



Planning a Plant Tour

Developing a “brand” that reflects you and your product in a way that consumers notice and remember is essential for a successful business. When you host a tour of your cheese plant you are also communicating something about your values, standards and principles. Marianne Smukoski, CDR’s quality and safety coordinator, knows what she is looking for when she visits. “I always like to see the maintenance shop and the restrooms; right away. That tells me what the rest of the plant will be like.” For example, “When the floor of the maintenance shop is clean and shiny and the tools are organized, well, then I know the plant will be too.”

How can you be sure that you are saying clean, careful and conscientious? If you are like most of us, familiar scenes often merge and blend to hide details that might need some attention. That’s why GMPs, or Good Manufacturing Practices are so important. They can highlight critical details and they can guide you to hosting a plant tour that shows off the best of your business. Cheese plant tours are often part of conferences, meetings or classes. In addition, retailers and distributors like to see a plant before signing a contract. You should prepare for these visits the same way you would for a third party audit.

Do you have a Visitor Policy? (And do you follow it?) Be ready to provide lab coats, safety goggles, booties, colored hairnets, and gloves too if any of your visitors are wearing nail polish. Jewelry is never allowed in a dairy plant, so make sure you have a safe storage area for your visitor’s belongings. Dave Jelle, of Foremost Farms, regularly updates his five-page Standard Operating Procedure (SOP) Visitor Policy, and notes that this contains only the minimum requirements. Of course, plant tours are only part

of this SOP; contractor, trucker and personal visits to employees are also covered. The document lists specific directives for plant tours, beginning with who gives approval for tours, what entrance they will use, what will they wear, how will they be identified as visitors and what areas they are allowed to see.

Developing a Visitor Policy is only one example of a detail you can handle in advance, which will help lessen the stress of visits. You can also plan the route in advance, paying attention to safety issues like slippery floors, forklift traffic, and potentially hazardous equipment. Do you need to protect any proprietary processes? Will you allow your visitors to take photos? Make these decisions before your guests arrive.



Traffic flow patterns

It is essential that you start the tour in the cleanest area of the plant. Although it seems logical to start at the beginning of the process—milk intake—this is also the most contaminated area. Instead, start with production and end at the intake area of the plant, if you decide to take visitors to this area. Also, pay close attention to the traffic pattern in the plant; you don’t want to lead visitors from a place where raw milk is handled into an area containing pasteurized milk.

Don’t forget about the outside of your plant. What does the roof look like? Are the windows intact and clean? Are the screen doors in good repair? Are they shut or propped open? Walking the perimeter of a plant might reveal more than you wish, for example, is the garbage overflowing?

Keep marketing and potential tours in mind when planning a new plant or an extensive remodel. Consider including hallways with windows that allow visitors to observe without ➤ ➤

➤➤ physically entering the production area. An alternative is to create a video of the process that you can show visitors in a quiet meeting room, although you do lose the sounds and smells that make the experience real.

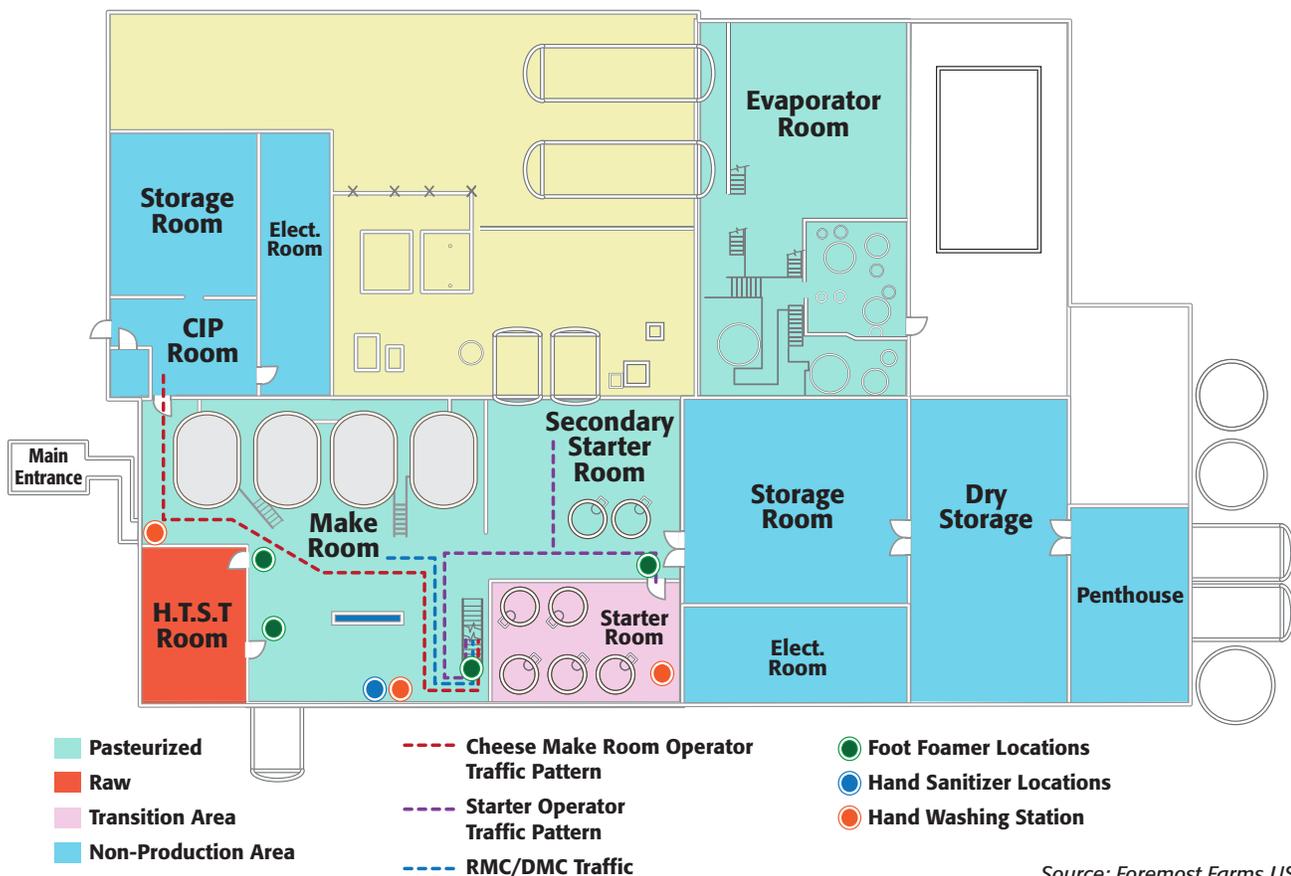
Dean Sommer, CDR's cheese and food technologist, has been on both sides of cheese plant tours. He suggests that you make sure each tour guide is ready for likely questions from the touring folks. Also, most of them want more than just seeing the plant and equipment; they want to know the "story" and "history" of the plant. And don't send them away hungry, folks always like to taste samples after finishing the tour.

Wisconsin Milk Marketing Board (WMMB) sponsors over 45 tours annually, which last three to four days and involve up to nine plants and 14 companies. The primary reason these

visiting retailers come to Wisconsin is to see where the product comes from and meet the people behind the product. Dave Leonhardi, WMMB tour guide extraordinaire says that most visitors come away amazed by what they have seen because the passion for producing dairy products permeates the industry from farmers to cheesemakers to packagers. His advice to hosts is "You don't have to do anything extraordinary, just tell them why you do what you do."

Small, medium or large, brand new or a century old, your cheese plant is a reflection of your business, your brand and your values. Make sure your visitors see that. And one last tip, don't hang anything on your bulletin board that you wouldn't want your grandmother to see. (Make sure your visitors don't see anything like that!)

Example of Employee Traffic Pattern



Curd Clinic

Clinic Doctors Dean Sommer and Bill Wendorff Ph.D

Q. Can high salt or other specialty cheeses be frozen?

A. As the diversity of cheese varieties continues to increase questions come in regarding the impact of freezing on the textural and flavor qualities of some specialty cheese varieties.

Some Spanish research indicated that freezing blue cheese had little effect on textural properties of cheeses that were frozen vs. those held at refrigeration temperatures. We decided to take a quick, practical look at this ourselves.

Samples of various specialty cheeses were purchased in triplicate from a local retail store. Two of the samples were frozen in the Babcock Dairy ice cream hardening freezer, while the third sample was held at 40°F. One of each of the frozen sample varieties was taken out of the freezer after three weeks and thawed at 40°F for about a day and a half. Then the thawed sample was compared to the refrigerated sample. Below are a few of the observations.



The texture of the frozen blue cheese sample was noticeably different from the refrigerated sample. The frozen sample was very crumbly compared to the refrigerated blue cheese sample. Additionally, the mold color in the frozen and thawed sample was a sickly green color compared to the robust blue color of the refrigerated sample.



The frozen and thawed feta sample was extremely crumbly. The chunk of cheese itself exhibited cracks after thawing and even a slight handling of the thawed feta resulted in a crumbling of the chunk.



The frozen and thawed tub of ricotta exhibited a high degree of watering off, a cracking of the surface and an undesirable and unpalatable mealy texture and mouthfeel.



The interior texture of frozen and thawed Brie cheese seemed to be similar to that of the refrigerated Brie. However, the white mold appearance on the surface of the frozen Brie was significantly disrupted and appeared to have collapsed and become much thinner and spottier on the surface.

Fresh mozzarella

Fresh mozzarella did not appear to be affected much by freezing, although the color of the frozen and thawed fresh mozzarella was slightly whiter and the flavor slightly sweeter than the refrigerated sample.

Muenster

Muenster cheese that was frozen appeared to be the least affected compared to the refrigerated muenster.

Conclusion

In this snapshot, uncontrolled look at the effects of freezing on the texture and flavor of different varieties of cheese, it appears that freezing impacts some varieties dramatically while having little impact on other varieties. More controlled experimentation may need to be done to document the impacts of freezing on different varieties of cheeses and to discover means of reducing the detrimental impacts on texture and flavor imparted by freezing on sensitive specialty cheese varieties.

Consumer F.A.Q: Is American Cheese Really a Cheese?

The Wisconsin Center for Dairy Research serves as a technical resource to the dairy industry, but in addition to industry outreach, staff member Susan Larson, Ph.D also assists the general public by staffing the United States Dairy Export Council Dairy Technical Support line. She fields several questions each day regarding everything from dairy ingredients to sell-by-date issues. Over time, Larson has compiled a list of frequently asked questions. Companies may find the answers to these questions helpful as you too may receive similar questions from your customers.

Processed cheese is one area in particular that can be confusing to those outside of the dairy industry. Consumers frequently wonder about the ingredients involved in processed cheese so the following chart may be helpful as you field similar questions.

Pasteurized Processed American Cheese (Cheese is the #1 ingredient; approximately 97% cheese)

Ingredients: American Cheese (Milk, Cheese Cultures, Salt, Enzymes, Annatto Vegetable Color, If Colored), Water, Cream, Sodium Citrate, Color Added, Salt, Sorbic Acid (Added As A Preservative), and Soy Lecithin (Non-Sticking Agent).

Pasteurized Processed American Cheese Food (with added calcium and vitamin D) (Cheese is the #1 ingredient. It contains a minimum of 51% cheese.)

Ingredients: American Cheese (Pasteurized Milk, Cheese Cultures, Salt, Enzymes) Water, Whey, Modified Whey, Skim Milk, Buttermilk, Sodium Citrate, Calcium Phosphate, Cream, Natural flavor, Salt, Sodium Phosphate, Annatto and B- APO-8 Carotenal (for color), and Cholecalciferol (Vitamin D3)



Pasteurized Prepared Cheese

Product (Because it contains a dairy ingredient that is not listed in the code of federal regulations, it is called a cheese product)

Ingredients: Milk, Whey, Milkfat, Milk Protein Concentrate, Salt, Calcium Phosphate, Sodium Citrate, Whey Protein Concentrate, Sodium Phosphate, Sorbic Acid (as a Preservative) Apocarotenal (color), Annatto (color), Enzymes, Vitamin D3, Cheese Culture. Contains: milk

American Pasteurized Processed Sandwich Slices

(“Sandwich slices...not cheese”)

Ingredients: Water, Partially Hydrogenated Soybean Oil, Food Starch, Casein and/or Caseinate, Whey, Modified Food Starch, Salt, Natural Flavor, Sodium Citrate, Sodium Phosphate, Stabilizers (Xanthan Gum, Locust Bean Gum, Guar Gum), Sorbic Acid (as a preservative), Artificial Color, Lactic Acid.

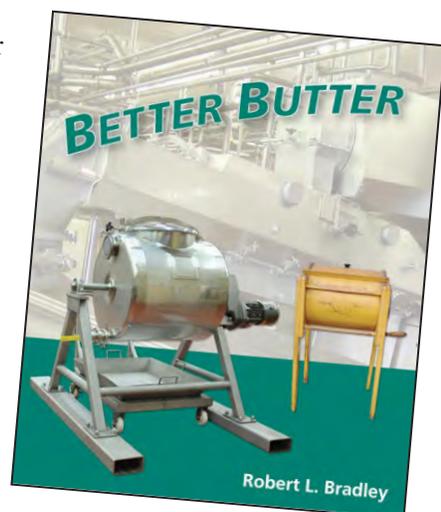
Dr. Robert Bradley Releases “Butter Book”

Better Butter, the first technical butter book to be published in nearly 50 years, offers industry insight into the art of quality butter manufacture. A labor-of-love, Robert Bradley, Ph.D, an Emeritus Professor in the UW-Madison Food Science Department, spent many years planning and writing *Better Butter*. The publication includes more than 80 pages detailing Bradley’s experiences and what he has learned about quality butter manufacture over his 40 plus years in industry and education. *Better Butter*, focuses on the knowledge and expertise needed to manufacture an award winning product. Butter is Bradley’s true passion and he shares this book with industry and the public as a continuation of his legacy as an educator and dairy expert.

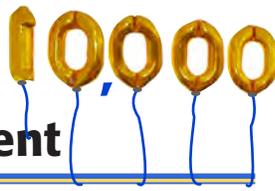
Better Butter can be purchased for \$39.95. Please make checks payable to The Wisconsin Center for Dairy Research. For more information please contact Joanne Gauthier at gauthier@cdr.wisc.edu or mail request and check to: Wisconsin Center for Dairy Research

Attn: Butter Book

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CDR welcomes its short course student



If you appreciate a fine Wisconsin dairy product, then it's very likely that you have enjoyed the delicious work of a University of Wisconsin-Madison dairy short course student. In fact, at the 2012 World Championship Cheese contest more than 89 percent of the U.S. winners had taken a UW-Madison dairy short course. A statistic which is not so surprising when one considers the fact that this spring the program welcomed its 10,000th student to campus, Davide Toffolon of BelGioioso Cheese Inc.

In 1890 the University of Wisconsin- Madison established the first Dairy Short Course in the United States. That tradition was then built upon in 1989 when the modern dairy short course was developed thanks to the work of Bill Wendorff, Ph.D., the Wisconsin Center for Dairy Research (CDR), the UW-Madison Food Science department and the Wisconsin Milk Marketing Board (WMMB).

Today, CDR and the Food Science Department offer more than 22 short courses a year on the UW-Madison campus, which focus on topics from cheese technology and buttermaking to sanitation practices and dairy chemistry. The modern short courses work to meet the needs of the current industry while also preserving the mission of the original dairy short course; to maintain the knowledge and tradition of crafts such as cheesemaking and buttermaking, while providing cutting-edge research-based education to industry.

The dairy industry, which contributes more than \$27 billion dollars to Wisconsin's economy and employs more than 146,000 people, is the main focus of CDR dairy short courses. CDR, WMMB and UW-Madison work together throughout the year to provide educational opportunities that will enhance the Wisconsin dairy industry and bring about Wisconsin dairy success stories. Over the past 20 years it is clear that those outreach efforts have had a tremendous impact on the economy

and individuals throughout the state. As companies such as Seymour Dairy, Edelweiss Creamery, Carr Valley Cheese and others grow; these businesses bring jobs and more to the Dairy State. One example of such growth is Uplands Cheese Company.

"As a farmer, I knew very little about making cheese," said Mike Gingrich, owner of Uplands Cheese Company in Dodgeville, Wisconsin and a proud dairy short course student. "So, a few years ago I decided to attend a dairy short course to learn a little bit more. That short course was really my introduction to cheesemaking. While I was attending the course I met several of the teachers and staff at CDR including John Jaeggi and Mark Johnson, both cheese experts who were willing to listen to my ideas and answer my questions."

During the short course CDR staff and Gingrich discussed the possible development of a hand-crafted cheese that would be based on the French style cheese, Beaufort.

"The staff was intrigued by my idea," said Gingrich. "So we made some test batches and they helped me to figure out the make procedure for what is now known as Pleasant Ridge Reserve."

Today, Pleasant Ridge Reserve is the only cheese to win the American Cheese Society's Best of Show three times. They were also named U.S. champion at the U.S. Championship Cheese Contest.

Gingrich said, "It really all started that day at the Cheese Technology short course."

It is stories such as Gingrich's that demonstrate the true reach and importance of dairy short course outreach efforts.

"The modern dairy short courses have had many positive impacts," said Bill Wendorff. "But one of the greatest benefits of short courses is that they allow CDR staff to connect with the Wisconsin dairy industry. It is these interactions and connections that will continue to lead to greater outreach and greater success for Wisconsin."



L-R Scott Rankin, Chair, UW Food Science; Davide Toffolon, BelGioioso Cheese Inc., Bill Wendorff, Emertis Professor, UW Food Science; Mark Johnson, Senior Scientist; CDR, John Lucey, Director, CDR

Pilot Plant Equipment Update

CDR is proud to serve the dairy and food industry as a technical resource and to provide a pilot plant at Babcock Hall where industry can experiment with products or find solutions. Below are the newest additions of noteworthy improvements to the pilot plant equipment, but look for more to come as CDR continues to expand and improve to meet industry needs.

Compact Ultrafiltration or Microfiltration (spiral element) System



Description: This pilot scale system was designed to have minimal internal volume and to be easily drained, which allows simple recovery of the valuable product after the trial is completed. The system can be used with either one vessel or two in series and holds one, 3.8" diameter element per vessel. Each element contains approximately five square meters of membrane area.

Uses/Projects: To concentrate the serum protein and casein from microfiltration permeate obtained from milk or to make whey protein concentrates, or to ultrafilter milk for cheese making or MPC production.

Reverse Osmosis or Nanofiltration (spiral element) System



➤➤ **Description:** This versatile filtration system was designed by Mike Molitor, CDR's Senior Instrumentation Technologist, and built on site in the Process Lab. The system's design allows for side-by-side comparisons to objectively evaluate permeate composition and flux rates of two or three different membranes at the same time. The system is highly flexible, making it ideal for use in projects that need both RO and NF work completed properly.

Uses/Projects: To conduct Reverse Osmosis and/or Nanofiltration trials on whey, UF permeate and unique carbohydrate streams derived from lactose. It can be operated at baseline pressures up to 500 psi.

Donations: Filtration Engineering donated all six of the complete filtration vessels and Fristam Pumps provided CDR with a deeply discounted model FPHP722 recirculation pump required for proper cross flow filtration (the long pump on the right hand side of the picture).

Small HTST Pasteurizer for Research projects



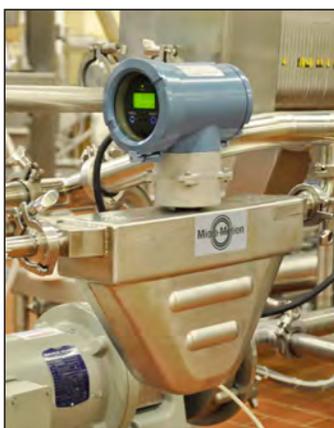
Description: The High Temperature Short Time Pasteurizer (HTST) efficiently pasteurizes product for research purposes as it's not a legal pasteurizer. It uses a three section plate heat exchanger which allows the product to start and end at any desired temperature up to 200°F. The typical product flow rate is 1.0-1.4 gallons per minute. This system also allows for significant hold time flexibility which can be set up for just over 16 seconds to 2.5 minutes. ➤➤

➤ **Uses/Projects:** To pasteurize products including sour cream mix, sports drinks, flavored milks, whey and milk for cheese making.

APV brand "Single Effect" Batch Evaporator (New improved features)



Description: The batch evaporator at CDR is equipped with a wide gap plate heat exchanger and large vacuum pump which are ideally suited to efficiently process dairy products, including those that are heat sensitive. The system also includes a brand new Micro Motion flow meter which measures mass, not volume, allowing for real time density measurements which correlate to the solids content of the product being evaporated. It will evaporate 250 pounds of water per hour (given an effect boiling temperature of 130°F). Moderately higher temperatures allow for water evaporation rates of 400 pounds per hour.



Micro Motion flow meter

Uses/Projects: To evaporate whey, UF permeate, skim, UF milk etc. The plate heat exchanger is also used independently (of the evaporator) to easily heat treat large batches of mix for yogurt, Greek yogurt, cream cheese and other cultured products.



Information regarding more pilot plant equipment is available on the CDR website along with a downloadable pdf reference sheet. www.cdr.wisc.edu/programs/dairyingredients/di_equipment.html

APV brand Pilot Scale Spray Dryer



Description: Our pilot scale, one stage spray drier is now equipped with a 'high pressure –fixed nozzle' product atomizer which has significantly increased the size and mass of the powder particles (see the two particle size graphs on page 10). The new benefits are; much higher powder recoveries, increased powder density and less problem atomizing viscous products like MPC80.

The dryer is direct fired with natural gas and is capable of 40-50 pounds of water evaporation per hour depending on the drying temperatures chosen. A double tube heat exchange system can be used to preheat the product up to 160°F just prior to spraying into the dryer. Preheating the product also increases the powder rate and density.

Uses/Projects: This system works best for lower sugar products such as nonfat dry milk, MPSs, whole milk, whey protein concentrates and isolates.

See page 10 for particle size graphs.

Look for CDR's cheese plant equipment descriptions in the next Pipeline.

Master Cheesemaker Class of 2012

This year, the Wisconsin Master Cheesemaker® Program will be honoring its 16th class of cheesemakers to complete the program. The program was established in 1994 through joint sponsorship with the Wisconsin Center for Dairy Research, University of Wisconsin-Extension, and the Wisconsin Milk Marketing Board. The 2012 class will welcome first-time Master Cheesemaker Gerard Knaus and returning Master Cheesemakers Tom Jenny and Scott Erickson. These Masters will be honored at the 2012 ICTE dinner in Milwaukee, WI on April 12.

Gerard Knaus, Class of 2012

Weyauwega Star Dairy Inc., Weyauwega ❁❁ *2012 Certified Master: Feta & Parmesan*

A third generation cheesemaker, Gerard always knew that he would join in the family business. “It runs in our blood,” said Knaus. “You always want to do more, you’re never satisfied.”

His father and mentor, Jim, always encouraged that kind of passion. Weyauwega Star Dairy was built on the Knaus family’s tenacity and their drive to make the most perfect cheese possible.

“When I began working with my father he taught me that everything had to be perfect; do it right the first time was his motto,” said Knaus. “The milk had to be perfect and the ingredients should be just right. He really groomed us to be perfect cheesemakers.”

As Weyauwega Star Dairy began to grow, Knaus and his family were equally inspired to maintain a family company focused on manufacturing a quality product that would continue to meet their high expectations.



Knaus remembers when Weyauwega Star Dairy was producing three vats per day. They now produce more than 23 vats on a daily basis. Knaus also makes more than 20 varieties of cheese but is most fond of brick style cheeses as they require a traditional hands-on approach.

“I remember my dad’s sisters coming to visit the plant,” said Knaus. “They saw the equipment and the expansion and said, ‘this isn’t how my daddy made cheese.’ I remember quickly replying, ‘well, this is how my daddy makes cheese.’ It was a special moment that really showed how far we’ve come.”

Knaus and his father still speak every day and most of the time, they are talking about cheese. “He inspires me to make the best cheese every day.”



Tom Jenny, Class of 1997

Carr Valley Cheese, LaValle 🌿 2012 Certified Master: *Fontina & Gouda*

Tom has a long history as a Master Cheesemaker. In fact, more than 15 years ago, he became one of the first people to earn the certification. Since that time, he has earned many awards including three for the Best of Class (Swiss cheese) at the United States Championship contest. He is honored to be a Master Cheesemaker and is proud to place the seal on his products.

“The Master Cheesemaker Program gives us more technical expertise and the Master Mark® tells the customer that the company has made a commitment to quality, craftsmanship and dedication,” said Jenny.

Tom worked at Old Wisconsin Cheese in Platteville making Swiss, Brick, Colby and Cheddar cheese for the first 31 years of his career and today he works at Carr Valley Cheese in LaValle where he recently earned his certification in Fontina and Gouda. Jenny is proud to continue his education and he strives to be a leader in his craft, adding that the Master program helps to support that leadership role.



“We advertise that we have highly skilled and dedicated cheesemaking veterans making our products,” said Jenny. “It is that skill and dedication that makes a difference in regards to the quality and taste of a product.”

Jenny and the Carr Valley Cheese team make quality and continued education a priority and encourage others to do the same.

“Learn and educate yourself as much as you can in regards to the products you make,” said Jenny. “You should become passionate about quality.”

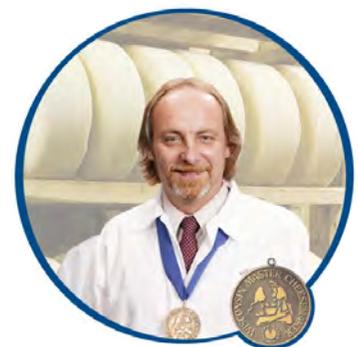
Scott Erickson, Class of 1998

Bass Lake Cheese Factory, Somerset 🌿 2012 Certified Master: *Juustoleipa*

A Wisconsin cheesemaker for more than 27 years and owner of Bass Lake Cheese Factory for more than 21, Scott is proud to be a part of the great Wisconsin tradition of cheesemaking. A Master since 1998, Scott is certified in Cheddar, Muenster, Monterey Jack, Chev’re and Colby.

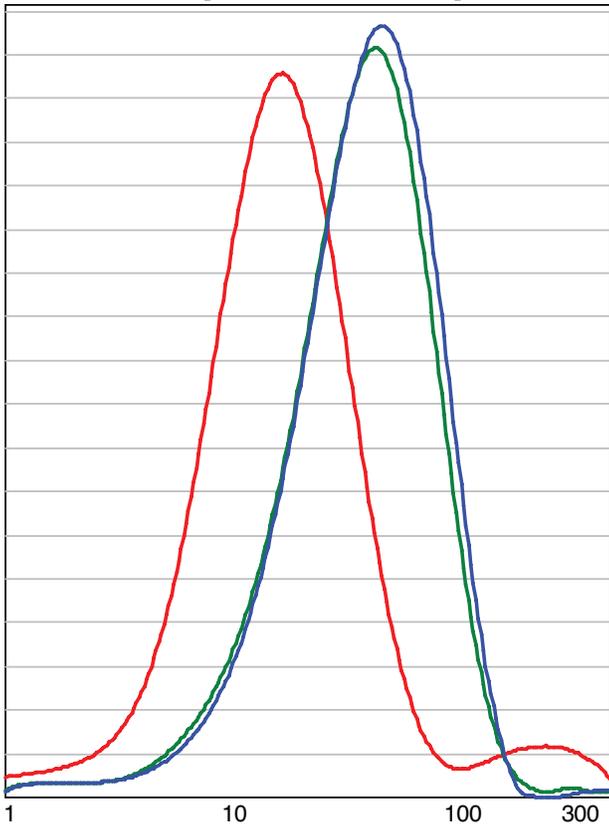
“Participating in the Master Cheesemaker® Program, I learned through lecture, hands-on experience and practice; what the cheesemaking process is all about,” said Erickson.

This year, he will make history when he becomes the first Master to be certified in Juustoleipa, a cheese with origins in Finland, Sweden and Lapland. Scott’s mentor, Jim Path, first introduced Wisconsin to this cheese in 2002. A unique specialty cheese due to the baking or grilling process required during its make process, Juustoleipa makes for an interesting product which can be eaten cold, warm, with bread or jam. “The main reason I wanted to achieve the ‘Master Mark®’ for Juusto was for Jim Path,” said Erickson.



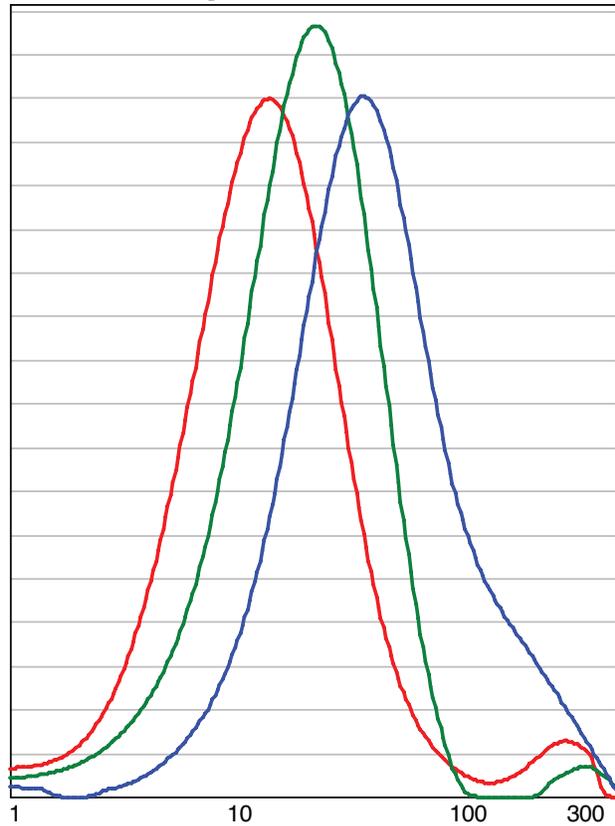
“The artisan cheese short courses at CDR offered me insight into different make procedures from many European countries,” said Scott. “These courses gave me the ambition to develop and create artisan crafted cheeses while adding my own personality.”

Particle size profiles of MPC powders



- MPC powder made with the two fluid nozzle
- MPC lot #1 dried with the new pressure nozzle
- MPC lot #2 dried with the new pressure nozzle

Particle size profiles



- NFDM made with the two fluid nozzle
- NFDM dried with the new pressure nozzle
- Whole milk dried with the new pressure nozzle

News from CDR

Luis Jimenez-Maroto, a 2009 graduate of the UW Department of Food Science, has been hired to fill a new position, Sensory Coordinator. Jimenez-Maroto will spend half of his time with CDR's sensory program and the other half doing sensory-related research and running the Food Science's Consumer Sensory Lab next to the dairy store in Babcock Hall. CDR's sensory program focuses on dairy products including cheese, yogurt, ice cream, and whey. But the Food Science side has a wider range; this year it has been

crackers, hot dogs, bread, brats and broths. Jimenez-Maroto emphasizes that the sensory lab is client-focused. They will work with you to define objectives and are able to run different tests for different types of products. Is a sensory evaluation something you need help with? Contact Luis at 608-262-3990 or ljmaroto@cdr.wisc.edu



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CDR Staff Offer Their Expertise at World Contest

The World Champion Cheese Contest, held March 5-7 at the Monona Terrace in Madison, WI welcomed judges from all around the world, including CDR's own Luis Jimenez-Maroto, John Jaeggi and Dr. Bob Bradley.



John Jaeggi (right) and fellow judge Russel Smith of Australia judge a wheel of smear ripened semi-soft cheese.



Nana Farkye, Ph.D of Cal Poly and Luis Jimenez-Maroto discuss a Hispanic style cheese.



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www.cdr.wisc.edu

Short Course Calendar:

World of Cheese- April 29-May 3

Cleaning and Sanitation- May 8

HACCP- May 9

Applied Dairy Chemistry- May 15-16

Cheese Grading- June 5-7

For detailed information on each short course

www.cdr.wisc.edu/shortcourses

Events:

International Cheese Technology Exposition (ICTE) April 10-13, Milwaukee

Master Cheesemaker® Program Applications due by May 15

International Dairy Federation (IDF) Cheese Ripening & Technology

Symposium May 21-24, Madison **www.idfcheeseus2012.com**

Institute of Food Technologists Conference, June 25-28, Las Vegas, NV

American Dairy Science Association Meeting, July 15-19 Phoenix, AZ