

# Plant Sciences/ Horticulture

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[www.ag.ndsu.edu/plantsciences/](http://www.ag.ndsu.edu/plantsciences/)

**Department Head:** Dr. Richard Horsley

**Graduate Coordinator:** Dr. Edward Deckard

**Program Location:** 166 Loftsgard Hall

**Telephone Number:** (701) 231-7971

**Degrees Offered:** Ph.D. (Plant Sciences only), M.S.

**Application Deadline:** International applications are due May 1st for Fall and August 1 for Spring. Domestic applicants should apply at least one month prior to the start of classes.

**Test Requirements:** GRE

**English Proficiency TOEFL** ibT 71

**Requirements:** IELTS 6

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## Program Description

The Department of Plant Sciences offers graduate studies leading to the M.S. degrees in Plant Sciences and Horticulture, and to a Ph.D. degree in Plant Sciences. Specialized academic and research training in Plant Sciences is available in plant breeding and genetics, weed science, biotechnology, field and forage crop production and management, and sports and urban turfgrass management. Areas of specialization in Horticulture and Forestry include breeding and genetics, biotechnology, physiology, propagation, 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 a comprehension of the discipline and of relevant regional and global-community social issues.

The Department of Plant Sciences is located in Loftsgard Hall, completed in 1991, with modern and well-equipped research laboratories, offices for faculty and graduate students, and classrooms. Loftsgard Hall, which is part of the Plant Science Complex, 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, Cereal and Food Sciences, 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. Not quite half of the graduate students are Ph.D. candidates.

## Admission Requirements

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 the Graduate School admission requirements.

Students who do not meet all requirements for admission, but show potential for successful graduate study, may be admitted under a conditional status. Evidence must be provided, showing that the applicant's potential is not adequately reflected by his/her record.

## Financial Assistance

Research assistantships (half-time) are provided on a competitive basis, usually based on scholarship and potential to undertake advanced study and research. As of the 2014-15 academic year, the annual stipend generally is \$17,000 for an M.S. candidate and \$18,200 for a Ph.D. candidate, but this may vary based on the research project. Graduate tuition is waived for all students with research assistantships. A limited number of graduate fellowships are available. The information provided for the application to the Graduate School is also used to assign available assistantships to applicants. The Department of Plant Sciences also has numerous annual scholarships of \$500 to \$1000 each for outstanding Plant Sciences graduate students.

The M.S. program (Thesis Option) requires completion of at least 30 credits; this includes 10 credits of thesis research. The Ph.D. program requires completion of at least 90 credits; this includes 30 credits for an earned M.S. degree (Thesis Option) and 20 additional research credits. For each M.S. or Ph.D. candidate, a plan of study will be developed in the first year that meets the disciplinary requirements as well as the individual needs of the student. The faculty adviser and other members of the student's supervisory/advisory and examining committee assist in developing of the plan of study as well as the student's research plan. An M.S. Program (Comprehensive Study Option) is also offered in Plant Sciences. This option requires completion of at least 30 credits, including 3 credits of a Master's Paper.

Candidates for the M.S. degree normally satisfy all requirements within a two-year period, and Ph.D. candidates normally require three additional years. For M.S. candidates, an oral examination of academics related to the discipline and the research-based thesis is required. The Ph.D. candidates are required to pass a preliminary written and oral examination of academics related to the discipline and a final oral defense of a research-based dissertation. A B.S. to Ph.D. program is permitted for students who meet higher admission requirements.

### Marisol Berti, Ph.D.

North Dakota State University, 2007

Research Interests: Forage and Biomass Crop Production

### Xiwen Cai, Ph.D.

Washington State University, 1998

Research Interests: Wheat Genetics

### Marcelo J. Carena, Ph.D.

Iowa State University, 1999

Research Interests: Corn Breeding

**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

**Kenneth F. Grafton, Ph.D.**

University of Missouri, 1980  
Research Interests: Dry Bean Breeding, Genetics

**Greta Gramig, Ph.D.**

University of Wisconsin-Madison  
Research Interests: Weed Biology and Ecology

**James J. Hammond, Ph.D.**

University of Nebraska, 1969  
Research Interests: Flax Breeding, Biometrics, Computer Programming

**Harlene Hatterman-Valenti, Ph.D.**

Iowa State University, 1993  
Research Interests: High-Value Crop Production

**Theodore C. Helms, Ph.D.**

Iowa State University, 1986  
Research Interests: Soybean Breeding, Genetics

**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

**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

**Rodney G. Lym, Ph.D.**

University of Wyoming, 1979

Research Interests: Weed Science/Perennial Weeds

**Frank A. Manthey, Ph.D.**

North Dakota State University, 1985  
Research Interests: Durum and Pasta Quality

**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

**Michael S. McMullen, Ph.D.**

University of Minnesota, 1976  
Research Interests: Oat Breeding, Genetics

**Kevin McPhee, Ph.D.**

University of Idaho, 1995  
Research Interests: Pulse Crop Breeding

**Mohamed Mergoum, Ph.D.**

Colorado State University, 1991  
Research Interests: Hard Red Spring Wheat Breeding

**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

**Mukhlesur Rahman, Ph.D.**

University of Manitoba, 2007  
Research Interests: Canola Breeding

**Joel K. Ransom, Ph.D.**

University of Minnesota, 1982  
Research Interests: Small Grains

**Andy Robinson, Ph.D.**

Purdue University, 2012  
Research Interests: Potato Production

**Paul B. Schwarz, Ph.D.**

North Dakota State University, 1987  
Research Interests: Malting Barley Quality

**Kalidas Shetty, Ph.D.**

University of Idaho, 1989  
Research Interests: Food Safety

**Senay Simsek, Ph.D.**

Purdue University, 2006  
Research Interests: Hard Spring Wheat Quality

**Asunta L. Thompson, Ph.D.**

University of Idaho, 1998  
Research Interests: Potato Breeding

**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

**Richard K. Zollinger, Ph.D.**

Michigan State University, 1989

Research Interests: Weed Science/Applied Weed Control

**Alan J. Zuk, Ph.D.**

Kansas State University, 2005

Research Interests: Sports and Urban Turfgrass Management

## Adjunct

**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

**Bryan Brunner, Ph.D.**

Michigan State University, 1992

Research Interests: Breeding Tropical/subtropical Crops

**Larry G. Campbell, Ph.D.**

Kansas State University, 1974

Research Interests: Sugarbeet Genetics

**Flavio Capettini, Ph.D.**

University of Minnesota, 1999

Research Interests: Barley Breeding

**Patrick M. Carr, Ph.D.**

Montana State University, 1989

Research Interests: Sustainable Agriculture

**Shiaoman Shaw Chao, Ph.D.**

North Carolina State University, 1984

Research Interests: Small Grains Genomics

**Wun Shaw Chao, Ph.D.**

University of California-Davis, 1996

Research Interests: Perennial Weeds

**Lynn S. Dahleen, Ph.D.**

University of Minnesota, 1989

Research Interests: Barley Genetics, Biotechnology

**Justin D. Faris, Ph.D.**

Kansas State University, 1999

Research Interests: Wheat Molecular Genetics

**Michael E. Foley, Ph.D.**

University of Illinois, 1982

Research Interests: Weed Biology

**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

**Yong Qiang Gu, Ph.D.**

University of California, 1994

Research Interests: Genetics

**Elcio P. Guimaraes, Ph.D.**

Iowa State University, 1985

Research Interests: Cereal Plant Breeding

**Liebao Han, Ph.D.**

China Agricultural University, 1996

Research Interests: Turfgrass Science

**David P. Horvath, Ph.D.**

Michigan State University, 1993

Research Interests: Perennial Weed Physiology

**Khwaja Hossain, Ph.D.**

University of Wales, 1995

Research Interests: Molecular Genetics and Genomics

**Brent S. Hulke, Ph.D.**

University of Minnesota, 2007

Research Interests: Flax and Sunflower Genetics

**Chao C. Jan, Ph.D.**

University of California, Davis, 1974

Research Interests: Sunflower Cytogenetics

**Prem P. Jauhar, Ph.D.**

Indian Agricultural Research Institute, 1963

Research Interests: Wheat Cytogenetics

**Brian Jenks, Ph.D.**

University of Nebraska, Lincoln, 1996

Research Interests: Integrated Weed Management

**Edward C. Lulai, Ph.D.**

North Dakota State University, 1978

Research Interests: Potato Physiology

**R. Macchiavelli, Ph.D.**

Pennsylvania State University, 2006

Research Interests: Statistics/Biometry

**Carlos Ortiz, Ph.D.**

University of Arkansas, 1993

Research Interests: Genetics-Starchy Crops and Turf

**Timothy Porch, Ph.D.**

Cornell University, 2001

Research Interests: Dry Bean Breeding and Genetics

**Lili Qi, Ph.D.**

Nanjing Agricultural University, 1997

Research Interests: Wheat Genetics

**Gerald J. Seiler, Ph.D.**

North Dakota State University, 1980

Research Interests: Sunflower and Sugarbeet Germplasm

**Joseph R. Sowokinos, Ph.D.**

University of North Dakota, 1969

Research Interests: Potato Physiology

**Jeffrey C. Suttle, Ph.D.**

Michigan State University, 1979

Research Interests: Potato Physiology

**Linda Wessel-Beaver, Ph.D.**

University of Illinois, 1981

Research Interests: Tropical Pumpkin and Squash Breeding

**Jochum Wiersma, Ph.D.**

University of Minnesota, 1995

Research Interests: Small Grains

**Steven S. Xu, Ph.D.**

North Dakota State University, 1994

Research Interests: HRSW Development