

Basics of Dairy Foods Workshop (2-Day)

Day1 (Aug 11th 2022) (instructor: Dr. Donald McMahon, Emeritus Professor of Dairy Technology, Utah State University)

Time	#	Duration min	Topic	Content summary
8:00am		30	Breakfast	Provided onsite
8:30	1	45	What is milk?	<ul style="list-style-type: none"> • protein <ul style="list-style-type: none"> ○ amino acids ○ whey proteins ○ casein micelles • fat <ul style="list-style-type: none"> ○ triglycerides ○ milk fat globules • lactose <ul style="list-style-type: none"> ○ lactose intolerance ○ browning • minerals <ul style="list-style-type: none"> ○ calcium and phosphate ○ biological function of milk ○ other minerals • vitamins
		15	Product Discussion	Whole, 2%, 1%, skim milk, <ul style="list-style-type: none"> • appearance, taste • legal standards
9:30	2	30	Dairy food quality and safety	<ul style="list-style-type: none"> • bacteria and spoilage <ul style="list-style-type: none"> ○ including cold storage of milk • bacteria and fermentation <ul style="list-style-type: none"> ○ including understanding pH • bacteria and food safety • bacteria and human health
		15	Product Discussion	Yogurts, with and without probiotic and health claims , Kefir <ul style="list-style-type: none"> • bacteria required in yogurt • probiotic bacteria
		15	Break	
10:30	3	45	Pasteurization and Fluid Milk Products	<ul style="list-style-type: none"> • purpose of pasteurization • how HTST pasteurization works • how batch pasteurization works • cream separation and standardization of milk • shelf life • concentration of milk by evaporation and filtration • chocolate milk • ESL and UHT

		15	Product Discussion	Flavored milks <ul style="list-style-type: none"> • pasteurized • ESL • UHT (Gossner) Half'n'half creamer
11:30	4	45	Milk gelation and overview of semi-solid dairy products	<ul style="list-style-type: none"> • basics of acid, rennet and heat coagulation • acidified dairy products <ul style="list-style-type: none"> ○ yogurts, cream cheese, cottage cheese ○ heat/acid coagulation <ul style="list-style-type: none"> • rennet coagulated dairy products ○ some common cheeses, including cheese curd
			Product Discussion	<ul style="list-style-type: none"> • cream cheese, cottage cheese, ricotta cheese, mild cheddar cheese
12:30 pm		60	Lunch	Provided onsite
1:30pm	5	45	Frozen dairy desserts	<ul style="list-style-type: none"> • Formulation of ice cream <ul style="list-style-type: none"> ○ ingredients ○ standard of identity • Fundamentals of freezing <ul style="list-style-type: none"> ○ role of sugar • Structure of ice cream <ul style="list-style-type: none"> ○ role of small air bubbles, fat droplets, lactose crystals ○ overrun • Storage of ice cream <ul style="list-style-type: none"> ○ soft serve vs gelato vs ice cream vs custard
		15	Product Discussion	Regular Ice Cream, Premium Ice Cream, Light Ice Cream, High Protein Ice Cream
2:30	6	30	How to Make Yogurt Products	
		15	Product Discussion	Stirred yogurt, set yogurt, Greek Yogurt, Yogurt Drink
		15	Break	
3:30	7	45	How to Make Cheeses	
		15	Product Discussion	Cheese curd, Aged Cheddar, Monterey, Fresh Mozzarella, String mozzarella cheese
4:30	Final thoughts and adjourn for Day-1			

Day 2 (Aug. 12th 2022) (instructor: Dr. Haotian Zheng, Assistant Professor of Food Chemistry, NC State University) meet at room 232, Schaub Hall, Department of Food, Bioprocessing and Nutrition Sciences, NC State University (400 Dan Allen Dr. Raleigh)

Time	#	Duration h	Topic	Content summary
8:00am		0.5	Breakfast	Provided onsite
8:30	1	4	Practical demonstration: Manufacturing protein fortified yogurt (fat-free)	<ul style="list-style-type: none"> • Introduction (1h) • Formulation & Ingredient handling & Yogurt milk preparation (2h) • Culture inoculation (0.5h) • Yogurt milk incubation (skip the waiting time) • Yogurt smoothing (0.5h)
12:30pm		1	Lunch	Provided onsite
1:00pm	Final thoughts and adjourn for Day-2			

Additional information:

- Venue: Room 103 at Schaub Hall, Department of Food, Bioprocessing and Nutrition Sciences, NC State University (400 Dan Allen Drive Raleigh, NC 27606)
- On campus parking: parking permit will be provided
- Accommodation option: <https://www.stateviewhotel.com/>

About the instructors



Professor McMahon taught at Utah State University for 34 years. He was the director of the Western Dairy Center and continues to teach workshops and courses on dairy foods, cheese and ice cream. Throughout his career he combined an interest in dairy foods and a passion for science that he passed on to students. He also directed the operation of the university's creamery, the home of Famous Aggie Ice Cream®.



Dr. Haotian Zheng is a tenure-track assistant professor in Food Chemistry at North Carolina State University (NC State). He directs the Food Rheology Laboratory; he also affiliates to the Southeast Dairy Foods Research Center at NC State University. Dr. Zheng's research interests include developing novel dairy ingredients, improving food ingredient functionality, food structure design for improved stability, textural attributes, and health benefits of processed foods, and solving real life problems in the food industry. He also teaches Food Chemistry and Food Ingredient Functionality related courses at NC State. Prior to the current position, he was a tenure-track assistant professor in Dairy Foods Manufacturing & Bioengineering at California Polytechnic State University, San Luis Obispo, CA. Moreover, Dr. Zheng gained professional research experiences from both industry and academia including Fonterra Research Center, Palmerston North, New Zealand as a research technologist and Lincoln University, New Zealand as a Food Engineering lecturer.