

Plant Sciences

Department Information

- **Department Head:**
Richard Horsley, Ph.D.
- **Graduate Coordinator:**
Marisol Berti, 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 must be completed with the Graduate School by October 1 for spring, March 1 for summer, and May 1 for fall. • Domestic applications should be completed with the Graduate School at least 2 months prior to the start of classes.
- **Credential Offered:**
Ph.D., M.S.
- **English Proficiency Requirements:**
TOEFL iBT 71, IELTS 6; Duolingo 105

The Department of Plant Sciences offers specialized academic and research training in plant breeding and genetics, weed science, biotechnology, and field and forage crop production and management leading to the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Plant Science with an optional Ph.D. subplan in Plant Breeding and Genetics.

The programs are designed for students looking for a full-time, hands-on research experience in state-of-the-art laboratories and field plots across the state. The Dalrymple Research Greenhouse, extensive growth chamber facilities, and 600 acres of field research land located near the North Dakota State University campus allow our faculty and research technicians to build a program unlike any other in the region.

NDSU College of Agriculture, Food Systems, and Natural Resources has a newly opened (June 2024) 85 million-dollar Peltier Complex to enhance collaborative work with such agricultural programs as Cereal Science without stepping outside. Excellent supporting coursework is offered just steps away from our home building, Loftsgard Hall, in animal sciences, biology, genomics/bioinformatics, microbiology, plant pathology, school of natural resources (entomology, range science, soils) and statistics. Our open curriculum guidelines allow students to tailor their academic and research programs to meet their interests and achieve their career goals.

Graduate student numbers per faculty member are limited, so the student gets adequate personal attention and works closely with their advisor in research. Final selection of the advisor 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.

Admission Requirements

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

B.S. to M.S. and M.S. to Ph.D. Eligibility:

For program admission requirements visit <https://www.ndsu.edu/gradschool/apply> (<https://www.ndsu.edu/gradschool/apply/>)

B.S. to Ph.D. Eligibility:

For admission requirements visit <https://www.ndsu.edu/gradschool/apply> (<https://www.ndsu.edu/gradschool/apply/>)

Additionally, for the B.S. to Ph.D. in Plant Sciences, at the time of application, the applicant must:

- Have or be working toward a B.S. degree in the same or a closely-related field
- Have a cumulative GPA of 3.70 or greater

Applicants interested in the B.S. to Ph.D. track must:

- Use the Statement of Purpose portion of the application to succinctly describe qualifications for applying to the Ph.D. program as an undergraduate student, including describing preparation for an advanced degree in the chosen area of study and detailing a focused research interest

- Use the Statement of Purpose to identify a Department of Plant Sciences faculty member who has shown definite, written interest in serving as advisor and providing financial and academic support of Ph.D. studies
- Support the Statement of Purpose with a CV listing previous academic and research experiences
- Request three letters of support to accompany the application, two of which will be written by persons able to specifically provide support of the student's potential to complete a Ph.D. program and why the B.S. to Ph.D. track is warranted

Financial Assistance

Correspondence with one or more departmental faculty members before and during the application process is not compulsorily but is encouraged. Applicants will not be considered without a department faculty member who has agreed to serve as the major advisor and can offer a Graduate Research Assistantship (GRA). To read more about our research teams and find faculty contact information, please visit <https://www.ndsu.edu/agriculture/academics/academic-units/plant-sciences/research> (<https://www.ndsu.edu/agriculture/academics/academic-units/plant-sciences/research/>).

A twenty-hour (half-time) GRA is provided to each accepted M.S. and Ph.D. student based on scholarship and potential to undertake advanced study and research. The annual stipend varies based on the research project and will not be less than \$24,000 annually for a M.S. or \$28,000 annually for a Ph.D. position.

In addition to the stipend, graduate assistants who meet the hours worked and training requirements each semester receive a graduate tuition waiver. Students are responsible for differential tuition, student and course fees, and tuition for non-graduate level credits taken.

A limited number of Ph.D. Graduate Fellowships are available.

The Plant Science program has numerous annual scholarships ranging from \$400 to \$2,200 each for outstanding Plant Sciences graduate students.

Degree Requirements

In the first year, each M.S. or Ph.D. student, in conjunction with their advisor, will form a supervisory committee, create a plan of study that meets disciplinary requirements below as well the goals of the student, and develop a research proposal paper for submission to the department.

Master's Program

The M.S. program requires the completion of at least 30 credits, during which an overall GPA of 3.0 or better must be maintained. The M.S. degree may be earned by either of two options. The Plan A: Thesis Option emphasizes completion of a research project. The Plan B: Comprehensive Study Option requires more course work and instead of conducting research and presenting a thesis, the candidate presents a paper or papers to the supervisory committee, demonstrating ability for scholarly study and written expression.

Candidates working toward either Plan A or Plan B must pass an oral defense, present a public Exit Seminar on the thesis research or comprehensive study, and have their thesis/paper accepted by the Graduate School to complete the degree.

Code	Title	Credits
M.S. Plan A - Thesis Option		30
Required Courses		
PLSC 724	Field Design I	3
PLSC 790	Graduate Seminar	1
PLSC 798	Master's Thesis	10
Additional Credits (13 credits must be didactic**)		16
Students focusing on Plant Breeding and Genetics must take and earn a B or better in		
PLSC 718	Genetics & Plant Improvement	
PLSC 631	Intermediate Genetics	

Code	Title	Credits
M.S. Plan B - Master's Paper Option		30
PLSC 724	Field Design I	3
Additional 600-700 level courses (18 credits must be didactic**)		21
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, during which time an overall GPA of 3.0 or better must be maintained. A maximum of 20 doctoral dissertation credits may be used to fulfil the total credit requirement. A Plant Breeding and Genetics subplan is available for doctoral students wishing to complete specific coursework, as listed below. To become a Ph.D. candidate, students are required to pass preliminary written and oral examinations directed to academic subject matter. Degree completion follows an oral defense of the dissertation, public Exit Seminar, and acceptance of the dissertation by the Graduate School.

Master of Science Doctoral Track

Qualifying M.S. students accepted will be allowed to use 30 credits from their completed Master's degree toward the Ph.D., thereby completing at least 60 Ph.D. graduate credits rather than 90. No undergraduate courses (100-400) may be counted toward a Ph.D. degree.

Bachelor of Science Doctoral Track

Qualifying B.S. students accepted will be required to complete 90 graduate credits toward the Ph.D. degree. No undergraduate courses (100-400) may be counted toward a Ph.D. degree.

All B.S. to Ph.D. track students must create, defend, and submit a manuscript to a scientific journal by the end of their sixth semester (spring/fall). This manuscript may be used as a chapter in the dissertation.

Code	Title	Credits
M.S. (thesis option) to Ph.D.		60
Required Courses		
PLSC 724	Field Design I (if not part of M.S. Must earn B or better)	3
PLSC 790	Graduate Seminar	2
PLSC 892	Graduate Teaching Experience	2
PLSC 899	Doctoral Dissertation	20
Additional didactic credits ** (12 credits must be 700-level)		24
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 credits		9

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.

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

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

Shahidul Islam, Ph.D.

University of Western Australia, 2013

Research Interests: Grain End-use Quality of Hard Wheat

Zhao Jin, Ph.D.

Jiangnan University, 2014

Research Interests: Malting, Food Fermentation

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

Clair Keene, Ph.D.

Pennsylvania State University, 2015

Research Interests: Small Grain Agronomy

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

Zhikai Liang, Ph.D.

University of Nebraska-Lincoln, 2019

Research Interests: Multiomics of Wheat and Other Crops

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, Ph.D.

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

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

Minwei Xu, Ph.D.
North Dakota State University, 2019
Research Interests: Food Processing Technology

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

Craig Carlson, Ph.D.
Cornell University, 2018
Research Interests: Cereal Crops

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

Chenggen Chu, Ph.D.
North Dakota State University, 2008
Research Interests: Sugarbeet and Potato Research

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

Rajeev Gupta, Ph.D.
University of Cambridge, UK, 1997
Research Interests: Cereal Crops

Darrin Haagensohn, Ph.D.
Purdue University, 2001
Research Interests: Crop Physiology and Ecology

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

Audrey Kalil, Ph.D.
University of Wisconsin-Madison, 2015
Research Interests: Pulse Crops

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

Raj S. Nandety, Ph.D.
University of Delaware, 2011

Research Interests: Small Grains Genotyping

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

James Rogers, Ph.D.

Clemson University

Research Interests: Forage Crop Production

Gerald J. Seiler, Ph.D.

North Dakota State University, 1980

Research Interests: Sunflower and Sugarbeet Germplasm

Senay Simsek, Ph.D.

Purdue University, 2006

Research Interests: Cereal Chemistry and Technology

Brent Trela, Ph.D.

Suranaree University of Technology, Thailand, 2006

Research Interests: Viticulture, Enology

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