

Plant Sciences/Horticulture

Department Information

- **Department Head:**
Richard Horsley, Ph.D.
- **Graduate Coordinator:**
Edward Deckard, Ph.D.
- **Department Location:**
166 Loftsgard Hall
- **Department Phone:**
(701) 231-7971
- **Department Web Site:**
www.ag.ndsu.edu/plantsciences/ (<http://www.ag.ndsu.edu/plantsciences/>)
- **Application Deadline:**
International applications are due May 1 for fall and October 1 for spring. Domestic applicants should apply at least one month prior to the start of classes.
- **Credential Offered:**
Ph.D. (Plant Sciences only), M.S.
- **English Proficiency Requirements:**
TOEFL iBT 71, IELTS 6; Duolingo 100

The Department of Plant Sciences offers graduate studies leading to the Master of Science (M.S.) degrees in Cereal Science, Plant Sciences, and Horticulture, and to a Doctor of Philosophy (Ph.D.) degree in Cereal Science or Plant Sciences, with an optional program of emphasis in Plant Breeding and Genetics. Specialized academic and research training in Plant Sciences is available in plant breeding and genetics, weed science, biotechnology, and field and forage crop production and management. Areas of specialization in Horticulture include breeding and genetics, biotechnology, physiology, propagation, sports and urban turf grass management, and production and management of horticultural crops such as woody plants, potatoes, vegetables, and herbaceous ornamentals. Areas of specialization in Cereal Science may involve research in the areas of carbohydrates, enzymes, legumes and other northern-grown crops, barley malting and brewing, wheat milling, baking, and pasta processing. Each study area is designed to provide students with comprehension of the discipline and of relevant regional and global-community social issues.

The Department of Plant Sciences is located in Loftsgard Hall, which provides a state-of-the-art facility for interdisciplinary research in plant sciences, ranging from basic studies and biotechnology to the more traditional applied areas. Facilities for cereal science research are located in Harris Hall. These facilities include analytical laboratories for grain quality research, baking, milling, malting and brewing, and pasta and noodle processing. State-of-the-art greenhouses and extensive growth chamber facilities are also available, as are 100 acres of field research land adjacent to the Plant Science Complex. An additional 500 acres of research land are located near the North Dakota State University campus. A horticultural farm only 25 miles west of campus has an extensive arboretum. Excellent supporting disciplines located nearby, or in the Plant Science Complex, include Soil Science, Botany, Biochemistry and Molecular Biology, Entomology, and Plant Pathology. The Department of Plant Sciences encourages interdisciplinary research and students frequently tailor their research program to meet their interests by working with faculty in one or more of the supporting disciplines.

Graduate student numbers per faculty member are limited, so the student gets adequate personal attention and works closely with their adviser in research. Final selection of the adviser will be made on the basis of the student's interest, availability of space in the researcher's laboratory, and a common desire of the student and professor to work together.

The Department of Plant Sciences graduate programs are open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full status to the program, the applicant must meet Graduate School and department admission requirements.

Financial Assistance

Graduate research assistantships (half-time) are provided on a competitive basis based on scholarship and potential to undertake advanced study and research. The information provided within the application to Graduate School is used to assign available assistantships to applicants. The annual stipend varies based on the research project. In addition to the stipend, graduate assistants who meet the hours worked requirement each semester receive a graduate tuition waiver. Students are responsible for differential tuition, student fees, and tuition for non-graduate level credits taken or Cooperative Education credits.

A limited number of graduate fellowships are available.

The Department of Plant Sciences has numerous annual scholarships of \$500 to \$1000 each for outstanding Plant Sciences graduate students.

For each M.S. or Ph.D. student, a plan of study that meets disciplinary requirements and the needs of the student will be developed in the first year. The faculty adviser and other members of the student's supervisory and examining committee assist in developing of the plan of study as well as the student's research plan.

Master's Program

The M.S. Plan A Thesis Option program requires completion of at least 30 credits, including 10 credits PLSC 798 Master's Thesis. The M.S. Plan B Comprehensive Study Option program requires completion of at least 30 credits, including 3 credits of a PLSC 797 Master's Paper. Both Plan A and Plan B further require an oral examination of academics related to the discipline and the research-based thesis as well as a public Exit Seminar discussing their thesis work. M.S. students generally satisfy all requirements within two years.

Code	Title	Credits
M.S. Plan A - Thesis Option		30
Didactic credits including **		16
PLSC 724	Field Design I	
Students focusing on Plant Breeding and Genetics must take and earn a B or better in		
PLSC 631	Intermediate Genetics	
PLSC 718	Genetics & Plant Improvement	
Additional 600-700 level courses		3
PLSC 790	Graduate Seminar	1
PLSC 798	Master's Thesis	10

Code	Title	Credits
M.S. Plan B - Master's Paper Option		30
Didactic credits including **		21
PLSC 724	Field Design I (or equivalent)	
Additional 600-700 level courses		5
PLSC 790	Graduate Seminar	1
PLSC 797	Master's Paper	3

** Didactic credits are graduate courses numbered 601-689, 691; 700-789, 791; and 800-889, 891.

Doctoral Program

The Ph.D. program requires completion of at least 90 credits; this may include 30 credits from a previously earned M.S. degree (Thesis Option). A Plant Breeding and Genetics subplan is available for doctoral students wishing to complete specific coursework.

All Ph.D. students are required to participate in two instances of PLSC 892 Graduate Teaching Experience (one credit each), two instances of PLSC 790 Graduate Seminar (one credit each), and 20 research credits (PLSC 899 Doctoral Dissertation). A preliminary written and oral examination of academics related to the discipline must be passed to progress to Ph.D. candidacy. Further, a final oral examination of academics related to the discipline and the research-based dissertation, as well as a public Exit Seminar discussing their dissertation work, are required. Ph.D. candidates with a previously earned Master's degree generally require three additional years to satisfy Ph.D. requirements.

Code	Title	Credits
M.S. (thesis option) to Ph.D.		60
Didactic credits including **		15
PLSC 724	Field Design I (if not part of M.S. Must earn B or better)	
Students focusing on Plant Breeding and Genetics must take and earn a B or better in		
PLSC 611	Genomics	
PLSC 631	Intermediate Genetics	
PLSC 718	Genetics & Plant Improvement	
Additional 600-700 level courses		21
PLSC 790	Graduate Seminar	2
PLSC 892	Graduate Teaching Experience	2
PLSC 899	Doctoral Dissertation	20

Code	Title	Credits
M.S. (thesis option) to Ph.D. - Plant Breeding and Genetics Option		60
600 - 800 level graduate courses including:		36
PLSC 611	Genomics	
PLSC 631	Intermediate Genetics	
PLSC 718	Genetics & Plant Improvement	
PLSC 724	Field Design I (if not part of master's degree)	
PLSC 731	Plant Molecular Genetics	
PLSC 751	Advanced Plant Genetics	
PLSC 776	Advanced Plant Breeding	
PLSC 782	Population and Quantitative Genetics	
PLSC 790	Graduate Seminar	2
PLSC 892	Graduate Teaching Experience	2
PLSC 899	Doctoral Dissertation	20

** Didactic credits are graduate courses numbered 601-689, 691; 700-789, 791; and 800-889, 891.

Faculty

Nonoy Bandillo, Ph.D.

University of Nebraska-Lincoln, 2016

Research Interests: Pulse Breeding, Genetics

Marisol Berti, Ph.D.

North Dakota State University, 2007

Research Interests: Forage and Biomass Crop Production

Bingcan Chen, Ph.D.

University of Massachusetts, 2012

Research Interests: Cereal and Food Chemistry

Michael J. Christoffers, Ph.D.

University of Missouri-Columbia, 1998

Research Interests: Weed Science/Genetics

David Wenhao Dai, Ph.D.

North Dakota State University, 2001

Research Interests: Woody Plant Physiology, Biotechnology

Edward L. Deckard, Ph.D.

University of Illinois, 1970

Research Interests: Crop Physiology

Elias M. Elias, Ph.D.

North Dakota State University, 1987

Research Interests: Durum Wheat Breeding, Genetics

Greta Gramig, Ph.D.

University of Wisconsin-Madison

Research Interests: Weed Biology and Ecology

Andrew J. Green, Ph.D.

Kansas State University, 2016

Research Interests: Hard Red Spring Wheat, Genetics

Harlene Hatterman-Valenti, Ph.D.

Iowa State University, 1993

Research Interests: High-Value Crop Production

Richard D. Horsley, Ph.D.

North Dakota State University, 1988

Research Interests: Barley Breeding, Genetics

Kirk A. Howatt, Ph.D.

Colorado State University, 1999

Research Interests: Weed Science, Annual Weeds

Joseph Ikley, Ph.D.

Purdue University, 2018

Research Interests: Weed Control

Burton L. Johnson, Ph.D.

North Dakota State University, 1993

Research Interests: Crop Production

Thomas J. Kalb, Ph.D.

Virginia Polytechnic Institute & State University, 1988

Research Interests: Extension Horticulture

Herman J. Kandel, Ph.D.

North Dakota State University, 1995

Research Interests: Crop Production

Chiwon W. Lee, Ph.D.

Purdue University, 1977

Research Interests: Vegetables, Floriculture, Biotechnology

Deying M. Li, Ph.D.

Iowa State University, 2001

Research Interests: Sports Turf Management

Xuehui Li, Ph.D.

University of Georgia, 2009

Research Interests: Statistical Genomics

Frank A. Manthey, Ph.D.

North Dakota State University, 1985

Research Interests: Durum Wheat Quality, Pasta/Noodle Processing

G. Francois Marais, Ph.D.

North Dakota State University, 1979

University of Stellenbosch, 1992

Research Interests: Hard Red Winter Wheat Breeding, Genetics

Phillip E. McClean, Ph.D.

Colorado State University, 1982

Research Interests: Dry Bean Genetics, Biotechnology

Esther E. McGinnis

University of Minnesota, 2013

Research Interests: Extension Horticulture, Native Plants, Perennial Hardiness, Floriculture

Michael S. McMullen, Ph.D.

University of Minnesota, 1976

Research Interests: Oat Breeding, Genetics

Carrie Miranda, Ph.D.

University of Missouri, 2018

Research Interests: Soybean Breeding, Molecular Genetics

Rebekah Oliver, Ph.D.

North Dakota State University, 2006

Research Interests: Genetics

Juan Osorno, Ph.D.

North Dakota State University, 2006

Research Interests: Dry Edible Bean Breeding

Thomas Peters, Ph.D.

North Dakota State University, 1990

Research Interests: Sugarbeet Agronomy, Weed Science

Mukhlesur Rahman, Ph.D.

University of Manitoba, 2007

Research Interests: Canola Breeding

Jiajia Rao, Ph.D.

University of Massachusetts, 2013

Research Interests: Food Chemistry, Ingredient Technology

Andy Robinson, Ph.D.

Purdue University, 2012

Research Interests: Potato Production

Kalidas Shetty, Ph.D.

University of Idaho, 1989

Research Interests: Food Safety

Asunta L. Thompson, Ph.D.

University of Idaho, 1998

Research Interests: Potato Breeding

Anuradha Vegi, Ph.D.

North Dakota State University, 2008

Research Interests: Teaching Techniques

Todd West, Ph.D.

Southern Illinois University, 2004

Research Interests: Woody Plant Improvement

Qi Zhang, Ph.D.

Kansas State University, 2007

Research Interests: Turfgrass Stress Physiology

Alan J. Zuk, Ph.D.

Kansas State University, 2005

Research Interests: Sports and Urban Turfgrass Management

Adjunct and Affiliate

James V. Anderson, Ph.D.

Virginia Polytech Institute, 1990

Research Interests: Plant Biochemistry

James Beaver, Ph.D.

University of Illinois, 1980

Research Interests: Dry Bean Genetics

David Bonnett, Ph.D.

University of Sydney, 1997

Research Interests: Wheat Breeding

Patrick M. Carr, Ph.D.

Montana State University, 1989

Research Interests: Sustainable Agriculture

Wun Shaw Chao, Ph.D.

University of California-Davis, 1996

Research Interests: Perennial Weeds

Munevver Dogramaci, Ph.D.

Cukurova University/North Dakota State University, 2000

Research Interests: Sugarbeet and Potato Research

Linda Dykes, Ph.D.

Texas A&M University, 2008

Research Interests: Food Science and Technology

Justin D. Faris, Ph.D.

Kansas State University, 1999

Research Interests: Wheat Molecular Genetics

Jason Fiedler, Ph.D.

Scripps Research Institute, 2012

Research Interests: Cereal Crop Genetics

Shana M. Forster, Ph.D.

North Dakota State University, 2017

Research Interests: Crop Production

Jose G. Franco, Jr., Ph.D.

Texas A&M University, 2015

Research Interests: Agroecology, Sustainable Food Systems

Karen L. Fugate, Ph.D.

Ohio State University, 1995

Research Interests: Sugarbeet Physiology

Russell Gesch, Ph.D.

Texas A&M University, 1995

Research Interests: Physiology of Oilseed Crops

Salvador Alejandro Gezan, Ph.D.

University of Florida, 2005

Research Interests: Statistic and Quantitative Genetics

Michael Grusak, Ph.D.

University of California-Davis, 1985

Research Interests: Crop Nutrient Quality

Yong Q. Gu, Ph.D.

University of California, Riverside, 1994

Research Interests: Wheat Genetics

Darrin Haagenson, Ph.D.

Purdue University, 2001

Research Interests: Crop Physiology and Ecology

David P. Horvath, Ph.D.

Michigan State University, 1993

Research Interests: Perennial Weed Physiology

Brent Hulke, Ph.D.

University of Minnesota, 2007

Research Interests: Flax and Sunflower Genetics

Brian Jenks, Ph.D.

University of Nebraska, Lincoln, 1996

Research Interests: Integrated Weed Management

Blaine Johnson, Ph.D.

University of Nebraska, 1986

Research Interests: Quantitative Genetics

Edward C. Lulai, Ph.D.

North Dakota State University, 1978

Research Interests: Potato Physiology

Kevin McPhee, Ph.D.

University of Idaho, 1995

Research Interests: Pulse Crops

Grant Mehring, Ph.D.

North Dakota State University, 2016

Research Interests: Agronomy; Wheat and Corn Research

Mohamed Mergoum, Ph.D.

Colorado State University, 1991

Research Interests: Hard Red Spring Wheat Breeding

Jae-Bom Ohm, Ph.D.

Kansas State University, 1996

Research Interests: Grain Science

Michael Ostlie, Ph.D.

Colorado State University, 2012

Research Interests: Weed Science

Timothy Porch, Ph.D.

Cornell University, 2012

Research Interests: Dry Bean Breeding and Genetics

Gautam Pradhan, Ph.D.

Kansas State University, 2011

Research Interests: Crop Physiology

Lili Qi, Ph.D.

Nanjing Agricultural University, 1997

Research Interests: Wheat Genetics

Calvin Trostle, Ph.D.

Texas A&M, 1996

Research Interests: Row Crops, Peanut, Alfalfa

Gerald J. Seiler, Ph.D.

North Dakota State University, 1980

Research Interests: Sunflower and Sugarbeet Germplasm

Thomas Walk, Ph.D.

Pennsylvania State University, 2005

Research Interests: Plant Physiology, Statistics

Jochum Wiersma, Ph.D.

University of Minnesota, 1995

Research Interests: Small Grains

Steven S. Xu, Ph.D.

North Dakota State University, 1994

Research Interests: Hard Red Spring Wheat Development

Shengming Yang, Ph.D.

North Dakota State University, 1994

Research Interests: Hard Red Spring Wheat Development