 varieties of soybeans were developed.

Source: NDSU News, 2/23/2022

Learning Center Improvement Project Helped by NDSU Giving Day

The Plant Sciences Learning Center in the lower level of Loftsgard Hall is an important place for students and faculty in all areas of crop production study at NDSU, and after more than 25 years of heavy use, the center is in need of updating.

Brenda Deckard, along with her husband Dr. Ed Deckard, spearheaded the development of the Learning Center in 1988, the year after Loftsgard Hall was completed. Since then more than 1000 students annually have utilized the space for study and tutoring sessions; hands-on learning with plant identification samples, models and displays; computer-assisted learning; student organization meetings; outreach activities for 4-H, FFA and elementary and high school groups; career development and networking events; and student recognition celebrations.

Eleven Plant Sciences courses, including horticulture science, weed science, crop and forage production, genetics, plant breeding and other topics, utilize the Learning Center during the school year. Undergraduate and graduate students alike study and hold meetings. The space is designed to encourage collaborative learning and is set up for groups as well as private study. Accessibility to all students of all abilities is a priority.

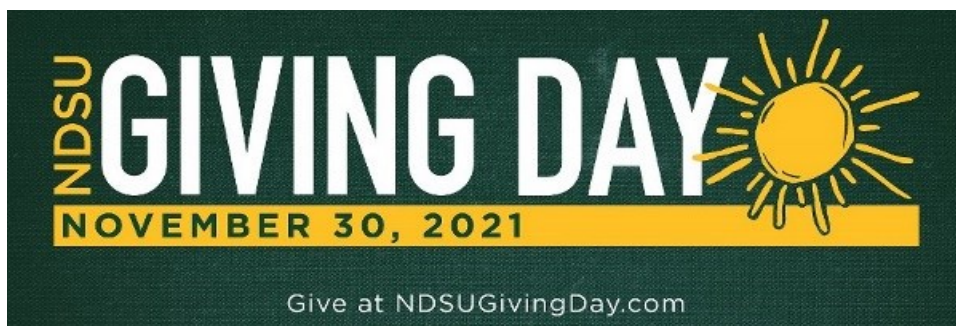
Improvement plans have been underway for several years, and students have been consulted about their priorities. On Giving Day, November 30, 2021, the NDSU Foundation designated a fund for the Plant Sciences Learning Center updates and created the **"75 gifts for 75K" Challenge**. During the 24-hour giving period, more than 75 donors gave to the fund and unlocked a \$75,000 gift from Dr. Ed and Brenda Deckard and Dr. Dwain and Gladys Meyer.

Proposed updates for the Learning Center include an enhanced media and computer center with a Smartboard computer, a scanner and improved technology; storage and display spaces for student organizations; study areas with improved lighting and large whiteboards; and office space for meetings, career development and counseling, tutoring and coaching of current students.

After more than 25 years of heavy use, updated furniture and flooring are necessary, including snacking and coffee space for student use. Students helped develop the list of needs for the Learning Center through discussions with the Deckards and anonymous surveys.

"Ed and I feel that you cannot possibly overestimate the power of an actively engaged educational environment (each student actively engaged with peers, teachers, and content) in developing young adults as learners, teachers, and leaders. This has been the force behind the initial development of the Learning Center and continues to be the driving force for updating and improving the Learning Center to meet the needs of today's learners," said Brenda Deckard.

The price tag for the entire project is around \$300,000. Donations to support the project can be made to the NDSU Foundation any time of the year at <https://ndsufoundation.com>.



Retirement: Dr. Paul Schwarz

Dr. Paul Schwarz, North Dakota State University Department of Plant Sciences professor and malting barley quality project leader, retired October 1, 2021, after 33 years of service with NDSU.

Schwarz joined NDSU in 1988 as a postdoctoral research fellow and took over management of the malting barley quality lab in what was then the Department of Cereal Science and Food Technology. A year later, he was hired as an assistant professor. In 1995, he achieved the rank of associate professor and was promoted to full professor in 2004. Schwarz was the fifth leader of the malting barley quality project, following Orville Banasik (1947-1972), Richard Pylar (1972-1973, 1977-1985), Charles Baker (1973-1977) and Michael Madson (1986-1988).

Background and Education

Schwarz grew up in Milwaukee, Wisconsin, a “big brewing city.” As a high school student and an undergraduate, he worked in a malt plant, which is where his interest in malting and brewing began to develop.

The Department of Cereal Science and Food Technology at NDSU was one of two programs in the country that offered graduate education in malting and brewing at that time, and he selected NDSU because of its malting focus. He completed his master’s degree in cereal chemistry, advised by Richard Pylar, and his doctorate in cereal science, advised by Vernon Youngs.

In addition to his academic work, Schwarz undertook practical training in malting and brewing. In 1984, in between finishing his M.S. and starting his Ph.D., he completed a practicum in brewing at the A. Egger Brewery in Worb, Switzerland. He also took a sabbatical in 1998-99, during which he worked in brewing research and development at the Coors Brewing Company in Golden, Colorado.

Career Highlights

Schwarz, barley breeder Richard Horsley, barley plant pathologist Tom Baldwin and seven technical staff worked full-time on barley improvement at NDSU. An important function of the malting barley quality program has been the evaluation of malt barley lines from the barley breeding program and the survey of regional barley crop quality. Several other NDSU faculty and USDA-ARS staff also conduct barley and malt research, making NDSU the center of barley expertise in the U.S. “What has been enjoyable at NDSU is that it’s really been a team effort with the barley projects,” says Schwarz.

In the early 1990s, when Fusarium Head Blight (FHB) and deoxynivalenol (DON) became a major issue in barley, Schwarz’s research focused on FHB and mycotoxins. NDSU received support from the U.S. Department of Agriculture (USDA) to establish a testing lab as part of the U.S. Wheat and Barley Scab Initiative (USWBSI). This lab tests DON for most of the research programs in the U.S. that are working on FHB in barley.

Schwarz’s research has resulted in more than 120 journal publications and 10 book chapters. His publication, “Fate and Development of Naturally Occurring Fusarium Mycotoxins During Malting and Brewing,” was the first to show that DON could increase during the malting of FHB infected barley and was largely transferred to beer, which is a consumer safety and perception issue. It is one of the most frequently cited papers on the subject.

Another notable publication, “Expansion of Internal Hyphal Growth in Fusarium Head Blight-infected Grains Contributes to the Elevated Mycotoxin Production During the Malting Process,” resulted from research using advanced microscopy and molecular techniques in collaboration with a postdoctoral researcher and the NDSU plant pathology lab. The publication explained why some barley samples develop mycotoxins during malting while others don’t. “We hope this work can eventually lead to better screening for barley and selection for malting and brewing,” says Schwarz.

Outreach

Schwarz collaborated to help create the Institute of Barley and Malt Sciences (IBMS) in 2006 and was its director. The IBMS has been a means to promote the informational and educational activities and resources on barley and malting that are available at NDSU. He also worked with the U.S. Grains Council on education and promotion of barley from this region.



“NDSU is the recognized center for barley production and malting barley. What has been enjoyable at NDSU is that it’s really been a team effort with the barley projects.”

~ Dr. Paul Schwarz

(Continued on page 6)

Schwarz (cont.)

(Continued from page 5)

Schwarz and Horsley have partnered with the Northern Crops Institute (NCI) to deliver courses on barley and malting to nationwide and international audiences. The short course, Barley and Malting Quality: A Field to Brewhouse Perspective, has been offered since 1984. It provided basic and technical information on barley production and malting and brewing. Barley and malt industry executives, maltsters, brewers, brew masters, farmers and students worldwide have attended the course over the years.

Since the 2010s interest in craft brewing has grown, and growers and craft maltsters from outside the region began to look to NDSU for information. "NDSU is the recognized center for barley production and malting barley," says Schwarz.

The Barley Field School was developed in 2013, in response to inquiries about growing barley in non-traditional regions for craft malting. Maltsters, brewers and farmers from multiple states learned how to grow high quality barley for malting, prevent diseases and pests in barley fields, harvest and store malting barley, and the best practices for managing risk when growing and marketing malting barley.

International Connections

Schwarz says he enjoyed the travel that was part of his position. Through his travels, he cultivated strong international connections with researchers in Germany, Finland and China. He also hosted at NDSU a number of visiting scientists and postdoctoral researchers from China and Finland.

He was invited to give presentations at numerous regional, national, and international meetings. Countries in which he presented include Germany, Finland, Belgium, Chile, Dominican Republic, Australia, Mexico, Brazil and others.

He has given many presentations in China on FHB, food safety and craft brewing. He says that in recent years, he has really enjoyed being asked to speak in China on craft brewing, beer styles, and specialty malts. "China's craft brewing industry is just starting to take off," says Schwarz. "They are now where the U.S. was about 20 years ago, and they are excited to learn more."

Awards and Honors

In recognition of his research contributions to the malting and brewing industry, Schwarz has received several awards. In 2021, the Craft Maltsters Guild awarded Schwarz the prestigious Soles of Malt Award for his leadership in the craft malt community and his teaching and mentorship of students who have gone on to work in the malting, brewing and food science industries.

In 2003, Schwarz and Horsley received the American Society of Brewing Chemists Eric Kneen Memorial Award, presented to the authors of the most outstanding research paper in the Journal of the American Society of Brewing Chemists the previous year.

In 1998, he received the NDSU College of Agriculture, Food Systems, and Natural Resources Early Career Excellence in Research Award, which recognized outstanding faculty and principal investigators who made a significant research contribution to address an applied problem or to the knowledge of the area investigated.

Teaching and Mentoring

In addition to research, Schwarz taught graduate-level courses and mentored graduate students. The main course he taught was Malting and Brewing. When he started teaching the course, it only covered malting. Schwarz expanded the course to include brewing and enhanced the lab work. Students also had the opportunity for a hands-on brewing experience at local breweries. During COVID-19, when students couldn't get the hands-on brewing experience, Schwarz recorded a video of home brewing in his driveway.

Over the course of his career, Schwarz mentored around 25 graduate students, including one from Zhejiang University in Hangzhou, China, where he was an adjunct professor for a time. He also served on graduate committees for students at NDSU and the University of Minnesota as well as in Finland, Australia and South Africa. "I am really proud that a number of my students have become fairly successful in careers in the malting and brewing industries," says Schwarz.

The Next Chapter

Schwarz and his wife, Alice, have moved to New Mexico, where they own an adobe house that they restored. Schwarz would like to do more woodworking and Alice plans to continue working with ceramics, ikebana (the Japanese art of flower arranging) and hopes to join the New Mexico Master Gardener program. Schwarz would like to remain connected to NDSU and help with the malting barley quality project where he can, complete a few publications, and finish writing a history of barley in the U.S.

We wish them a long and happy retirement!

Faculty Updates

New Hires

Dr. Clair Keene joined the Department of Plant Sciences in July 2021 as an assistant professor and Extension agronomist specializing in cereal crops and field corn.

Prior to joining the department, she was the Extension specialist in cropping systems at the NDSU Williston Research Extension Center.

Keene's research interests include crop rotation, weed management, cover crops, soil health, organic agriculture and saline soil reclamation with perennial forages.

She earned bachelor's degrees in biology and Spanish at Iowa State University and her doctorate in agronomy at Pennsylvania State University.

Dr. Quincy Law joined NDSU in April 2021 as an assistant professor and invasive and noxious weeds specialist.

His research will focus on the biology, management and control of North Dakota's 13 noxious weeds and other invasive species, mainly in cropland. He also will teach a course on seed technologies and traits.

Law earned his bachelor's degree in horticulture at Iowa State University. His master's in agronomy and doctorate in horticulture were earned at Purdue University.

Dr. Minwei Xu joined NDSU in July 2021 as an assistant professor in the food and cereal science group.

Prior to joining NDSU, he was a food scientist at the Northern Crops Institute, where he oversaw projects in food processing and food sustainability.

Xu earned his bachelor's degree in bioengineering at Tianjin University of Technology, China, his master's in fermentation engineering at Jiangnan University, China, and his doctorate in cereal science at NDSU.



Promotions

Dr. Xuehui Li was promoted to associate professor with tenure. His research area is in quantitative genomics with a focus on innovative genomic approaches for trait improvement in wheat and other crops grown in the Northern Great Plains. He teaches graduate and undergraduate courses in Genomics, Genomic Techniques and Applied Plant Molecular Breeding. Li earned his Ph.D. in plant breeding at Iowa State University and was hired at NDSU in 2014.



Dr. Juan Osorno was promoted to professor. He leads the dry edible bean breeding project, which today, is the largest public program in the country devoted exclusively to dry bean breeding and genetics. He teaches undergraduate Genetics/Laboratory and graduate Seminar, advises undergraduate students, and actively participates in graduate student training. Osorno earned his Ph.D. in plant sciences at NDSU and was hired to lead the dry bean breeding program in 2007.



Emeritus Professor Appointments

Dr. Ted Helms, Dr. Joel Ransom and Dr. Paul Schwarz were appointed Emeritus Professors in January 2022.

Helms was a professor and the soybean breeding project leader from 1986 until his retirement on June 30, 2020.

Ransom was a professor and the NDSU Extension small grains specialist from 2002 until his retirement on February 1, 2021.

Schwarz was a professor and the malting barley quality project leader from 1989 until his retirement on October 1, 2021.



Helms



Ransom

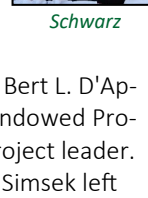


Schwarz

Resignations

Dr. Xiwen Cai resigned from his position as professor and leader of the wheat genetics and cytology research project. He was hired at NDSU in 2002 and had 19 years of service.

Dr. Senay Simsek resigned from her position as the Bert L. D'Apollonia Cereal Science and Technology of Wheat Endowed Professor and wheat quality/carbohydrate research project leader. She was hired in 2007 and had 14 years of service. Simsek left NDSU to join her alma mater, Purdue University, where she was appointed head of the Department of Food Science.



Welcome

Staff Updates

New Staff and Updated Positions

New postdoctoral research fellows are **Indalecio Vieira, Jr.** (not pictured), **Jeonghwa Kim** and **Atanda Sikiru Adeniyi**, pulse breeding; **Sagar Satish Datir** (not pictured), sugarbeet and potato research; **Naa Korkoi Ardayfio**, oat breeding; **M. Massub Tehseen**, statistical genomics; **Jayanta Roy** and **Bikash Poudel**, dry bean genetics and genomics; **Taiyoung Kang**, food chemistry; and **Mohammad Erfatpour**, dry bean breeding. **Filipe Matias** is a new research scientist in hard spring wheat breeding.

New research specialists are **Samuel Bibby**, forages and biomass crop production; **Andrew Fuchs** (not pictured), oilseed breeding; **Brian Smart**, sunflower research; **Ryan Borgen**, Extension sugarbeets and weed control; **Kelly Peppel** (not pictured), potato breeding; and **Makenson Maisonneuve**, dry bean breeding. Additional new research staff are **Tom Studzinski**, chemist in malting barley quality, and **Didier Murillo-Florez**, statistician and developer with breeding pipeline database management.

Research specialist **Vicki Magnusson** transferred from woody plant physiology and biotechnology to soybean breeding, and research specialist **Wei Zhang** transferred from wheat genetics and cytology to woody plant physiology and biotechnology.

Resignations

Postdoctoral research fellows who resigned are **Ajay Kumar**, durum breeding; **Indalecio Vieira, Jr.**, pulse breeding; **Zhouyu Wang**, high value crop production; **Andrea Cecchin**, forages and biomass crop production; **Datir Sagar**, sugarbeet and potato research; **Guojia Ma**, statistical genomics; and **Tatiana Danilova**, wheat genetics and cytology. Research scientist **Filipe Matias** also resigned.

Research staff who resigned are **Kris Boll**, weed biology and ecology; **Yu Liu**, durum quality; **Kristin Whitney** and **Edil Vidal Torres**, wheat quality; **John Posch**, dry bean breeding; **John Davies**, oat breeding; and **Tom Walk**, breeding pipeline database management.

Retirement



Jerry Gee, ag research technician in the soybean breeding program, retired in August 2021 after eight years of service. "I learned a great deal about soybean research and enjoyed my work and the people I worked with very much," says Gee. In retirement, he plans to spend more time with his family and also hunt, fish, garden and work on home projects. We wish him a very happy retirement!



Kim



Atanda



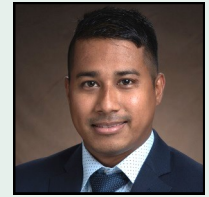
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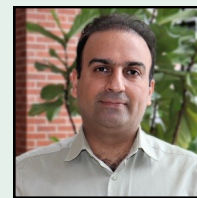
Roy



Poudel



Kang



Erfatpour



Matias



Bibby



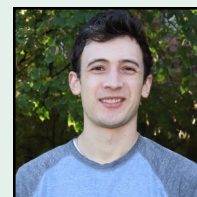
Smart



Borgen



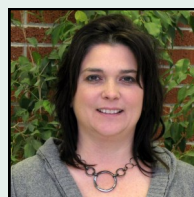
Maisonneuve



Studzinski



Murillo-Florez



Magnusson



Zhang



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NDSU Plant Sciences

Faculty & Staff Awards & Honors

Berti Honored for Conservation Research and Career Achievement

Conservation Research Award

Marisol Berti received a Soil and Water Conservation Society 2021 Conservation Research Award. The award honors members whose research has led to exceptional improvements in soil conservation, water conservation or related natural resources research.



In the award nomination, Berti is credited with helping to make cover crop seeding and management practices more widely accepted across the northern Great Plains.

Berti has led the forages and biomass crop production project in the Department of Plant Sciences since 2009. The project works to improve forage production practices, introduce biomass crops for bioenergy production, and evaluate the impact that annual and perennial forages used in intercropping, as cover crops, and as living mulches have on crop productivity and soil quality in North Dakota.

In 2016, Berti was awarded a multi-state, multi-researcher USDA-NIFA-AFRI grant. The goal of the grant was to increase the use of cover crops in the upper Great Plains to reduce soil erosion. Twelve researchers from four universities and agencies participated in the four-year, \$3.7 million grant. Learn more at <https://www.cropsyscap.org/>.

In 2019, Berti was awarded a \$429,011 USDA-NIFA grant to study alfalfa management practices and their effect on arbuscular mycorrhizal fungi (AMF) populations. The objectives of the study are to improve health, productivity, and sustainability of alfalfa production. This research will continue through August 2022. Learn more at <https://bit.ly/3i7YFai>.

Career Achievement Award

Berti also was awarded the 2021 A.E. Thompson Career Achievement Award by the Association for the Advancement of Industrial Crops (AAIC). The award honors an individual who has made significant contributions to the advancement of industrial crops and products throughout their career.

During the award presentation, Berti was commended for her research, which has helped advance the knowledge and characterization of industrial crops and contributed to the development of sustainable cropping systems. Also mentioned was her academic mentorship, which has helped educate and develop the next generation of scientists and researchers of industrial crops.

Berti has been a member of the AAIC for 30 years and has served as president, division chair, conference organizer and editor-in-chief of the *Industrial Crops and Products* journal.

Over the course of her career, Berti has researched over 150 different crops including pseudocereals, oilseeds, medicinal plants, forages, energy crops and cover crops.

Berti's influence in the advancement of industrial crops transcends geographic borders. Her research in the integration of energy crops and cover crops into existing cropping systems has been applied in many European countries. She has led national and international research teams to address various aspects of field crop management, develop sustainable cropping systems, and phenotype crops for agriculturally important traits. She also has been the Principle Investigator or the Co-PI on national and international collaborative research grants adding up to approximately \$7.9 million.

Her work has resulted in 84 peer-reviewed publications, 26 proceedings publications, 220 conference and symposium presentations, and 50 Extension or magazine publications.

During her career, Berti has mentored 116 undergraduate students, 19 graduate students and three postdoctoral research fellows, and served on many graduate thesis committees. She teaches courses in forage production, sugarbeet production, and professional development and has led a study abroad course on sustainable agriculture and renewable energies in Europe.

"It has been a very satisfactory career and I still have many years to continue to contribute to science and agriculture in North Dakota and elsewhere," says Berti.

Schwarz Receives Craft Malt Guild Award

Paul Schwarz received the Craft Maltsters Guild Soles of Malt Award during the 2021 Craft Malt Conference.



The Soles of Malt Award is named after the co-founder of Grouse Malt House in Wellington, Colorado. The award is given to individuals for leadership, selflessness and philanthropic stewardship in the craft malt community and includes a scholarship to be used for further education and collaboration opportunities.

Schwarz led the NDSU Malting Barley Quality project from 1988 to 2021 and the Institute of Barley and Malt Sciences from 2006 to 2021. He taught Advanced Cereal and Food Chemistry and Malting and Brewing to NDSU undergraduate and graduate students. He conducted numerous malting and brewing short courses and seminars in partnership with the NDSU Northern Crops Institute, industry and malting and brewing groups.

The Craft Maltsters Guild was established in 2013 with the mission of "promoting and sustaining the tradition of malting in North America" and providing support for small, local and independent malthouses.

Faculty & Staff Awards & Honors

Oliver Named Faculty Fellow

Rebekah Oliver was named a Faculty Fellow in the Office of Teaching and Learning for the 2021-2022 school year. In this role, she collaborates with the director of the Office of Teaching and Learning to advance a culture of learning improvement at NDSU.



The Faculty Fellows program is an initiative of the Office of the Provost that provides a leadership and professional development opportunity to established faculty members.

Faculty Honored During Ag Week

Four Department of Plant Sciences faculty were honored by the NDSU Ag Collective during the annual Ag Week Banquet in April.

Marisol Berti received the Herd Award, which is given for great advising and believing that “students come first.” **Rich Horsley** received the Owl Award for teaching classes that are beneficial, fun, challenging and help prepare students for successful agriculture careers. **Juan Osorno** received the George Washington Award, which is given to faculty who are respected in the agriculture community for their knowledge and contributions to the industry. **Joel Ransom** received the Golden Bison Award, which is given to honor faculty who have made great contributions to agriculture at NDSU.



Berti



Horsley



Osorno



Ransom

Employees Honored at Awards Program

Three Department of Plant Sciences employees received awards during the 2021 NDSU Agriculture and Extension Faculty and Staff Awards program. **Collin Auwater**, research specialist for the high value crop production project, received the Charles and Linda Moses Staff Award. **Marisol Berti**, professor and leader of the forages and biomass production project, received the Eugene R. Dahl Excellence in Research Award. **Anuradha Vegi**, assistant professor of practice and food science undergraduate program coordinator, received the Earl and Dorothy Foster Excellence in Teaching Award.



Auwater



Berti



Vegi

Other employees from the department who were nominated for awards were senior accounting specialist Krista Caldwell,

associate professor Michael Christoffers, administrative secretary Karen Jevning, professor Burton Johnson, associate professor and Extension sugarbeet agronomist Thomas Peters, and assistant professor Jiajia Rao.

McGinnis Recognized by Staff Senate

Esther McGinnis received an NDSU Staff Senate Campus Kudos Award in May. The award recognizes NDSU employees who demonstrate excellence through customer service, continuous improvement, teamwork, integrity or quality.



Faculty Publications Honored

GENETICS Editor's Choice Award

A paper co-authored by NDSU dry bean researchers **Juan Osorno**, **Phillip McClean** and **Rian Lee** was selected as one of the 2020 *GENETICS* Editors' Choice Awards. The award for their article, “Genetic Associations in Four Decades of Multi-environment Trials Reveal Agronomic Trait Evolution in Common Bean,” was announced on the “Genes to Genomes” blog for the Genetics Society of America.

Nature Communications Editors' Highlights

Phil McClean was one of the lead authors on an article about the tepary bean genome that was selected for the Editors' Highlights page of the online journal *Nature Communications*, Plants and Agriculture section. This honor is given to only a small number of articles that report noteworthy plant research. Three co-authors, Samira Mafi Moghaddam, Atena Oladzad and Sujana Mamidi, are graduates of the NDSU genomics and bioinformatics graduate program that McClean oversees.

Horticulturae Editor's Choice Award

Harlene Hatterman-Valenti is one of three authors honored for an Editor's Choice Article in the MDPI Open Access Publishing *Horticulturae* journal. The article title is "Utilizing Pruning and Leaf Removal to Optimize Ripening of Vitis riparia-Based 'Frontenac Gris' and 'Marquette' Wine Grapes in the Northern Great Plains".

Plant Phenome Outstanding Article of the Year

Research scientist **Filipe Matias** received the *Plant Phenome Journal* 2021 Outstanding Article of the Year award. His article, “FIELDimageR: An R Package to Analyze Orthomosaic Images from Agricultural Field Trials,” was published May 12, 2020.

ND Forest Service Media Outreach Award

The Extension news column “Dakota Gardener” was selected by the North Dakota Forest Service to receive the 2021 Media Outreach Trees Award. NDSU Extension horticulturists **Esther McGinnis** and **Tom Kalb** contribute to the column and were honored during the NDSU Trees Bowl football game in October.

Osorno Leads Gender-Responsive Plant Breeding Capacity Building Initiative with International Group

NDSU dry bean breeder Juan Osorno led an effort to create an online course titled “Gender-Responsive Plant Breeding” for researchers and scientists working in sub-Saharan Africa. In collaboration with the Feed the Future Innovation Lab for Legume Systems Research managed by Michigan State University and the Gender Responsive Researchers Equipped for Agricultural Transformation (GREAT) project, Osorno and a team from the U.S., Zambia, Malawi and Mozambique developed a pilot initiative to adapt a normally multi-week, in-person course to an online program. All this thanks to an additional award given by the Feed the Future Innovation Lab for Legume Systems Research, which is funded by the U.S. Agency for International Development (USAID) under the Feed the Future initiative.



Osorno worked with Andrea Allen, the Feed the Future Innovation Lab for Legume Systems Research gender advisor, and GREAT consultant, Margaret Mangheni, to set up the course.

Allen said that although they had been discussing possible in-person courses with GREAT, it became evident that these plans needed to be revised in light of the COVID-19 pandemic. The groups decided that an online program would help keep the

GREAT objectives on track and the November course was quickly organized.

Allen and GREAT program administrator Elizabeth Assimwe say that not only was a top-notch program presented but planning precedents and protocols for online courses were established, which will lead to future successful online events. Allen and Assimwe said, “It was a groundbreaking experience for all individuals involved.”

GREAT is a five-year collaboration between Cornell University in the U.S. and the Makerere University in Uganda designed to provide sub-Saharan African researchers opportunities to create effective and inclusive agricultural systems for both women and men in these regions.

The activity noted in this article was made possible through support provided by the U.S. Agency for International Development (USAID) under the Feed the Future Innovation Lab for Legume Systems Research. The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of USAID or the U.S. Government.



Staff & Extension Years of Service

40 Years



Jody Vanderwal
dry beans

35 Years



Allen Peckrul
food & cereal
chemistry

25 Years



Brenda Deckard
Student Services
Director



15 Years

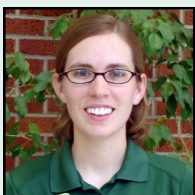


Jesse Underdahl
hard spring wheat



Kristin Whitney
wheat quality

10 Years



Joyana Baumann
ND Foundation
Seedstocks

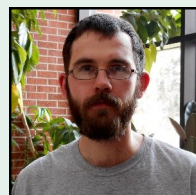


Kamie Beeson
main office

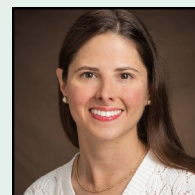


Sally Mann
durum wheat

5 Years



John Grieger
barley



Clair Keene
Extension recognition



Tom Walk
breeding pipeline
database manager

First NDSU Soybean Symposium Held

The first ever NDSU Soybean Symposium was held March 24, 2021, via Zoom. NDSU soybean breeder Carrie Miranda organized and hosted the event, which connected soybean researchers across multiple disciplines to foster collaboration and research that will benefit North Dakota soybean growers. Over 100 participants heard research updates from NDSU experts including breeders, pathologists, entomologists and food scientists.



Keynote speaker Kristin Bilyeu, a research molecular biologist from the USDA at the University of Missouri, spoke about applied soybean genomics. View the 2021 presentations at <https://bit.ly/3oErkGg>.

The 2022 NDSU Soybean Symposium was held in-person on March 17 on the NDSU campus. The keynote speaker was Jianxin Ma, a professor of agronomy specializing in plant genetics and genomics at Purdue University. Students attending the symposium had the opportunity to compete for a cash prize by presenting their soybean-related research. View the 2022 presentations at <https://bit.ly/3KcqqZz>.

Miranda's goals for the symposium are to make it an annual event for U.S. soybean researchers, private industry and students to facilitate collaborations, network and present research, and to showcase NDSU soybean-related research.

The 2021 and 2022 symposia were sponsored by the North Dakota Soybean Council.

Miranda began working in the Department of Plant sciences in 2020 and is an assistant professor and leader of the soybean breeding program.

NDSU Hosts Weed Science Contest for First Time

For the first time, the North Central Weed Science Society (NCWSS) Student Weed Contest was held at North Dakota State University in 2021. The contest was planned by 56 NDSU weed scientists and alumni. Sixty-one students (52 graduate and nine undergraduate) from ten universities participated.

Students competed in Weed Identification, Herbicide Application Technology, Identification of Unknown Herbicides, and Problem Solving and Recommendation. Awards were given to graduate and undergraduate student participants in team and individual categories. Undergraduate prize winners were from the University of Missouri, Western Illinois University and the University of Wisconsin-Madison. Graduate students from Kansas State University, the University of Minnesota, Purdue University and the University of Wisconsin-Madison were prize winners. Other schools attending the contest were the University of Illinois, Iowa State University, the University of Kentucky and the University of Nebraska.

The primary planning committee from NDSU included faculty Joe Ikley and Kirk Howatt, research specialists Stephanie DeSimini and Joe Mettler, technician Sandy Mark, and students Jeff Stith, Emma Mitchell and Nathan Haugrud. Other helpers were faculty Mike Christoffers, Harlene Hatterman-Valenti, Tom Peters and Quincy Law, research specialists Collin Auwarter, Darin Eisinger, Alexa Lystad and Rob Sabba, and students from Peters's and Greta Gramig's projects. Emeritus professor Cal Messersmith and industry representatives from Bayer, Corteva and Syngenta also volunteered their time.

To prepare for the contests, the NDSU team prepared 18 farmer problem plots and three different planting timings for the herbicide identification contests.

Ikley and Howatt were pleased with the success of the contest and hope to host it again in the future. "We can't thank the volunteers enough for helping make it a successful contest. Students and volunteers who came from out-of-state were very complimentary of our facilities at NDSU, and the contest itself," said Ikley.



Outreach

Master Gardeners Distribute Garden Produce to Food Pantries

In the winter of 2019-2020, a NDSU Extension Master Gardener program to distribute free vegetable seeds through the Fargo Public Library had to regroup when the library closed in March 2020 due to COVID-19. NDSU Extension horticulturist and Master Gardener coordinator Esther McGinnis developed a plan to distribute the seed to Master Gardeners to grow produce for food pantries across the state. The seed was distributed in 16 counties and 11,787 pounds of garden produce was donated to county food banks and other sites.



Master Gardeners also work with Veggies for the Pantry and Growing Together in Fargo-Moorhead to share garden produce.



Veggies for the Pantry involves Master Gardeners staffing weekly collection points in Fargo, West Fargo, Moorhead and Dilworth from mid-July to the first frost of the season to collect and deliver produce to food pantries in the area. Donations have increased

from 2,000 pounds in 2016 to more than 14,000 pounds in 2020.

Growing Together started in two Fargo churches and consists of six community gardens, which are maintained by more than 200 volunteers, mostly new Americans. Master Gardeners assist the volunteers and deliver extra produce to food pantries.

Through these and other statewide programs, the NDSU Extension Master Gardener program donated and delivered 38,308 pounds of produce during the COVID-19 pandemic in 2020.

Source: *NDSU News*, 6/4/2021

Graduate Students Support Local Food Pantries

The Plant Sciences Graduate Student Association sponsored a food drive in April to benefit the NDSU 'Goods for the Herd' food pantry. The food pantry aims to alleviate food insecurity at NDSU. It is housed in Memorial Union and is open to all currently enrolled NDSU students and employees.



The Graduate Student Association also helped pack food at the Great Plains Food Bank, which is the largest hunger-relief organization in North Dakota and the state's only food bank.



Remote Assistance for Moldovan and Liberian Farmers

NDSU Extension agronomist Hans Kandel remotely assisted farmers in Moldova and Liberia last fall.



Moldova

The Moldova Organic Value Chain Alliance (MOVCA), an organization that advocates for organic farming and organic foods, developed the "E-learning Educational Portal in Organic Agriculture" to train farmers and students. The objective of the project was to create a platform with multiple virtual courses organized into 12 chapters. One of the chapters is focused on green manure crops.

Kandel was asked to develop content for a pocket guide and infographics on the subject of "Green manures adapted to the steppe and drought-prone areas of Moldova" for farmers operating in organic agriculture.

The U.S. Agency for International Development (USAID) Farmer to Farmer (F2F) program supported the project. Kandel was the F2F-selected expert developing the content for the pocket guide and infographics, the Association for Education Development in Moldova was responsible for editing, translating, and printing the materials, and MOVCA placed the information on an e-learning platform and distributed printed materials to interested parties.

Liberia

In Africa, Liberian rice farmers received hands-on training in harvesting and post-harvest management through the F2F Remote Paired program, in which a local volunteer in Liberia is paired with a U.S. based expert to allow program implementation during COVID-related travel restrictions.



Virtual support from Kandel helped to provide supplementary training resources, fill in the gaps for technical areas, and share creative ideas and solutions.

The objective of this two-week assignment was to build capacity and to equip rice farmers with practical knowledge in good post-harvest handling practices and storage. Kandel provided the local agronomist, Oliver Musa Lavelah, with a lesson outline, a PowerPoint with easy-to-understand teaching illustrations, and video clips on solar drying and moisture testing. During the assignment, Kandel communicated regularly with Lavelah. Farmers received hands-on training in all aspects of correct harvesting and post-harvest management.

Breeding Pipeline Database Managers Support the Modernization of NDSU Breeding Programs

The success of a plant breeding program depends on millions of data points collected from phenotypic observations of plants in the field, genetic and genomic information, biochemical measurements of physiological and food safety characteristics, and quality factors of the products of the crop in question. The Breeding Pipeline Database Management (BPDM) team in the Department of Plant Sciences is creating tools and platforms to speed and streamline the entire plant breeding process.

The BPDM project is unique because it is a centralized and dedicated team focused on helping NDSU breeding programs. Its interdepartmental and collaborative approach with other universities, non-profit organizations and industry strengthens NDSU breeding efforts.

Ana Heilman-Morales and Tom Walk coordinate the pipeline breeding efforts and offer automated solutions to breeding programs with the help of statistician and mathematician Didier Murillo-Florez, all under the leadership of barley breeder and department head Richard Horsley. This team develops tools to manage data and projects for all the stages of variety testing, data management, experiment creation, statistical analysis, selection and final reporting of results. Heilman-Morales is a plant breeder and data manager and Walk is a plant scientist and platform administrator.



"The Breeding Pipeline Database Management team is creating tools and platforms to speed and streamline the entire plant breeding process."

Ten different traditional breeding programs at NDSU work closely with the BPDM team. Dry edible bean breeder Juan Osorno, durum breeder Elias Elias, hard spring wheat breeder Andrew Green, hard red winter wheat breeder Francois Marais, oat breeder Michael McMullen, oilseed breeder Mukhlesur Rahman, potato breeder Susie Thompson, pulse breeder Nonoy Bandillo, soybean breeder Carrie Miranda, and Horsley advise and consult with the BPDM team to develop and learn new technology and methods for their data management needs.

The BPDM team is collaborating with two international Linear Mixed Models (LMM) and spatial analysis experts. Johan Steven Aparicio is a statistician and research associate at the International Center for Tropical Agriculture (CIAT, Cali, Colombia) and Salvador Alejandro Gezan is a quantitative geneticist and statistician consultant at VSN International (Hemel Hempstead, UK). The goal of this collaboration is the development of two tools, one used for the creation of randomizations or design of experiments, called Field-Hub, and the second used for the analysis of experiments using LMM and spatial analyses, called

Mr.Bean. Both tools can be found in Github.

Field-Hub significantly advances experimental design options available to plant breeders. In this R Shiny app, users can quickly generate experimental designs, rapidly randomize experiments, and automatically produce reports that are refreshed as users change selections. Not only are these options hard to find in other plant breeding apps, but Field-Hub also gives plant breeders a range of traditional and modern experimental design choices that is not available in other packages. Plus, Field-Hub also has simulation features that are useful for assessing designs and training future plant breeders.

Mr.Bean is an R Shiny app that simplifies the analysis of large-scale plant breeding experimental analysis by using the power and versatility of LMM. This app combines the analytical robustness and speed of ASReml and SpATS with the visual power offered by R. Mr.Bean provides a graphical workflow for importing data, identifying outliers, and fitting field data using LMM with or without spatial correction. The results are BLUPs/BLUEs predictions and heritabilities for single-environment experiments or multiple-environment trial (MET) analyses. In addition, Mr.Bean also provides a module for exploring results from METs using several graphical and multivariate techniques.

Additionally, a third tool was deployed to the breeders in 2020 called Ag.Q.Hub, which is a JMP add-in that helps to accelerate the querying processes of breeding lines, while providing additional analytical options to the breeders. The promise of Ag.Q.Hub is to expedite the breeding data analysis from plant breeding trials by quickly opening complex datasets and distribution charts in JMP, the graphical statistics and visualization program made by SAS.



Future plans of the BPDM team include migrating data and apps to scalable systems at NDSU or in the cloud, improving management and analysis of phenotypic, genomic and image data, developing more output tables and graphics, offering more dynamic graphical apps, and creating an agile development environment for present and future contributors.

BPDM team members have also participated in and planned several learning events and seminars, with more planned for the future.

Editor's note: Since the original publish date of this article, Tom Walk resigned from his position.

2021 Research Grants

Plant Sciences researchers actively pursue grants for research funding and support. Here is a snapshot of funds awarded in 2021.

Over **\$12.2 million** were awarded to Plant Sciences projects. 167 grants from \$500 to \$747,870 were awarded to 35 projects.

The projects receiving the largest grants were:

- ◆ **Dr. Marisol Berti:** *Fostering Resilience and Ecosystem Services in Landscapes by Integrating Diverse Perennial Circular Systems*
\$747,870, University of Wisconsin/USDA/NIFA
- ◆ **Dr. Nonoy Bandillo:** *Increasing Total Protein Content in Pea Using Large-Scale Phenotyping and Targeted Breeding with Genomic Selection*
\$596,558, Foundation for Food and Agricultural Research
- ◆ **Dr. Michael McMullen:** *Genomic Approaches for Improving Durable Crown Rust Resistance and Nutritional Quality in Oats*
\$500,000, USDA/NIFA-Foundational Program
- ◆ **Dr. Bingcan Chen:** *Spatial Localization and Positional Assembly of Enzyme on Metal-Phenolic Framework Enabling One-Step Digestion for Dietary Fiber*
\$435,628, USDA/NIFA-Foundational Program
- ◆ **Dr. Jiajia Rao:** *Understanding Mechanism Actions of Fractionated Flavor Oil Nanoemulsions for Mycotoxin Mitigation during Food Processing*
\$333,363, USDA/NIFA

- ◆ **Dr. Greta Gramig:** *Biodegradable Mulches for Environmentally Responsible Pest Management in Fruit and Vegetable Crops*
\$286,622, USDA/NIFA-Organic Agriculture Research and Extension Initiative



- ◆ **Dr. Paul Schwarz:** *Evaluation of Barley and Malt for DON and Deoxynivalenol-3-Glucoside*
\$274,063, USDA/ARS-USWBSI

The agencies granting the most funds were:

- ◆ USDA-NIFA: 17 grants, \$3,245,980
- ◆ USDA/AMS-ND Dept of Ag/ND Specialty Crop Block Grant: 26 grants, \$2,398,996
- ◆ USDA/ARS: 16 grants, \$1,231,176
- ◆ USDA/ARS-USWBSI, 10 grants, \$1,116,458
- ◆ ND Wheat Commission: 20 grants; \$841,660
- ◆ ND Soybean Council: 6 grants, \$607,836
- ◆ Foundation for Food and Agricultural Research: 1 grant, \$596,558

Crop Variety Releases

The North Dakota Agricultural Experiment Station released three new crop varieties in 2021.

ND Stanley durum / Breeder: Elias Elias

ND Stanley has high yield potential and good quality, especially protein content. This new variety has high test weight, large kernels, and medium height. It has average maturity and good straw strength. ND Stanley is resistant to both leaf and stem rust diseases. ND Stanley has low cadmium uptake.

ND Stanley is named in honor of the late durum breeding technician Stanley Stancyk, who served the program for 27 years.

ND21008GT20 soybean / Breeders: Ted Helms and Carrie Miranda

ND21008GT20 has resistance to glyphosate herbicide with 0.8 maturity. This new variety has high yield potential and resistance to Race 4 of phytophthora root rot. ND21008GT20 has good iron-deficiency chlorosis (IDC) tolerance. ND21008GT20 has purple flowers, tawny pubescence, brown pods, gray hila and dull seed coat luster. ND21008GT20 is sensitive to metribuzin herbicide and is not resistant to soybean cyst nematode (SCN).

Development of this variety was made possible through funds provided by the North Dakota Soybean Council.

ND2108GT73 soybean / Breeders: Ted Helms and Carrie Miranda

ND2108GT73 has resistance to glyphosate herbicide with 0.8 maturity. This new variety has high yield potential. ND2108GT73 has moderate tolerance to iron-deficiency chlorosis (IDC) and is not prone to lodging. ND2108GT73 has white flowers, tawny pubescence, brown pods, yellow hila and dull seed coat luster. ND2108GT73 is sensitive to metribuzin herbicide and is not resistant to soybean cyst nematode (SCN).

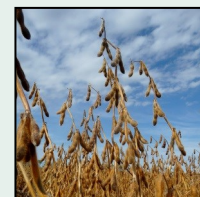
Development of this variety was made possible through funds provided by the North Dakota Soybean Council.



ND Stanley



ND21008GT20



ND2108GT73

Woody Plant Release

Hyland Guard™ Mountain Pine (*Pinus uncinata* 'GuarDaK') is the latest woody plant selection introduced by the North Dakota Agricultural Experiment Station and the NDSU Research Foundation. It was developed by the Woody Plant Improvement Program led by Todd West. Hyland Guard™ is a unique cold hardy upright narrow pyramidal evergreen conifer that will reach a mature height that is taller than the currently available upright Mugo pine (*Pinus mugo*) cultivars.

Germplasm for this release began in 1972 with a single seedling selection originating from a population of *Pinus uncinata* collected from the Hrubý Jeseník mountain range of Eastern Sudetes in the northern Moravia region near the village of Rejvíz of the Czech Republic. This region consists primarily of native spruce and mountain pine. Seed was acquired in the fall of 1971 from the Mendel University of Agriculture and Forestry (Brno, Czech Republic) and was collected from a single mature tree growing at the Nový Dvůr Arboretum (Oslava, Czech Republic). The original tree was 8 m (~26 ft) tall. This accession was designated at NDSU as TS72212.

The evaluated tree (top photo) has grown for 49 years at the NDSU Dale E. Herman Research Arboretum to a mature height of 8 m with a 1.8 m canopy spread. This is a cold hardy selection of *Pinus uncinata* that has survived without damage in USDA climatic zone 3b at -37 °C. This selection is a two-needled pine with forest green needle color and is not considered messy relating to cone shedding because seed cones are fairly small (30 x 40 mm).

Nursery production trials at the Oregon Pride Nursery in the U.S. have shown that grafted plants of Hyland Guard™ are upright with a soft forest green needle color with no winter burning. Propagation is by side grafting onto upright *Pinus mugo* seedlings or other compatible pine species.

Trademark Issued for Plant Release

KoolKat® Katsura Tree was issued a trademark in September 2021. The tree was introduced in 2020 by the North Dakota Agricultural Experiment Station and the NDSU Research Foundation and is the 60th new plant selection developed by the Woody Plant Improvement Program.

A registered trademark designates a specific registered name to the plant selection and ties ownership of the registered name to NDSU, which is important for marketing and licensing NDSU releases to the commercial nursery trade. Commercial nurseries must be licensed with the NDSU Research Foundation to use NDSU's name with the release (a specific genetic clone). This is required to legally sell the named release and also to collect royalties.

It can take up to one year from the time the trademark application is submitted to the U.S. Patent and Trademark Office (USPTO) to be officially registered. There are many rules involved with plant names, which limit the availability of words and phrases that can be used. If the USPTO reviewer finds that the name will cause confusion in the trade, the name can be rejected and sent back for revision.

"This review process is as stressful and can be as time consuming as getting a research manuscript published," says West.

Out of 61 woody plant releases, NDSU has 41 active trademarks with the USPTO.



West with Hyland Guard™ Mountain Pine



KoolKat® Katsura Tree



Dates to Remember

2022 Events Calendar

Department Events

- Aug. 9** Plants, Local Foods & Outdoor Spaces, Horticulture Research & Demonstration Gardens, NDSU Campus, Fargo, ND
- Aug. 25** Northern Plains Potato Growers Assoc. Field Day, Larimore, Inkster and Hoople, ND
- Sept. 10** Ornamental Plants Field Day, Horticulture Research Farm, Absaraka, ND
- TBD** Food and Edible Plants Field Day, Horticulture Research Farm, Absaraka, ND
- TBD** Weed Science Field Day, Prosper, ND and NW 22

Note: Dates for all events are subject to change. Follow our website and social media for updates.

www.ag.ndsu.edu/plantsciences

Research Extension Center Field Days

- July 11** Central Grasslands Research Extension Center, Streeter
- July 12** Hettinger Research Extension Center
- July 13** Dickinson Research Extension Center
- July 13** Williston Research Extension Center, dryland tour
- July 14** Nesson Research & Development Farm, Williston, irrigated tour
- July 18** Agronomy Seed Farm, Casselton
- July 19** Carrington Research Extension Center
- July 20** North Central Research Extension Center, Minot
- July 21** Langdon Research Extension Center
- Aug 4** Oakes Irrigation Research Site

www.ag.ndsu.edu/research/field-days

Graduate Studies

The Department of Plant Sciences offers graduate level academic and research training. Each specialized area of study is designed to provide students with an understanding of the discipline and of relevant regional and global issues.

Degrees

- Cereal Science - M.S. | Ph.D.
- Horticulture - M.S.
- Plant Sciences - M.S. | Ph.D.

Disciplines

- Biotechnology · Breeding · Cereal Science · Food Science · Genetics · Horticulture · Physiology · Production · Turfgrass · Weed Science

Scholarships

In the 2021-22 academic year, 29 scholarships were awarded ranging from \$160 to \$2,000, and totaling over \$30,000.

Accepted students become paid research assistants and are eligible for tuition waivers. All graduate students are part of the **Plant Sciences Graduate Student Association** and are eligible to participate in the annual graduate symposium with Canadian universities.

www.ag.ndsu.edu/plantsciences

Undergraduate Majors

A Bachelor of Science degree in one of the Department of Plant Sciences majors provides a strong base for advanced degrees and preparation for a variety of careers. Students may pursue a general degree or specialize in curriculum options.

Majors Leading to a B.S.

- Crop & Weed Sciences
- Food Science
- Horticulture
- Biotechnology

Scholarships

In the 2021-22 academic year, 60 scholarships were awarded ranging from \$100 to \$3,000, and totaling over \$45,000.

Student Organizations

- Agronomy Club
- Food Science/Food Safety Club
- Horticulture & Forestry Club

A low student-to-faculty ratio gives students numerous opportunities to work closely with faculty mentors, both in and outside the classroom, in relevant research activities that range from laboratory to greenhouse to field research.

Graduate Student News

Magallanes López Receives Honors

2021 was a year of hard work, new opportunities, and recognition for cereal science Ph.D. candidate **Ana Magallanes López**. She was recognized by three organizations and received invitations to speak at two important events.



Awards

Magallanes López won the **Young Scientist Award for Best Poster Presentation** during the 16th International Association for Cereal Science and Technology International Cereals and Bread Congress online meeting. She presented her poster, “Solvent retention capacity: supplemental solvents for evaluation of gluten quality”, during the closing ceremony.

The award promotes and encourages scientific work in the discipline of cereal science. Finalists were selected based on originality, scientific merit, and expected research outcomes for the food industry, as well as the quality of the presentation.

Magallanes López also was awarded the Phi Kappa Phi honor society **2021 Love of Learning Award**. The award recognizes academic achievement, campus and community service, and career goals. It comes with a stipend to help fund post-baccalaureate activities including graduate studies, continuing education, travel for teaching and research, and professional development.

Magallanes López has demonstrated academic achievement through opportunities to showcase and publish her research. She also possesses a passion for serving and advancing the reach of science.

In the future, “I want to be a proactive link between industry and customers,” she says. “This link would represent the development and implementation of the industry’s product quality assurance and safety programs to enhance the customers’ trust. Ultimately, I am interested in conducting high impact research projects that will benefit the involved actors in the production chain of grains.”

Finally, Magallanes López was awarded a **Doctoral Dissertation Fellowship** by the NDSU College of Graduate and Interdisciplinary Studies. Being selected for the competitive fellowship is a significant achievement.

The fellowship provides funds for research supplies and travel to professional meetings as well as a monthly stipend, allowing the awardee to dedicate their time solely to completing their dissertation. The fellowship is in effect through April 2022.

Magallanes López’s doctoral dissertation, “Functional ingredients extracted from dry beans: chemical, structural, and functional characterization”, characterizes soluble dietary fiber extracted from dry beans as a functional ingredient to study how its composition interacts with the immune system during a chronic condition, such as obesity.

Speaking Opportunities

Magallanes López was a guest speaker at the **CIMMYT Global Wheat Program** meeting. She highlighted food safety aspects of wheat milling and processing and the potential for adoption of new technologies.

She also spoke alongside state and campus leaders during the **Peltier Complex Groundbreaking and Naming Ceremony** (see p. 3). She represented current and future students who are the next generation of agricultural scientists.

She is advised by Senay Simsek, former NDSU professor and wheat quality project leader.

Running Receives Outstanding Service Award

The NDSU Volunteer Network selected **Katherine Running** for the 2021 Sarah Martinsen Outstanding Service Award. The annual award honors Sarah Martinsen, an NDSU student who was known for her passion to serve.



Nominees must demonstrate citizenship, civic engagement, and volunteer service that positively impacts the community and shows a commitment to the world around them. The recipient receives a scholarship to apply to their academic studies.

Running is a Ph.D. student in the College Teaching Certificate program and the Genomics, Phenomics and Bioinformatics program and is advised by Justin Faris, USDA-ARS cereal crops research geneticist. Her resume of volunteer activities includes teaching, community service, and selfless acts of kindness.

She volunteered to teach two lab sections of the Genetics 315 course and arranged small-group study sessions beyond the lab time and classroom.

She is active in the Plant Sciences Graduate Student Association and has served as president and vice president. She coordinated fundraising events to help fellow students attend a conference and mentors new graduate students.

As a STEM education volunteer for Girl Scouts Dakota Horizons, she works to inspire young learners to develop an interest in the sciences. She collaborated with peers to develop an activity to explain crop domestication to middle and high school students.

In addition, Running gives her time to foster and raise kittens as young as three days old for Homeward Animal Shelter.

After completing her Ph.D., Running would like to lead a lab at a research university, where she can teach and mentor students in the lab and the classroom. “I am interested in teaching genetics and genomics courses using evidence-based, active learning strategies, project-based learning, and computational labs,” she says.

Graduate Student News

Students Honored by Gamma Sigma Delta

Graduate students **Andrej Svyantek**, **Edoardo Poletti**, **Amy Greenberg** and **Hashim Andidi** won awards for their presentations in the Gamma Sigma Delta NDSU Chapter (GSD-NDSU) 2021 Faculty and Student Symposium.

In the Doctoral Presentations category, Andrej Svyantek won first place with “Dr. Grapelove or: How I Learned to Stop Working and Love the Leaf”, and Edoardo Poletti took second place with “Characterization of Resistance to *Dickeya dianthicola* in NDSU Potato Germplasm”. Their advisors are Harlene Hatterman-Valenti and Asunta Thompson, respectively.

In the Master’s Presentations category, Amy Greenberg won first place with “Potassium Fertilization and Its Impact on Yield, Nutritive Value, and Winter Hardiness of Alfalfa”, and Hashim Andidi took second place with “High Throughput Phenotyping to Evaluate Metribuzin Sensitivity of Potato”. Their advisors are Marisol Berti and Asunta Thompson, respectively.

In addition, thirty-nine students were inducted into GSD-NDSU membership for the 2019-2020 (delayed due to COVID-19) and 2020-2021 academic years.

Ganiger Vice-Chair of Plant Breeders Graduate Student Group

Mala Ganiger was selected as Vice-Chair of the 2021-2022 National Association of Plant Breeders (NAPB) Graduate Student Working Group (GSWG). She is a liaison between the NAPB-Early Career Group and Borlaug Scholar Committee, and the NAPB-Graduate Student Working Group. She also serves on the Education Committee and George Washington Carver Scholars Committee.

The GSWG is composed of graduate students from across the country that share a passion for plant breeding. The students assist NAPB committees, provide input for upcoming meetings, and have the opportunity to meet and network with prominent industry and university plant breeding representatives.

Ganiger is a plant sciences Ph.D. student and is advised by Richard Horsley.



Svyantek



Poletti



Greenberg



Andidi



Student’s Research Expands Herbicide Access

The research of M.S. student **Emma Burt** on the efficacy of an herbicide previously used on soybeans to control water hemp in sugarbeets led to an emergency exemption from the U.S. Environmental Protection Agency that allowed sugarbeet producers to use the herbicide to control water hemp in their crop in 2021. The emergency exemption was first granted in North Dakota and Minnesota, then three more states applied for and received emergency exemptions for the herbicide. Burt’s graduate program advisor, Thomas Peters, believes this is the first emergency exemption in the history of the sugarbeet crop in North Dakota and Minnesota.

Source: *AgWeek*, Dec. 14, 2021



Burt (right) and Peters

NDSU Graduate School Honors Students

Graduate students **Zixuan Gu** and **Amanda Peters Haugrud** received NDSU College of Agriculture, Food Sciences and Natural Resources 2020-2021 Graduate School Awards. Gu received the Graduate Teaching Award and Peters Haugrud received the Graduate Research Award.



Gu

Gu received his award for his role as the teaching assistant for assistant professor Jiajia Rao’s Food Unit Preparation class in fall 2020. Rao and student teaching evaluations praised Gu for his dedication, organization and enthusiasm for teaching. His teaching philosophy is “teaching benefits both teachers and students.” He is pursuing a Ph.D. in cereal and food science with advisor Bingcan Chen.



Peters Haugrud

Peters Haugrud received her award for the research she is conducting for a Ph.D. in genomics, phenomics and bioinformatics. She is advised by affiliate professor and USDA-ARS research geneticist Justin Faris. Faris says that Peters Haugrud is “extremely dedicated, motivated and productive.”

The NDSU Graduate School Research and Teaching Awards recognize outstanding contributions by graduate students and are awarded in partnership with the NDSU colleges each year.



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Graduate Student News

Maddakandage Dona Honored by Food Technologists

Jayani Maddakandage Dona was honored at the 2021 Institute of Food Technologists (IFT) annual meeting. She was one of six finalists in the IFT Mark L. Bieber Graduate Student Oral Competition - Nutrition Division and received third place for her presentation, "Nutritional quality of hulled wheat species: Einkorn, emmer and spelt", from her master's degree research.



She also was selected to receive a graduate scholarship and travel award by the Minnesota Section of the IFT. These awards recognize outstanding academic achievement.

Maddakandage Dona is a doctoral student in the cereal science program, researching the effect of flour particle size on the nutritional quality of sourdough bread. She is advised by Senay Simsek, former NDSU professor and wheat quality project leader.

Andidi Honored by Potato Association

Hashim Andidi was awarded fourth place in the Frank L. Haynes Graduate Student Research Award Competition held during the Potato Association of America annual meeting. His presentation was titled "Evaluation of Metribuzin Sensitivity of Potato Using High Throughput Phenotyping".



Andidi is a master's student in the potato breeding program and is advised by Asunta (Susie) Thompson. Andidi's research objectives are to screen NDSU potato germplasm for response to metribuzin and to develop a high-throughput phenotyping pro-

cedure to predict yield and quality loss due to metribuzin sensitivity. He hopes that his research will "help improve food production and the livelihood of farmers around the world."

Students Honored at Crop Science Meeting

Sam Bibby and **Lucas Alexandre Batista** won awards for their research posters at the 2021 American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America International Meeting.



Bibby

Bibby received second place in the Robert F. Barnes Graduate Education Awards Competition for his poster, "Corn-Alfalfa Intercropping with Different Row Spacings". The award recognizes graduate students who give outstanding presentations and make contributions to research in the Forage and Grazinglands Division of the CSSA.



Alexandre
Batista

Bibby is a research specialist in the Department of Plant Sciences and is pursuing his M.S. in plant sciences advised by Marisol Berti.

Alexandre Batista received third place in the CSSA Crop Breeding and Genetics Division Graduate Student Poster Competition for his poster, "Applying High Throughput Phenotyping in Hard Red Spring Wheat Breeding in Early-Generations". Selection of award recipients was based on presentation of the research, interpretation of results, and visual appeal of the poster.

Alexandre Batista is a plant sciences M.S. student advised by Andrew Green.

2021 Ph.D. and M.S. Graduates

Ph.D.

Angela Kazmierczak (*Plant Sciences, Ikley*)
Amanda Peters-Haugrud (*Genomics, Phenomics & Bioinformatics, Faris*)
Xiaoxi Qi (*Cereal Science, Rao*)
Ramnarain Ramakrishna (*Cereal Science, Shetty*)
Jayanta Roy (*Plant Sciences, Rahman*)
Peder Schmitz (*Plant Sciences, Kandel*)
Andrej Svyantek (*Plant Sciences, Hatterman-Valenti*)



M.S.

Peter Beerbower (*Genomics, Phenomics & Bioinformatics, McClean*)
Amy Greenberg (*Plant Sciences, Berti*)
Jed Grow (*Plant Sciences, Robinson*)
Eddy Ixcotoyac (*Plant Sciences, Osorno*)
Johanna Lukaschewsky (*Plant Sciences, Berti*)
Joseph Mettler (*Plant Sciences, Howatt*)
Brandon Olson (*Cereal Science, Simsek*)
Binu Rana (*Plant Sciences, Hatterman-Valenti*)
Ryan Skiba (*Genomics, Phenomics & Bioinformatics, McClean*)
Devin Wirth (*Plant Sciences, Ikley*)

Undergraduate Student News

Mertz Named Top 10 Senior

Chantel Mertz was named a Top 10 Senior by the NDSU Agriculture Collective during Ag Week. Mertz is majoring in crop and weed sciences with minors in biological science and soil science.



Students were selected based on leadership and community service; honors, awards and recognitions; work experience or internships; and additional noteworthy experiences, activities or accomplishments.

The Agriculture Collective plans activities year round to promote agricultural literacy at NDSU and in the Fargo community.

Scholarship Recipients

Kevin Friedt received the Moore Landscape Scholarship, a 2021 National Association of Landscape Professionals Foundation Scholarship. Friedt is from Harvey, North Dakota, and graduated in December 2021 with a B.S. in horticulture and a business minor. He was advised by Todd West.



Friedt

Forrest Hanson received a Mid America CropLife Association 2021 Young Leader Scholarship. Hanson is a crop and weed sciences student from Webster, South Dakota. He is advised by Greta Gramig.



Hanson

Katlyn Balstad received the Northern Plains Potato Growers Association 2021 Research and Education Foundation Scholarship. Balstad is from Fosston, Minnesota, majoring in management communication and crop and weed sciences with a minor in general agriculture. She is advised by Catherine Kingsley-Westerman, Department of Communication, and Rebekah Oliver, Department of Plant Sciences.



Balstad

NDSU Scholarships

In the 2021-2022 academic year, Department of Plant Sciences graduate and undergraduate students received 89 NDSU scholarship awards totaling \$75,566. They were honored at the NDSU College of Agriculture, Food Systems and Natural Resources Recognition Luncheon in November.

Students Honored at 95th Little International

Crop and weed sciences students **Emily Middendorf** and **Hunter Frederick** received awards at the 95th NDSU Saddle and Sirloin Little International Livestock Show. Middendorf was awarded Reserve Champion in Dairy. She is a student in animal sciences and crop and weed sciences from Sauk Center, Minnesota. Frederick won second place in Ham Curing. He is from Flasher, North Dakota, majoring in agriculture systems management and minoring in precision agriculture and crop and weed sciences.

Horticulture Students Win Team Award

A team of six NDSU Horticulture and Forestry Club students won the National Association of Landscape Professionals (NALP) National Collegiate Landscape Competition (NCLC) Team Award in the Less Than Ten Students category. Team members were **Halley Bartlett, Rachel Borgert, Kevin Friedt, Matthew Keller, Elizabeth Knutson** and **Ethan Lorenz**. Club advisors are Harlene Hatterman-Valeni and Todd West.

The NALP has held the annual networking and scholarship event for students enrolled in two- and four-year colleges and universities for more than 40 years.

Food Science/Food Safety Club Hosts Regional Competition

The NDSU Food Science and Food Safety Club hosted the 2021 North Central Institute of Food Technologists Student Association Area Meeting and College Bowl virtually in April. Food science undergraduate and graduate students from NDSU, the University of Wisconsin-Madison and Iowa State University participated in events via Zoom. NDSU cereal science M.S. student **Brandon Olson** chaired the meeting. The club advisor is Anuradha Vegi.

The Food Science College Bowl was the meeting's key event, in which students tested their knowledge in food science and technology, the history of foods and food processing, food law and general food-related trivia. After double overtime, the NDSU team took second place in the North Central Area College Bowl. NDSU team members were **Jayani Maddakandage Dona, Anna Mahoney, Claire Moffet, Abrielle Schnurr, Allison Stoner** and **Jacob Thomsen**.

NDSU alumna Dr. Chantal Nde, principal scientist at Frito-Lay, PepsiCo, Texas, presented a talk on "Food Safety Career Progression" at the meeting.



L-R: Mahoney, Moffet, Stoner, Schnurr, Maddakandage Dona, Thomsen



Virtual meeting



Alumni News

Dr. Marvin Boerboom was named the NDSU College of Agriculture, Food Systems and Natural Resources 2021 Distinguished Alumnus. Boerboom earned his M.S. and Ph.D. in Agronomy/Plant Genetics at NDSU in 1977. Boerboom spent nearly 40 years as a corn breeder, concluding his career at Monsanto (Bayer) as the Line Development Breeder. Throughout his career, Boerboom documented over 93 million units (1 unit = 80,000 Kernel bag) of U.S. hybrid corn sales that contain an inbred patent de-



Dr. Greg Lardy (left) presenting award to Dr. Marvin Boerboom

veloped in his breeding program. These 93 million units were planted on over 232 million acres of crop land, which is approximately equivalent to planting every corn acre in North Dakota for 66 years.

Dr. Magan Lewis was featured on the CBS “Mission Unstoppable” TV program on November 13, 2021. She demonstrated how robotics is used in farming. Lewis completed her Ph.D. in Plant Sciences at NDSU in 2012. She is the Global Technology Adoption Lead at Corteva Agriscience in Iowa.



Memorials

Prem Jauhar, a retired senior research geneticist at the USDA-ARS Northern Crop Science Laboratory and a former NDSU Plant Sciences adjunct professor, died on March 12, 2021, in Hicksville, New York. Jauhar is known for his work in cytogenetics and its relevance to plant breeding and evolution.

Arthur A. Boe, emeritus professor of plant sciences, passed away on May 24, 2021, in Northfield, Minnesota. Boe was chair of the NDSU Horticulture and Forestry Department from 1983 to 1992. In 1993, he founded North Star Seed and Nursery in Faribault, Minnesota, and managed it for 28 years. He patented numerous plants including the Proven Winners brand North Pole.

Neil Riveland passed away on September 2, 2021, in Detroit Lakes, Minnesota. He worked for 42 years as an agronomist and later as co-director at the NDSU Williston Research Extension Center.

Donna Nalewaja passed away on September 30, 2021. She was the wife of the late John Nalewaja, former NDSU professor and weed scientist.

Myron Thoreson passed away on October 9, 2021, in Fargo, North Dakota. He worked in the NDSU Horticulture Department from 1967 until his retirement in 1998 and then continued to work on a “temporary” basis until 2012.

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Plant Sciences Faculty

Richard D. Horsley	Department Head; Professor (6-rowed and 2-rowed barley breeding, genetics)
Nonoy Bandillo	Assistant Professor (pulse breeding, genetics)
Marisol Berti	Professor (forages and biomass crop production)
Bingcan Chen	Assistant Professor (food and cereal chemistry)
Michael J. Christoffers	Associate Professor (weed science, genetics teaching)
Wenhao (David) Dai	Professor (woody plant physiology, biotechnology)
Edward L. Deckard	Plant Sciences and Horticulture Graduate Programs Coordinator; Professor (crop physiology)
Elias M. Elias	University Distinguished Professor, J.F. Carter Durum Wheat Breeding/Genetics Endowed Professor (durum wheat breeding)
Greta Gramig	Associate Professor (weed science)
Andrew Green	Assistant Professor (hard spring wheat breeding)
Harlene Hatterman-Valenti	Assistant Dept. Head; Professor (high value crop production)
Kirk A. Howatt	Crop and Weed Sciences Undergraduate Program Coordinator; Associate Professor (weed science-annual weeds)
Joe Ikley	Assistant Professor (Extension weed control)
Burton L. Johnson	Professor (sunflower, minor and new crop production)
Thomas Kalb, II	Extension Horticulture Specialist (western ND)
Hans Kandel	Professor and Extension Agronomist (broadleaf crop production)
Clair Keene	Assistant Professor and Extension Agronomist (cereal crops and field corn)
Quincy Law	Assistant Professor (invasive and noxious weed control)
Chiwon W. Lee	Professor (greenhouse production, vegetable culture and breeding)
Deying Li	Professor (sports turf management)
Xuehui Li	Associate Professor (statistical genomics)
Frank A. Manthey	Cereal Science Graduate Program Coordinator; Professor (durum and pasta quality)
G. Francois Marais	Professor (hard red winter wheat breeding, genetics)
Phillip E. McClean	Dr. Charles J. Mode Endowed Professor of Phenomics Research; Director, Genomics & Bioinformatics Program; Professor (dry bean genetics, biotechnology)
Esther McGinnis	Associate Professor and Extension Horticulturist
Michael S. McMullen	Professor (oat breeding, genetics)
Carrie Miranda	Assistant Professor (soybean breeding, genetics)
Rebekah Oliver	Associate Professor of Practice (genetics)
Juan M. Osorno	Professor (dry edible bean breeding)
Tom Peters	Associate Professor and Extension Agronomist (sugarbeet production/weed science)
Mukhlesur Rahman	Associate Professor (oilseed breeding, genetics)
Jiajia Rao	Assistant Professor (food chemistry and ingredient technology)
Andrew Robinson	Associate Professor and Extension Agronomist (potato production)
Kalidas Shetty	Associate VP for International Partnerships and Collaborations; Professor (plant metabolism, food security)
Asunta (Susie) L. Thompson	Associate Professor (potato breeding)
Anuradha Vegi	Food Science Undergraduate Program Coordinator; Assistant Professor of Practice (food safety, processing, microbiology)
Todd West	Horticulture Undergraduate Coordinator; Professor (woody plants improvement)
Minwei Xu	Assistant Professor (food processing)
Qi (Chee) Zhang	Associate Professor (turfgrass stress physiology)
Alan Zuk	Associate Professor (sports and urban turfgrass management)

Emeritus Faculty

Duane R. Berglund	Richard C. Frohberg	H. Roald Lund	Paul B. Schwarz
Harold Z. Cross	Kenneth F. Grafton	Rodney G. Lym	Ronald C. Smith
Bert D'Appolonia	Dennis Gordon	Calvin G. Messersmith	LeRoy A. Spilde
Alan G. Dexter	Ted C. Helms	Dwain W. Meyer	Dean A. Whited
Murray E. Duysen	Dale E. Herman	Donald C. Nelson	Vernon Youngs
Jerry D. Franckowiak	Khalil Khan	Joel K. Ransom	Richard K. Zollinger

Adjunct & Affiliate Faculty (*USDA)

James V. Anderson* (plant biochemistry)	Brian M. Jenks (weed science)
James S. Beaver (dry bean genetics)	Blaine E. Johnson (range management)
David Bonnett (plant breeding, genetics)	Edward C. Lulai* (potato physiology)
Patrick M. Carr (sustainable agriculture)	Kevin McPhee (plant science)
Wun S. Chao* (perennial weeds)	Grant Mehring (cereal crops)
Munevver Dogramaci* (sugarbeet and potato research)	Mohamed Mergoum (plant breeding, genetics)
Linda Dykes* (food science and technology)	Jae-Bom Ohm* (grain science)
Justin D. Faris* (cereal crops)	Rebekah E. Oliver (genetics)
Jason Fiedler* (chemical biology)	Michael H. Ostlie (crop production)
Shana M. Forster (cereal crops)	Timothy G. Porch (dry bean breeding, genetics)
Jose G. Franco, Jr.* (agroecology, sustainable food systems)	Gautam Pradhan (crop physiology)
Karen L. Fugate* (sugarbeet physiology)	Lili Qi* (molecular genetics)
Russell W. Gesch (oilseed crops)	Gerald J. Seiler* (sunflower and sugarbeet germplasm)
Salvador Alejandro Gezan (statistics and quantitative genetics)	Calvin Trostle (soil chemistry)
Michael Grusak* (nutrition of crop plants)	Anuradha Vegi (food safety, processing and microbiology)
Yong Q. Gu* (wheat genetics)	Tom C. Walk (plant breeding database management)
Darrin M. Haagensohn* (crop physiology and ecology)	Jochum J. Wiersma (small grains)
David P. Horvath* (perennial weed physiology)	Steven S. Xu* (hard red spring wheat development)
Brent S. Hulke* (sunflower)	Shengming Yang* (cereal crops)

Postdoctoral Research Fellows/Research Scientists

Naa Korkoi Ardayfio (oat breeding)	Hui Li (food and cereal chemistry)
Atanda Sikiru Adeniyi (pulse crops breeding)	Sepehr Naraghi (oat breeding)
Md. Abdullah Al Bari (pulse crops breeding)	Bikash Poudel (cereal crops research)
Uyory Choe (food chemistry and ingredient technology)	Jayanta Roy (dry bean genetics and genomics)
Mohammad Erfatpour (dry bean breeding)	Dipayan Sarkar (plant metabolism and food security)
Zhao Jin (food and cereal chemistry)	Sudeshi Seneviratne (wheat molecular genetics)
Jawahar Jyoti (barley genetics)	Kristin Simons (dry bean breeding)
Taiyoung Kang (food chemistry)	Zahirul Talukder (sunflower germplasm development)
Jeonghwa Kim (pulse crops breeding)	Muhammad Tehseen (statistical genomics)
Yang Lan (food chemistry and ingredient technology)	

Research and Support Staff

Collin Auwarter (high value crop production)	Alexa Lystad (Extension sugarbeet weed control)
Jason Axtman (durum breeding)	Vicki Magnusson (soybean breeding)
John Barr (barley quality)	Makenson Maisonneuve (dry bean breeding)
Sam Bibby (forages and biomass crop production)	Sally Mann (durum wheat breeding)
Brad Bisek (hard red winter wheat breeding)	Sandra Mark (weed science)
Ryan Borgen (Extension sugarbeets and weed control)	Kelly McMonagle (wheat quality)
Eric Brandvik (Extension potato production)	Joseph Mettler (annual weeds)
Brian Cattnach (barley breeding)	André Miranda (hard spring wheat breeding)
Kathy Christianson (wheat quality)	Didier Murillo-Florez (breeding pipeline database management)
Ashley Cooper (soybean breeding)	Richard Nilles (potato breeding)
Brenda Deckard (Director, Plant Sciences Student Services)	DeLane Olsen (wheat quality)
Chad Deplazes (Extension crop production)	Allen Peckrul (food and cereal chemistry)
Stephanie DeSimini (weed science)	Kelly Peppel (potato breeding)
Darin Eisinger (minor and new crops, Extension crop production)	James Perleberg (durum and pasta quality)
Brock Fagerstrom (soybean breeding)	Lisa Piche (pulse crops breeding)
Aaron Froemke (soybean breeding)	Andrew Ross (pulse crops breeding)
Andrew Fuchs (oilseed breeding)	Kevin Rue (turfgrass)
James Gillespie (malting barley quality)	Robert Sabba (weed science)
John Grieger (barley breeding)	Evan Salsman (durum breeding)
Connor Hagemeyer (woody plant improvement)	Thor Selland (hard spring wheat breeding)
Nathan Haugrud (Extension weed control)	Brian Smart (sunflower research)
Justin Hegstad (statistical genomics)	Tom Studzinski (malting barley quality)
Ana Heilman-Morales (large database breeding pipeline)	Gwen Thomas (wheat quality)
Karen Hertsgaard (information specialist)	Jesse Underdahl (hard spring wheat breeding)
Peter Ihry (Extension potato production)	Jody VanderWal (dry bean breeding)
Kreg Kercher (oilseed breeding)	Amber Walter (wheat quality)
Barb Laschkewitsch (vegetables and perennials)	Adam Walz (hard spring wheat breeding)
Rian Lee (dry bean genetics)	Wei Zhang (woody plant physiology and biotechnology)

Office Staff

Accounting

Krista Caldwell, Senior Accounting Specialist
Cora Crane, Grants Coordinator
Andrea Evert, Accounting Technician
Lorin Miller, Accountant

Academic Program Assistance

Kamie Beeson, Information Processing Specialist
Eileen Buringrud, Administrative Assistant
Karen Jevning, Administrative Secretary
Lisa Johnson, Administrative Secretary
Shannon Ueker, Administrative Secretary

North Dakota Foundation Seedstocks

Steve Sebesta, Director
Joyana Baumann, Assistant Director
Toni Muffenbier, Accounting Specialist

CS = Cereal Science

HORT = Horticulture PLSC = Plant Sciences

GPB = Genomics, Phenomics, Bioinformatics

Graduate Students

<u>Name</u>	<u>Prog.</u>	<u>Deg.</u>	<u>Advisor</u>	<u>Name</u>	<u>Prog.</u>	<u>Deg.</u>	<u>Advisor</u>
Sonya Abe	HORT	MS	Hatterman-Valenti	Emma Larson	PLSC	MS	Peters
Namrata Acharya	PLSC	MS	X. Li	Marcus Mack	PLSC	MS	Ransom
Sagar Adhikari	PLSC	MS	Marais	Jayani Maddakandage Dona	CS	PhD	Simsek
Shahab Ahmad	PLSC	PhD	Rahman	Ana Magallanes Lopez	CS	PhD	Simsek
Waqas Ahmad	PLSC	PhD	Gramig	Makenson Maisonneuve	PLSC	MS	Horsley
Abdulrahman Alahmed	CS	PhD	Simsek	Phabian Makokha	PLSC	PhD	Robinson
Md Zahangir Alam	PLSC	PhD	Rahman	Amanda Malik	CS	PhD	Xu
Lucas Alexandre Batista	PLSC	MS	Green	Ashok Mandal	PLSC	MS	Rahman
Aizaz Ali	PLSC	PhD	Osorno	Maria Mazala	PLSC	MS	Osorno
Tannis Anderson	PLSC	MS	Thompson	Maram Milad	HORT	MS	West
Hashim Andidi	PLSC	MS	Thompson	Vimukthi Molligoda	CS	MS	Simsek
Ryan Archer	PLSC	MS	Hatterman-Valenti	Jose Montoro Bais	PLSC	MS	Kandel
Jason Axtman	PLSC	MS	Elias	Yejune Moon	PLSC	MS	Shetty
Peter Beerbower	GPB	PhD	Cai	Mario Morales	GPB	PhD	Bandillo
Apurva Bhopal	HORT	MS	H-Valenti/Shetty	Presley Mosher	PLSC	MS	Hatterman-Valenti
Samuel Bibby	PLSC	MS	Berti	Kenneth Mozea	PLSC	MS	Berti
David Boehm	CS	PhD	Chen	Mika Mzumara	HORT	MS	Hatterman-Valenti
Emmanuella Bredu	HORT	MS	Zhang	Harry Navasca	PLSC	MS	Bandillo
Ryan Buetow	PLSC	PhD	Ransom	McKayla Neubauer	PLSC	MS	Berti
Ryan Campbell	PLSC	MS	Berti	Bipin Neupane	PLSC	MS	Marais
Melissa Carlson	PLSC	PhD	Ransom	David Ngunjiri	PLSC	PhD	Thompson
Liuyi Chang	CS	PhD	Rao	Brandon Olson	PLSC	PhD	Shetty
Anto Pradeep Charles	CS	PhD	Rao	Neil Olson	PLSC	MS	Hulke
Mahesh Chinthalapudi	PLSC	MS	X. Li	Ramesh Pilli	PLSC	MS	X. Li
Bhanu Dangi	PLSC	MS	Marais	Zach Pull	PLSC	MS	Gramig
Maria De Oliveira	PLSC	PhD	Osorno	Afrina Rahman	PLSC	PhD	Rahman
Benoit Decormeille	PLSC	MS	Hatterman-Valenti	Arunika Rajapaksha	CS	MS	Simsek
Hava Delavar	PLSC	PhD	Hatterman-Valenti	Shuangfeng Ren	GPB	PhD	Cai
Baochen Fang	CS	PhD	Rao	Oscar Rodriguez	PLSC	PhD	Osorno
Jewel Faul	PLSC	MS	Law	Kevin Rue	PLSC	MS	Zhang
Jose Figueroa Cerna	PLSC	MS	Osorno	Mory Rugg	PLSC	PhD	Green
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Mala Ganiger	PLSC	PhD	Horsley	Sidra Saleem	PLSC	PhD	Hatterman-Valenti
Kun Gao	CS	PhD	Chen	Evan Salsman	PLSC	PhD	X. Li
Bijaya Ghimire	PLSC	MS	Hatterman-Valenti	Rica Saldaña	PLSC	PhD	Bandillo
Andre Gossweiler	PLSC	MS	Hulke	Darby Schye	PLSC	MS	Law
Matteo Grossi	CS	PhD	Chen	TM Shaikh	PLSC	MS	Rahman
Jed Grow	PLSC	MS	Robinson	Avery Shikanai	PLSC	PhD	Hatterman-Valenti
Zixuan Gu	CS	PhD	Chen	Gurminder Singh	GPB	PhD	Faris
Connor Hagemeyer	HORT	MS	West	Brian Smart	PLSC	MS	Hulke
David Halvax	PLSC	MS	West	Amjad Sohail	CS	PhD	Xu
Nathan Haugrud	PLSC	PhD	Ikley	Jeffery Stith	PLSC	MS	Ikley
Amber Hermanson	HORT	MS	Dai	Nirmala Subedi	CS	MS	Manthey
Aaron Hoppe	PLSC	PhD	Peters	Aishwarya Suresh	CS	PhD	Manthey
Ahasanul Hoque	PLSC	PhD	Rahman	Andrej Svyantek	PLSC	PhD	Hatterman-Valenti
Shakil Hosain	PLSC	MS	Rahman	Gabriel Swanson	CS	MS	Chen
Seyed Ali Hosseinirad	PLSC	PhD	Elias	Mikayla Tabert	PLSC	MS	Berti
Justin Jacobs	PLSC	MS	Johnson	Diego Vargas Yana	CS	MS	Shetty
Haiyang Jiang	CS	PhD	Rao	Haley Visto	PLSC	MS	Green
Josephine Johnson	GPB	PhD	Bandillo	Tiffany Walter	PLSC	MS	Howatt
Ela Jusino Montalvo	PLSC	MS	Horsley	Adam Walz	PLSC	MS	Green
Venkateswara Kadium	PLSC	MS	Hatterman-Valenti	Runhao Wang	PLSC	PhD	X. Li
Heymamt Kaur	CS	MS	Vegi	Cerly Rini Yeruva	PLSC	MS	McMullen
Austin Kraklau	PLSC	MS	Berti	Muxin Zhao	CS	PhD	Chen
Anil Kunapareddy	CS	PhD	Rao	Yaojie Zheng	PLSC	PhD	X. Li

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