

# WISCONSIN CENTER FOR DAIRY RESEARCH



- **University of Wisconsin-Madison**  
[www.cdr.wisc.edu](http://www.cdr.wisc.edu)

## CENTER DIRECTOR

**John Lucey, Ph.D.**  
**Director**  
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## OVERVIEW

The Wisconsin Center for Dairy Research (CDR) is located within a licensed, operating dairy plant on the University of Wisconsin-Madison campus and is one of the premier dairy research centers in the world. Building on Wisconsin's tradition as the "Dairy State," the center explores functional, flavor and physical properties of cheese/cheese products and other milk components used as ingredients and as finished products. CDR researches cheese making and dairy protein processing/separation procedures, use of dairy ingredients in foods, and technologies for product safety and quality. More than 30 researchers and scientists are involved in conducting basic and applied dairy research. Collectively, the CDR staff has over 250 years of food industry experience, which creates a unique mix of academic and industry perspectives to help address any challenges facing the dairy industry. The facilities (including a pilot plant) and equipment are extensive, allowing the center to not only create new products, uses and processes, but also to meet the unique needs of the food industry. Annually, the CDR provides specialized training and short courses to over 1,400 industry personnel.

## RESEARCH FOCUS

- Explore and understand the functional properties of cheese, cheese products and cultured dairy products
- Functional dairy proteins (casein alternatives, milk protein concentrate (MPC), modified whey protein concentrate (WPC), etc.) and ingredients
- Dairy food safety and quality systems
- Dairy processing (membrane filtration, drying, separation, etc.)

## CHEESE

The University of Wisconsin-Madison has a long and proud history of cheese research and outreach. The CDR extends the art and science of cheese making into the realm of specialty cheese innovation, as well as cheese as an ingredient. Its licensed cheese makers/scientists provide industry with training programs, research facilities, cheese making protocols for specific end use, and leading-edge technologies for adjusting the texture, taste and/or functionality of cheese in food applications.

The CDR cheese making pilot plant is located within the University of Wisconsin-Madison Dairy Plant, an operational dairy. This setting allows for flexibility in all aspects of the cheese making process. The facility is designed for manufacture of any retail cheese variety (fresh, cream, cottage, hard, soft, semisoft, surface-ripened, molded and eyed), process cheese and cheese food, plus cold pack.

CDR cheese applications staff, through consultation, pilot plant trials, applications laboratory evaluation, and on-site trials and visits, works in a confidential manner with all entities of the dairy industry. From dairy producers and manufacturers to ingredients suppliers and equipment manufacturers, applications staff works with the entire cheese distribution system, including foodservice, retail, wholesale, brokers, converters, warehouses, executive chefs and quick-service restaurants — wherever cheese is used in food application systems. Staff members also provide direct technical support for the end use of natural, process and cold pack cheeses, as well as cheese in food applications.

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### DAIRY PROTEIN/INGREDIENTS

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CDR has an extensive program focusing on dairy ingredients. Working on a confidential basis, the program strives to meet the needs of regional and national dairy ingredient processors and food manufacturers. These needs include process, product and applications support. The dairy ingredient program and applications lab offer technical support for whey, buttermilk, nonfat dry milk, permeate, whey protein concentrate (WPC), whey protein isolate (WPI), individual whey proteins, milk protein concentrates and isolates, milk protein fractions and native whey protein. Services include information, training, seminars, process development, process troubleshooting, ingredient functionality testing and prototype development. Application areas of expertise are beverages, baked products, confections, dairy products, energy bars and prepared foods.

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### ANALYTICAL SERVICES

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Analytical services are offered to support projects carried out at the Wisconsin Center for Dairy Research. CDR provides comprehensive chemical and microbiological testing services and follows *EURACHEM-CITAC Guide CG-2* as quality assurance guideline of nonroutine and R&D analysis of samples. Tests performed include crude protein, casein, true protein, milkfat, total solids, mineral content by reference methods, enzymatic determination of lactose and galactose, protein profiles of milk and milk products by capillary electrophoresis, cheese proteolysis and determination of particle size analysis. Rheological tests performed include texture profiles, cheese meltability and functional properties of milk products.

Microbiological dairy food safety and quality tests are routinely determined, including tests for coliforms, standard plate count, plus yeast and mold. Shelf life and microbial challenge studies also are performed.

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## SAFETY/QUALITY APPLICATIONS

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Providing an active approach to safety and quality, the CDR staff performs audits of dairy facilities, solves problems for dairy plants and reviews dairy facilities' good manufacturing practice (GMP) programs. CDR staff works with facility personnel to improve their GMP program and establish or modify an HACCP program. Staff members also interpret government regulations related to specific dairy products and dairy facilities and provide technical expertise in HACCP implementation and compliance with the Committee for the Assurance of Wisconsin Dairy Product Safety requirements.

In addition, cheese and dairy ingredients produced at CDR are monitored for microbial safety.

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## SENSORY ANALYSIS

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This area designs, conducts and summarizes sensory analysis of cheese and dairy ingredients, using modern sensory testing approaches including the use of FIZZ Networks software with trained panelists performing a wide range of consumer and quantitative tests to meet the customers' needs. Evaluations include flavor, body/texture and appearance profiles, as well as cheese functionality for shredding/slicing and cooking applications. Panels conducted range from trained to focus group, from descriptive to consumer.

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## FACILITIES AND EQUIPMENT

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The CDR pilot plant facilities meet the needs of the dairy and food processing industry by offering access to smaller-scale equipment. The small-vat new product development capability in the cheese pilot plant helps evaluate new cheese making processes. The dairy ingredient pilot plant has the capability to perform milk and whey processing of all types to produce beverages, yogurt, ice cream, sauces, spreads, dips and salad dressings. In addition, the applications lab at CDR has equipment to test the functionality of cheese as an ingredient, including a full line of foodservice pizza ovens. CDR also can evaluate the functionality of dairy ingredients and formulate dairy ingredients into baked products and confections. The chemical and microbiological laboratories extend more than 5,000 square feet and offer some unique testing capabilities.

## FACILITIES AND EQUIPMENT

### WISCONSIN CENTER FOR DAIRY RESEARCH/UW-MADISON PILOT PLANT EQUIPMENT

**CONTACT: THOMAS SZALKUCKI**  
Wisconsin Center for Dairy Research  
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**EQUIPMENT:** Full cheese making manufacturing line located in a state-licensed, state-inspected, operating dairy manufacturing facility. Natural cheese manufacturing line includes multiple raw storage tanks, separator, homogenizer, HTST and various membranes (RO, UF, MF) for full milk standardization based on any desired ratios or incorporation of any ingredient before pasteurization of cheese milk. Capabilities to manufacture any style and variety of cheeses.

- 30-gal. bulk starter preparation tank
- pH meters with computer hookup to continuously monitor pH reading in 4 vats or redox potential in 2 vats over the course of manufacture
- 4 Stoelting 600-lb. vats with variable speed agitators and ¼-in., ⅜-in. and ½-in. knives
- Kusel 5,400-lb. cheese vat
- Kusel 600-lb. Double-O cheese vats (2)
- Small 5-gal. capacity mini-cheese vats with automatic agitation with continuous pH monitoring (4)
- Supreme steel fabricating cooker/stretcher (mixer/molder) Model 640 mixing machine; includes ends for string cheese, 5-lb. loaves with capability for 20-lb. block
- Stoelting prepress with 4 separate pressing chambers (for pressing of eyed cheeses)
- EBR curd mill for Cheddared slabs
- Miller horizontal cheese press with 2 air rams
- Kusel A-frame vertical cheese press
- DR Tech Carousel Cheese Vacuum Press for blocks and horns
- Stainless steel cheese forms (Wilson 10-, 20- and 40-lb. block, perforated brick/Muenster hoops, 5-lb. round Muenster hoops)
- Plastic cheese forms of various sizes and shapes, including 10-lb. wheels (both Crellin and Fromagex), 5-lb. loaves, smaller sizes for 1-lb. Edam balls, Camembert, ricotta and panela baskets, etc.
- Stacked fiberglass circulating brine system
- Hot Pack Environmental Chamber Model 317532 for ripening mold and surface-ripened cheeses; off-site ripening also available upon request
- Warm room capabilities for eyed cheese storage
- Various cold storage capabilities with variety of temperature ranges for cheese ripening

**EQUIPMENT:** Full cream cheese manufacturing line. Cream cheese manufacturing line includes items listed below, as well as equipment listed under other categories. Processing lines include cheese vats, pumping line to collect whey and cream cheese, holding vessel, through packaging.

- Sharples Penwalt Model DS2 cream cheese separator
- APV Gaulin homogenizer Model M3, 2-stage minimum, 2 gal. of product
- Scherping Systems PT 30G 30-gal. capacity swept-surface tank with heating/cooling capability

Cold pack and process cheese manufacturing line. Cold pack and process cheese manufacturing line includes items listed below, as well as equipment listed under other categories. Processing lines include mixing/cooking vessels, homogenization and blending. All direct steam comes from culinary steam source.

- Biro cheese grinder, Model 922, includes various plate sizes
- Stephan cold pack cheese blender, 10-lb. capacity
- Stephan high-speed cutter, Model UMC 5, 5-lb. capacity, direct and indirect steam with vacuum
- Pick Heater for jet cooking sauces
- Blendtech twin-screw process cheese cooker, Model CC 0025, 20-lb. capacity, direct and indirect steam with vacuum
- Gerstenberg Schröder scraped surface heat exchanger (SSHE), Model VP 90/50
- Stephan vertical cutter/mixer, Model 17 91, 50-lb. capacity, indirect steam only
- Gerstenberg Schröder emulsifying machine for water/oil emulsions
- Gerstenberg Schröder mixing and holding tanks

Other various equipment used in the processing, converting and packaging of cheese:

- Winning Designs stainless steel butter churn, 1-gal. capacity
- Lincoln Impinger oven, Model 1130, for baking of Juustoleipä
- Urschel cheese shredder, Model CC-D
- Multivac vacuum sealer with gas flush capabilities, Model C400
- Vemag V 500 robot cheese grinder and vacuum machine with guillotine cutoff
- Variety of portable holding tanks

**\*PLEASE NOTE:** Additional equipment may be obtained by the CDR on a project-specific basis.

**DAIRY  
INGREDIENT  
PROCESSING  
EQUIPMENT**

- Three spiral-wound UF- or MF-compatible systems that contain multiple vessels
- One system using up to six 3.8-in.-dia. vessels holding two elements each
- One system using up to two 4.3-in.-dia. vessels holding two elements each
- One system using one or two 8.0-in.-dia. vessels holding one element each
- NF or RO operated with one 3.8-in.-dia. vessel, one or two elements long
- Ceramic microfiltration system (not UF)
- One single-stage spiral-wound membrane filter system (UF/MF)
- Ceramic membrane system (UF/MF)
- Pilot-scale plate evaporator capable of 200 to 400 lbs. of water evaporation/hr.
- Pilot-scale spray dryer capable of 40 to 60 lbs. of water evaporation/hr.
- Stephan mixer with 40-L capability
- Homogenizer (two-stage)
- Two pilot-scale milkfat separators
- Small HTST/UHT pasteurizer
- Ion exchange chromatography system – 10 L
- Tanks ranging from 5 to 100 gal.
- Gerstenberg Schröder scraped surface heat exchanger (SSHE)
- Gerstenberg Schröder emulsifying machine
- Swept-surface jacketed tank with heating and cooling (100 gal.)
- APV Gaulin homogenizer Model M3, 2-stage minimum, 2 gal. of product

**ADDITIONAL  
PROCESSING  
EQUIPMENT**

- Ice cream: Emery Thompson, Taylor and Coldelite batch
- Taylor soft serve
- Ice cream: Tetra Pak continuous

**SUPPORTING ANALYTICAL EQUIPMENT**

Moisture analyzers	Total solids, moisture
Forced-air ovens	Total solids, moisture, total solids (nonfat)
pH/mV meters	pH
Balances (capable of reading to 1 mg)	Fat, nitrogen, lactose, galactose, lactates, protein composition, acid degree value, titratable acidity, whey (undenatured) protein number, coliforms, yeast and mold, starter organisms, Lactococcus starter, nonstarter lactic acid bacteria, Lactobacillus (hetero), standard plate count, ash, mineral analysis, triglycerides
Immersion sonicators	Solutions, suspensions, degasification
Centrifuges (various sizes to 25,000 rpm)	Soluble nitrogen, milkfat separation
Paar Physica and Malvern Rheometers	Gelation, small deformation technology
Zeiss Epi-Fluorescence Microscope	Light and fluorescent microscopy

### SUPPORTING ANALYTICAL EQUIPMENT

Centrifuge rotors (fixed-angle and swing bucket)	Soluble nitrogen, milkfat separation
Microcentrifuges	Protein composition
Microwave mineralization oven	Mineral analysis
Viscometer	Viscosity
Electrophoresis tanks	Protein composition (10 to 250 kD), protein composition (casein variants)
Electrophoresis power supplies	Protein composition (10 to 250 kD)
Capillary electrophoresis	Protein composition (10 to 250 kD)
Block digesters (6 and 20 Place)	Nitrogen content
Automated nitrogen analyzer with autosampler	Nitrogen content
Furnaces	Ashing
Cryoscope	Freezing point depression
ALP analyzer	Alkaline phosphatase
Melt meter	Melt test
-80 C freezers	Sample preservation, starter culture storage
Low-temperature incubators	Various microbiological tests
Refrigerated circulating water baths	Sample preparation
Rotary evaporators (1 L)	Solvent evaporation
Soxhlet extractors (100 mL)	Fat extractions
Sample homogenizers	Sample preparation
Particle size analyzer (20 to 2,000 $\mu\text{m}$ ) with autosampler	Particle size determination
Microfluidizer	Preparation of liposomes
Multi-angle laser light scattering detector (MALLS)	Determination of molecular weight of polymers

### SUPPORTING ANALYTICAL EQUIPMENT

Inductively coupled plasma-axial optical emission spectroscopy with autosampler	Mineral analysis
Gas chromatograph-flame ionization detectors with autosampler	Fatty acid composition, triglycerides, fatty acid sn- triglyceride positional analysis
High-performance liquid chromatograph with autosampler	Phospholipids, carbohydrates
Evaporative light-scattering detector	Phospholipids, carbohydrates, triglycerides
Drop point analyzer	Melt point
Walk-in coolers (4 C)	Sample preservation
Commercial deli-style slicers	Melt test
Vacuum sealers	Sample preservation
Oxidative stability instrument	Accelerated oxidative stability
Chloride analyzers	Salt determination
Shaker water bath	Lactose

### COURSES, SYMPOSIA AND EVENTS

- Applied Dairy Chemistry Short Course
- Cleaning and Sanitation Workshop
- Cheese Grading and Evaluation Short Course (two times per year)
- Cheese Technology Short Course (two times per year)
- Cultured Dairy Products Short Course (odd-numbered years)
- Dairy and Food Plant Wastewater Short Course
- Dairy HACCP Workshop
- Dairy Ingredients Utilization Short Course (odd-numbered years)
- Ice Cream Makers Short Course
- Dairy Ingredient Manufacturing Short Course (even-numbered years)
- Master Cheese Maker Short Course (Focus on specific trends and technologies in the manufacture of various cheeses)
- Milk Pasteurization and Process Control School (two times per year)
- Process Cheese Short Course
- World of Cheese — Pasture to Plate Short Course
- Buttermakers Short Course

## COURSES, SYMPOSIA AND EVENTS

- Various courses related to sustainability
- Custom company training programs for industry
- CDR Industry Team Research Forum
- International Cheese Technology Exposition
- Wisconsin Cheese Industry Conference

## COMMUNICATIONS AND OTHER RESOURCES

- *The Dairy Pipeline* technical newsletter (published quarterly)
- Technical reviews
  - Dried Dairy Ingredients
  - Dairy Proteins
  - Whey Processing — Bleaching
  - Fact sheets
  - Cracker and Cheese Pairing Guide
  - Distribution of Milk Components Between Cheese & Whey
  - Membranes 101
  - Membrane Configurations
  - Quick Guide to Choosing the Best Type of Whey
  - Relative Milk Component Sizes in Comparison with Membrane Pore Size Ranges
  - Use of Membranes for Standardizing Milk for Cheese Production
  - Guide to Smoked Cheeses
  - Brining Cheese, A Comprehensive Guide



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**RESEARCHERS AND STAFF**

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**ROBERT BRADLEY, JR., PH.D.****Professor Emeritus of Food Science***UW-Madison**rbradley@wisc.edu*

Processing and utilization of dairy foods, analytical methods of analysis; food product development; ultrafiltration and reverse osmosis, frozen dessert technology, analytical methods of food analysis and dairy foods technology; stabilization and emulsification of food systems, environmental toxicants in food products; independent third-party, 3A-mandated equipment cleanliness evaluations.

**KIMBERLEE (K.J.) BURREINGTON****Coordinator, Dairy Ingredients Applications Program***Wisconsin CDR**burrington@cdr.wisc.edu*

Coordinates dairy ingredients program targeting industry needs in the areas of whey processing/component separation and utilization of these components in a variety of food and beverage products.

**CAROL CHEN****Researcher, Sensory Analysis***Wisconsin CDR**cchen@cdr.wisc.edu*

Designs, conducts and summarizes sensory analysis of cheese; evaluations include flavor, body/texture and appearance profiles, as well as cheese functionality for shredding/slicing and cooking applications; types of panels conducted range from focus group to descriptive to consumer.

**BÉNÉDICTE COUDÉ****Assistant Coordinator, Cheese Industry & Applications***Wisconsin CDR*

Coordinates cheese making trials involving a wide variety of natural and process cheeses; provides information and technical support for brokers, end users, ingredients suppliers, manufacturers and others in the industry.

**SRINIVASAN DAMODARAN, PH.D.****Winters-Bascom Professor, Food Chemistry***UW-Madison**sdamodar@wisc.edu*

Enzyme chemistry and technology; food chemistry; protein chemistry and technology.

**MARK ETZEL, PH.D.****Professor, Food Science (joint with Chemical Engineering)***Food Research Institute**UW-Madison**etzel@che.wisc.edu*

Food and bioprocess engineering; mass transfer and bioseparation processes; membrane bioseparations; protein purification; drying of foods and microorganisms.

**KATHY GLASS, PH.D.****Assistant Scientist, Microbial Sciences***Food Research Institute**UW-Madison**kglass@facstaff.wisc.edu*

Process cheese safety; shelf-life studies with foodborne pathogens; evaluation of product safety for new formulations.

**RANI GOVINDASAMY-LUCEY, PH.D.****Senior Scientist***Wisconsin CDR**rani@cdr.wisc.edu*

Coordinates research projects within CDR. Areas of expertise include: evaluation of texture and rheological properties of cheese; standardization approaches for cheese making, including cheese yield determination; design of cheese projects/trials; determination of the coagulation properties of cheese milk; membrane processing for cheese making; cream cheese properties; buttermilk as an ingredient; low-fat cheese.

**SUNDARAM GUNASEKARAN, PH.D.****Professor, Biological Systems Engineering (joint with Food Science)***UW-Madison**guna@wisc.edu*

Determining physical properties and quality factors of food materials and design of sensors and instrumentation for quality evaluation of food materials nondestructively; rheological and transport properties, structure-function relationships; value-added food and nonfood processes of biomaterials.

**RICHARD HARTEL, PH.D.****Professor, Food Science (joint with Biological Systems Engineering)***UW-Madison**rwhartel@wisc.edu*

Food engineering/processing, separations, crystallization/particulate processes, structure-function relations.

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**RESEARCHERS AND STAFF**


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**KRISTEN HOUCK**

**Research Specialist**  
 Wisconsin CDR  
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Coordinator of microbiological services.

**BARBARA INGHAM, PH.D.**

**Associate Professor, Food Science**  
 UW-Madison  
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Analytical methods for food analysis; microbial quality and safety of foods; HACCP, food quality and food safety.

**JOHN JAEGGI**

**Cheese Industry and Applications Coordinator**  
 Wisconsin CDR  
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Coordinates cheese making trials; serves as an industry information resource, provides technical support for specialty cheese makers.

**LUIS JIMENEZ MAROTO**

**Sensory Coordinator**  
 Food Science/Wisconsin CDR

Designs, conducts and summarizes sensory analysis of cheese; evaluations include flavor, body/texture and appearance profiles, as well as cheese functionality for shredding/slicing and cooking applications; types of panels conducted range from focus group to descriptive to consumer.

**MARK JOHNSON, PH.D.**

**Assistant Director  
 Senior Scientist**  
 Wisconsin CDR  
 jumbo@cdr.wisc.edu

Coordinates CDR's strategic and applied cheese research program; cheese technology; manufacturing procedures and effects on quality; technology and microbiology of reduced-fat cheeses; enhanced ripening of cheese using lactobacilli; and cheese defects.

**SUSAN LARSON, PH.D.**

**Research Specialist**  
 Wisconsin CDR  
 slarson@cdr.wisc.edu

Dairy ingredient applications and responsible for the InnovateWithDairy.com website and dairy technical-support line.

**YANJIE LU, PH.D.**

**Associate Researcher, Lab Manager**  
 Wisconsin CDR  
 yanjielu@cdr.wisc.edu

Supports research projects on cheese and dairy ingredients. Lab manager for Dr. Lucey lab.

**JOHN LUCEY, PH.D.**

**Director, Wisconsin CDR  
 Professor, Food Science**  
 UW-Madison  
 jalucey@cdr.wisc.edu

Dairy chemistry/technology; physicochemical properties of dairy products; cheese technology; rheological properties of dairy products; milk proteins; yogurt science and technology.

**FRANCO MILANI, PH.D.**

**Assistant Professor and Extension Specialist,  
 Food Science**  
 UW-Madison  
 milani@wisc.edu

Application of sustainable practices in food process, product and marketing designs; support for short courses in dairy/food industry; food analytical and application testing method development, process development and optimization.

**SARAH MINASIAN**

**Applications Lab Coordinator**  
 Wisconsin CDR  
 sminasian@cdr.wisc.edu

With a culinary background, supports research and development application projects for the CDR.

**GINA MODE**

**Assistant Coordinator, Cheese Industry & Applications Program**  
 Wisconsin CDR  
 gmode@cdr.wisc.edu

Coordinates cheese making trials involving a wide variety of natural and process cheeses; provides information and technical support for brokers, end users, ingredients suppliers, manufacturers and others in the industry.

**MIKE MOLITOR**

**Pilot Plant Technical Support**  
 Wisconsin CDR  
 molitor@cdr.wisc.edu

Coordinates the center's pilot plant use for filtration, evaporation and spray-drying projects; serves as department resource for equipment design and maintenance; supports processing of dairy products, including yield and mass balance.

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**RESEARCHERS AND STAFF**

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**KIRK PARKIN, PH.D.**

**Professor, Food Science**  
UW-Madison  
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Food chemistry and biochemistry, particularly enzymology and bioactive phytochemicals and nutraceuticals; identification, characterization and enrichment of health promoting, bioactive compounds in foods; characterization of enzymes in foods and as processing aides.

**SCOTT RANKIN, PH.D.**

**Associate Professor, Food Science**  
UW-Madison  
[sarankin@wisc.edu](mailto:sarankin@wisc.edu)

Characterization primarily of dairy food flavor with sensory and instrumental techniques; programs and short courses in support of the dairy foods processing industry.

**JUAN ROMERO**

**Researcher**  
Wisconsin CDR  
[romero@cdr.wisc.edu](mailto:romero@cdr.wisc.edu)

Supports analytical activities for the CDR, including comprehensive chemical, microbiological, sensory and rheological testing services.

**PAMELA L. RUEGG,  
DVM, MPVM, DABVP (Dairy Practice)**

**Professor, Dairy Science**  
UW-Madison  
[plruegg@wisc.edu](mailto:plruegg@wisc.edu)

Milk quality specialist; on-farm implementation of best management practices to improve milk quality and safety; research interests focused on the application of epidemiologic techniques to critical issues related to milk quality and safety; influence of cow and farm hygiene on milk safety and quality.

**KAREN SMITH, PH.D.**

**Dairy Processing Technologist**  
Wisconsin CDR  
[smith@cdr.wisc.edu](mailto:smith@cdr.wisc.edu)

Specializes in process development, scale-up and troubleshooting; conducts research in milk/whey separation, concentration and drying; develops materials for industry education.

**MARIANNE SMUKOWSKI**

**Safety and Quality Coordinator**  
Wisconsin CDR  
[msmuk@cdr.wisc.edu](mailto:msmuk@cdr.wisc.edu)

Serves as technical adviser to the dairy industry for safety/quality programs, HACCP implementation and dairy facility audits; facilitates industry/regulatory interactions; and is technical coordinator for the Wisconsin Master Cheesemaker® Program.

**DEAN SOMMER**

**Cheese and Food Technologist**  
Wisconsin CDR  
[dsommer@cdr.wisc.edu](mailto:dsommer@cdr.wisc.edu)

Serves as a resource for cheese manufacturers and end users interested in expanding the use of cheese, particularly as an ingredient.

**JAMES STEELE, PH.D.**

**Professor, Food Science**  
UW-Madison  
[jlsteele@wisc.edu](mailto:jlsteele@wisc.edu)

Dairy microbiology; genetics and physiology of lactic acid bacteria; cheese flavor; probiotics.

**TOM SZALKUCKI**

**Wisconsin CDR**  
[tszal@cdr.wisc.edu](mailto:tszal@cdr.wisc.edu)

Serves as assistant to the director with specific additional duties related to projects, contracts, reports, technical information and CDR physical facilities.

**DEBRA WENDORF BOYKE**

**Communications Coordinator**  
Wisconsin CDR  
[dwboyke@cdr.wisc.edu](mailto:dwboyke@cdr.wisc.edu)

Manages all internal and external communication and short course/training activities of the center.

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**RESEARCHERS AND STAFF**

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**WILLIAM WENDORFF, PH.D.**

**Emeritus Professor, Food Science**  
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Quality and environmental concerns of the dairy industry;  
sheep milk processing.

**DANA WOLLE, PH.D.**

**Research Specialist**  
Wisconsin CDR  
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Supports applied and basic research and development  
projects in both the dairy ingredients and cheese utilization  
group.

