



Gary J. Muehlbauer, PhD

Welcome to the spring edition of Plant Pages, the Department of Agronomy and Plant Genetics newsletter. Read on to learn about the department's recent social events, including a coffee tasting and wine and cheese sampling, and how we're engaging with the local community with the African Vegetable Project. We'll also highlight some exceptional work from our students, faculty, staff, and alumni.

Smith Honored by CSSA



Professor Kevin Smith received the Crop Science Society of America (CSSA) Fellow award at the October 2023 Tri-Society Annual Meeting. Fellow is the highest recognition bestowed by the CSSA. Members of the Society nominate worthy colleagues based on their professional achievements and meritorious service. Up to 0.3 percent of the Society's active and emeritus members may be elected Fellow.

Fall Wine and Cheese Social Well-Attended



The APG Social Committee held its annual Fall Wine and Cheese Social in October after the monthly faculty meeting in the Borlaug Hall seminar room. Current and retired Agronomy faculty, staff, graduate students, and family members were all invited to the social, which welcomed new students and staff to the department.



A STIMULATING GATHERING

Bernardo Brews up a mini-seminar on coffee

In October, Professor Rex Bernardo gave a taste of his freshman seminar, *Coffee from the Ground Up* (AGRO 1921), to faculty, staff members, and graduate students in the Horticultural Science, Agronomy and Plant Genetics, and Plant Pathology departments. Nearly 25 participants learned about the movement of coffee—the plant and the beverage—around the world and sampled and rated eight brewed coffees.

Those coffees included five arabica species, one robusta (*Coffea canephora*) from Vietnam, and one liberica and one excelsa, both from the Philippines. *Coffea arabica* is considered to have the best flavor, whereas liberica and excelsa are lesser-known coffee species. Four of the arabicas were single-origin coffees from Colombia, Costa Rica, Ethiopia, and Sumatra. The fifth was a blend of arabica coffee from Yemen and Java.

Bernardo asked participants to rate the coffees from 1 (poorest) to 10 (best). The winner was the Ethiopian coffee, which had a median score of 8. The coffee was an heirloom arabica from the Yirgacheffe region of Ethiopia. It was grown at an altitude of 1,700 to 1,950 meters above sea level.

The least favored coffee was the Vietnamese robusta, with a median score of 3. Robusta coffee is known as an inferior brew but is an important component of the best espresso coffees, Bernardo said, “and we didn’t brew any espressos.”

Bernardo said he’s considering a second Coffee Origins gathering this semester if you missed the fall coffee tasting.



Get to Know the Department's New Graduate Students

We introduced five new department grad students in the fall newsletter. Hear more about their research interests.



Sarah Klingenberg, PhD

I am investigating the enhancement of protein yield in *Medicago sativa* with metabolomic, genomic, and other approaches.



Sithin Mathew, PhD

My research area focuses on different agronomic practices in soybean, which influence soybean canopy closure and weed suppression. My program also looks into the influence of cereal rye as a cover crop on soil moisture in the succeeding summer soybean.



Isabella Fiore, PhD

I am investigating iron deficiency chlorosis in soybeans. Iron deficiency chlorosis is a common abiotic stress in the upper Midwest. Genetic resistance to iron deficiency chlorosis is the recommended method for combating this stressor. My research aims to cultivate varieties that are more resistant to iron deficiency chlorosis.



Lovepreet Singh, PhD

My research interests are quantitative genetics and genomics-assisted breeding broadly. I am part of the SOYGEN (Science Optimized Yield Gains across ENvironments) project. The major goal of this project is to predict cultivar performance in future target environments through genomics-assisted breeding models, phenomics, and environment characterization.



Navjot Singh, PhD

My research aims to quantify the level and investigate the genetic and physiological mechanisms of glufosinate resistance in recently identified waterhemp accessions from Minnesota. Glufosinate is an important non-selective herbicide, and numerous recently approved herbicide-resistant crop traits are genetically engineered for resistance to this herbicide. Information from this study would help to reduce the spread and facilitate management of glufosinate resistance in the state. In addition, I am also investigating a critical period of weed seed control for long-term waterhemp management.



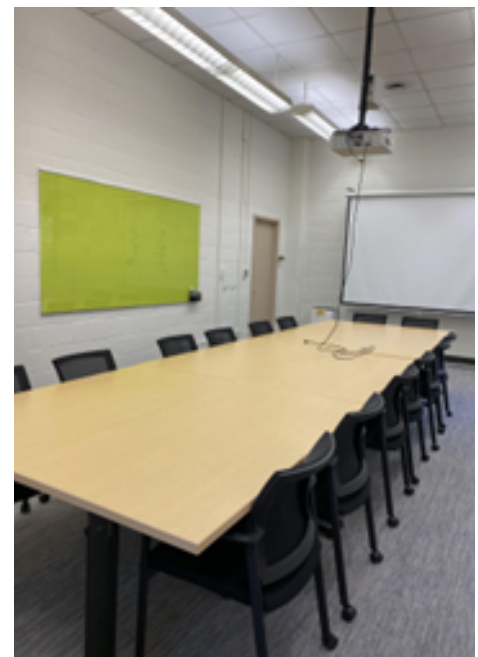
Fresh Spaces for 2024

Our administrative team worked to update and improve several of our meeting, conference, atrium, and classroom spaces this year.

Conference Room Updates



During the fall semester, the administrative team worked to update several of our conference rooms. Improvements included new carpet, paint, tables, chairs, and glass boards! We are excited about these transformations, which adds freshness and functionality to department spaces.



411 Borlaug Hall

We also completed a major cleanout and update to our main office, 411 Borlaug Hall. This included new carpet, paint, lower cubicle walls (let there be light!), and a new seating area. Stop by and say hi; it's so bright and welcoming!



These renovations were made in part by generous department donors. Interested in donating? Click here: [DONATE](#)

U of M Interim President Ettinger gets a close look at Forever Green successes

On Monday, October 9, the [Forever Green Initiative](#) was honored to host Jeff Ettinger, Interim President of the University of Minnesota, and Peter Frosch, CEO of Greater MSP. President Ettinger was joined by Shashank Priya, Vice President for Research; Rich Huebsch, Associate VP for Research; Melisa Lopez Franzen, Executive Director of Government and Community Relations; Brian Buhr, CFANS Dean; and other top UMN leadership. Peter Frosch was joined by his colleagues Matt Lewis and Julia Silvis.



As the guests snacked on Kernza[®] cereal, crackers, and puffs made by food science professor George Annor, Forever Green leaders presented an overview of the platform, followed by a snapshot of progress on [Kernza](#).

Then, the presentation turned toward the winter oilseeds — [pennycress](#) and [winter camelina](#) — to highlight the importance of Forever Green’s basic science and cross-sector collaborations and our potential to directly benefit the environment, the climate, and the regional and state economy. David Marks told how he helped domesticate pennycress from a weed to a crop in under 10 years, Jim Anderson gave an update on the pennycress breeding program, and Matthew Ott presented an overview of the winter camelina breeding program.

This tour was very timely, as Forever Green’s efforts to pilot winter camelina are ramping up, and the transportation and energy sectors are ratcheting up their focus on low-carbon biofuels. The winter oilseeds have the potential to produce low-carbon biofuel feedstocks while protecting soil and water, making them one of the first crop-based biofuels to produce substantial co-benefits for the environment. Peter Frosch and Greater MSP have just launched the [Minnesota Sustainable Aviation Fuel Hub](#) to bring SAF production to our state. [MBOLD](#), a project of Greater MSP, has been a key partner for Forever Green on winter camelina scaling, so we are poised for deeper engagement with the SAF Hub.

We look forward to working with Peter Frosch, President Ettinger, and other regional leaders to advance this critical climate solution.

African Vegetable Project

The Community Plant Breeding Team is a dedicated group of graduate students and post-doctoral volunteers associated with the University of Minnesota's Plant Breeding Center. Our goal is to foster collaboration among researchers, growers, and community members to breed culturally relevant food plants for Minnesota communities. To achieve this, we actively engage with local community members, growers, consumers, and Master Gardeners. Through these collaborations, we have studied how over 20 different species, most originating from Africa or Southeast Asia, grow (or fail to grow) in Minnesota.

Looking ahead, our team is committed to breeding culturally relevant plants for Minnesota community members. However, we emphasize the importance of community support in this endeavor. We aim to work closely with communities that value these plant species as part of their cultural heritage.



Chidi Chidoze (Hennepin County Master Gardener) takes cuttings of amaranth to share with local East and West African community members.



The team hosted an open house in August 2023. Growers, community members, Master Gardeners, researchers, and more came out to tour the field, took home free produce, and shared a meal.



**PLANT
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NEW FACULTY SPOTLIGHT

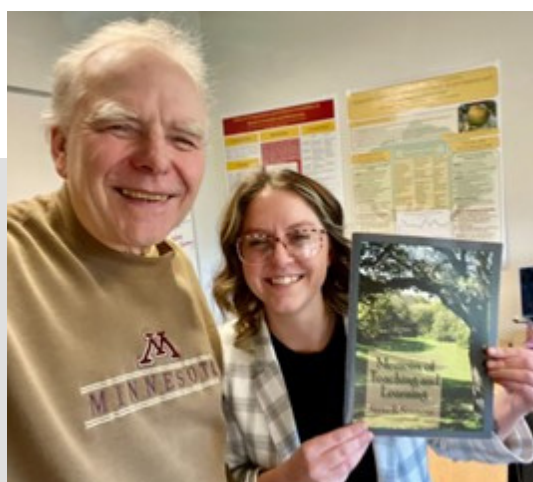
Katy Guthrie

Katy Guthrie joined APG in August as a new teaching assistant professor. She co-instructed “Agroecosystems of the World” and “The Science of Cannabis” last fall and built connections throughout the APG community.

Guthrie is originally from the St. Louis area and received a PhD in maize developmental genetics from the University of Missouri under the mentorship of Paula McSteen, PhD. For the past two years, she has worked as an active learning researcher for the School of Integrated Plant Sciences at Cornell. During this time, she developed and evaluated the efficacy of individual active learning activities, evaluated individual instructors and courses as a whole, provided recommendations on school curricula, mentored first-time instructors, and collaborated on grants centered on teaching innovation.

Guthrie looks forward to teaching three classes in the spring semester, including “Plant Genetic Resources,” which will allow her to revisit her graduate school expertise. She is excited to continue Mary Brakke’s amazing work with the “Professional Internship Experience” course, which she believes is one of the most special aspects of our curriculum. In addition, Guthrie will be part of the third generation of instructors for AGRO 3202W, which she is co-instructing with Pedro Urriola, PhD, from Animal Sciences.

When not at work, Guthrie is likely watching pro wrestling with her partner, learning a new craft, or walking around her neighborhood restocking Little Free Libraries. Education has always been her passion, and she looks forward to building it into a career here at the U. Guthrie says her classes are always open for observations, and her door is open for collaboration. She looks forward to connecting with more of the U’s community this year.



Steve Simmons gave Guthrie a copy of his “Memoirs of Teaching and Learning.” He developed AGRO 3203W with Mike White, which she is co-instructing this semester with Pedro Urriola, PhD, from Animal Science.



Guthrie (far right) with her AGRO 3306 students and co-instructor Tessa Bailey (far left).

FACULTY SPOTLIGHT

NICK JORDAN, PHD

Nick Jordan, PhD, professor in the Department of Agronomy and Plant Genetics, leads an agroecology research and teaching program and co-directs the Forever Green Initiative. This broad partnership is working to make Minnesota farmland “forever green” by introducing crops that work well with current crops to advance continuous living cover (CLC) in agriculture. CLC agriculture denotes agricultural systems that maintain living plants and roots in the ground throughout the year, enhancing and sustaining agricultural production and stewardship of soil, water, and wildlife. The Forever Green Initiative is a comprehensive project linking crop research and development (R&D) with active commercialization efforts, advocacy, and policy development.

In his research program, Jordan is focused on developing strategies for regional-scale diversification in agriculture, addressing the question: “How can we overcome barriers to diversification to achieve diversification over millions of acres in the Upper Midwest to advance production and resource stewardship?” Project personnel includes Sarah Lloyd, PhD; Postdoc Amy Teller; PhD candidate Tara Conway; and Forever Green Associate Directors Mitch Hunter and Colin Cureton. Jordan teaches Agro 5321, Ecology of Agricultural Systems, and ESPM 3108/5108, Ecology of Managed Systems.

An important building block for regional diversification is place-based diversification projects. Such projects devise locally adapted and economically viable diversified farming systems tailored to particular geographies’ biological, physical, and socio-economic circumstances. These projects require organizing farmer networks to engage farmer innovation in diversification and cross-sector community support for diversification. Jordan supports one such effort in central Wisconsin, which is focusing on increasing the use of managed grazing in conventional dairy farms. Work includes organizing community gatherings to discuss diversification, supporting farmer innovation, and analyzing the economic and conservation benefits of this form of diversification.



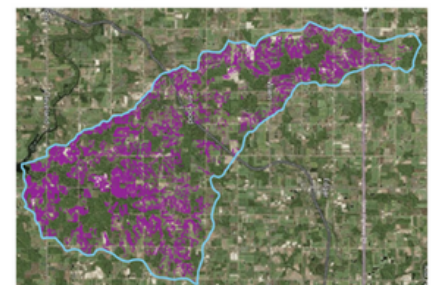
Project personnel and others at a 2023 meeting focused on value-chain development for new crops.



Community discussion of diversification options, Marathon County, Wisconsin.

Fenwood Creek, Marathon Co. WI

Convert all slopes above 7% to managed grazing



Targets:

P loss under 1.3 lbs/ac/yr - met ✓

Soil loss under 0.85 tons/ac/yr - met ✓

Analysis of conservation benefits of managed grazing adoption by conventional dairy farms.

Faculty Spotlight

Nancy Jo Ehlke,
PhD



Nancy Jo Ehlke, PhD, professor in the Department of Agronomy and Plant Genetics, leads a diverse research project focused on plant breeding and cropping systems research. She conducts breeding programs on turfgrasses, forage legumes and grasses, and cover crops for Minnesota and the north-central region. Nancy conducts agronomic research that improves the profitability and sustainability of grass and legume seed production in northwestern Minnesota. She played a critical role in introducing perennial ryegrass into seed production in the area, resulting in a positive economic impact on the region. In addition, Ehlke conducts cropping systems research on canola, grass seed, soybean, small grains, and “Forever Green” crops.

Ehlke’s current plant breeding program focuses on developing new varieties of perennial ryegrass in collaboration with Donald Wyse, PhD, Department of Agronomy and Plant Genetics, and Eric Watkins, PhD, Department of Horticultural Science with improved turf quality, better winter survival, high levels of disease and pest resistance, herbicide tolerance, and excellent seed yield potential in northern Minnesota. She is an active member of the Cover Crop Breeding Network, a national network of scientists that works to develop new cover crop varieties to boost the profitability of farms and protect the environment. Ehlke is currently breeding hairy vetch and cereal rye as cover crops, selecting for multiple traits, including winter hardiness, early season vigor, high biomass production, disease resistance, early maturity, seed yield, and soft seed.

Ehlke is responsible for the University of Minnesota Magnusson Research Farm near Roseau, Minnesota. The Magnusson Research Farm comprises 40 acres of land and was donated to the college in 1998 as a permanent location to conduct grass and legume seed production research, a unique agricultural production system in northwestern Minnesota. There is a long-standing relationship between the seed producers and the University of Minnesota dating back to the 1940s. The location of the farm is critical to meeting the research objectives of the grass and legume breeding projects at the University. Seed production of forage and turf species is environmentally sensitive and must be conducted in the production ecoregion. Donn Vellekson, research plot coordinator, and Dave Grafstrom, PhD, research scientist, are the primary staff responsible for managing the farm and the research trials. In addition to seed production research, the research farm staff runs the Canola Production Center and manages over 3,600 research plots on small grains, soybeans, and Forever Green crops in collaboration with research project leaders.

Ehlke is engaged in outreach activities primarily with the grass and legume seed producers. She is a regular speaker at the annual growers’ meeting in late winter in Roseau, Minnesota, and participates in the annual field tour at the farm at the end of June. Ehlke has taught numerous graduate-level courses, ranging from plant breeding and quantitative genetics to experimental design and analysis. Recently, she started teaching AGRO 8210/AGRO 4888: Colloquium in Sustainable Agriculture.

UNDERGRAD STUDENT SPOTLIGHT

Matthew Robidou

Matthew Robidou's journey at the University of Minnesota has been transformative. As a junior in the Department of Agronomy and Plant Genetics, majoring in plant science (agroecology), he discovered a passion that's been part of his family's legacy. Robidou's great-grandfather, Jonas Jergen Christensen, PhD, who advised Nobel Laureate Norman Borlaug, inspires him each time he passes the plant pathology lab bearing Borlaug's name. Robidou's military background in the Marine Corps as a signals intelligence analyst and Mandarin cryptologic linguist fueled his analytical skills, which he applies to deep dives into plant physiology and chemistry. Currently, he's unraveling the complexities of hemp and is focusing on glandular trichomes, the critical component for phytochemical production.

Recognizing the emerging scientific frontiers in hemp, Robidou dedicates his time to mastering the science behind its cultivation. With graduation approaching in spring 2025, he hopes to further his expertise in the CFANS Applied Plant Sciences graduate program. Robidou hopes to become a leading expert in hemp science, contributing globally to an industry on the cusp of significant growth.



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Interested in supporting current students as a mentor or volunteering in other ways? Visit cfans.umn.edu/alumni for more information.

STAFF SPOTLIGHT

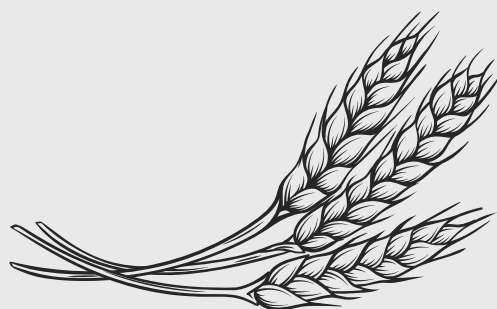
Emily Conley

Emily Conley has been a part of the Anderson Lab/Wheat Breeding Project since February 1999, wearing multiple hats over the years. Juggling work and studies, she completed her MS in the APS program in 2004 while working as a lab technician. After a break to focus on family, she returned in 2011 to resume her role as the lab manager while pursuing a PhD in APS. Her doctoral research focused on genomic prediction of fusarium head blight in wheat.



Her current responsibilities include lab management, genotyping operations, trait mapping, and marker development for the wheat program. Throughout her journey, the department's support of her graduate education and professional development has been instrumental, including her attainment of the Office for Equity and Diversity Certificates I and II in 2014-2015. She is in her first year serving on the APG DEI Committee and is excited to work with the committee to continue building a culture of inclusivity in the department's research labs.

Mentoring student research is a passion for Conley, and last year she had the privilege of mentoring Emily Jopp in her summa cum laude thesis research in the undergraduate Plant Science program. This summer, she will be one of the instructors for a new CFANS Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS) camp for middle school students titled "Food, Agriculture and U." Conley appreciates the supportive research atmosphere in the department, aiding her professional growth and encouraging collaboration and teamwork.





ALUMNI

EMILY (COMBS) ZIEMKE, PHD CORTEVA[™] AGRISCIENCE

Emily Ziemke earned her PhD from the Department of Agronomy and Plant Genetics in 2012. Under the guidance of Rex Bernardo, PhD, her thesis research focused on genomewide selection to introduce exotic traits—specifically dwarfing and density tolerance—into adapted germplasm. This was achieved through multiple cycles of genomewide selection and empirical evaluation of selection gains. Ziemke also explored the impact of training population design on genomewide prediction accuracy and marker imputation prior to genomewide selection.



After completing her studies at the University of Minnesota, Ziemke joined DuPont Pioneer as a corn breeder in Mankato, Minnesota. Over the course of eight years, she led a corn breeding program to enhance the genetic diversity of Corteva's product lineup. From 2018 to 2020, she served as the North American Corn Technology Lead, where she played a pivotal role in deploying and enhancing technologies such as genetic prediction and advanced phenotyping within North American corn breeding programs. In 2023, Ziemke transitioned to a new role in Data Science and Informatics (now Farming Solutions and Digital), serving as the portfolio lead for Seed Product Development. In this capacity, she oversees strategic planning, resource allocation, budgeting, project portfolio management, and communication plans for all projects aligned with Seed Product Development.



Beyond her professional endeavors, Ziemke actively engages with her community and professional societies. She represents Corteva in the Excellence in Breeding initiative and has delivered several talks to this group. Additionally, she has been involved with the Communications Committee of the National Association of Plant Breeders, collaborates with GreenSeam, a Southern Minnesota agriculture advocacy organization, and volunteers annually at FarmAmerica.



ALUMNI

TODD KRONE, PHD FOUNDER POWERPOLLEN®

Todd Krone received his PhD in the Department of Agronomy and Plant Genetics in 1994 with Professor Ron Phillips working on high methionine corn.

The same motive that drove his graduate work is still driving him today: to improve the world's food supply. Krone began his career with Asgrow in Ames, Iowa, with the task of starting a molecular marker program for their corn and soybean breeding efforts. Shortly thereafter, Monsanto (now Bayer) purchased Asgrow, and Krone helped build a molecular marker lab across company functions, which is still operating today in Ankeny, Iowa.



In 1998, Krone made the jump to Pioneer (now Corteva) to become a high oil breeder in Champaign, Illinois. This took him back to his UMN roots of improving the nutritional quality of corn. The high oil market quickly dissipated in 2000. As a result, Krone shifted within Pioneer and moved his family back to Iowa, where he began a marker-assisted backcrossing program for Pioneer to aid in the introgression of biotech traits. Krone led backcrossing efforts in corn until 2008, when his entrepreneurial spirit led him to a start-up called Targeted Growth to breed crops for better biofuel production. While this company was ahead of its time and a pioneer in this area, like many pioneers, they were in the right place at the wrong time and closed their doors shortly thereafter.

Upon returning to Pioneer in 2009, Krone led trait development efforts for insect control. In 2012, he expanded his scope to senior director of trait characterization and development and led all biotech trait development across all crops. In 2015, Krone's entrepreneurial itch motivated him to begin a startup called PowerPollen, a company that aims to improve crop productivity by enabling superior pollination systems. After more than eight years of operations, PowerPollen's focus on pollen preservation and handling has led to the licensing of its patents to several major seed companies to improve hybrid seed production for corn. Pollen preservation for rice and wheat hybrid seed production is in development and will likely commercialize in three to four years. Krone is most excited about the ability to deliver value-added traits to a farmer's field via pollen. This technology leverages male sterility and xenia to improve farmers' income. Traits are delivered to a corn farmer's fields via pollen, enabling farmers to pivot their products during pollination based on market signals, differentiating from a commodity crop to a higher value crop.

Krone fondly recalls his time at the U as one of the best of his life and critical in forming his scientific and professional skills. Professor Phillips profoundly influenced him and imparted a love of science and discovery. Every job he has held throughout his career has heavily engaged in and relied on knowledge, skills, and habits developed in and around Borlaug Hall. He and his wife, Jackie, have been married for 33 years and have raised four children since leaving the U in 1994. They are now empty nesters and are open to opportunities for ways to help and/or serve the ag community, the U, and the Department of Agronomy and Plant Genetics.



**Agronomy
and Plant
Genetics**

Celebrating Success

Congratulations to student, faculty, and staff award winners, and a special farewell to department veteran Gail Nelson.

BEST WISHES, GAIL!



On January 2, Gail Nelson, executive office and administrative specialist, retired from the University of Minnesota. Nelson worked on the administrative team in various roles for the Department of Agronomy and Plant Genetics for the last 25 years, beginning in 1998 after transferring from the Carlson School, where she began in 1987. In retirement, Nelson plans to spend time with friends and family and enjoy time on her land in northern Minnesota with her husband. Please join us in wishing Gail Nelson well and thanking her for **36 years of service** at the University!



FALL AWARD WINNERS



Name	Award
GRADUATE STUDENTS	
Mjay Espina	Doctoral Dissertation Fellowship, University of Minnesota Graduate School
Navjot Singh	First-place poster award for "Profile and Patterns of Herbicide Resistance in Waterhemp in Minnesota," at the 2023 North Central Weed Science Society Conference
Eric Yu	Second-place poster award for "Emergence Periodicity of Six Weed Species as Impacted by Cereal Rye Cover Crop" at the 2023 North Central Weed Science Society Conference
FACULTY	
Walid Sadok	Senior Fellow, Collegium Helveticum
Walid Sadok	Co-Chair of the 2024 Gordon Research Conference on Multiscale Plant Vascular Biology
Kevin Smith	Fellow, Crop Science Society of America
STAFF/POST-DOCS	
Charlotte Brault	Second place in the postdoctoral poster competition, U.S. Wheat and Barley Scab Initiative
Adenike Ige	Third place in the postdoctoral research poster competition at the 2023 National Fusarium Head Blight Forum, the U.S. Wheat and Barley Scab Initiative