College of Agricultural, Consumer & Environmental Sciences
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

What we do & Why it matters

Crop Sciences | cropsciences.illinois.edu

The Department of Crop Sciences advances agriculture through local and international research to increase food security while protecting the environment. Our internationally recognized faculty lead cutting-edge research programs that educate the next generation of agricultural professionals.

LISA AINSWORTH (C.A. Ewing Chair of Crop Physiology and Professor)

Dr. Ainsworth applies physiological, biochemical, and genomic tools to understand the mechanisms of plant responses to global environmental changes, including rising atmospheric carbon dioxide concentration and increasing ozone pollution.

JUAN DAVID ARBELAEZ-VELEZ (Assistant Professor)

Dr. Arbelaez-Velez focuses on the genetics and breeding of internationally important crops like rice and oats to diversify the regional agricultural system and support agricultural productivity in developing nations.

KACIE ATHEY (Assistant Professor)

Dr. Athey contributes to the understanding of non-chemical insect control within specialty crop systems. Her research combines field research with molecular gut content analysis to study practical insect control applications and arthropod food webs.

MOHAMMAD BABADOOST (Professor)

Dr. Babadoost develops solutions for vegetable and fruit crop diseases. He is internationally renowned for identifying effective disease management strategies for cucurbits, tomatoes, peppers, horseradish, basil, and apples. He also educates scientists in developing countries to improve production and quality of food crops.

TALON BECKER (Adjunct Assistant Professor)

Dr. Becker works with farmers, researchers, and other ag stakeholders to facilitate statewide agricultural research and outreach. He works to share research findings and gather input from stakeholders to better identify and advance economically and environmentally sustainable agricultural practices.

FRED BELOW (Professor)

Dr. Below creates strategies to teach farmers and agricultural professionals the value of crop management decisions and develops systems to sustainably produce high-yielding corn and soybeans. He evaluates environmental, genetic, and management factors that impact the productivity of corn and soybeans.

GEVAN BEHNKE (Lecturer)

Dr. Behnke analyzes agronomic practices and their impact on the environment, nutrient cycling, crop productivity, and sustainability. He teaches courses on these topics, along with cannabis management and flower production. Additionally, he coordinates the online Master's and certificate programs.

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CARL BERNACCHI (Professor)

Dr. Bernacchi conducts research on the impacts of atmospheric and climatic change on crop species in the Midwest. He develops strategies to increase food production, maximize sustainability, and minimize environmental impacts in light of these changes.

MARTIN BOHN (Professor)

Dr. Bohn breeds corn lines that contribute to economically efficient and sustainable, high-yielding production. He studies the genetic basis of biotic and abiotic stress responses, root development, and grain processing characteristics of corn using innovative, high-throughput phenotyping tools and genomic information.

GUSTAVO CAETANO-ANOLLÉS (Professor)

Dr. Caetano-Anollés explores molecular diversity and how molecular structure determines biological function in plants, animals, fungi, and microbes of significance to agriculture. He studies the origin, structure, and evolution of genomes, proteomes, RNomes, and functionomes for applications including bioengineering, biomedicine, and systems biology.

BORIS CAMILETTI (Assistant Professor)

Dr. Camiletti and his team at the Smart Plant Pathology lab study the biology and epidemiology of diseases affecting soybean, corn, and wheat, developing innovative and sustainable management strategies. Utilizing nanotechnology, remote sensing, and molecular tools, his team advances plant disease management. Dr. Camiletti's team has also pioneered the use of drone spraying technology in their efforts to combat plant diseases in Illinois. Committed to extension services, he ensures that their research benefits farmers, stakeholders, and the scientific community. By fostering collaboration and translating discoveries into practical solutions, the Smart Plant Pathology lab enhances crop health and productivity, striving for a sustainable agricultural future.

STEVE CLOUGH (USDA-ARS)

Dr. Clough is known internationally for his work on Arabidopsis transformation. His main research focus is on the use of genomics and molecular biology to explore plant-microbe and plant-pest interactions, mainly in soybean. His work improves our understanding of plant defense biology and identifies soybean genes affecting defense.

ADAM DAVIS (Professor and Department Head)

Dr. Davis uses innovative modeling tools to identify and test new management strategies to make cropping systems more productive, profitable, and environmentally friendly. His research on integrated weed management provides farmers tools to reduce their reliance on herbicides. His group's data-mining and statistical analyses present new ways for farmers to improve yield resilience in a changing climate.

ELHAN ERSOZ (Clinical Assistant Professor)

Dr. Ersoz's research identifies sustainable and cost-effective best management practices for farmers through systems-scale computer modeling of agricultural production systems, as well as technology and policy proposals.

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AARON HAGER (Professor and Faculty Extension Specialist)

Dr. Hager contributes to increased crop production through development and implementation of integrated weed management programs. His research helps to identify and manage herbicide-resistance in the most aggressive agronomic weeds.

EMILY HEATON (Professor)

Dr. Heaton connects science with practice to incorporate perennial biomass crops into temperate cropping systems. She does this through the lens of regenerative agriculture, using combined field-modeling approaches to identify tactics that improve environmental and social outcomes in the US Midwest. An international expert, Heaton helps growers use the giant grass miscanthus for a range of bioproducts and ecosystem services.

SARAH HIND (Assistant Professor)

Dr. Hind examines how the plant immune system detects pathogenic bacteria that cause diseases on tomato and other vegetable crops. Her research contributes to the understanding of plant-microbe interactions and aids in the development of plants with enhanced resistance to infection.

MATTHEW HUDSON (Professor)

Dr. Hudson uses supercomputing and DNA sequencing to solve problems in plant, animal, and human genetics. His current research focuses on how crops are bred and on ways to treat and prevent plant, animal, and human diseases. He is particularly interested in the genetics of crop traits and the genetic and molecular interactions of soybeans with pathogens, pests, and other organisms.

TIFFANY JAMANN (Associate Professor)

Dr. Jamann decreases losses caused by corn diseases by studying plant host resistance. Her research provides the foundation for the deployment of host resistance as an effective disease management strategy that will provide long-term solutions to corn producers and industry.

JOHN JONES (Assistant Professor)

Dr. Jones develops tactics to better measure, monitor, and manage nutrients in Illinois and North Central U.S. cropping systems. His research and outreach efforts focus on profitable and sustainable nutrient use efficiency and reduce losses from croplands. His emphasis is on fertilizer and soil management, soil and plant analysis, precision agriculture technologies, and minimizing nitrogen and phosphorous management impacts on water quality.

JACK JUVIK (Professor)

Dr. Juvik enhances food nutritional quality while reducing the incidence of cancer, heart disease, macular degeneration, obesity, and other degenerative diseases in his plant breeding program, which focuses on the development of brassica vegetable germplasm (broccoli, cabbage, cauliflower, and kale) with improved flavor and health properties. He investigates the genetics controlling the biosynthesis of health-promoting phytochemicals in these vegetables.

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ISSAC KLIMASMITH (Lecturer)

Dr. Klimasmith designs and teaches mathematics and statistics courses specifically for crop science students. He aims to make quantitative instruction accessible, engaging, and discipline-specific to ensure that all students can participate in data analysis and research.

KRIS LAMBERT (Associate Professor)

Dr. Lambert develops sustainable strategies to manage plant nematodes. He studies the molecular and biochemical basis of plant-nematode interactions in order to determine how plant parasitic nematodes evade plant resistance mechanisms.

D.K. LEE (Cavanah Chair and Professor)

Dr. Lee improves perennial grass production systems for sustainable biomass and bioenergy feedstocks. His research focuses on increasing genetic and abiotic stress tolerances of perennial grasses. He finds new ways to integrate perennial grasses into row cropping systems to improve sustainability, ecosystem services, and water quality.

ALEXANDER LIPKA (Associate Professor)

Dr. Lipka accelerates the development of high-performing crops by identifying specific DNA regions associated with agronomically important traits. He uses statistical approaches for quantitative genetic analyses in crops.

ANDREW MARGENOT (Associate Professor)

Dr. Margenot addresses the literal foundation of all cropping systems: soils. He advances how we monitor and manage soils as natural capital. His research team evaluates how human activities can enhance or compromise soil services to human societies, with an emphasis on food security from urban and rural agroecosystems in the U.S. Midwest and East Africa.

NICOLAS MARTIN (Associate Professor)

Dr. Martin improves long-term profitability and stability of cropping systems by exploring applications of quantitative methods on big data. He leverages interdisciplinary efforts to expand the frontiers of agricultural research; investigates quantitative methods on processes at multiple spatial and temporal scales; and studies effective approaches to implement new insights and discoveries in agricultural decisions and operations.

JACK MCCOY (Lecturer)

Dr. McCoy utilizes the classroom and the Sustainable Student Farm as a living laboratory for discipline-based education research to improve horticultural pedagogy. His program emphasizes accessible, student-centered education and undergraduate research training in horticultural food systems. He teaches courses primarily focused on small-scale, diversified, urban, and local food production.

SANTIAGO MIDEROS (Associate Professor)

Dr. Mideros studies fungal and oomycete plant pathogens. Based on genetic information from the host and the pathogen, he develops tools for precision management of diseases of field crops.

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ELIANA MONTEVERDE (Assistant Professor)

Dr. Monteverde's breeding program is dedicated to developing and releasing high-yielding commodity and specialty soybean varieties that meet the evolving needs of farmers, processors, and consumers. Through cutting-edge research and innovative breeding methods, she strives to enhance yield potential, seed composition, and overall crop performance.

STEPHEN MOOSE (Alexander Professor)

Dr. Moose discovers genes that influence corn and related bioenergy grasses' response to nitrogen supply. He develops new approaches to increase crop yields with lower input costs and helps mitigate environmental issues associated with nitrogen fertilizer. His work reveals how genes cooperate to control plant traits important to both productivity and nutritional quality.

BIN PENG (Assistant Professor)

Dr. Peng is deeply motivated to drive transdisciplinary, convergence, and use-inspired research for breaking new ground in sustaining agricultural production and environmental quality. He is passionate about developing innovative technologies and systems solutions in digital agriculture and precision conservation to foster sustainable agri-food systems and preserve healthy watersheds amidst the pressures of land use intensification and climate change. The driving force behind his research pursuits lies in addressing critical societal issues, including ensuring water, food, and energy security, enhancing water quality and environmental sustainability, and nurturing rural economies and human well-being in both the United States and across the globe.

GIOVANI PREZA FONTES (Assistant Professor)

Dr. Preza Fontes tackles key challenges in crop production by seeking ways to enhance both the agronomic and environmental performance of high-yielding corn and soybean systems. Using an interdisciplinary approach, he studies how conservation practices like cover crops, conservation tillage, and 4R nutrient stewardship influence crop yields, soil health, water quality, and greenhouse gas emissions. His findings are then shared through Extension programs.

AMIT RAI (Assistant Professor)

Dr. Amit Rai investigates how phytochemicals enhance plant resilience to pathogens, environmental stress, and climate change using high-resolution mass spectrometry and spatial metabolomics. His research aims to develop new strategies for developing disease-resistant crop varieties, nutrient-dense foods, and sustainable farming.

DEAN RIECHERS (Professor)

Dr. Riechers investigates how plants respond and adapt to stress caused by herbicides. He explains herbicide-resistance mechanisms and describes herbicide safener mode of action by discovering new genes and proteins that rapidly detoxify herbicides. His work leads to an increased margin of selectivity between cereal crops and difficult-to-control weeds.

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CHANCE RIGGINS (Research Assistant Professor)

Dr. Riggins conducts interdisciplinary research on wild, weedy, and cultivated plants to understand adaptive evolution in natural and agricultural environments. Exploring plant uses and novel applications of plant natural products is another theme of his work. As curator of the Crop Evolution Lab Herbarium, which documents agricultural biodiversity, crop-wild relative genetic diversity, and allied biocultural knowledge, Dr. Riggins also passionately advocates for raising awareness of where our botanical products come from and why it matters.

JESSICA RUTKOSKI (Assistant Professor)

Dr. Rutkoski puts the principles and techniques of quantitative genetics and statistics to use in applied plant breeding to accelerate genetic progress in ways that benefit people and the environment. Her work is making winter wheat more profitable for farmers in the North Central Midwest to promote cropping system diversity and ultimately, environmental sustainability.

MARTIN SACHS (USDA-ARS)

Dr. Sachs directs the Maize Genetics Cooperation Stock Center, a collection of maize mutants used in global research. He also analyzes flooding-related stress responses in maize. His research develops new strategies for improving crop tolerance to oxygen deprivation and ultimately increases crop productivity.

ERIK SACKS (Professor)

Dr. Sacks studies the genetics of rice, miscanthus, and sugarcane to facilitate the breeding of improved cultivars that address critical societal needs, such as the sustainable production of food, fiber, and energy. By identifying genes that confer tolerance to environmental stresses, such as cold, heat, or salt, and resistance to diseases and pests, he allows farmers to do more with less by reducing the risks and costs of production.

JAMES SANTIAGO (Assistant Professor)

Dr. Santiago conducts research on the effects of high-temperature stress on flowers of field-grown specialty crops and on improving vegetable production indoors, such as greenhouses and vertical farms. He also develops and integrates sustainable solutions to increase indoor and outdoor horticultural crop production.

NATHAN SCHROEDER (Associate Professor)

Dr. Schroeder makes new discoveries on the biology of nematodes, one of the world's most abundant groups of animals. His work identifies how nematodes survive difficult environmental conditions, which helps control parasitic nematodes, and reveals how higher animals like humans deal with stress.

NICHOLAS SEITER (Research Assistant Professor)

Dr. Seiter develops and evaluates management strategies for insect pests of field crops. His research includes developing economic decision-making tools, identifying natural enemies of insect pests, and assessing insect control methods for their effectiveness and fit within management systems. His overall goal is to provide management recommendations that improve the economic returns and environmental profile of insect management practices.

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CONNOR SIBLE (Research Assistant Professor)

Dr. Sible's research program focuses on understanding how agronomic practices influence the plant-microbiome interactions that drive nutrient cycling and crop productivity. He then uses applied field research to manage those interactions into high-yielding and resilient crop production systems to help farmers improve their yields, reduce risks, and ensure long-term profitability.

ANTHONY STUDER (Associate Professor)

Dr. Studer improves the efficiency and productivity of cereal crops by optimizing photosynthesis and water use. His research helps develop crops that are resilient to climate change and meet the needs of growers at the regional, national, and international levels.

ANDREA FABER TAYLOR (Teaching Associate Professor)

Dr. Faber Taylor examines the effects of green schoolyards and gardens on child development. She advances our understanding of the importance of greenspace in supporting health and well-being and future stewardship of the Earth. She teaches courses on this topic, sustainable horticulture, home gardening, and planting design to support pollinators.

PATRICK TRANEL (Ainsworth Professor)

Dr. Tranel uses molecular and genomic approaches to investigate how weeds evolve in response to farmers' attempts to manage them. His work aids in the development of effective, sustainable weed management systems.

MARÍA VILLAMIL (Professor)

Dr. Villamil identifies management strategies to improve soil health and productivity in agroecosystems by addressing the societal challenge of sustainable food production. She focuses on how changes in soil health brought about by agronomic practices relate to carbon and nutrient cycling, crop production, and mitigation of greenhouse gas emissions.

MARTY WILLIAMS (USDA-ARS)

Dr. Williams helps growers sustainably produce affordable and nutritious vegetables for consumers. He is an international leader in framing high-caliber research, explaining critical problems in weed management and crop production, and delivering solutions to the vegetable seed and processing industries in the U.S. and beyond.