

# Food Safety

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## Program and Application Information

<b>Program Director:</b>	Paul Schwarz
<b>Email:</b>	paul.schwarz@ndsu.edu
<b>Department Phone:</b>	(701) 231-7971
<b>Application Deadline:</b>	Applications are not being accepted currently for this program.
<b>Degrees Offered:</b>	Ph.D., M.S., Certificate
<b>Test Requirement:</b>	GRE
<b>English Proficiency Requirements:</b>	TOEFL iBT 71; IELTS 6

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## Program Description

The Food Safety program was founded in 2001 to help meet the increasing need for individuals with food safety expertise in government, business, and academia. The graduate program is interdisciplinary, and NDSU graduate faculty from several colleges participate in advising graduate students. The NDSU Graduate School administers the academic program, while the home department of the adviser handles assistantship and tuition waiver administration. Academic policies are under the governance of the Food Safety graduate program faculty.

### Degrees Offered and the Graduate Certificate

Three programs are offered at the graduate level. Research project-based degrees include the Doctor of Philosophy (Ph.D.) and the Master of Science (M.S.). The thesis-based M.S. degree will prepare students for supervisory roles in the food industry, in regulatory agencies, or in public health and is preparatory for students who may wish to advance to Ph.D. programs. Individuals earning a Ph.D. degree will be educated as independent researchers, expanding their potential to become principal investigators of food safety research in various arenas, including business, academia, and government. The non-thesis M.S. is intended for working professionals looking to augment their skills or credentials. Most coursework can be completed online, although the candidate must be present on-campus to present seminar and also the M.S. paper. The Graduate Certificate in Food Protection is aimed at professionals looking to augment their skills, as well as graduate students in other programs wishing to add a credential to their degree programs. All course work for the Certificate is completed online.

## Admissions Requirements

Food Safety program admission is open to all qualified graduates of universities and colleges of recognized standing. Appropriate degrees might be in food science, food safety, meat science, cereal science, microbiology, veterinary science, economics, engineering, dietetics, nutrition, agricultural policies or communication. To be admitted with full status to the program, the applicant must meet the Graduate School admission requirements along with additional requirements:

### *Thesis based M.S.*

- Submission of Graduate Record Examination (GRE) General Test scores that are lower than the 50th percentile will generally weaken an applicant's chance of being accepted. In all cases, other forms of evidence for academic success will be considered and may supersede the GRE score for evaluative outcomes.

### *Dissertation based Ph.D.*

- Applicants with a completed M.S. degree (in any related field of study) are generally regarded as more prepared for the Ph.D. program than applicants with only a bachelor's degree.

For students that have not already completed an M.S. degree at an institution in the United States, the Graduate Record Examination (GRE) General Test scores are required. Scores that are lower than the 50th percentile will generally weaken an applicant's chance of being accepted. Other forms of evidence for academic success will be considered and may supersede the GRE score for evaluative outcomes.

### *Graduate Certificate and Non-thesis option*

- The Graduate Certificate in Food Protection does not require the Graduate Record Examination (GRE) General Test (GRE).
- Applicants to the non-thesis M.S. holding a bachelor's degree from a recognized U.S. institution are not required to complete the Graduate Record Examination (GRE) General Test. The GRE is required for International applicants to the non-thesis M.S. program. Other forms of evidence for academic success will be considered and may supersede the GRE score for evaluative outcomes.

The Graduate School does not forward applications for review to the program until the application package is complete. Failure to meet these program deadlines may result in rejection or postponement of admission. Common errors resulting in late applications include missing letters of recommendation and late payment of application fees.

Applications completed by the deadlines are forwarded from the Graduate School to the Food Safety Program director. These are then sent to the Food Safety faculty for review. Acceptance of the applicant will be judged by the faculty using a combination of factors, including those presented above, and on applicant's recommendation letters and statement of purpose. Applications of acceptable quality for the M.S. and Ph.D. programs may still be rejected if an adviser cannot be identified and if there is not an assistantship available to support the applicant.

Applications of acceptable quality for the Graduate Certificate will generally be accepted, unless enrollment caps are being enforced.

All applicants will be notified about final decisions as soon as possible, however, applicants should understand that processing may take several weeks after the deadlines.

## Financial Assistance

Applicants must apply to the Graduate School and be accepted before being eligible for an assistantship in the Food Safety M.S and Ph.D. programs. Very limited funding is available through the Food Safety program itself. Assistantships are generally only available when faculty members have grant funding for support of a student. Graduate tuition is waived for students with assistantships. Teaching assistantships are occasionally available to qualified students. Alternative support, equivalent to a Graduate Research Assistantship may be provided to a student by an outside sponsor such as a private company, university or government.

Financial support is not available for the Graduate Certificate Program and the non-thesis M.S in Food Safety.

## Doctor of Philosophy (Ph.D.)

For candidates who have been granted a M.S. from a recognized program, the Ph.D. program requires the completion of 35 semester credits of course work with an overall GPA of 3.0 or better, as well as 25 research credits (SAFE 899). Fifteen of these credits must be at the 700-789 level. The Ph.D. program is, by design, highly flexible to allow study in the diverse areas of specialization that are related to food safety. While a number of core courses, including SAFE 601-609, seminar (SAFE 790) and research (SAFE 899) are required, additional course work can be tailored to meet the candidate's interests and area of specialization. This additional course work, however, must contribute to proficiency in an area of food safety.

An advisory committee will be established for each candidate admitted. This committee will consist of the major adviser (committee chair), and two other selected graduate faculty. The student and major adviser will prepare the plan of study, which is subject to the approval of the advisory committee, the Food Safety program director, and the Graduate School dean. The plan of study should be completed by the end of the first semester of enrollment in the program.

Ph.D. candidates are required to pass a preliminary examination at least one semester prior to the defense of the dissertation. Two preliminary exam options are available. The first involves the standard written and oral examinations covering the candidate's course work. The second involves successful preparation and defense of a research grant proposal, under accepted guidelines (e.g. USDA-NIFA, NIH).

### Core Courses (required)

SAFE 601	Food Safety Information & Flow of Food	1
SAFE 602	Foodborne Hazards	1
SAFE 603	Food Safety Risk Assessment	1
SAFE 604	Epidemiology of Foodborne Illness	1
SAFE 605	Costs of Food Safety	1
SAFE 606	Food Safety Crisis Communication	1
SAFE 607	Food Safety Risk Management	1
SAFE 608	Food Safety Regulatory Issues	1
SAFE 609	Food Safety Risk Communication & Education	1
SAFE 790	Graduate Seminar	2
SAFE 899	Doctoral Dissertation	1-15

### Course Options

Food Safety		
SAFE 652	Food Laws and Regulations	3
SAFE 684	Food Safety Practicum	1-3
SAFE 753	Food Toxicology	2
SAFE 785	Advanced Crisis Communication	3
SAFE 786	Risk Communication	3
Microbiology		
MICR 653	Food Microbiology	3
MICR 674	Epidemiology	3
MICR 724	Applied Epidemiology and Biostatistics	3

MICR 750		3
MICR 752	Advanced Topics in Food Safety Microbiology	3
Depending upon the candidate's area of specialization, additional course work may be found in programs such as Agribusiness and Applied Economics (AGEC), Agricultural & Biosystems Engineering (ABEN), Animal Sciences (ANSC), Cereal and Food Sciences (CFS), Chemistry (CHEM), Communication (COMM), Health, Nutrition & Exercise Sciences (HNES), Master of Public Health (MPH), Plant Pathology (PPTH), Plant Sciences (PLSC), and Statistics (STAT).		
Total Credits		90

## Master's of Science (M.S. thesis option)

The Master of Science (thesis) is a research degree and can prepare the candidate for future study at the doctoral level. The candidate will perform a novel research project designed to contribute to the body of knowledge in some area pertinent to food safety, prepare a thesis on this research, and defend it in a final oral examination administered by the advisory committee. This program requires a total of 30 semester credits with an overall GPA of 3.0 or better. A minimum of 21 credits of course work, as well as 6-10 research credits must be completed. A minimum of 16 of these credits must be didactic (600-689 or 700-789). SAFE 601-609, seminar (SAFE 790) and research (SAFE 798) are required. Remaining course work can be tailored to meet the candidate's interests and area of specialization.

An advisory committee will be established for each candidate admitted. This committee will consist of the major adviser (committee chair), and two other selected graduate faculty. Additionally, the Graduate School will appoint an outside member of the committee. The student and major adviser will prepare the plan of study, which is subject to the approval of the advisory committee, the Food Safety program director, and the Graduate School dean. The plan of study should be completed by the end of the first semester of enrollment in the program.

### Core Courses (required)

SAFE 601	Food Safety Information & Flow of Food	1
SAFE 602	Foodborne Hazards	1
SAFE 603	Food Safety Risk Assessment	1
SAFE 604	Epidemiology of Foodborne Illness	1
SAFE 605	Costs of Food Safety	1
SAFE 606	Food Safety Crisis Communication	1
SAFE 607	Food Safety Risk Management	1
SAFE 608	Food Safety Regulatory Issues	1
SAFE 609	Food Safety Risk Communication & Education	1
SAFE 790	Graduate Seminar	2
Course Options		
MICR 798	Master's Thesis	6-10
Food Safety		
SAFE 652	Food Laws and Regulations	3
SAFE 684	Food Safety Practicum	1-3
SAFE 753	Food Toxicology	2
SAFE 785	Advanced Crisis Communication	3
SAFE 786	Risk Communication	3
Microbiology		
MICR 653	Food Microbiology	3
MICR 674	Epidemiology	3
MICR 724	Applied Epidemiology and Biostatistics	3
MICR 750		3
MICR 752	Advanced Topics in Food Safety Microbiology	3
Depending upon the candidate's area of specialization, additional course work may be found in programs such as Agribusiness and Applied Economics (AGEC), Agricultural & Biosystems Engineering (ABEN), Animal Sciences (ANSC), Cereal and Food Sciences (CFS), Chemistry (CHEM), Communication (COMM), Health, Nutrition & Exercise Sciences (HNES), Master of Public Health (MPH), Plant Pathology (PPTH), Plant Sciences (PLSC), and Statistics (STAT).		
Total Credits		30

## Master of Science (M.S. non-thesis option)

The Master of Science (non-thesis) is intended for working professionals seeking additional food safety knowledge and credentials. Selection of candidates into this program is very competitive, and is largely based upon the prior experience of the candidate. Identification of an adviser is key. The majority of course work for this program can be completed online, but several visits to the NDSU Fargo campus will be required for seminar and the defense of the final M.S. paper. No financial support is available for candidates in this program, including expenses for travel.

The non-thesis M.S. program requires a total of 30 semester credits with an overall GPA of 3.0 or better. A minimum of 21 credits of course work, as well as 2-4 research paper credits must be completed. A minimum of 16 of these credits must be approved for graduate credit (600-689 or 700-789). SAFE 601-609, seminar (SAFE 790) and Masters paper (SAFE 797) are all required. Remaining course work can be tailored to meet the candidate's interests and area of specialization.

An advisory committee will be established for each non-thesis M.S. candidate admitted. This committee will consist of the major adviser (committee chair), two other food safety faculty, and one recommended by the Graduate School. The student and major adviser will prepare the plan of study, which is subject to the approval of the advisory committee, the Food Safety program director, and the Graduate School dean. The plan of study should be completed by the end of the first semester of enrollment in the program.

The following table only shows courses which are available online. Candidates are encouraged to work with their adviser and the Food safety Program director to determine additional courses that utilize the Tegrity lecture capture program, and thus might be available to students who cannot regularly attend course lectures. Instructor requirements for Tegrity classes can vary widely.

### Core Courses (required)

SAFE 601	Food Safety Information & Flow of Food	1
SAFE 602	Foodborne Hazards	1
SAFE 603	Food Safety Risk Assessment	1
SAFE 604	Epidemiology of Foodborne Illness	1
SAFE 605	Costs of Food Safety	1
SAFE 606	Food Safety Crisis Communication	1
SAFE 607	Food Safety Risk Management	1
SAFE 608	Food Safety Regulatory Issues	1
SAFE 609	Food Safety Risk Communication & Education	1
SAFE 790	Graduate Seminar (not on-line))	2
MICR 797	Master's Paper	3

### On-line Course Options

SAFE 652	Food Laws and Regulations	3
SAFE 684	Food Safety Practicum	1-3
SAFE 753	Food Toxicology	2
SAFE 785	Advanced Crisis Communication	3
SAFE 786	Risk Communication	3

Depending upon the candidate's area of specialization, additional course work may be found in programs such as Agribusiness and Applied Economics (AGEC), Agricultural & Biosystems Engineering (ABEN), Animal Sciences (ANSC), Cereal and Food Sciences (CFS), Chemistry (CHEM), Communication (COMM), Health, Nutrition & Exercise Sciences (HNES), Master of Public Health (MPH), Plant Pathology (PPTH), Plant Sciences (PLSC), and Statistics (STAT).

Total Credits	30
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## Graduate Certificate in Food Protection Requirements

To be admitted to this program, students must demonstrate that they have a baccalaureate degree in an area pertinent to food safety from an accredited educational institution of recognized standing. To obtain a Graduate Certificate in Food Protection, students must successfully complete the nine (9) semester credits of core curriculum below and earn a grade of B or better in each course. All courses are offered online. Certificate students are assigned an adviser. No assistantships are available for Certificate applicants.

SAFE 601	Food Safety Information & Flow of Food	1
SAFE 602	Foodborne Hazards	1
SAFE 603	Food Safety Risk Assessment	1
SAFE 604	Epidemiology of Foodborne Illness	1
SAFE 605	Costs of Food Safety	1
SAFE 606	Food Safety Crisis Communication	1

SAFE 607	Food Safety Risk Management	1
SAFE 608	Food Safety Regulatory Issues	1
SAFE 609	Food Safety Risk Communication & Education	1
Total Credits		9

**Peter Bergholz, Ph.D.**

Assistant Professor  
Michigan State University, 2007  
Department: Veterinary and Microbiological Sciences  
Research Interests: Disease Transmission, Landscape Genomics

**Teresa Bergholz, Ph.D.**

Assistant Professor  
Michigan State University, 2007  
Department: Veterinary and Microbiological Sciences  
Research Interests: Foodborne Disease

**Julie Garden-Robinson, Ph.D.**

Extension Specialist, Professor  
North Dakota State University, 1994  
Department: Health, Nutrition, and Exercise Sciences; NDSU Extension  
Teaching and Research Interests: Nutrition, Food Safety

**Penelope Gibbs, Ph.D.**

Associate Professor  
University of Georgia, 2001  
Department: Veterinary and Microbiological Sciences  
Research Interests: Virulence of *Cronobacter sakazakii*-induced Meningitis in Humans and *Moraxella bovis*-induced Pinkeye in Bovine Species

**Clifford A. Hall III, Ph.D.**

Food Science Undergraduate Program Coordinator, Associate Professor  
University of Nebraska-Lincoln, 1996  
Department: Plant Sciences, Cereal and Food Science Program  
Research Interests: Phytochemical Stability in Food Systems, Pulse Utilization and Quality, Flaxseed, Chemical Food Safety, Effect of Processing on Food Safety Issues

**Robert Maddock, Ph.D.**

Extension Meats Specialist, Associate Professor  
Texas A&M, 2000  
Department: Animal Science; NDSU Extension  
Teaching and Research Interests: Meat Processing, HACCP Systems

**William Nganje, Ph.D.**

Department Chair, Professor  
University of Illinois at Urbana-Champaign, 1999  
Department: Agribusiness and Applied Economics  
Teaching and Research Interests: Risk Management, Economics of Obesity, Food Safety, and Food Terrorism

**Birgit Pruess, Ph.D.**

Associate Professor  
Ruhr-Universität Bochum Germany, 1991  
Department: Veterinary and Microbiological Sciences  
Research Interests: Bacterial Physiology and Biofilms

**David Saxowsky, J.D.**

Associate Professor  
Ohio State University, 1979  
Department: Agribusiness and Applied Economics  
Teaching and Research Interests: Applied Agriculture Law, Food Law, Water Law

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

Food Safety Program Director, Professor  
North Dakota State University, 1987  
Department: Plant Sciences, Cereal and Food Science Program

Research Interests: Mycotoxins in Cereal Grains and Products

**Kalidas Shetty, Ph.D.**

Associate Vice President of International Partnerships and Collaborations, Professor  
University of Idaho, 1989

Department: Plant Sciences

Research Interests: Plant Metabolism, Food Security

**Senay Simsek, Ph.D.**

Bert L. D'Appolonia Endowed Associate Professor

Purdue University, 2006

Department: Plant Sciences, Cereal and Food Science Program

Research Interests: Wheat Mycotoxins In Relation To End-Product Quality

**Charlene Wolf-Hall, Ph.D.**

Vice-Provost for Academic Affairs, Professor

University of Nebraska-Lincoln, 1995

Department: Veterinary and Microbiological Sciences

Teaching Interests: Toxicology