



Since 1946, a tradition of food safety leadership through research, training, and outreach

The Food Research Institute (FRI) was founded in 1946 at the University of Chicago and moved to the University of Wisconsin in 1966.

FRI aims to be an internationally recognized leader in research on microbial foodborne pathogens and toxins and a center that conducts independent research, catalyzes multidisciplinary and collaborative research, and promotes education and outreach to enhance the safety of the food supply. To fulfill this mission FRI will engage in the following food safety activities:

- Provide leadership in identifying and resolving food safety issues to meet community, government, and industry needs
- Conduct fundamental and applied research
- Provide accurate and practical information and expertise
- Deliver quality education and training

The major focus of FRI activities focus is on the microbiology of foodborne disease. The goal is to enhance the understanding of the science underlying food safety for the scientific community, government, industry, and the public to make informed decisions.

FRI is an interdepartmental interdisciplinary unit at the University of Wisconsin-Madison. Executive Committee and Affiliated Faculty have tenure homes in: the Departments of Bacteriology, Animal Sciences, Food Science, and Plant Pathology in the College of Agricultural and Life Sciences (CALS); the Departments of Medical Microbiology and Immunology, and Pediatrics, in the School of Medicine and Public Health (SMPH); and the Departments of Medical Sciences and Pathobiological Sciences in the School of Veterinary Medicine (SVM). In addition, our faculty and staff collaborate with: the Wisconsin Center for Dairy Research; the Molecular and Environmental Toxicology Center; the Departments of Genetics, Nutrition, Biosystems Engineering, Chemical and Biological Engineering; The Wisconsin Department of Agriculture, Trade, and Consumer protection; the Wisconsin Division of Public Health; and the Wisconsin Veterinary Diagnostic Laboratory.

FRI's funding is derived from four sources:

1. The University: which provides our building and laboratories; pays faculty salaries; and contributes to certain projects.
2. Competitively awarded government grants and contracts.
3. Industry funds for work on specific non-proprietary projects.
4. Unrestricted gifts from companies, suppliers, and trade associations.

Unrestricted gifts support the FRI infrastructure and provide funding for faculty to maintain research programs relevant to FRI sponsor needs. The latter is especially important because it provides resources needed to quickly respond to developing problems without having to wait for extramural support. For example, FRI supported projects on *Listeria* and *E. coli* O157:H7 were initiated and some basic questions answered almost a year before extramural support became available.

Industrial companies that support FRI provide an annual contribution based upon the annual volume of their food sales. The rate is \$34.00 per million dollars in sales up to a billion dollars of food sales, or a maximum of \$34,000. The minimum annual gift is \$2,500.



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Sponsorship Benefits

1. FRI provides a portal to the vast resources at the University of Wisconsin-Madison campus for food safety information, including experts in microbiology, food science, animal and meat sciences, veterinary medicine, plant pathology, engineering, dairy research, food allergy, and many others.
2. Consultation with FRI faculty at no charge. Consultation requiring extensive work or travel results in a consulting fee.
3. Access to collaborative research at sponsor rate with the FRI Applied Food Safety Laboratory, which can work with *Clostridium botulinum*, *Clostridium perfringens*, *Listeria monocytogenes*, *Bacillus cereus*, *Staphylococcus aureus*, *Salmonella*, *E. coli* O157:H7, and other foodborne microorganisms in a variety of refrigerated and shelf-stable foods. The laboratory is a recognized process authority for pasteurized process cheese products. Sponsored research with other faculty members is welcomed and encouraged.
4. Access to literature Food Safety Reviews reviewing emerging food safety concerns, as well as customized literature reviews on specific food protection issues. There is an additional fee for extensive reviews and white paper development.
5. Rapid access to significant findings generated from FRI research through seminars and webinars, updates in newsletters, at annual and special meetings, and personal communication with FRI and affiliated faculty.
6. Multiple opportunities to participate in conferences, seminars, and webinars, including:
 - Biweekly FRESH seminars during fall and spring semesters
 - FRI Annual Meeting, featuring presentations on pertinent subjects by expert speakers from other institutions and government agencies, and updates on projects being conducted by FRI faculty and staff.
 - Annual collaborative symposia with the Institute for Food safety and Health on select issues facing the food industry
 - Better Process Cheese School for safe production of low-acid shelf-stable process cheese
 - Food Safety and Meat Microbiology School provides an overview of microbiology, sanitation, thermal processing, new ingredients/technologies, and demonstrations and laboratory exercises pertinent to fresh and processed meats
 - Other training webinars and customized training sessions can be developed by coordination with UW-Madison faculty
 - Reduced-rate registration for all conferences; no charge for participation at training webinars and FRESH seminars
7. Our monthly e-newsletter (FRI eNews) provides concise updates on research and events at FRI and UW-Madison. Additional emails provide the latest developments on exceptional issues, upcoming events and pertinent publications affecting the food industry.
8. Third-party contact with regulatory agencies regarding issues and problems.
9. Access to well-trained graduates as potential employees.
10. A location for your employees to learn and work on problems with foodborne pathogens.
11. Access to the Sponsors Only portion of the FRI website, which includes the most current Food Safety Reviews and recorded presentations from FRESH seminars and select conferences. Contact outreach specialist Lindsey Jahn (lindsey.jahn@wisc.edu) to request access codes.



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Supporting Organizations of the Food Research Institute

ARYZTA	Johnsonville Foods
Bel Brands USA	Jones Dairy Farm
Berner Foods, Inc.	JTM Food Group
Campbell Soup Company	Jungbunzlauer
Chr. Hansen	Kemin Food Ingredients
Coca-Cola	Kerry Ingredients
Corbion Purac	Kikkoman Foods Foundation
Dairy Farmers of Wisconsin	Kraft Heinz Company
Dairy Industries Jamaica	Kwik Trip
Dairyfood USA	Land O' Frost
Double R Brand Foods	Leprino Foods
Emmi Roth USA	Mattson
Eurofins Food Integrity & Innovation	Old Fashioned Cheese
Farmington Foods	Ornua
Fonterra	OSI
Fromm Family Foods	PepsiCo
Gamay	Plumrose USA
General Mills	Promega Corporation
Gilman Cheese Corp.	Salm Partners
Good Foods Group	Sargento Foods
Great Lakes Cheese	Schreiber Foods
Holmen Cheese	Sensient Technologies
Hormel Foods (Jennie-O & Century Foods International)	SugarCreek
Hydrite Chemical Company	Thermo Pac
ICL Performance Products (BK Giulini)	Wayne Farms
Jeneil Biotech	Wegmans
	Winona Foods

FRI Contacts

Charles Czuprynski, Director; 608-263-6826, czuprync@svm.vetmed.wisc.edu

Kathleen Glass, Associate Director; 608-263-6935, kglass@wisc.edu

Kristin Schill, Associate Scientist, kmmarshall@wisc.edu

Adam Borger, Outreach Program Manager; 608-263-7062, acborger@wisc.edu

Lindsey Jahn, Outreach Specialist; 608-263-4229, lindsey.jahn@wisc.edu

Wendy Bedale, Science Writer; 608-698-1553, bedale@wisc.edu



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FRI Executive Committee and Affiliate Faculty

Executive Committee	
Jeri Barak Professor, Dept. Plant Pathology, UW-Madison (608) 890-2581; barak@plantpath.wisc.edu	Laura J. Knoll Professor, Dept. Medical Microbiology & Immunology, UW-Madison (608) 262-3161; ljkknoll@wisc.edu
Charles Czuprynski Director, FRI; Chair, Dept. Pathobiological Sciences (608) 263-6826; czuprync@svm.vetmed.wisc.edu	Andrew Milkowski Adjunct Professor, Dept. Animal Sciences, UW-Madison (608) 263-6826; milkowski@wisc.edu
Kathleen Glass Associate Director and Distinguished Scientist, Food Research Institute; (608) 263-6935; kglass@wisc.edu	Michael W. Pariza Professor Emeritus, Dept. Food Science, UW-Madison (608) 263-6955; mwpariza@wisc.edu
Eric A. Johnson Professor, Dept. Bacteriology, UW-Madison (608) 263-7944; eajohnso@wisc.edu	Jeff Sindelar Associate Professor, Dept. Animal Sciences, UW-Madison (608) 262-0555; jsindelar@wisc.edu
Charles W. Kaspar Professor and Chair, Dept. Bacteriology, UW-Madison (608) 263-6936; cwkaspar@wisc.edu	Amy C. Wong Professor Emeritus, Dept. Bacteriology, UW-Madison (608) 263-7777; acwong@wisc.edu
Nancy P. Keller Professor, Dept. Medical Microbiology & Toxicology, UW-Madison; (608) 262-9795; npkeller@wisc.edu	Jae-Hyuk Yu Professor, Department of Bacteriology, UW-Madison (608) 262-4696; jyu1@wisc.edu
Affiliate Faculty	
Dorte Dopfer Associate Professor, UW School of Veterinary Medicine dopferd@vetmed.wisc.edu	Keith Poulsen Director, Wisconsin Veterinary Diagnostic Laboratory (608) 262-5432; keith.poulsen@wvdl.wisc.edu
Johanna Elfenbein Assistant Professor, UW School of Veterinary Medicine jelfenbein@wisc.edu	Federico E. Rey Assistant Professor, Dept. of Bacteriology, UW-Madison (608) 890-2046; ferey@wisc.edu
Tu Anh Huynh Assistant Professor, Dept. Food Science, UW-Madison (608) 262-5960; thuyinh6@wisc.edu	Stacey Schultz-Cherry Associate Member, St. Jude Children's Research Hospital Stacey.Schultz-Cherry@stjude.org
Barb Ingham Professor, Dept. Food Science, UW-Madison bingham@wisc.edu	Anne Marie Singh Associate Professor, UW School of Medicine and Public Health amsingh@wisc.edu
Steven Ingham Administrator, Division of Food Safety, WI DATCP (608) 224-4701; Steve.Ingham@wisconsin.gov	Garret Suen Associate Professor, Dept. Bacteriology (608) 890-3971; gsuen@wisc.edu
Rachel Klos State Public Health Veterinarian, WI Division of Public Health (608) 266-2154; Rachel.klos@wi.gov	Jan Peter van Pijkeren Assistant Professor, Dept. Food Science, UW-Madison (608) 890-2640; vanpijkeren@wisc.edu



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FRI Research

FRI Research and Expertise

Microbiology

Clostridium botulinum and medical uses of its toxin
Clostridium perfringens
Bacillus cereus
Listeria and listeriosis
Salmonella
Shiga-toxin producing *E. coli*, including O157:H7
Staphylococcus aureus
Fungi and Mycotoxins
Fungal/Bacterial genomics
Cryptosporidia, *Toxoplasma*, *Cyclospora*
Novel detection systems
Stress response in foodborne pathogens
Viruses (Astrovirus, Norovirus, Bacteriophages)
Challenge studies

Intervention strategies

Pre-harvest interventions
Traditional – Clean-label antimicrobial food ingredients
Dairy/Meat/Produce safety
Biofilm intervention
Host-Microbe interactions

Other expertise

Conjugated linoleic acid (CLA)
Host response to food components/pathogens
Food allergy
Microbiome in health and disease
Alternatives to antibiotics in food animals
Statistical analysis of complex data sets
Safety issues related to produce
Probiotics

Select FRI Research Projects

Jeri Barak: How does plant infection by bacterial plant pathogens help *Salmonella enterica* survive and multiply; How do plant-eating insects spread *Salmonella* and *E. coli* from plant to plant pre-harvest; Which plant-eating insects act as biomultipliers, increasing populations and survival, of *Salmonella* and *E. coli*; Identifying *Salmonella* survival mechanisms on sprouts as targets for control strategies

Chuck Czuprynski: How does *Listeria monocytogenes* cause fetal infection and abortion? Formation, survival, and virulence of stress-induced filamentous *L. monocytogenes* and *Salmonella* (with Chuck Kaspar); Interaction of environmental microbiota with *Salmonella* and *Listeria*; Novel strategies to prevent bacterial adhesion and biofilm formation

Kathy Glass: Developing a predictive model for the botulinum safety of shelf-stable process cheese products; Enhancing the safety of refrigerated foods with clean-label antimicrobial food ingredients; Microbiological safety of foods during extended cooling; Enhancing the safety of reduced-sodium cheese and high moisture cheese; Validating growth models for *Clostridium perfringens*, *Clostridium botulinum*, and *Bacillus cereus* during extended cooling of uncured meat and poultry products; Thermal inactivation of *Listeria monocytogenes*

Eric Johnson: Construction of nontoxicogenic *Clostridium botulinum* strains for food challenge studies; Genomic and proteomic analysis of *Clostridium botulinum* endospore resistance

Chuck Kaspar: Desiccation tolerance in *Salmonella* serovars; Modeling persistence of non-O157 Shiga toxin-producing *E. coli* during beef cattle production and slaughter (with Dorte Dopfer); Evolution and transmission of enteric pathogens

Nancy Keller: Antimicrobial activity of fungal metabolites; Fungal/bacterial interactions that affect plant disease and toxin production; Regulators of mycotoxin production

Laura Knoll: Using next generation sequencing of the CRISPR system to create a *Toxoplasma* vaccine; Mouse models of intestinal parasitic infections

Garrett Suen: Improving milk production efficiency in dairy cows by manipulating the rumen microbiome; Microbiome characterization of mastitis in dairy cows; High-throughput detection of antimicrobial resistance genes on dairy farms; Applying next-generation sequencing to characterize unculturable microbes

JP van Pijkeren: Development of next-generation probiotics to eradicate foodborne pathogens; *Lactobacillus*-bacteriophage interactions

Jae-Hyuk Yu: Use of novel regulators to achieve fungal spore inactivation and mycotoxin control



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FRI Undergraduate and Graduate Student Opportunities

Since 2011, FRI has coordinated the FRI Undergraduate Research Program in Food Safety for UW-Madison students seeking a B.S. degree. Each summer, FRI supports talented undergraduate students as FRI Research Scholars, who work on food safety projects in the laboratories of FRI faculty and staff, attend tutorials, and visit food processing plants.

FRI faculty and senior staff have trained hundreds of undergraduate and graduate students, post-docs, visiting scientists, and research specialists. Our alumni hold positions in industry, government, and academia across the country and abroad, where they continue to promote food safety.

PAST FRI STUDENTS AND SCIENTISTS (PARTIAL LISTING)

Name	Last known employer	Position and Degree at FRI
Meareg Amare	UW-Madison	M.S.
Keegan Anderson	PPD	FRI Summer Scholar
Susan (Anderson) Hough	Masterson Company	Undergrad Lab Asst.
Rhona Applebaum	The Coca-Cola Company (retired)	Ph.D.
Makala Bach	Wrigley	FRI Summer Scholar
Nicole Baker	DuPont	FRI Summer Scholar
Cheryl Barrett-Kaiser	Rockline Industries	Undergraduate
Adam Bartling	PepsiCo	FRI Summer Scholar
David Baumler	University of Minnesota	Ph.D.
Doug Beecher	FBI Laboratory, Hazardous Materials Unit	Scientist
Jeffrey Bose	University of Kansas	M.S.
Robert Brackett	Institute for Food Safety & Health (IFSH)	Ph.D.
Byron Brehm-Stecher	Iowa State University	Ph.D.
Carmen Buchrieser	Pasteur Institute, France	Visiting scientist
Donald Burr	FDA CFSAN	Ph.D.
Jeffrey Byrd	St. Mary's College, Maryland	Visiting scientist
Christie Cheng	Kerry	FRI Summer Scholar, Undergrad Lab Asst.
Michelle Cizek	Jones Dairy Farm	Undergraduate, Research Intern
Maribeth Cousin	Purdue University, Food Microbiology	Ph.D.
Virginia Deibel	Deibel Laboratories	Independent Study
Ratih Dewanti	Bogor Agricultural University, Indonesia	Ph.D.
Sean Dineen	Beckman Coulter Genomics	Ph.D.
Michael Doyle	Univ. Georgia, Center Food Safety (retired)	Ph.D.
Case Dunphy	Richelieu Foods	FRI Summer Scholar
Staci (Eickert) Richardson	Schreiber Foods Inc.	Undergraduate
Patrick Eimerman	DNA Script	Undergrad Lab Asst.
Katina Fisher	FitJoy Nutrition	Undergrad Lab Asst.



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Name	Last known employer	Position and Degree at FRI
Joseph Frank	University Georgia, Food Science (retired)	Ph.D.
Alyssa Hangartner	Kraft Heinz Company	FRI Summer Scholar
Tim Harried	Socius Ingredients	Undergrad Lab Asst., Research Spec.
Catie Hawkins	USDA FSIS	DVM Summer Student
Quinn Huibregste	Food Research Institute	FRI Summer Scholar
Jennifer Johnson	Badger State Food Safety Consulting	Ph.D.
Rebecca Kalscheur	Foremost Farms	FRI Summer Scholar
Kristine (Kaufman) Clemons	Mérieux NutriSciences	Undergrad Lab Asst., Research Spec.
Katherine Kennedy	Michigan State University	FRI Summer Scholar
Amanda King Hauser	Kemin Food Technologies	Ph.D.
Jeffrey Kornacki	Kornacki Microbiology Solutions, Inc.	Ph.D.
Ronald Labbe	Univ. Massachusetts, Food Science	Ph.D.
Anna Lammerding	Public Health Branch , Health Canada, retired	Ph.D.
Sean Leighton	Cargill	B.S.
Michael Liewen	PepsiCo	Ph.D.
Melanie Maas	Oscar Mayer, retired	Ph.D.
Kristin (Marshall) Schill	Food Research Institute	Ph.D.
Julia Martien	UW-Madison Ph.D.	FRI Summer Scholar
Jodi McDermott	University of Wisconsin-Platteville	Research Specialist
Megan McGough	Kerry Ingredients	M.S.
Joseph Meyer	Kerry	Master's Program
Lloyd Moberg	Church And Dwight Co.	Ph.D.
Alhaji N'jai	Procter & Gamble	Ph.D.
Julie Nordlee	University of Nebraska, Dept Food Science	Research Specialist
Lindsey O'Brien	Arena Cheese	Research Specialist
Katie Osterbauer	University of Wisconsin-Madison	FRI Summer Scholar, Assoc. Research Spec.
Yeonhwa Park	Univ. Massachusetts, Food Science	Ph.D.
James Pestka	Michigan State University, Food Sci. and Human Nutrition	Ph.D.
Dawn (Waidanz) Picket	Smithfield (John Morrell Food Group)	Undergrad Lab Asst.
Hannah Pilch	Kerry Ingredients	M.S.
Keith Poulsen	Dir. WI Vet. Diagnostic Lab., UW-Madison	Ph.D.
Dawn Preston Gadicke	Grande Cheese	Undergrad Lab Asst.
Anjan Reddy	Bel Brands	Ph.D.
Jennifer Roberts	Agropur	FRI Summer Scholar
Nicholas Rogall	Promega	FRI Summer Scholar
Julian Rood	Monash University, Australia; Microbiology	Ph.D.



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Name	Last known employer	Position and Degree at FRI
Amy Ronner	Silgan Containers Manufacturing Corp.	Research Specialist
Elliot Ryser	Michigan State University, Food Science	Ph.D.
Kori Scherer	University of Wisconsin-Madison	FRI Summer Scholar
Ellen Schneider	UW-Madison School of Veterinary Medicine	FRI Summer Scholar
William Schroeder	Ginkgo Bioworks	Ph.D.
Jenny Scott	FDA	M.S.
Merike Seaman	Gehl Foods	Undergrad Lab Asst.
Joe Shebuski	Cargill (retired)	Ph.D.
Jack Shere	USDA, APHIS, VS	Ph.D.
Subash Shrestha	Cargill	Research Specialist
William Sperber	Cargill (retired)	Ph.D.
Ann Sticha	PepsiCo	Student Hourly
Yi-Cheng Su (deceased)	Seafood Res. Education Center, Oregon State	Ph.D.
Susan Sumner	Virginia Tech, Dept. Food Science	Ph.D.
Matthew J. Sylte	USDA-ARS	Ph.D.
Chelsey Timm	Nestle	FRI Summer Scholar
Megan Wagner	Colony Brands	Student Hourly, FRI Summer Scholar
Robby Weyker	Kerry Ingredients	M.S.; outreach specialist
Pam Wilger	Cargill	Undergrad Lab Asst., M.S.
Stella Winarto	Perfect Foods Muuri	FRI Summer Scholar
Ahmed Yousef	The Ohio State University, Dept. Food Science	Ph.D.

Food Research Institute

University of Wisconsin-Madison 1550 Linden Drive Madison, Wisconsin 53706
Phone: 608/263-7062 Fax: 608/263-1114 Web: fri.wisc.edu



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FRI Outreach: Meetings, Training, and Seminars

FRI, in collaboration with other UW-Madison departments and other organizations, provides outreach to the scientific community through meetings, short courses, conferences, and symposia. The goal of these events is to bring individuals interested in food safety topics together, allowing for public debate and the development of relationships among scientists. Some of our past events are listed below.

Dates	Event	Comments
2005–present	FRESH seminar series	Bi-weekly seminar series each semester
2009–present	Better Process Cheese School	Presented annually; Co-sponsored with the Dept. of Food Science, UW-Madison
2016–present	Preventive Controls for Human Food Training	This course developed by the FSPCA is the “standardized curriculum” recognized by FDA; successfully completing this course is one way to meet the requirements for a “preventive controls qualified individual.”
Biennial since 2010	Food Safety and Meat Microbiology School	Co-sponsored with the Master Meat Crafter Program, Dept. of Animal Sciences, Dept. of Meat Science, and the Muscle Biology Lab, UW-Madison
2019	Managing Microbiological Testing as a Preventive Control Verification	<i>FRI Focus on Food Safety Series</i> , co-sponsored with the Institute for Food Safety and Health (IFSH)
2019	FRI 2019 Spring Meeting	Validation and verification for preventive controls, foodborne disease investigations, microbiome
2018	Food Waste and Sustainability: Strategies to Improve Food Safety, Food Security, and Nutrition	<i>FRI Focus on Food Safety Series</i> , co-sponsored with the Institute for Food Safety and Health (IFSH)
2018	Advanced Meat Microbiology & Food Safety for Processed Meats	Provides resources to manage process variations, establish thermal process, formulating foods for safety, and handling cooling deviations, focusing on real-world, in-plant scenarios.
2018	FRI 2018 Spring Meeting	FRI current research; <i>Special Topics</i> : Diet and human health, foodborne disease investigations, decision tools for product developers, hot topics in food safety
2017	The Microbiomes: From Field to Food to Human Gut	<i>FRI Focus on Food Safety Series</i> , co-sponsored with the Institute for Food Safety and Health (IFSH)
2017	FRI 2017 Spring Meeting	FRI current research; <i>Special Topics</i> : Clean-label ingredients, <i>Salmonella</i> , decision tools for product developers, fermented foods, botulism in traditional ethnic foods
2016	FRI 2016 Spring Meeting and 50/70 Anniversary Celebration	FRI current research; <i>Special Topics</i> : FRI history, food microbiomes, microbial evolution, new detection methods, interactive packaging, produce safety, validation and preventive controls for low-moisture foods, <i>Listeria</i> outbreaks in ice cream, regulatory updates

Social Media

Facebook (<https://www.facebook.com/FoodResearchInstitute>)

Twitter (<https://twitter.com/FoodResearchUW>)

LinkedIn (<https://www.linkedin.com/company/10274804/>)

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University of Wisconsin-Madison 1550 Linden Drive Madison, Wisconsin 53706
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