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August 13–17, 2016 • Denver, Colorado, U.S.A.

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General Information

Registration Desk Hours

Registration is in the Plaza Concourse Level Registration area. Registration is open at the following times:

Saturday, August 13:	12:00–7:30 p.m.
Sunday, August 14:	7:30 a.m.–5:30 p.m.
Monday, August 15:	7:45 a.m.–4:00 p.m.
Tuesday, August 16:	7:45 a.m.–5:30 p.m.
Wednesday, August 17:	8:00–11:00 a.m.

Please wear your name badge at all times to ensure access to sessions and events. Event tickets must be presented at their applicable events.

Hospitality Hours

Connect with your colleagues over a beer in the Hospitality Room, located in the Tower Building, Second Level, Windows Room. You must be over 21 and have a name badge to access the hospitality room. The hospitality room is open at the following times:

Saturday, August 13:	2:00–7:00 p.m. 9:30–11:30 p.m.
Sunday, August 14:	5:15–11:30 p.m.
Monday, August 15:	4:00–11:30 p.m.
Tuesday, August 16:	5:15–6:45 p.m. 10:00–11:30 p.m.

Silent Auction

Help strengthen the future of the brewing industry by bidding on fabulous items at the WBC 2016 Silent Auction. Dozens of donated items from various individuals and companies will be on display in the Plaza Foyer, ready to be bid on by you! Proceeds from the Silent Auction support students' educational and research endeavors.

Sunday, August 14:	11:30 a.m.–5:30 p.m.
Monday, August 15:	9:00 a.m.–2:00 p.m.
Tuesday, August 16:	8:30 a.m.–3:20 p.m.

Charging Station

Is the battery running low on your laptop or mobile device? Come to the Charging Station in the Governor's Square Foyer (located in the Plaza Building, Concourse Level) for a recharge!



The WBC Charging Station is sponsored by ABS Commercial.

Giveaway Monday

Come to the Exhibit Hall on Monday for a chance to win wonderful prizes worth \$100 or more! To enter, simply drop off your business card at participating booths on Monday between 11:30 a.m. and 1:00 p.m. Winners will be announced 1:00–2:00 p.m. You must be present to win.

WBC Mobile App

Keep connected with the WBC mobile app. Access the schedule, abstracts, exhibitor descriptions, announcements, and more, all at your fingertips! Download now at worldbrewingcongress.org.



The WBC mobile app is sponsored in part by Fermentis.



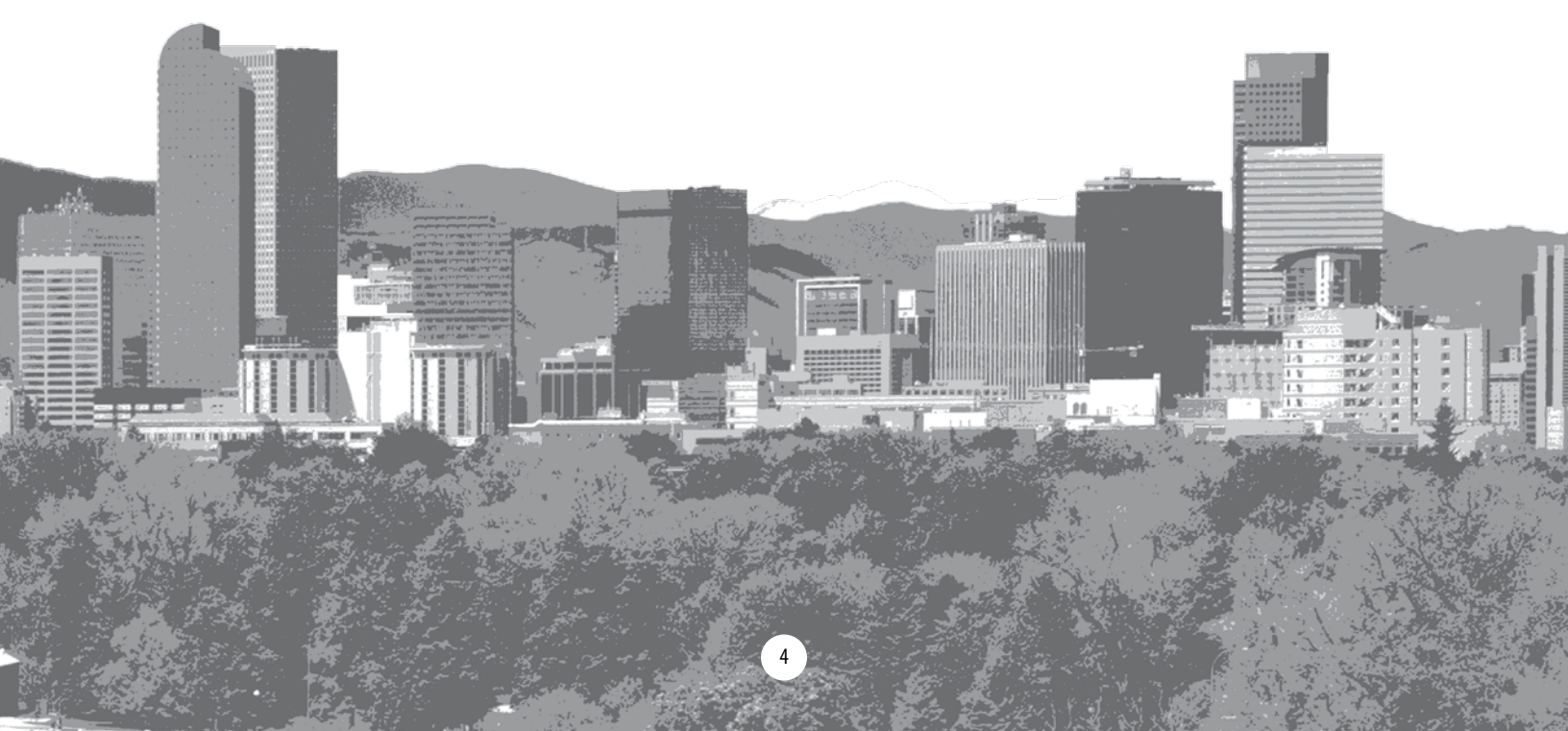
Abstracts

WBC abstracts can be accessed in two ways:

- WBC Mobile App: The mobile app is available for download on the WBC website or the Apple store.
- WBC Website: Visit www.worldbrewingcongress.org and go to Congress, then Abstracts

Proceedings

Electronic proceedings are available to purchase for \$55 at the Registration Desk. The proceedings will be available online following the meeting to all who purchased them.



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Schedule-at-a-Glance

Saturday, August 13	
8:00 a.m.–12:00 p.m.	Pre-Congress Course: Experimental Design for Brewers* • <i>Tower Building, Second Level, Tower Court B</i>
9:30 a.m.–2:45 p.m.	Pre-Congress Course: OSHA 10-Hour General Industry Course part II* • <i>Plaza Building, Concourse Level, Plaza Court 3</i>
1:00–5:00 p.m.	Pre-Congress Course: ASBC Lab-in-a-Fishbowl—Yeast Viability, Wort Gravity, and IBUs* • <i>Tower Building, Second Level, Tower Court A</i> Pre-Congress Course: Commercial Enzymes in Brewing* • <i>Tower Building, Second Level, Tower Court B</i> Pre-Congress Course: The Science of Beer and Food Pairing* • <i>Tower Building, Second Level, Tower Court D</i>
7:00–9:30 p.m.	Mile High Meet-Up • <i>Tower Building, Second Level, Grand Ballroom and South Lobby</i>
9:30–11:00 p.m.	The Afterglow • <i>Tower Building, Second Level, Tower Court D</i>
Sunday, August 14	
8:15–9:30 a.m.	Opening Session and Keynote Speaker • <i>Tower Building, Second Level, Grand Ballroom</i>
9:45–11:30 a.m.	Technical Session 1: Eco-Awareness & Sustainability • <i>Plaza Building, Concourse Level, Governor’s Square 14</i> Technical Session 2: Sensory I • <i>Tower Building, Second Level, Grand Ballroom</i> Technical Session 3: Yeast Biotechnology • <i>Plaza Building, Concourse Level, Governor’s Square 15</i> Workshop: Brewery and Laboratory Safety • <i>Tower Building, Majestic Level, Majestic Ballroom</i> Supplier Sessions • <i>Plaza Building, Concourse Level, Plaza Court 4–7</i>
11:30 a.m.–2:00 p.m.	Exhibits, Posters, Lunch • <i>Plaza Building, Concourse Level, Plaza Ballroom and Foyer</i>
2:00–3:15 p.m.	BCOJ Symposium • <i>Plaza Building, Concourse Level, Governor’s Square 14</i> Technical Session 4: Barley & Malt I • <i>Tower Building, Second Level, Grand Ballroom</i> Technical Session 5: Lactic Acid Bacteria • <i>Plaza Building, Concourse Level, Governor’s Square 15</i> Supplier Sessions • <i>Plaza Building, Concourse Level, Plaza Court 4–7</i>
3:30–5:15 p.m.	Global Conversation: Brewing Water: Taking Control of Flavor Impacts • <i>Plaza Building, Concourse Level, Governor’s Square 14</i> Technical Session 6: Hops I • <i>Plaza Building, Concourse Level, Governor’s Square 15</i> Workshop: Brewing Fundamentals: Wort Boiling, Practical Science and Techniques • <i>Tower Building, Second Level, Grand Ballroom</i> Workshop: A Sensory Lexicon for Barrel-Aged Beers • <i>Tower Building, Majestic Level, Majestic Ballroom</i>
Monday, August 15	
8:15–9:30 a.m.	EBC Symposium • <i>Plaza Building, Concourse Level, Governor’s Square 14</i> Technical Session 7: Brew House Operations • <i>Tower Building, Second Level, Grand Ballroom</i> Technical Session 8: Yeast Stress & Performance • <i>Tower Building, Majestic Level, Majestic Ballroom</i> Supplier Sessions • <i>Plaza Building, Concourse Level, Plaza Court 4–6</i>
9:45–11:30 a.m.	Technical Session 9: Brewing Microbiology • <i>Plaza Building, Concourse Level, Governor’s Square 14</i> Technical Session 10: Dry Hopping • <i>Tower Building, Second Level, Grand Ballroom</i> Technical Session 11: Engineering and Packaging • <i>Plaza Building, Concourse Level, Governor’s Square 15</i> Workshop: Supplier Partnerships • <i>Tower Building, Majestic Level, Majestic Ballroom</i> Supplier Sessions • <i>Plaza Building, Concourse Level, Plaza Court 4–6</i>
11:30 a.m.–2:00 p.m.	Exhibits, Posters, Lunch • <i>Plaza Building, Concourse Level, Plaza Ballroom and Foyer</i>
2:15–4:45 p.m.	Workshop: Practical Applications of Six Sigma Concepts in a Brewing Laboratory* • <i>Tower Building, Majestic Level, Majestic Ballroom</i>
2:15–6:00 p.m.	Denver Urban Adventure* • <i>Off-site: Meet in lobby by WBC field trip signage</i> Distillery Tour* • <i>Off-site: Meet in lobby by WBC field trip signage</i> RiNo Brewery Tour* • <i>Off-site: Meet in lobby by WBC field trip signage</i>

Tuesday, August 16	
8:15–9:30 a.m.	IBD Symposium part I • <i>Tower Building, Second Level, Grand Ballroom</i> Technical Session 12: Filtration • <i>Plaza Building, Concourse Level, Governor's Square 14</i> Technical Session 13: Sensory II • <i>Plaza Building, Concourse Level, Governor's Square 15</i>
9:45–11:30 a.m.	IBD Symposium part II • <i>Tower Building, Second Level, Grand Ballroom</i> Technical Session 14: Hops II • <i>Plaza Building, Concourse Level, Governor's Square 14</i> Technical Session 15: World Class Manufacturing • <i>Plaza Building, Concourse Level, Governor's Square 15</i> Workshop: Hygienic Design, Sustainable Cleaning, and Validation • <i>Tower Building, Majestic Level, Majestic Ballroom</i>
11:30 a.m.–2:00 p.m.	Exhibits, Posters, Lunch • <i>Plaza Building, Concourse Level, Plaza Ballroom and Foyer</i>
2:00–3:15 p.m.	Global Conversation: Beverage Consumer Trends • <i>Tower Building, Majestic Level, Majestic Ballroom</i> Technical Session 16: Barley & Malt II • <i>Plaza Building, Concourse Level, Governor's Square 14</i> Workshop: Food Safety—What is Required for Breweries and How Are They Doing It? • <i>Tower Building, Second Level, Grand Ballroom</i>
3:30–5:15 p.m.	Technical Session 17: Beer Aging • <i>Plaza Building, Concourse Level, Governor's Square 14</i> Technical Session 18: Evolution of Brewing • <i>Plaza Building, Concourse Level, Governor's Square 15</i> Workshop: Hops and Their Evaluation within Today's Ever-Changing Brewing World • <i>Tower Building, Second Level, Grand Ballroom</i> Workshop: Sour Beers • <i>Tower Building, Majestic Level, Majestic Ballroom</i>
7:00–10:00 p.m.	The Street Scene Block Party • <i>Off site—Left on 16th Street to Glenarm Place</i>
Wednesday, August 17	
8:15–9:30 a.m.	Technical Session 19: Beer Bitterness • <i>Tower Building, Second Level, Grand Ballroom</i> Technical Session 20: Mashing, Boiling, & Wort • <i>Plaza Building, Concourse Level, Governor's Square 14</i> Workshop: Managing the Herd • <i>Tower Building, Majestic Level, Majestic Ballroom</i>
9:45–11:00 a.m.	Closing Session • <i>Tower Building, Second Level, Grand Ballroom</i>

*Additional registration required to attend.





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Schedule: Day-by-day

Friday, August 12

9:30 a.m.–4:30 p.m.	Red Rocks/Coors Brewery Tour*	Off-site: Meet in lobby by WBC field trip signage
9:45 a.m.–5:00 p.m.	Fort Collins Breweries Tour*	Off-site: Meet in lobby by WBC field trip signage
10:15 a.m.–5:30 p.m.	Experience Boulder*	Off-site: Meet in lobby by WBC field trip signage
12:30–5:30 p.m.	Pre-Congress Course: Packaging Test Methods*	Off-site: Meet in lobby by WBC field trip signage
12:30–6:15 p.m.	Pre-Congress Course: OSHA 10-Hour General Industry Course part I*	Plaza Building, Concourse Level, Plaza Court 3

Saturday, August 13

8:00 a.m.–12:00 p.m.	Pre-Congress Course: Experimental Design for Brewers*	Tower Building, Second Level, Tower Court B
9:30 a.m.–2:45 p.m.	Pre-Congress Course: OSHA 10-Hour General Industry Course part II*	Plaza Building, Concourse Level, Plaza Court 3
12:00–7:30 p.m.	Registration Open	Plaza Registration
1:00–5:00 p.m.	Pre-Congress Course: ASBC Lab-in-a-Fishbowl—Yeast Viability, Wort Gravity, and IBUs*	Tower Building, Second Level, Tower Court A
1:00–5:00 p.m.	Pre-Congress Course: Commercial Enzymes in Brewing*	Tower Building, Second Level, Tower Court B
1:00–5:00 p.m.	Pre-Congress Course: The Science of Beer and Food Pairing*	Tower Building, Second Level, Tower Court D
2:00–7:00 p.m.	Exhibitor Set-up	Plaza Building, Concourse Level, Plaza Ballroom
2:00–7:00 p.m.	Hospitality Room	Tower Building, Second Level, Windows
7:00–9:30 p.m.	Mile High Meet-Up	Tower Building, Second Level, Grand Ballroom and South Lobby
9:30–11:00 p.m.	The Afterglow	Tower Building, Second Level, Tower Court D
9:30–11:30 p.m.	Hospitality Room	Tower Building, Second Level, Windows

*Additional registration required to attend.

Saturday Highlights

Pre-Congress Course: Experimental Design for Brewers*

8:00 a.m.–12:00 p.m. • Tower Building, Second Level, Tower Court B

Eric Samp, MillerCoors

The experimental design techniques covered in this workshop will provide brewers with the statistical tools necessary to construct tests with multiple factors using orthogonal two-level factorial designs. Discover how to determine the statistical significance of individual factors on responses, identify interactions, and interpret them when changing more than one factor at a time. In addition, reducing experimental test sizes by using fractionating full factorials will be covered along with interpretation of design resolution and techniques to determine it. Gain a working knowledge of how to use factorial designs to help identify the key variables that influence a process and use that information to optimize and control your brewing processes for specific business objectives. Participants must bring their own calculator for the hands-on exercises.

Pre-Congress Course: OSHA 10-Hour General Industry Course Part II*

9:00 a.m.–2:45 p.m. • Plaza Building, Concourse Level, Plaza Court 3

Andrew Dagnan, Breckenridge Brewery; Jim Kuhr, Matt Brewing; Scott Millbower, Millbower LLC; Jim Stricker, Odell Brewing

This 10-hour OSHA General Industry Course is a two-day class designed for breweries. Students will learn about OSHA (Occupational Safety and Health Administration), what the rules are, how to comply with those rules, particular hazards in breweries, and best practices that will help breweries protect their employees. Subjects covered will be Intro to OSHA, Walking and Working Surfaces, Life Safety, Health and Safety, Personal Protective Equipment, Noise, Forklifts, Ergonomics, and Hazardous Materials.

Pre-Congress Course: ASBC Lab-in-a-Fishbowl—Yeast Viability, Wort Gravity, and IBUs*

1:00–5:00 p.m. • Tower Building, Second Level, Tower Court A

Patricia Aron, Rahr Corporation; Scott Britton, Duvel Moortgat, NV; Christine Hanson, E&J Gallo Winery; Kelly Tretter, New Belgium Brewing Co.

Take a look inside “Lab-in-a-Fishbowl” as we compare methodologies on three fundamental brewing topics: 1) enumerating yeast and assessing their viability, 2) measuring wort gravity, and 3) evaluating IBUs and its bitterness implications. This workshop will provide an in-depth explanation and demonstration of the simple and low-cost ASBC method used to determine cell count, viability, and vitality with a microscope, hemocytometer, and commercially available dyes. In addition, we will describe the various ways a brewer can measure wort gravity via hydrometer, refractometer, and a hand-held density meter. Lastly, we will define the IBU, discuss the difference between measuring the iso-alpha acids and measuring bitterness units by spectrophotometer, and address how these analytical differences impact perceived bitterness. Join us for live demonstrations of these core methods.

**Pre-Congress Course:
Commercial Enzymes in Brewing***

1:00–5:00 p.m. • Tower Building, Second Level, Tower Court B

Wilbert Heijne, DSM Food Specialties; David Maradyn, Novozymes North America; Jannik Musksgaard, DuPont Industrial Biosciences; Sylvie Van Zandycke, DSM Food Specialties

This will be an interactive session with some of the world’s foremost enzyme experts representing the three major enzyme companies in the world today. The program will consist of two major sections. The first section will be a review of enzymes: those occurring in nature and those available as commercial enzymes, including a discussion on what enzymes are, how they interface brewing processes, how they

are controlled, an overview of naturally occurring enzymes within the malting and brewing process, and more. The second half of the workshop will be a review of real world challenges in brewing and how commercial enzymes can be used to address these challenges. This discussion will be interactive, so bring your ideas, problems, and challenges for inclusion into this discussion. During the entire session participants will have the opportunity to engage the presenters on a series of questions as well as any question that may be of interest as it relates to the program, so come prepared to learn, relate, and push the limits of possibilities.

**Pre-Congress Course:
The Science of Beer and Food Pairing***

1:00–5:00 p.m. • Tower Building, Second Level, Tower Court D

Ray Daniels, Cicerone Certification Program; Adam Dulye, Brewers Association; Pat Fahey, Cicerone Certification Program; Nicole Garneau, Flavor Lab, LLC; Julia Herz, Brewers Association

In this workshop, we will discuss how the norms of food and beer pairings are being challenged through practical sensory-focused research. Crowdsourced data, accumulated from beer and food pairing events, will be presented in an attempt to add value to, debunk, or generate new hypotheses regarding food and beer pairing dogma. In addition to recent findings, we will cover practical food and beer pairing examples that elegantly display the science behind pairing decisions. The aim of this workshop is to make beer the model for other beverages in terms of the way we understand, discuss, and organize beer and food pairings.

Mile High Meet-Up

7:00–9:30 p.m. • Tower Building, Second Level, Grand Ballroom and South Lobby

Join us in the WBC mountain chalet to hoist a few beers and listen to the sounds of a Bluegrass band. Taste local foods, samples local spirits, enjoy a game of air hockey or foosball, and have your photo taken in the open-air photo booth. Adjust to the altitude of Colorado as you reconnect with colleagues and make new friends!

The Afterglow

9:30–11:00 p.m. • Tower Building, Second Level, Tower Court D

Wind down your evening with this traditional event full of friends, hospitality, and Irish coffee.

The Afterglow is sponsored by Malteurop North America.





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Schedule: Day-by-day

Sunday, August 14

7:00–8:00 a.m.	Speaker Breakfast		<i>Tower Building, Majestic Level, Majestic Ballroom</i>
7:00–11:00 a.m.	Exhibitor Set-up		<i>Plaza Building, Concourse Level, Plaza Ballroom</i>
7:30 a.m.–5:30 p.m.	Registration Open		<i>Plaza Building, Concourse Level, Registration</i>
8:15–9:30 a.m.	Opening Session and Keynote Speaker		<i>Tower Building, Second Level, Grand Ballroom</i>
9:30–11:00 a.m.	Poster Set-up		<i>Plaza Building, Concourse Level, Foyer; Plaza 2 & 3</i>
9:45–11:15 a.m.	Supplier Sessions		<i>Plaza Building, Concourse Level</i>
	• 9:45–10:15 a.m.	Cablevey Conveyors	<i>Plaza Court 4</i>
	• 9:45–10:15 a.m.	Steinfurth, Inc.	<i>Plaza Court 5</i>
	• 9:45–10:15 a.m.	Munters Corporation	<i>Plaza Court 6</i>
	• 9:45–10:45 a.m.	Christian Gresser	<i>Plaza Court 7</i>
	• 10:45–11:15 a.m.	Donaldson Company, Inc.	<i>Plaza Court 6</i>
	• 10:45–11:15 a.m.	Rheonix Food & Beverage	<i>Plaza Court 5</i>
9:45–11:30 a.m.	Technical Session 1: Eco-Awareness & Sustainability		<i>Plaza Building, Concourse Level, Governor's Square 14</i>
	<i>Moderator: Doug MacNair, Harpoon Brewing</i>		
	• 9:45 a.m.	1. Global impacts of water scarcity—Culture of cooperation. <i>Benjamin Moline, Molson Coors Brewing Company</i>	
	• 10:10 a.m.	2. Sustainable treatment of high-strength brewery effluent at Bell's Brewery: Operational efficiencies and life-cycle cost of ownership. <i>Evan Meffert, Bell's Brewery, Inc.</i>	
	• 10:35 a.m.	3. Creating a man-made wetland to process brewery wastewater. <i>Karlos Knott, Bayou Teche Brewing</i>	
	• 11:00 a.m.	4. Brewer's spent grain—Waste material as potential raw material for healthy diet. <i>Julia Steiner, Technische Universität München</i>	
9:45–11:30 a.m.	Technical Session 2: Sensory I		<i>Tower Building, Second Level, Grand Ballroom</i>
	<i>Moderator: Cindy-Lou Lakenburges, Anheuser-Busch, LLC.</i>		
	• 9:45 a.m.	254. What we now know about flavor perception. <i>Karl Siebert, Cornell University</i>	
	• 10:10 a.m.	6. Sensory and instrumental analyses of compounds affecting beer smoothness. <i>Seiko Miyashita, Asahi Breweries, Ltd.</i>	
	• 10:35 a.m.	7. Modern approaches to beer taster training. <i>Bill Simpson, Cara Technology Ltd.</i>	
	• 11:00 a.m.	8. The suitability of the tetrad test as a replacement for the triangle test in the brewing industry. <i>Hannah Lemar, Campden BRI</i>	
9:45–11:30 a.m.	Technical Session 3: Yeast Biotechnology		<i>Plaza Building, Concourse Level, Governor's Square 15</i>
	<i>Moderator: Sylvie Van Zandycke, DSM Food Specialties</i>		
	• 9:45 a.m.	9. Selection and development of new brewing yeasts with superior industrial phenotypes. <i>Alicia Gutierrez Linares, KU Leuven CMPG & VIB Lab for Systems Biology</i>	
	• 10:10 a.m.	10. A large set of newly created interspecific yeast hybrids increases aromatic diversity in lager beers. <i>Stijn Mertens, KU Leuven/VIB</i>	
	• 10:35 a.m.	11. A new take on the oldest biotechnology: Engineering brewer's yeast for production of hop-derived terpenes. <i>Charles Denby, LBNL</i>	
	• 11:00 a.m.	12. Self-cloning brewing yeast—New dimension of beer fermentation? <i>Susann Fischer, Chair of Brewing and Beverage Technology, Technische Universität München</i>	
9:45–11:30 a.m.	Workshop: Brewery and Laboratory Safety		<i>Tower Building, Majestic Level, Majestic Ballroom</i>
11:30 a.m.–2:00 p.m.	Exhibits and Lunch		<i>Plaza Building, Concourse Level, Plaza Ballroom</i>
11:30 a.m.–2:00 p.m.	Poster Session		<i>Plaza Building, Concourse Level, Foyer; Plaza 2 & 3</i>
	• 12:30–1:00 p.m.	Authors present at odd-numbered posters	
	• 1:00–1:30 p.m.	Authors present at even-numbered posters	
11:30 a.m.–5:30 p.m.	Silent Auction		<i>Plaza Building, Concourse Level, Foyer</i>

2:00–3:15 p.m.	<p>BCOJ Symposium Moderator: <i>Tom Shellhammer, Oregon State University</i></p> <ul style="list-style-type: none"> • 2:00 p.m. Welcome to all delegates of World Brewing Congress 2016 in Denver. <i>Koichi Toyoshima, Brewery Convention of Japan</i> • 2:05 p.m. The progress of brewing technology and new product development in Japan. <i>Takeshi Nakamura, Sapporo Breweries Ltd.</i> • 2:25 p.m. Selective removal of myrcene and improved utilization of alpha-acids by pre-incubation of aroma hops. <i>Hisato Imashuku, Asahi Breweries, Ltd.</i> • 2:50 p.m. Development of a novel culture-independent method for comprehensive detection and identification of beer-spoilage microorganisms. <i>Masaki Shimokawa, Asahi Breweries, Ltd.</i> 	<i>Plaza Building, Concourse Level, Governor's Square 14</i>
2:00–3:15 p.m.	<p>Technical Session 4: Barley & Malt I Moderator: <i>Xiang Yin, Rahr Corporation</i></p> <ul style="list-style-type: none"> • 2:00 p.m. 13. Impact of malt-specific pro- and antioxidants on the formation of dimethyl sulfoxide. <i>Matthias Baldus, Technische Universität Berlin</i> • 2:25 p.m. 14. Barley starch—It's not about quantity but the quality (Does size matter?). <i>Glen Fox, The University of Queensland</i> • 2:50 p.m. 15. Understanding metabolite variation in barley, malt, and beer and association to flavor and flavor stability: A metabolomics approach. <i>Adam Heuberger, Colorado State University</i> 	<i>Tower Building, Second Level, Grand Ballroom</i>
2:00–3:15 p.m.	<p>Technical Session 5: Lactic Acid Bacteria Moderator: <i>Scott Britton, Duvel Moortgat, NV; Kelly Tretter, New Belgium Brewing Co.</i></p> <ul style="list-style-type: none"> • 2:00 p.m. 16. The lifestyle of beer-spoiling lactic acid bacteria is based on digging in the plasmid pool. <i>Rudi F. Vogel, Technische Universität München</i> • 2:25 p.m. 17. Characterization of beta-glucan formation by <i>Lactobacillus brevis</i> TMW1.2112 isolated from slimy spoiled beer. <i>Marion E Fraunhofer, Technische Universität München</i> • 2:50 p.m. 18. Genome comparisons of <i>Lactobacillus</i> and <i>Pediococcus</i> reveal genetic markers of brewery adaptation. <i>Barry Ziola, University of Saskatchewan</i> 	<i>Plaza Building, Concourse Level, Governor's Square 15</i>
2:00–3:15 p.m.	<p>Supplier Sessions</p> <ul style="list-style-type: none"> • 2:00–2:30 p.m. DuPont Tate & Lyle Bio Products, LLC <i>Plaza Court 7</i> • 2:00–3:00 p.m. Day & Zimmermann <i>Plaza Court 5</i> • 2:00–3:00 p.m. EAGLE Certification Group <i>Plaza Court 4</i> • 2:00–3:00 p.m. HEUFT USA, Inc. <i>Plaza Court 6</i> • 2:45–3:15 p.m. DuPont Industrial Biosciences <i>Plaza Court 7</i> 	<i>Plaza Building, Concourse Level</i>
3:30–5:15 p.m.	<p>Global Conversation: Brewing Water: Taking Control of Flavor Impacts</p>	<i>Plaza Building, Concourse Level, Governor's Square 14</i>
3:30–5:15 p.m.	<p>Technical Session 6: Hops I Moderator: <i>Patricia Aron, Rahr Corporation</i></p> <ul style="list-style-type: none"> • 3:30 p.m. 19. Influence of time, temperature, and hop oil content on aroma extraction during dry-hopping. <i>Sebastian Hinz, Barth Haas Group</i> • 3:55 p.m. 20. The impact of solution-state equilibria on the rate of alpha-acid isomerization. <i>Paul Hughes, Oregon State University</i> • 4:20 p.m. 21. Direct ESI-MS quantitation of bittering acids, isomerization, and oxidation products in hops and beer. <i>Andre Venter, Western Michigan University</i> • 4:45 p.m. 22. Bitterness assessment in dry-hopped beers based on sensory and analytical analysis. <i>Willi Mitter, Hopsteiner</i> 	<i>Plaza Building, Concourse Level, Governor's Square 15</i>

3:30–5:15 p.m.	Workshop: Brewing Fundamentals: Wort Boiling, Practical Science and Techniques	<i>Tower Building, Second Level, Grand Ballroom</i>
3:30–5:15 p.m.	Workshop: A Sensory Lexicon for Barrel-Aged Beers	<i>Tower Building, Majestic Level, Majestic Ballroom</i>
5:15–11:30 p.m.	Hospitality Room	<i>Tower Building, Second Level, Windows</i>

Sunday Highlights



Opening Keynote—Peter Coors, Chairman, Molson Coors Brewing Company; Chairman, MillerCoors

8:15–9:30 a.m. • *Tower Building, Second Level, Grand Ballroom*

Peter H. Coors is chairman of Molson Coors Brewing Company and chairman of MillerCoors. Pete is a native of the state of Colorado. He was born in Golden, Colorado, and remains a resident of Golden today.

He graduated from the Phillips Exeter Academy in Exeter, N.H., in 1965, attended Cornell University where he received his bachelor's degree in industrial engineering in 1969. He earned a master's degree in business administration from the University of Denver in 1970. He also has received honorary doctorates from Regis University in 1991, Wilberforce University in 1992, Johnson & Wales University in 1997, and Colorado State University in 2011.

Pete's professional career in the brewing business follows a Coors tradition that has spanned more than a century and five generations of Coors family members. He has served in a number of positions at the company. In 2002, Pete was named chairman, Coors Brewing Company and chairman of Adolph Coors Company. Currently, Pete is chairman of Molson Coors Brewing Company. In addition, in July, 2008, Pete was named chairman of MillerCoors.

Workshop: Brewery and Laboratory Safety

9:45–11:30 a.m. • *Tower Building, Majestic Level, Majestic Ballroom*

Aaron Golston, Lagunitas Brewing Co.; Mark Jaeggi, Monsanto; Jody Seamen, MillerCoors; Jaime Wenham, Sierra Nevada Brewing Co.

There is nothing more important in a brewery than safety. Brewery staff are surrounded by hazardous equipment on a daily basis and can become quite comfortable with this fact. However, comfort should never preclude a safety-minded culture. Each brewery is unique; however, one commonality exists between all: the desire to keep the loyal, dedicated, and hardworking people safe while producing delicious beer. This joint workshop will address the big picture of safety for both brewery and laboratory operations. Interactive examples and discussions on the most common safety concerns and oversights within the industry will provide insight into safety solutions. The goal of this session is to increase awareness of best practices and to establish the importance of a safety-minded culture. A culture that ensures everyone goes home safe every night.

Global Conversation: Brewing Water: Taking Control and Flavor Impacts

3:30–5:15 p.m. • *Plaza Building, Concourse Level, Governor's Square 14*

Steve Corbett, H2O Engineering; Aaron Justus, Ballast Point Brewing; John Palmer, Palmer Brewing Solutions, Inc.

Are you still struggling to take control of water at your brewery? Do

you have control but wonder about the next steps? Are you wondering if you are actually doing everything you should be doing? This Global Conversations session will help you answer these questions. This session will consist of an overview of water chemistry and pH control so that you understand the basic processes and the methods for adjustments. It will also include a discussion of the practical use of reverse osmosis and deaeration technology in a large craft brewery to assist with your understanding on the next step in water treatment. Lastly the session captures the essence of a study examining the effects of manipulating water chemistry and its resultant impact on beer flavor, also at a large craft brewery. Join us to learn and understand how you can take control of your brewing water and better control of your beer.

Workshop: Brewing Fundamentals: Wort Boiling, Practical Science and Techniques

3:30–5:15 p.m. • *Tower Building, Second Level, Grand Ballroom*

Ashton Lewis, Paul Mueller Company; John Mallet, Bell's Brewery, Inc.; Gregg Norris, GEA; Chad Thompson, Ecolab

Brewing Fundamentals sessions aim to provide information for people who are new to the brewing industry while progressing to information that should be new or at least a welcomed reminder for seasoned veterans.

This year the focus will be on Wort Boiling, Practical Science and Techniques! Boiling is a critical process for producing high quality beers. This process can often be taken for granted until there is a reduction in performance. Being able to maintain optimal conditions it is critical and knowing how to troubleshoot the process can be invaluable when problems occur. To tackle this topic thoroughly we will deliver a concise review of the subject by covering the following topics: theory of heat exchange, wort boiler design and construction, approach to heating and boiling wort, and brew kettle cleaning.

Workshop: A Sensory Lexicon for Barrel-Aged Beers

3:30–5:15 p.m. • *Tower Building, Majestic Level, Majestic Ballroom*

Jessica Davis, The Bruery; Chad Yakobson, Crooked Stave Artisan Beer

The ever-evolving world of craft brewing has given birth to many exciting beer styles, including barrel-aged beers. The plethora of sensory attributes varies depending on the type of barrel. Beers can be aged many types of barrel, including rum, tequila, brandy, wine, and whiskey. Barrel-aged beers can be further categorized into sour or non-sour ("cleans"). This workshop will explore the sensory descriptors of beers aged in whiskey barrels. It will include sensory descriptors for both sour and non-sour beers. Prepare yourself for an interactive session that includes samples for both sour and non-sour whiskey barrel-aged beers.



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LESAFFRE FOR BEVERAGES

Schedule: Day-by-day

Monday, August 15

7:45 a.m.–4:00 p.m.	Registration Open		<i>Plaza Building, Concourse Level, Registration</i>
8:15–9:15 a.m.	Supplier Sessions		<i>Plaza Building, Concourse Level</i>
	• 8:15–8:45 a.m.	Logos Biosystems	<i>Plaza Court 6</i>
	• 8:15–9:15 a.m.	Cicerone Certification Program	<i>Plaza Court 5</i>
	• 8:15–9:15 a.m.	DSM Food Specialties	<i>Plaza Court 4</i>
8:15–9:30 a.m.	EBC Symposium		<i>Plaza Building, Concourse Level, Governor's Square 14</i>
	• 8:15 a.m.	Moving EBC from autonomy to effective integration within the context of Brussels based associations. <i>John Brauer, The Brewers of Europe aisbl.</i>	
	• 8:40 a.m.	Hop analysis: International cooperation and new challenges by craft beer. <i>Martin Biendl, Hopsteiner HHV GmbH</i>	
	• 9:05 a.m.	The EBC Brewing Science Group—Challenges and outlook. <i>Carsten Zufall, Cerveceria Polar, C. A.</i>	
8:15–9:30 a.m.	Technical Session 7: Brew House Operations		<i>Tower Building, Second Level, Grand Ballroom</i>
	<i>Moderator: Vince Coonce, Briess Malt and Ingredients Co.</i>		
	• 8:15 a.m.	23. Improving brewhouse efficiency by adjusting mash water, lauter, and sparge volumes. <i>Eddie Gutierrez, Saint Arnold Brewing Co.</i>	
	• 8:40 a.m.	103. Blocking layers in the lautering filter cake—Influence of particle size and shape. <i>Jörg Engstle, Technische Universität München</i>	
	• 9:05 a.m.	25. The comparison of DP enzyme release and persistence with the production of yeast-fermentable sugars during a modified IoB 65°C and Congress mashes. <i>Glen Fox, University of Queensland</i>	
8:15–9:30 a.m.	Technical Session 8: Yeast Stress & Performance		<i>Tower Building, Majestic Level, Majestic Ballroom</i>
	<i>Moderator: Katherine Smart, SABMiller Plc</i>		
	• 8:15 a.m.	26. Yeast stress when fermenting at high gravity—Sources, damage and the cellular response. <i>Chris Powell, University of Nottingham</i>	
	• 8:40 a.m.	27. Terminal acidic shock inhibits sour beer bottle conditioning by <i>Saccharomyces cerevisiae</i> . <i>Matthew Bochman, Indiana University</i>	
	• 9:05 a.m.	28. Serial repitched fermentations: Two case studies. <i>Maria Josey, Heriot Watt University</i>	
9:00 a.m.–2:00 p.m.	Silent Auction		<i>Plaza Building, Concourse Level, Foyer</i>
9:45–10:45 a.m.	Supplier Sessions		<i>Plaza Building, Concourse Level</i>
	• 9:45–10:15 a.m.	Fulton Companies	<i>Plaza Court 4</i>
	• 9:45–10:15 a.m.	Beer Flavor Map	<i>Plaza Court 6</i>
	• 9:45–10:45 a.m.	Milne Fruit Products	<i>Plaza Court 5</i>
9:45–11:30 a.m.	Technical Session 9: Brewing Microbiology		<i>Plaza Building, Concourse Level, Governor's Square 14</i>
	<i>Moderator: Caroline Pachello, MillerCoors</i>		
	• 9:45 a.m.	29. Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) for brewing microbiology. <i>Anita Van Landschoot, Ghent University</i>	
	• 10:10 a.m.	30. Recent development in detection and identification methods for beer spoilage lactic acid bacteria. <i>Koji Suzuki, Asahi Breweries, Ltd.</i>	
	• 10:35 a.m.	31. Investigation of <i>Lachancea thermotolerans</i> as a novel, single-strain brewing yeast. <i>Claire Svendsen, North Carolina State University</i>	

	• 11:00 a.m.	32. Isolation and identification of antibacterial compounds against Gram-negative anaerobic bacteria from beer. <i>Hajime Nakata, Sapporo Breweries Ltd., Frontier Laboratories of Value Creation</i>	
9:45–11:30 a.m.	Technical Session 10: Dry Hopping <i>Moderator: John Palmer, Palmer Brewing Solutions Inc.</i>		<i>Tower Building, Second Level, Grand Ballroom</i>
	• 9:45 a.m.	33. Hop swelling behavior during dry hopping. <i>Jörg Engstle, Technische Universität München</i>	
	• 10:10 a.m.	34. Assessing the role of four key process variables in the dry-hopping of beer. <i>Christian Holbrook, New Belgium Brewing Company</i>	
	• 10:35 a.m.	35. The influence of hop oil content and composition on hop aroma intensity in dry-hopped beer. <i>Daniel Vollmer, Anheuser-Busch Inbev</i>	
	• 11:00 a.m.	36. Impact of hop pellet processing in regard to flavor contribution in dry-hopped beers. <i>Christina Schoenberger, Barth Haas Group</i>	
9:45–11:30 a.m.	Technical Session 11: Engineering and Packaging <i>Moderator: John Mallett, Bell's Brewery Inc.</i>		<i>Plaza Building, Concourse Level, Governor's Square 15</i>
	• 9:45 a.m.	37. Process engineering opportunities and impact of relevant parameters in alcohol-free beer production with a focus on thermal dealcoholization. <i>Magdalena Mueller, Technische Universität München</i>	
	• 10:10 a.m.	38. A simplified discussion and explanation of the impact of proper tuning of PID loops on your process. <i>Stephen Carter, LT Software Solutions, Inc.</i>	
	• 10:35 a.m.	39. Working with performance metrics for beer packaging-line operational efficiency improvement. <i>Jaime Jurado, Abita Brewing Co.</i>	
	• 11:00 a.m.	104. Combining in-line instrumentation and data monitoring to improve brewhouse and brewery efficiency. <i>Daniel Gore, Anton Paar GmbH</i>	
9:45–11:30 a.m.	Workshop: Supplier Partnerships		<i>Tower Building, Majestic Level, Majestic Ballroom</i>
11:30 a.m.–2:00 p.m.	Exhibits and Lunch		
	• 1:00–2:00 p.m.	Giveaway Monday	<i>Plaza Building, Concourse Level, Plaza Ballroom</i>
11:30 a.m.–2:00 p.m.	Posters		<i>Plaza Building, Concourse Level, Foyer; Plaza 2 & 3</i>
	• 12:30–1:00 p.m.	Authors present at even-numbered posters	
	• 1:00–1:30 p.m.	Authors present at odd-numbered posters	
2:15–4:45 p.m.	Workshop: Practical Applications of Six Sigma Concepts in a Brewing Laboratory*		<i>Tower Building, Majestic Level, Majestic Ballroom</i>
2:15–6:00 p.m.	Denver Urban Adventure*		<i>Off-site: Meet in lobby by WBC field trip signage</i>
2:15–6:00 p.m.	Distillery Tour*		<i>Off-site: Meet in lobby by WBC field trip signage</i>
2:15–6:00 p.m.	RiNo Brewery Tour*		<i>Off-site: Meet in lobby by WBC field trip signage</i>
4:00–11:30 p.m.	Hospitality Room		<i>Tower Building, Second Level, Windows</i>

*Additional registration required to attend.

Monday Highlights

Workshop: Supplier Partnerships

9:45–11:30 a.m. • Tower Building, Majestic Level, Majestic Ballroom

Sal Calandra, Linde Gas; Aaron Golston, Lagunitas Brewing Co.; Rob Maruyama, MillerCoors; Susan Welch, Skagit Malting; Jim Withee, GigaYeast

Are you taking full advantage of your brewery and supplier relationships? Have you ever found yourself wondering why your brewery/supplier relationship isn't driving more performance and value? Whether you have a fully functioning supplier management process at your brewery/supplier location or you just need to solve day-to-day issues, this workshop will share best practices for developing and leveraging

supplier partnerships. Case studies from brewery/supplier partnership work will be presented by industry peers to illustrate the importance and value of building partnerships. Quality and productivity improve and value is created when each partner understands the others' expectations and requirements and appreciate what each brings to the supplier/brewer partnership.

Workshop: Practical Applications of Six Sigma Concepts in a Brewing Laboratory*

2:15–4:45 p.m. • Tower Building, Majestic Level, Majestic Ballroom

Ruth Krywicki, MillerCoors

Register for this workshop to gain insight on how to apply Six Sigma concepts in your laboratory using real examples. This workshop will help you understand when and how to create control charts for instrumentation and laboratory tests; when and how to use gage repeatability and reproducibility (R&R), why this would be the tool to use, and what to do with the results; when and how to do a failure modes and effects analysis (FMEA) and how the risk priority number (RPN) should drive improving data credibility; and how to improve your lab flow using a Spaghetti Diagram.

Denver Urban Adventure*

2:15–6:00 p.m. • Off-site: Meet in lobby by WBC field trip signage

This Urban Adventure tour will immerse you into the local history and culture of Denver, one of the fastest growing cities in the US. See Denver's well known and beautiful parks surrounded by historic neighborhoods, Victorian mansions and magnificent views of the skyline. Experience the fun and hip RiNo district, where you will meet

with local business owners, see public art, sample gourmet specialty shops, drink craft beer, and hear aspirational stories that make this city so unique. Transportation from the Sheraton included.

Distillery Tour*

2:15–6:00 p.m. • Off-site: Meet in lobby by WBC field trip signage

Denver and Colorado have long been recognized as havens for beer lovers and brewers. Only in recent years has that love of fine craft beer transferred to the art of distilling spirits. Denver's Craft distilleries make some of the finest whiskey, gin, & other distilled spirits in Colorado. Join us on a Distillery tour through Denver that will introduce you to some of Colorado's finest spirits and experience the passion of these local start-up businesses. You will get a chance to tour some of the distilleries, meet the owners, and try some delicious samples. Transportation from the Sheraton included.

RiNo Brewery Tour*

2:15–6:00 p.m. • Off-site: Meet in lobby by WBC field trip signage

Join us as we tour one of the hottest neighborhoods in Denver. In no other neighborhood is the Denver craft beer culture more visible than in the River North (RiNo) district. Located just north of downtown, RiNo has been recently transformed from an industrial landscape into one of the hippest spots in Denver, featuring art galleries, innovative businesses, and a variety of new craft breweries. We have selectively chosen to highlight a few of the microbreweries that stand out for innovation, quality, and their unique perspective on craft beer. Transportation from the Sheraton included.

*Additional registration or ticket required to attend.

The advertisement features a central image of a beer glass filled with beer and a hop cone. Surrounding this central image are logos for various brewing ingredient suppliers: MALTING COMPANY OF IRELAND, LTD., PATAGONIA MALT, RAHR MALTING CO., SIMPSONS MALT, CRISP malting GROUP, WILHELM, Fermentis, MURPHY & SON, DSM, KERRY, Candico, BSG Hops, HVG, and BSG CraftBrewing. The text 'Select Brewing Ingredients' is prominently displayed on the right side of the advertisement.

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Schedule: Day-by-day

Tuesday, August 16

7:15–8:00 a.m.	Speaker Breakfast	<i>Tower Building, Majestic Level, Majestic Ballroom</i>
7:45 a.m.–5:30 p.m.	Registration Open	<i>Plaza Building, Concourse Level, Registration</i>
8:15–9:30 a.m.	IBD Symposium part I <ul style="list-style-type: none">• 8:15 a.m. The legal status of gluten-free beer. <i>Joy Dubost, Dubost Food & Nutrition Solutions, LLC.</i>• 8:40 a.m. Gluten detection methods—Advancements and considerations. <i>Lindsay Barr, New Belgium Brewing Co.</i>• 9:05 a.m. Ultra-low gluten barley—Kebari. <i>Crispin Howitt, CSIRO Agriculture Flagship</i>	<i>Tower Building, Second Level, Grand Ballroom</i>
8:15–9:30 a.m.	Technical Session 12: Filtration <i>Moderator: Leon Fyfe, Pall Corp.</i> <ul style="list-style-type: none">• 8:15 a.m. 41. Addition of xylanase and beta-gulucanase at optimal conditions improves the filtration efficiency in rye-malt brewing. <i>Hideki Maeda, Research Laboratories for Alcoholic Beverage Technologies, Kirin Company, Limited</i>• 8:40 a.m. 42. Use of different filtration and stabilization methods for dry-hopped beers and their influence on beer quality parameters (turbidity, foam, and sensory). <i>Christoph Neugrodda, Chair of Brewing and Beverage Technology, Technische Universität München</i>• 9:05 a.m. 43. Challenges in beer membrane filtration—Impact of volatiles on filtration performance of polymer membranes. <i>Michael Kupetz, Chair of Brewing and Beverage Technology, Technische Universität München</i>	<i>Plaza Building, Concourse Level, Governor's Square 14</i>
8:15–9:30 a.m.	Technical Session 13: Sensory II <i>Moderator: Ian McLaughlin, Craft Brew Alliance</i> <ul style="list-style-type: none">• 8:15 a.m. 44. Characterization of polymeric beer ingredients for evaluation of palate fullness. <i>Georg Krebs, Chair of Brewing and Beverage Technology, Technische Universität München</i>• 8:40 a.m. 45. Can analytical and sensory assessment be used to accurately predict the sensory characteristics of hops finished beers? <i>Chris Smart, Campden BRI</i>• 9:05 a.m. 46. The IBU, pH, dry-hopping, ABV, and perceived bitterness—A half century of evolution in the brewing industry has affected the relevance of the IBU. <i>Kurt Driesner, Urban Chestnut Brewing Company</i>	<i>Plaza Building, Concourse Level, Governor's Square 15</i>
8:30 a.m.–3:20 p.m.	Silent Auction	<i>Plaza Building, Concourse Level, Foyer</i>
9:45–11:30 a.m.	IBD Symposium part II <ul style="list-style-type: none">• 9:45 a.m. Degradation of immunostimulatory gluten peptides in traditional barley malt beer using a proline-specific endopeptidase. <i>Sylvie Van Zandycke, DSM Food Specialties</i>• 10:10 a.m. Production of gluten-free beers using transglutaminase. <i>Birgit Schnitzenbaumer, Döhler</i>• 10:35 a.m. Producing a gluten-reduced beer using silica gel treatment. <i>Kenneth Berg, PQ Corporation</i>• 11:00 a.m. Beyond the beer: The story of the development, production, and stewardship of malted barley based beers made with gluten specific protease. <i>Joe Casey, Craft Brew Alliance</i>	<i>Tower Building, Second Level, Grand Ballroom</i>
9:45–11:30 a.m.	Technical Session 14: Hops II <i>Moderator: John Bryce, MBAA</i> <ul style="list-style-type: none">• 9:45 a.m. 47. Hops (<i>Humulus lupulus</i>) provide important sources of thiol precursors: A key ingredient to obtain fruity beers. <i>Laurent Dagan, Nyseos</i>	<i>Plaza Building, Concourse Level, Governor's Square 14</i>

	<ul style="list-style-type: none"> • 10:10 a.m. 48. A role of harvest timing in aroma characteristics and related compounds in Saaz hops. <i>Takako Inui, Suntory Beer Ltd.</i> • 10:35 a.m. 49. The varietal aroma of ‘Sorachi Ace’: Identification and characterization of unique flavor compounds. <i>Ayako Sanekata, Sapporo Breweries Ltd.</i> • 11:00 a.m. 50. Analyzing hoppy beer flavor—The winding road of a research tool merging into brewery quality control. <i>Nils Rettberg, VLB Berlin</i> 	
9:45–11:30 a.m.	<p>Technical Session 15: World Class Manufacturing Moderator: <i>Tom Eplett, MillerCoors</i></p> <ul style="list-style-type: none"> • 9:45 a.m. 51. Brewing innovation—Why you need it and how you can get it. <i>Alastair Pringle, Pringle-Scott LLC</i> • 10:10 a.m. 52. Optimization of energy supply and recovery system in brewing process. <i>Kohei Yamada, Suntory Beer Ltd.</i> • 10:35 a.m. 53. Lean manufacturing and kaizen in the brewing industry. <i>Jason Wilson, Back Forty Beer Company</i> • 11:00 a.m. 54. Do your asset failures come as a surprise? It’s time to change your maintenance strategy and turn maintenance into a contributor to your profitability. <i>Louis Houle, Systemex Industrial Consulting</i> 	<i>Plaza Building, Concourse Level, Governor’s Square 15</i>
9:45–11:30 a.m.	Workshop: Hygienic Design, Sustainable Cleaning, and Validation	<i>Tower Building, Majestic Level, Majestic Ballroom</i>
11:30 a.m.–2:00 p.m.	Exhibits and Lunch	<i>Plaza Building, Concourse Level, Plaza Ballroom</i>
11:30 a.m.–2:00 p.m.	Posters	<i>Plaza Building, Concourse Level, Foyer; Plaza 2 & 3</i>
	<ul style="list-style-type: none"> • 12:30–1:00 p.m. Authors present at odd-numbered posters • 1:00–1:30 p.m. Authors present at even-numbered posters 	
2:00–2:30 p.m.	Poster Take-down	<i>Plaza Building, Concourse Level, Foyer; Plaza 2 & 3</i>
2:00–5:00 p.m.	Exhibitor Take-down	<i>Plaza Building, Concourse Level, Plaza Ballroom</i>
2:00–3:15 p.m.	Global Conversation: Beverage Consumer Trends	<i>Tower Building, Majestic Level, Majestic Ballroom</i>
2:00–3:15 p.m.	<p>Technical Session 16: Barley & Malt II Moderator: <i>Susan Welch, Skagit Valley Malting</i></p> <ul style="list-style-type: none"> • 2:00 p.m. 55. Influence of high molecular weight proteins and polypeptides on smoothness of beer. <i>Masaru Kato, Research Laboratories for Alcoholic Beverage Technologies, Kirin Co., Ltd.</i> • 2:25 p.m. 56. Influence of <i>Fusarium avenaceum</i> on barley malt—Monitoring the changes in the protein profile of barley during the malting process. <i>Cajetan Geißinger, Chair of Brewing and Beverage Technology, Technische Universität München</i> • 2:50 p.m. 57. Influence of the grist fractions on the final beer quality. <i>Martin Zarnkow, Research Institute Weihenstephan for Brewing and Food Quality, Technische Universität München</i> 	<i>Plaza Building, Concourse Level, Governor’s Square 14</i>
2:00–3:15 p.m.	Workshop: Food Safety—What is Required for Breweries and How Are They Doing It?	<i>Tower Building, Second Level, Grand Ballroom</i>
3:30–5:15 p.m.	<p>Technical Session 17: Beer Aging Moderator: <i>Aaron Golston, Lagunitas</i></p> <ul style="list-style-type: none"> • 3:30 p.m. 58. The kinetics and chemistry of beer aging—A critical review. <i>Margaux Huismann, International Centre for Brewing and Distilling</i> • 3:55 p.m. 59. Sulfite and thioredoxin: An approach for potentially increasing the free thiol concentration in beer for improvement of flavor stability. <i>Marianne N. Lund, University of Copenhagen</i> • 4:20 p.m. 60. Chasing staling aldehydes—A unique application of HS-SPME-GC-MS/MS in brewing. <i>Jörg Maxminer, Research and Teaching Institute for Brewing in Berlin (VLB)</i> 	<i>Plaza Building, Concourse Level, Governor’s Square 14</i>

	• 4:45 p.m.	61. Utilizing gas chromatography with time-of-flight mass spectrometry to monitor the aging process in bottled beer. <i>Elizabeth Humston-Fulmer, Leco Corporation</i>	
3:30–5:15 p.m.		Technical Session 18: Evolution of Brewing <i>Moderator: Michael James, Molson Coors</i>	<i>Plaza Building, Concourse Level, Governor's Square 14</i>
	• 3:30 p.m.	62. Brewing intensification through the lens of the craft brewer. <i>Graham Stewart, International Centre for Brewing and Distilling (ICBD), Heriot Watt University</i>	
	• 4:20 p.m.	63. Tasting the past: The unearthing of the chemistry of medieval beer. <i>Lee Eales, University of Sheffield</i>	
	• 4:45 p.m.	64. The beginnings of beer in the ancient world. <i>Travis Rupp, Avery Brewing Company</i>	
3:30–5:15 p.m.		Workshop: Hops and Their Evaluation within Today's Ever-Changing Brewing World	<i>Tower Building, Second Level, Grand Ballroom</i>
3:30–5:15 p.m.		Workshop: Sour Beers	<i>Tower Building, Majestic Level, Majestic Ballroom</i>
5:15–6:45 p.m.		Hospitality Room	<i>Tower Building, Second Level, Windows</i>
7:00–10:00 p.m.		The Street Scene Block Party	<i>Off site—Left on 16th Street to Glenarm Place</i>
10:00–11:30 p.m.		Hospitality Room	<i>Tower Building, Second Level, Windows</i>

Tuesday Highlights

Workshop: Hygienic Design, Sustainable Cleaning, and Validation

9:45–11:30 a.m. • Tower Building, Majestic Level, Majestic Ballroom

Wade Begrow, Bell's Brewery, Inc.; James Diamantis, The Vincit Group; Bryan Downer, Central States Industrial; Kara Taylor, White Labs, Inc.

Even though the optimization and validation of sanitation procedures is the most efficient way to minimize product contamination—it is oftentimes neglected. At the conclusion of this workshop, participants will have an increased understanding of the principles of brewery hygiene. Topics will include plant sanitary design, sanitation validation, sustainable cleaning, air/compressed gas monitoring, sanitary surfaces, and environmental testing. This interactive workshop will provide participants with hands-on demonstrations of monitoring techniques such as ATP testing, air settling plates, and environmental swabbing. Attendees will be sure to come away with practical techniques to improve their own hygiene programs.

Global Conversation: Beverage Consumer Trends

2:00–3:15 p.m. • Tower Building, Majestic Level, Majestic Ballroom

Jenny Zegler, Mintel

Global consumer insights agency Mintel provides a look at three trends shaping the way international consumers are approaching beverages, including, but not limited to, alcohol. The presentation will include how story-telling is changing consumers' preferences, the influence nostalgia is having on flavors, and how omnipresent health and wellness priorities are affecting the alcohol category. Following the trend presentation, a question and answer session will take place with the analyst.

Workshop: Food Safety—What is Required for Breweries and How Are They Doing It?

2:00–3:15 p.m. • Tower Building, Second Level, Grand Ballroom

Tatiana Lorca, Ecolab; Mary Jane Maurice, Malteurop North America; Gary Nicholas, Surly Brewing Company; Patrick Staggs, Crown Beverage Packaging; Dan Voce, Matt Brewing Company

The topic of food safety for breweries is becoming very prevalent as pressures increase from regulatory agencies and customers while brewers try to keep up with the requirements as they are rolled out. We have assembled a panel covering the spectrum of brewery sizes as well as an industry expert to help us translate the requirements for breweries and hear from brewers about how they are getting it done. The panel will answer some of the biggest questions in this area on topics such as GMP/GBP and prerequisite programs, HACCP, training programs, anticipated roadblocks, and cultural barriers. Audience members will benefit from well-rounded answers of various points of view from brewers at different stages in his/her journey with food safety. There will also be an open period to address questions from the audience.

Workshop: Hops and Their Evaluation within Today's Ever-Changing Brewing World

3:30–5:15 p.m. • Tower Building, Second Level, Grand Ballroom

Tim Kostelecky, John I Haas Inc.; Paul Matthews, Hopsteiner; Jason Perrault, Select Botanicals Group LLC; Christina Schoenberger, Joh Barth & Sohn GmbH & Co. KG; Tom Shellhammer, Oregon State University

Today's brewing landscape is constantly evolving with more demand than ever on providing the customer with continued variability and consistent quality. Hops play a key role in this pursuit influencing many new beer styles. New evaluation techniques for hops and beers, along with exciting new varieties, are the centerpiece of this beer renaissance. This workshop will bring various groups together to learn about evaluating hops from

the field to the finished beer. We will show different perspectives from several groups that will demonstrate how far hop industry evaluation techniques have come. This interactive workshop will provide attendees with an educational and meaningful experience on the world of hops.

Workshop: Sour Beers

3:30–5:15 p.m. • Tower Building, Majestic Level, Majestic Ballroom

Rob Christiansen, New Belgium Brewing Co.; Andy Parker, Avery Brewing Co.; Lauren Salazar, New Belgium Brewing Co.; Kelly Tretter, New Belgium Brewing Co.

New Belgium Brewing Company and Avery Brewing Company join together to take you through their souring processes. They combine the art and mystery of blending from a wood cellar with the science

of souring, including TA measurements, acid profiles, and microbial populations. Learn from industry experts the art of creating a blended sour beer from a wood cellar, then dive into the science going on behind the scenes of these unique and complex beers. Finally, the official beer of the WBC will be explored.

The Street Scene Block Party

7:00–10:00 p.m. • Off site—Left on 16th Street to Glenarm Place

Take the party outside tonight! Mix ‘n mingle in the beer garden and relish in eating some savory street food as we congregate for a block party on Glenarm Place. Celebrate to the stylings of our mainstage DJ, all while enjoying the sights and sounds of downtown Denver.



Brewery made simple.

Visit us at WBC booth #110.

Life is complicated enough. So make it simpler — with the new solutions for valve manifold from Burkert — designed with the needs of the brewery industry in mind, featuring a hygienic design, easy cleaning and simple operation. A complex fluidic task can therefore become simplicity itself. Perfect for high process yields and your peace of mind.

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Schedule: Day-by-day

Wednesday, August 17

8:00–11:00 a.m.	Registration Open	Plaza Building, Concourse Level, Registration
8:15–9:30 a.m.	Technical Session 19: Beer Bitterness <i>Moderator: Walter Heeb, MillerCoors</i> <ul style="list-style-type: none">• 8:15 a.m. 65. A holistic examination of beer bitterness. <i>Christina Hahn, Oregon State University</i>• 8:40 a.m. 66. Hop oil extracts add more to beer than hop aroma! Investigating the impact of hop essential oils on bitterness perception. <i>Olayide Oladokun, University of Nottingham</i>• 9:05 a.m. 67. Influence of beer color on bitterness perception: A consumer-sensory study. <i>Joseph Spearot, Yards Brewing Company and Dogfish Head Craft Brewery</i>	Tower Building, Second Level, Grand Ballroom
8:15–9:30 a.m.	Technical Session 20: Mashing, Boiling, & Wort <i>Moderator: Fred Scheer, Kronen Inc.</i> <ul style="list-style-type: none">• 8:15 a.m. 68. Identification of a precursor of 2-mercapto-3-methyl-1-butanol in beer. <i>Shigekuni Noba, Asahi Breweries, Ltd.</i>• 8:40 a.m. 69. Circular dichroism and infrared spectroscopic characterization of secondary structure components of protein Z during mashing and boiling processes. <i>Linjiang Zhu, Jiangnan University</i>• 9:05 a.m. 70. An investigation of process controls and microbes for the degradation of gluten proteins in wort. <i>Brett Taubman, Appalachian State University</i>	Plaza Building, Concourse Level, Governor's Square 14
8:15–9:30 a.m.	Workshop: Managing the Herd	Tower Building, Majestic Level, Majestic Ballroom
9:45–11:00 a.m.	Closing Session	Tower Building, Second Level, Grand Ballroom

Wednesday Highlights

Workshop: Managing the Herd

8:15–9:30 a.m. • Tower Building, Majestic Level, Majestic Ballroom

Matthew Bochman, Indiana University and Wild Pitch Yeast; Karen Fortmann, White Labs; Alicia Gutierrez Linares, KU Leuven CMGP and VIB Lab for Systems Biology; Stijn Mertens, KU Leuven CMGP and VIB Lab for Systems Biology

It is an exciting time in the “yeastdom,” the expansive world of brewing yeasts! The tools available to characterize these fascinating organisms and gain a deeper understanding of the individual strains have greatly expanded in recent years. This knowledge can truly bring a new dimension to beer and is giving brewers new opportunities to use their creativity. This workshop will focus on the newest developments regarding yeast strain characterization and latest updates on yeast production and handling.



Closing Speaker—Scott Zimmer, Generational Expert, BridgeWorks

9:45–11:00 a.m. • Tower Building, Second Level, Grand Ballroom

Scott Zimmer is a seasoned public speaker, writer, and market researcher. With 12 years of speaking experience, he’s developed a uniquely personable style and uses insight, humor, and data to foster an environment where every generation feels valued and understood.

As one of BridgeWorks’ generational experts and resident Gen Xer, Scott’s keynotes clearly illustrate the stress points between these generations and provide clear solutions to help relieve tension and encourage better understanding and collaboration across generational divides. A child of the 80s and 90s, Scott has insider knowledge into what makes his generation tick. Sandwiched between the idealistic Boomers and innovative Millennials, his Xer lens allows him to hone in on the key challenges facing each generation.

Scott grew up on a dairy farm in Central Minnesota and has mastered the art of milking cows. He graduated from St. John’s University in 2000 with a BA in Communications. When he’s not researching or presenting, he enjoys his other role as a self-proclaimed movie-buff.









Megazyme

How well do you know your Barley?

Megazyme has developed a suite of assay kits for the measurement of various enzymatic activities vital to the brewing industry.

Megazyme Product	Enzyme Analysed	Enzyme Function
CERALPHA	α -Amylase	Hydrolyzes starch into shorter dextrins.
BETAMYL-3	β -Amylase	Hydrolyzes starch and dextrins into maltose, the main fermentable sugar.
PULLG6	Limit-dextrinase	Debranches starch, thereby increasing the yield of fermentable sugars.
MBG4	β -Glucanase	Hydrolyzes barley cell walls to allow dextrinizing enzymes to break down starch. Controls the level of β -glucan present in the wort which contributes to its viscosity.
XYLX6	endo-1,4- β -Xylanase	Hydrolyzes barley cell walls to allow dextrinizing enzymes to break down starch.
CELLG5	endo-Cellulase	Hydrolyzes barley cell walls. It can be present due to fungal contamination.

All Megazyme enzymatic assay kits are:

-  Highly sensitive and specific for the desired enzyme
-  Suitable for the analysis of crude malt extracts & industrial enzyme preparations
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-  Suitable for automation
-  Complete with standardised controls of the relevant enzyme
-  Based on chemically-defined substrates - no variability between reagent substrate batches

Career advancement...

Recent IBD examination successes

The Institute of Brewing & Distilling (IBD) provides professional qualifications supported by training and a wide range of educational resources for the brewing and distilling industry. In 2015 we had over 3000 exam candidates in 87 different countries. The IBD is the largest provider of vocational professional qualifications to the brewing and distilling sectors in the world.

There is a web-based Learning Zone resource centre; publications include the monthly Brewer & Distiller

International as well as the peer-reviewed Journal of the Institute of Brewing – which is also available as an on line resource – with past editions to 1890 fully digitised and searchable.

The IBD is a membership organisation and offers members important ongoing learning and Continuing Professional Development support through its popular events and convention agenda. The IBD membership numbers in excess of 5000 professionals located in over 90 countries.



Aaron Golston

Quality manager, Lagunitas Brewery, Chicago

Aaron Golston has been quality manager at the Lagunitas Brewing Company in Chicago for three years. He started on the IBD training ladder in his previous role, as an Analytical / Microbiology Specialist, at MillerCoors, in 2011.

Aaron Golston's route into brewing wasn't entirely straightforward: he was enrolled on a Ph. D. programme in textile chemistry at the University of California, Davis, when he stumbled into a lecture on brewing by Dr Charlie Bamforth. Already a keen home brewer, he decided to switch to Charlie's Masters in Brewing, which led, after graduation, to the role at MillerCoors.

His first IBD examination was the *General Certificate in Packaging* – a qualification he clearly rated highly as he now encourages his team at Lagunitas to complete it. The following year, he started the *Diploma in Brewing*, completing all three modules within four years – taking a year off between modules 2 and 3.

"The more informed you are, the better decisions you make," he says. "Studying for the Diploma has given me a more holistic view of brewing, so I can speak in a more informed manner to colleagues and vendors. I visited a glass facility recently and was able to ask more educated questions, something I couldn't have done before taking the exams."

The Diploma exams were far from easy, says Aaron. "I put in a couple of hours of studying several nights a week and on the weekends, reading through the IBD's revision notes, text books and going over past papers. The format was quite different to other exams I had experienced, as they were entirely essay answers, so I needed to practice that technique."

Securing the Diploma in 2015 made all the hard work

worthwhile. "With this qualification, I feel I can walk into any brewery and quickly understand the way they do things, so it's opened up new opportunities." His recommendation to potential candidates: "If you want to brew, the *Diploma in Brewing* can only help you."



Tiago Falcone

Brewer and cellarman, Beavertown Brewery, London.

Tiago Falcone has been part of the brewing team at London craft brewer Beavertown since 2013, playing a part in its meteoric rise to success, which has seen the business move from a seven-barrel plant to a 30-barrel site in north London.

Tiago admits he probably has beer rather than blood running through his veins. His father established the respected Falke Brewery in Brazil in 2004 and Tiago worked in the family business before deciding to spread his wings and explore brewing in other parts of the world. He initially worked in Italy before heading to London and its burgeoning craft beer scene.

"Beavertown encourages its brewers to take the *General Certificate in Brewing*," says Tiago. "It's a way of backing up the practical knowledge you learn in your everyday work with theoretical knowledge. As Beavertown has grown, they've needed to become more rigorous about staff training, and the GCB is an excellent first step on the ladder."

For Tiago, the GCB was a stretching exam, but he found the multiple choice format made it more accessible than essay questions for a candidate with English as his second language.

He says, "The knowledge I had to acquire to pass the exam has been invaluable in my job. I think it's important for a brewer to know the

calculations for a brew without using a computer, for example, and now I can do that. With the GCB under my belt, I feel I know all I need at this stage as a brewer. I'd definitely recommend it to anyone serious about a career in brewing."



Rodney Hughes

Head brewer, R&B Brewing, Vancouver

Rod passed the IBD's *Diploma in Brewing* in June 2015 after attending the Master Brewers' Programme at the University of California, Davis. Gaining the qualification helped him to secure his current role as head brewer at Vancouver, Canada microbrewery R&B Brewing, which he joined in late 2015.

Prior to R&B, Rod worked for Steamworks Brewery in the same city, and has been home brewing for around six years. "Preparing for the exams locked in knowledge that I now use every day," says Rod. "It has given me the language to speak intelligently to seasoned brewers and has helped me troubleshoot countless issues in the brewery."

The UC Davis programme was "perfect preparation" for the exams, says Rod, but adds that "a tremendous amount of self study" was required on top of classes, and he advises would-be Diploma students to be prepared for the workload.

"For me, gaining the Diploma was less about letters after my name, and more about retaining and gaining knowledge that will help me be the best brewer I can be. The qualification has already helped me get to where I am, and I'm sure it will only help me in the future."

The IBD's *Master Brewer* qualification is something Rod is considering for the future, after he gains more experience in the industry, as a way of continuing to develop his brewing knowledge and skills.

Contact us for details of membership, examinations and training.



The Institute of Brewing & Distilling

44A Curlew Street, Butler's Wharf, London, SE1 2ND.

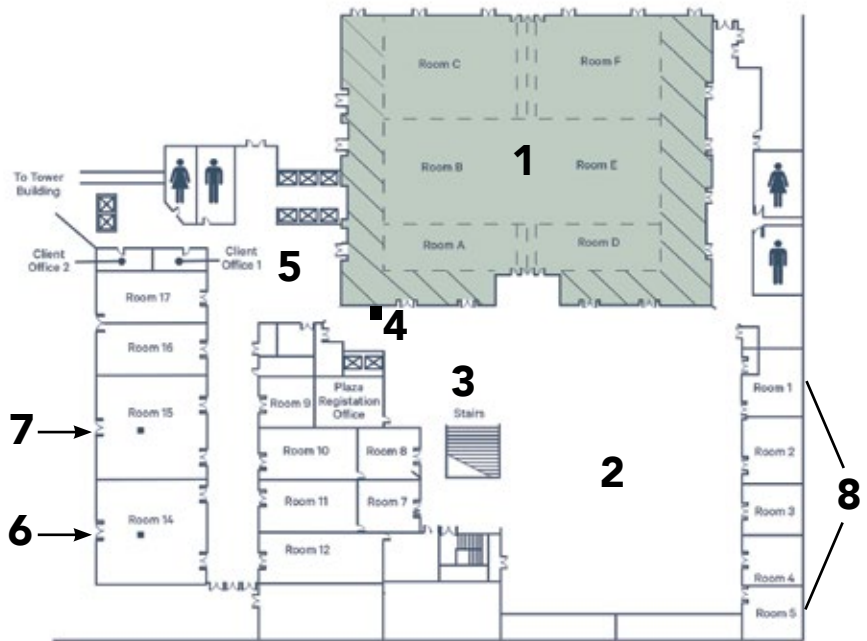
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Sheraton Downtown Denver Floor Plans

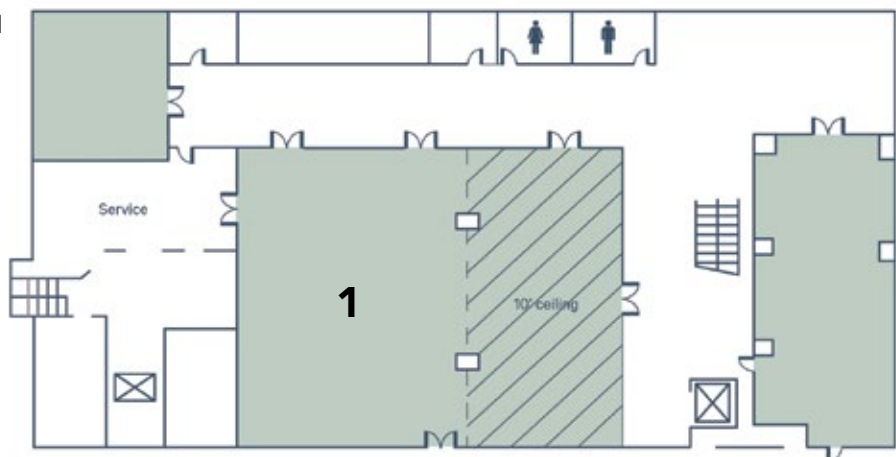
Plaza Building – Concourse Level

1. Plaza Ballroom – Exhibit Hall
2. Plaza Foyer – Posters
3. Registration Kiosks
4. Speaker Kiosks
5. Charging Station
6. Governor Square 14 – Session Room
7. Governor Square 15 – Session Room
8. Plaza Court Rooms



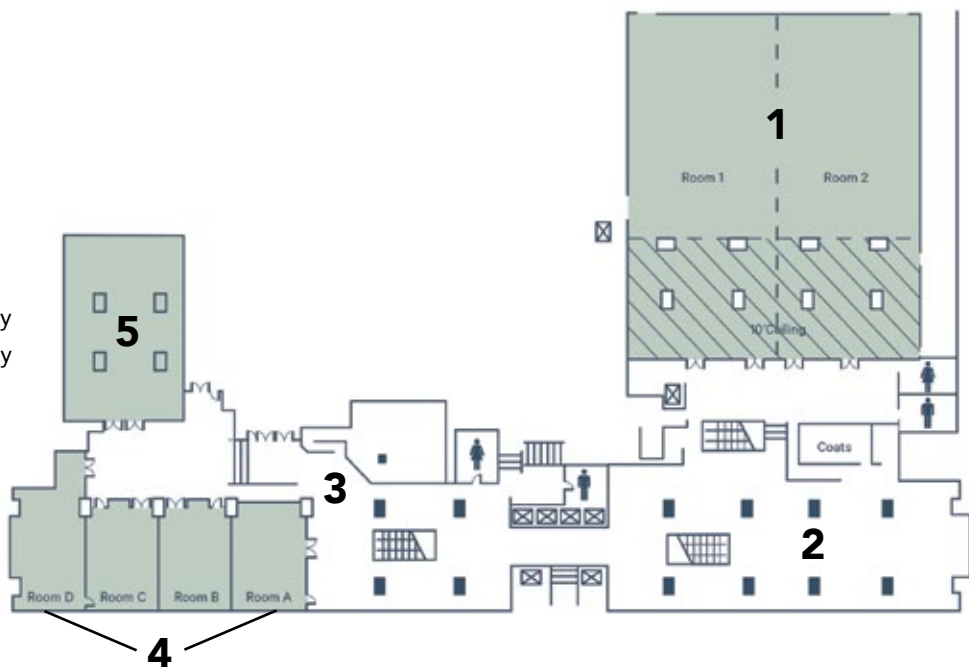
Tower Building – Majestic Level

1. Majestic Ballroom



Tower Building – 2nd Level

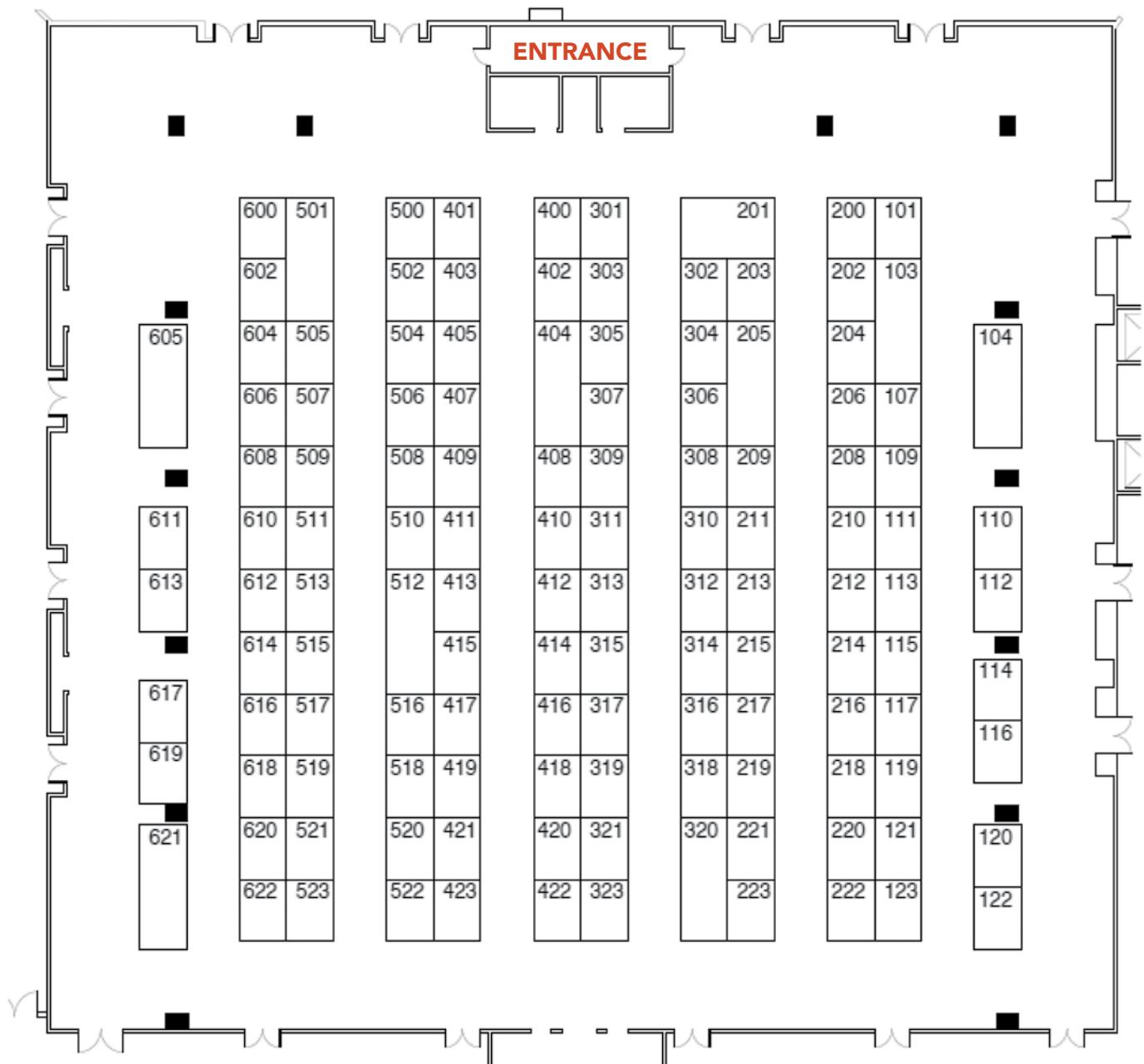
1. Grand Ballroom
2. South Convention Lobby
3. North Convention Lobby
4. Tower Court Rooms
5. Windows – Hospitality Suite



Exhibition

Exhibit Hall Hours

Saturday, August 13	2:00–7:00 p.m.	Exhibitor Set-up
Sunday, August 14	7:00–11:00 a.m. 11:30 a.m.–2:00 p.m.	Exhibitor Set-up Exhibits Open
Monday, August 15	11:30 a.m.–2:00 p.m.	Exhibits Open, Giveaway Monday
Tuesday, August 16	11:30 a.m.–2:00 p.m. 2:00–5:00 p.m.	Exhibits Open Exhibitor Take-down



Numerical Exhibitor Listing

- 101 LECO Corporation
103 Kronos Inc.
104 Pentair
107 LGC Standards
109 First Key Consulting
110 Burkert Fluid Control Systems
111 Comptoir Agricole Hops
112 Hamilton Company
113 VLB Berlin
114 Cara Technology Ltd.
115 McRae Integration Ltd.
116 Donaldson Company, Inc.
117 Sealed Air Corporation Food Care Division.
119 Meura
120 BW Container Systems and Accraply
121 FILTEC
122 Wilbur-Ellis Co.
123 Cicerone Certification Program
200 Briggs of Burton, Inc.
201 Bühler Inc.
202 BSG CraftBrewing
203 Flottweg Separation Technology, Inc.
204 Weyermann Specialty Malts
205 DSM Food Specialties
206 ChemTreat
208 Dex-O-Tex by Crossfield Products Corp.
209 Siebel Institute/World Brewing Academy
210 Parallel Products
211 Lallemand Brewing
212 Thermo Fisher Scientific
213 Milne Fruit Products
214 Orbijet Technologies, Inc.
215 Simpsons Malt
216 CE Elantech, Inc.
217 Ecolab
218 StainlessDrains.com
219 Peco|InspX
220 BIOTECON Diagnostics
221 GERSTEL, Inc.
222 Rice Bran Technologies
223 Day & Zimmermann
301 ZIEMANN HOLVRIEKA GmbH
302 Petainer Manufacturing USA Inc.
303 HEUFT USA, Inc.
304 BMT USA, LLC
305 Weber Scientific
306 Bruker Corporation
307 ProLeiT Corp.
308 GKD-USA, Inc.
309 Neogen Corporation
310 Fulton Companies
311 Albert Handtmann Armaturenfabrik GmbH & Co. KG
312 Separators, Inc.
313 EAGLE Certification Group
314 ABM Equipment Co., Inc.
315 Cambrian Innovation
316 Newlands Systems
317 ABT, Inc.
318 Ashland
319 Profamo Inc.
320 ATPGroup
321 EP Minerals
323 Skalar Inc.
400 optek-Danulat, Inc.
401 Anton Paar USA
402 Commodity Specialists Company
403 Hydro Dynamics—Apotech
404 Hach
405 PQ Corporation
407 Hygiena
408 Munters Corporation
409 Logos Biosystems
410 PONNDORF Anlagenbau GmbH
411 Shimadzu Scientific Instruments, Inc.
412 Gusmer Enterprises
413 Aber Instruments, Ltd.
414 Esau & Hueber GmbH
415 John I. Haas, Inc.
416 Christian Gresser
417 Proximity Malt LLC
418 Elementar Americas, Inc.
419 Colorado Malting Company
420 ClearCove
421 Kusters Water
422 Invisible Sentinel
423 Argelith Ceramic Tiles, Inc.
500 Kagetec Industrial Flooring
501 Hopsteiner
502 Siemens Industry, Inc.
504 GEA Group
505 Cargill
506 DuPont Tate & Lyle Bio Products Company, LLC
507 Pall Corporation
508 Analytical Flavor Systems LLC
509 Symbiont Science, Engineering and Construction, Inc.
510 Blefa Kegs, Inc.
511 Doehler North America
512 DuPont Industrial Biosciences
513 Alfa Laval
515 Malteurop North America
516 LPR Construction Co.
517 Industrial Test Systems, Inc.
518 EMG International, Inc.
519 InnovaPrep
520 Five Star Chemicals & Supply, Inc.
521 Enzyme Development Corporation
522 PerkinElmer, Inc.
523 Steinfurth, Inc.
600 Zee Company, A Member of The Vincit Group
602 Nexcelom Bioscience
604 Veolia Water Technologies
605 Rheonix Food & Beverage
606 Endress+Hauser
608 Centec LLC
610 Miura America Co., Ltd.
611 Separator Technology Solutions
612 Big Ass Solutions
613 Cablevey Conveyors
614 Astoria-Pacific
617 Cloud-Sellers
618 Loeffler Chemical Corporation
619 AFCO/Alex C. Ferguson LLC
620 CO2Meter, Inc.
621 ABS Commercial
622 Palmer Canning Systems
FOYER American Society of Brewing Chemists
FOYER Brewery Convention of Japan
FOYER European Brewery Convention
FOYER Institute of Brewing and Distilling
FOYER Master Brewers Association of the Americas

Alphabetical Exhibitor Listing

- 413** **Aber Instruments, Ltd.**, Science Park, Aberystwyth, Ceredigion SY23 3AH, United Kingdom; +44.1970.636300; Email: sales@aberinstruments.com. Aber Instruments will be displaying the PerfectPitch, a yeast pitching skid with the acclaimed Yeast Monitor and a flow meter plus PLC. The Countstar is a new instrument for rapid yeast viability and live cell counts using the safe, traditional methylene blue stain together with a disposable 5 chamber haemocytometer.
- 314** **ABM Equipment Co., Inc.**, 13911 NW 3rd Ct #100, Vancouver, WA 98685 U.S.A.; +1.360.558.7156; Fax: +1.503.248.0715; Web: www.abmequipment.com; Email: jcassa@abmequipment.com. ABM Equipment is dedicated to providing services and solutions for the brewery industry. We provide components, systems, and up-to-turnkey installations and commissioning. ABM equipment has the experience to help you become more efficient and productive using reliable technologies. Our team looks forward to solving your next challenge!
- 621** **ABS Commercial**, 3709 Neil Street, Raleigh, NC 27607 U.S.A.; +1.919.400.9087; Web: www.abs-commercial.com; Email: sales@abs-commercial.com; Facebook: @ABSCommercialLLC. Make ABS Commercial your choice for craft brewing equipment. We have the highest quality equipment and supply some of the shortest lead times in the industry. Think of ABS Commercial first when you need a fermenter, beer bright tank, or other supplies for your brewery.
- 317** **ABT, Inc. – PolyDrain – TrenchFormer**, 259 Murdock Road, Troutman, NC 28166 U.S.A.; 1.800.438.6057; +1.704.528.5478; Web: www.abtdrains.com; Email: bshort@abtdrains.com; Facebook: @abtdrains. ABT, Inc., is a leading manufacturer of engineered trench drainage systems. ABT specializes in performance systems which provide the highest chemical resistance using stainless steel, FRP, and polymer concrete materials which are used extensively in food and beverage applications of all types from production to bottling to shipping.
- 619** **AFCO**, 5121 Coffey Avenue, Chambersburg, PA 17201 U.S.A.; +1.717.264.9147; Fax: +1.717.264.9182; Web: www.afcocare.com. Since 1855, AFCO has been delivering chemical, process, training, equipment and distribution solutions to leaders in the food, beverage, and hospitality industries that help them operate at the best and highest levels of sanitation, productivity and profitability. We are full-service partners throughout all areas of facilities and process management.
- 311** **Albert Handtmann Armaturenfabrik GmbH & Co. KG**, Arthur-Handtmann-Str. 11, Biberach/Riss 88400 Germany; +49.7351.342.4434; Web: www.handtmann.de; Email: sales.fittings@handtmann.de; Facebook: @HandtmannArmaturenfabrik. Handtmann Armaturenfabrik is one of the leading suppliers of fittings, valves, and process technology to the beverage industry, as well as the biotechnology and chemical-pharmaceutical industries. Innovative components stand for a hygienic and safe process. Our engineering provides knowhow from brewhouse to bottling.
- 513** **Alfa Laval**, 955 Mearns Road, Warminster, PA 18974 U.S.A.; +1.215.499.4443; Fax: +1.215.443.4234; Web: www.alfalaval.us/brewery; Email: customerservice.usa@alfalaval.com; Facebook: www.facebook.com/pages/Alfa-Laval/171132542929029; Twitter: @Alfa_Laval. Alfa Laval partners with breweries of all capacities and sizes to help brew the highest quality of beer, with a full range of hermetic, bottom feed high-speed separators, decanters for beer recovery, ready-to-use modules, and brewery systems, all backed with proven history of innovation, service, and engineering expertise.
- 508** **Analytical Flavor Systems LLC**, 409 East Fairmount Avenue, State College, PA 16801 U.S.A.; +1.305.794.8392. Analytical Flavor Systems applies machine learning to sensory data to quantify what individuals taste in beer. Analytical Flavor Systems' Gastrograph can identify and predict beer flaws and batch-to-batch deviations in real-time and determine the percentage of the consumer population who can taste the problem.
- 401** **Anton Paar USA**, 10215 Timber Ridge Drive, Ashland, VA 23005-8135 U.S.A.; +1.804.550.1051; Fax: +1.804.550.1057; Web: www.anton-paar.com; Email: lillianne.hall@anton-paar.com; Facebook: @AntonPaarUSA; Twitter: @WhatsAPNews. Anton Paar is a leading supplier of instrumentation for key analytical parameters with over 30 years of experience and many long-term partnerships with the biggest names in the craft beverage industry. Precisely determine and monitor the alcohol content and numerous other quality parameters in wine, beer, spirits, and countless more.
- 423** **Argelith Ceramic Tiles, Inc.**, 103 N. 11th Avenue, Suite 204, St. Charles, IL 60174 U.S.A.; +1.630.444.0665; +1.630.945.2054; Fax: +1.630.444.0667; Web: www.argelithus.com; Email: info@argelithus.com; Twitter: @ski4bob. Argelith is an old—since 1870—German manufacturer of industrial floor tile. Our tile systems are the only permanent floor solution for the brewery. Argelith floors are the strongest, most durable floors you can install. They are made to withstand heavy machinery, fork lifts, and heavy chemical abuse.
- 318** **Ashland**, 500 Hercules Road, Wilmington, DE 19808 U.S.A.; 1.877.546.2782; Web: www.ashland.com. Ashland is a leading supplier of polyvinylpyrrolidone (PVP) for beer. With over 50 years of experience providing beer stabilizers and wort clarifiers to the brewing industry, Ashland's Polyclar stabilizers are the leading brand in clarification and stabilization technology for beer. Visit ashland.com to learn more.
- 614** **Astoria-Pacific**, PO Box 830, Clackamas, OR 97015, U.S.A.; 1.800.536.3111; Fax: +1.503.655.7367; Web: www.astoria-pacific.com; Email: sales@astoria-pacific.com. Astoria-Pacific is pleased to offer the inexpensive rAPID-T system for the analysis of total sulfite and acetaldehyde. The rAPID-T is a fully automated spectrophotometer, which can be programmed to test other colorimetric tests that you might have at your laboratory.
- 320** **ATPGroup**, 2 Madison Avenue, Suite 210, Larchmont, NY 10538, U.S.A.; +1.914.834.1881; Web: www.atpgroup.com; Email: atpbeer@atpgroup.com. ATPGroup has a division dedicated to the brewing industry. We proudly present a wide product range that includes processing aids, anti-foams, cartridges and housings, clarifiers/stabilizers, enzymes, yeasts, filtration aids (cellulose, DE, Perlite), filter sheets, filtration equipment, glassware, packaging equipment, analytical equipment, and more. ATP represents well-respected and established companies such as Alfatek, Ajinomoto, Ashland, Eaton/Begerow, Birko, Craftmaster Malts, EP Minerals, Fermentis, Padovan, SPX, Stölzle, Swaen Specialty Malts, and WeissBiotech.

- 612 Big Ass Solutions**, 2348 Innovation Drive, Lexington, KY 40511, U.S.A.; +1.859.967.1693; +1.949.892.0187; Web: www.bigassolutions.com. Our provocative moniker originated with massive overhead fans that brought comfort and energy savings. Today, though, Big Ass Solutions is fans, lights, and our unique approach. Big Ass means quality, design and working directly with customers to solve their problems. We don't do things halfway. We go Big Ass.
- 220 BIOTECON Diagnostics**, Hermannswerder 17, Potsdam, Brandenburg 14473, Germany; +49.331.2300.200; Web: www.bc-diagnostics.com; Email: bcd@bc-diagnostics.com. BIOTECON Diagnostics focuses on the development and production of innovative, rapid detection systems for pathogens, spoilage organisms, genetically modified organisms (GMOs) and allergens by real-time PCR. Besides detection kits, the Foodproof and Microproof product lines also include kits for sample preparation.
- 510 Blefa Kegs, Inc.**, 182 Jefferson Pike, LaVergne, TN 37086, U.S.A.; +1.615.462.4329; Web: blefa.com; Twitter: @BLEFABeverage; Blefa Kegs, Inc. is the world's leading provider of stainless steel kegs. We deliver innovative, effective, and environmentally friendly products and services which add and retain value for our partners.
- 304 BMT USA, LLC**, 14532 169th Dr. SE, Ste. 142, Monroe, WA 98292, U.S.A.; +1.360.863.2252; Web: www.bmtus.com; Email: jeffh@bmtus.com; Facebook: @BMTUSALLC. BMT USA is the premier supplier of Clean Steam Generators utilized for the sterilization of kegs. Available in electric and steam-to-steam designs with capacities from 50-5,000 lb/hr. BMT also provides incubators and autoclaves for the QC lab. BMT USA—Assuring your quality.
- 200 Briggs of Burton, Inc.**, 400 Airpark Drive, Suite 40, Rochester, NY 14624, U.S.A.; +1.585.426.2460; Fax: +1.585.426.0250; Web: www.briggspc.co.uk; Email: sales@briggsusa.com; Twitter: @briggsofburton. Briggs has global experience in the brewing and distilled spirits industries, offering specialized process equipment, project management, and process engineering services. Briggs has designed, engineered, and built world-class facilities recognized for their efficiency in water and energy. Briggs specializes in hygienic process design and cleaning in place.
- 306 Bruker Corporation**, 15 Fortune Drive, Billerica, MA 01821, U.S.A.; +1.978.667.9580; Web: www.bruker.com; Facebook: @bruker.corp; Twitter: @bruker. Bruker Corporation has several solutions for use in flavor-stability applications. Our e-scan bench-top EPR spectrometer has been optimized for measuring and predicting oxidative flavor stability throughout the entire brewing process. With over 10 years in the field, Bruker remains the gold standard for maximizing the shelf life of your beer.
- 202 BSG CraftBrewing**, 800 West First Avenue, Shakopee, MN 55379, U.S.A.; 1.800.374.2739; Web: www.bsgcraftbrewing.com; Email: sales@bsgcraft.com; Facebook: @BSGCraftbrewing; Twitter: @BSGCraftBrewing. Since 2004, we've earned the trust of our customers by delivering the finest brewing ingredients at competitive values, all backed by excellent customer service and a depth of industry experience. Whether it's exclusive specialty malts, in-demand hop varieties, or premium brewing aids, we have you covered.
- 201 Bühler Inc.**, PO Box 9497, Minneapolis, MN 55440; +1.763.847.9900; Web: www.buhlergroup.com. Bühler specializes in dry material handling and grist production solutions for the brewing industry: from grain intake through storage, transport, dust control, cleaning, classification, and weighing to milling. In close cooperation with our customers, we provide a wide range of innovative solutions.
- 110 Burkert Fluid Control Systems**, 2915 Whitehall Park Drive, Suite 650, Charlotte, NC 28273, U.S.A.; +1.704.504.4440; Web: www.burkert-usa.com; Email: marketing-usa@burkert.com. A global system solution provider with expertise in automation, brewery process control. We offer complete control loops for flow, conductivity, pH, temperature, pressure, or level. Where compactness, smart communication, plant footprint, wash-down, and reliability are a concern we provide process efficiency and higher yields by offering you unlimited process modularity.
- 120 BW Container Systems and Accraply**, 8020 Forsyth Blvd., St. Louis, MO 63105, U.S.A.; +1.630.759.6800; +1.763.557.1313; Web: www.barrywehmiller.com; Email: sales@bwcontainersystems.com. BW Container Systems, solutions provider specializing in robotics, buffering/accumulation, advanced conveyance technology and controls, palletizers/depalletizers, and automated can and end product handling equipment. Accraply, a leader in the design, manufacture, and support of automated label application systems along with converting and finishing equipment for the shrink sleeve label and flexible packaging markets.
- 613 Cablevey Conveyors**, P.O. Box 148, 2397 Hwy 23, Oskaloosa, IA 52577, U.S.A.; +1.641.673.8451; Web: www.cablevey.com; Email: info@cablevey.com; Facebook: @cableveyconveyors. Enclosed tubular drag cable and disc conveying maintains consistency of barley and malt materials—so there is virtually zero breakage. From your mill to your mash tun to your waste discharge, Cablevey Conveyors offers customized, flexible systems with multiple inlets and discharges. Material separation and degradation are practically eliminated.
- 315 Cambrian Innovation**, 27 Drydock Avenue, Floor 2, Boston, MA 02210, U.S.A.; +1.617.307.1755; Web: www.cambrianinnovation.com; Email: info@cambrianinnovation.com; Twitter: @CambrianInno. Cambrian Innovation's EcoVolt solutions are modular, bioelectrically enhanced wastewater treatment solutions for breweries. At Bear Republic, Lagunitas, and Northern United, EcoVolt solutions generate clean water and energy from wastewater, turning a former cost center into a revenue stream. Automated, robust, and expandable, Cambrian's solutions are unparalleled in quality and results.
- 114 Cara Technology Ltd.**, Leatherhead Enterprise Centre, Randalls Road, Leatherhead, Surrey KT22 7RY, United Kingdom; +44.01372822218; Web: www.cara-online.com, www.aroxa.com; Email: marketing@cara-online.com; Facebook: @aroxafs; Twitter: @aroxafs. Cara Technology has helped breweries make great beer for over 20 years. We develop, manufacture, and supply our AROXA Certified Flavour Standards, run performance assessment schemes, and deliver training courses for both tasters and taste panel leaders. We also provide browser-based sensory management software, SensCheck, to the industry.
- 505 Cargill**, 15407 McGinty Road W., Wayzata, MN 55391, U.S.A.; 1.800.669.MALT; Web: www.cargillmalt.com; Twitter: @cargillmaltus. We are committed to providing you with world-class malts. Our network of global production and sourcing taps the best available malting barley. Our network spans the four primary barley growing regions of the world, and Cargill's 18 operations in ten countries produce high quality malt for the world's brewers.

- 216 CE Elantech, Inc.**, 170 Oberlin Avenue North, Suite 5, Lakewood, NJ 08701, U.S.A.; 1.888.232.4676; Fax: +1.732.370.3888; Web: www.ceelantech.com; Email: sales@ceelantech.com. Featured instruments: Thermo Flash 2000 Combustion Elemental Analyzer available configurations: N/Protein through CHNS/O for both solid and liquid samples. Thermo Microstructure including Pycnomatic ATC Densitometer Next Instruments CropScan, MultiScan and SeedCount Image Analyzers Navas Instruments TGA 1000 Analyzer, AFS 5000 XRF and LOI Fusion System, and Indentor Hardness Testers.
- 608 Centec LLC**, W140N9103 Lilly Road, Menomonee Falls, WI 53051, U.S.A.; +1.262.251.8209; Fax: +1.262.251.8376; Web: www.centec-usa.com; Email: info@centec-usa.com. Centec uses optical process transmitters to measure CO₂ concentration. Transmitters used for the determination of Brix, Plato, and Alcohol. Centec builds fully-automated units for HG-blending, carbonating, nitrogenating, flash-pasteurization and sterile filtration, CIP and water de-aeration. Centec provides a wide range of Centec butterfly valves, pipe connections, reducers, bends, and HyCom-fittings.
- 206 ChemTreat**, 5640 Cox Road, Glen Allen, VA 23060, U.S.A.; +1.804.935.2000; Web: www.chemtreat.com. ChemTreat is one of the world's largest providers of water treatment products and services. We develop customized programs with sustainable solutions to improve operating efficiencies, minimize expenditures, reduce carbon footprints, and improve energy and water management delivered through the most experienced sales and service team in the industry.
- 416 Christian Gresser**, Auweg 34, Regensburg, 93055, Germany; +49.941.6037114; +49.175.5631497; Web: www.gresser.net; Email: sgresser@gresser.net; Facebook: @openfermenting. Since 1872, Gresser Company, family-owned for four generations in Bavaria, manufactures high quality tanks and vessels. Gresser does continuous research and is famous as an expert in open fermentation with an automatic CIP system.
- 123 Cicerone Certification Program**, 4043 N Ravenswood, Chicago, IL 60613, U.S.A.; +1.773.857.1383; Web: www.cicerone.org; Email: info@cicerone.org; Facebook: @cicerone.org; Twitter: @cicerone. The Cicerone Certification Program certifies and educates beer professionals in order to elevate the beer experience for consumers.
- 420 ClearCove**, 7910 Rae Boulevard, Victor, NY 14564, U.S.A.; +1.585.267.5004; Web: www.clearcovesystems.com; Email: info@clearcovesystems.com; Facebook: @ClearCove; Twitter: @ClearCoveSys. As a leading renewable energy company, ClearCove's patented, biology-free technology transforms the economics of brewery wastewater operations. This is achieved through unparalleled delivery of clean water, while recovering organics as a resource for energy production. Tailor-made for producers with a critical need to eliminate high concentrations of organics from wastewater.
- 617 Cloud-Sellers**, 4855 Morabito Place, San Luis Obispo, CA 93401, U.S.A.; +1.805.549.8093; Fax: +1.937.938.7191; Web: www.cloudinc.com; Email: mkemp@cloudinc.com. Cloud-Sellers designs and manufactures a complete line of rotary impingement cleaning machines for hygienic cleaning of all process, storage, and transport vessels.
- 620 CO2Meter, Inc.**, 131 Business Center Drive, Ormond Beach, FL 32174, U.S.A.; +1.386.872.7669; Web: www.co2meter.com; Email: sales@co2meter.com; Facebook: @co2meter; Twitter: @co2meter. CO2Meter, Inc., is a U.S.-based designer and manufacturer of gas detection and monitoring equipment focusing on carbon dioxide. Our global business delivers solutions worldwide for brewery and staff safety.
- 419 Colorado Malting Company**, 2064 County Road 12 S., Alamosa, CO 81101, U.S.A.; +1.719.580.0051; Email: Maltbarn@coloradomaltingcompany.com. Colorado Malting is a family farm and malting operation that grows and malts their own grain in the world-famous barley region, the San Luis Valley of southern Colorado. Together with Viking Malt from Lahti Finland, they have united to bring craft malt to brewers around the world.
- 402 Commodity Specialists Company**, 10733 Sunset Office Drive, Suite 260, St. Louis, MO 63038, U.S.A.; +1.314.909.7447; 1.800.767.4092; Fax: +1.314.909.9366; Web: www.csc-world.com; Email: twilkinson@csc-world.com. CSC is a national marketer of feed byproducts and for over 35 years the largest marketer of wet brewer's grains in the United States, serving the needs of large and craft brewers. We have experienced personnel nationwide who understand the logistic needs of breweries and feed values and needs of farmers.
- 111 Comptoir Agricole Hops**, 35, Route de Strasbourg, Hochfelden 67270, France; +33 631299543; Web: www.hops-comptoir.com; Email: info@cophoudal.fr. Comptoir Agricole is the main hops producer in Alsace, France, with one of the finest hops in the world: Strisselspalt. This area has bred several new hops of typical aromas, including Aramis and Barbe-Rouge Mistral. Beers brewed with hops from Alsace are mostly delicate. They are described as refined rather than intense.
- 223 Day & Zimmermann**, 125 The Parkway, Suite 400, Greenville, SC 29615, U.S.A.; +1.864.241.6886; +1.717.391.7998; Web: www.dayzim.com; Email: aaron.landolt@dayzim.com. Day & Zimmermann specializes in engineering and construction, staffing, and defense solutions for leading corporations and governments. With 150 worldwide locations, a workforce of 55,000, and \$2.5 billion in revenue, D&Z is ranked as one of the largest private companies in the U.S. by Forbes. We do what we say.
- 208 Dex-O-Tex by Crossfield Products Corp.**, 3000 E. Harcourt Street, Rancho Dominguez, CA 90221, U.S.A.; +1.310.886.9100; Fax: +1.310.886.9119; Web: www.dextex.com; Email: dextex@cpmail.net; Facebook: @DexOtex; Twitter: @DexOExpert. Scientifically superior and performance proven, Dex-O-Tex floor, wall, and waterproofing systems are made for demanding environments that require long-term protection, durability, cleanliness, and aesthetics. Decorative and Terrazzo Products—Epoxy Products—Overhead, Patching, and Underlayment Systems—Urethane Products—Wall Coatings—Waterproof/Decking Products.
- 511 Doehler North America**, 400 High Point Road S.E., Cartersville, GA 30120, U.S.A.; +1.770.383.0451; Web: www.doehler.com; Facebook: @doehlergroup; Twitter: @doehlergroup. Doehler is one of the world's leading producers, marketers, and suppliers of natural ingredients and ingredient systems for the food and beverage industry. Using nature and innovative technologies as our starting point, we always go one step further to create real added-value for our customers. We bring ideas to life.
- 116 Donaldson Company, Inc.**, PO Box 1299, Minneapolis, MN 55440, U.S.A.; 1.800.543.3634; Web: www.donaldsonprocessfilters.com; Email: processfilters@donaldson.com. Donaldson Compressed Air & Process provides compressed air purification equipment and process filtration.

Our steam, sterile air, compressed air, and liquid filtration is used throughout the food and beverage industry to reduce risk to food safety, prolong shelf life, and ensure equipment is operating without issue.

- 205 DSM Food Specialties**, 3502 N Olive Road, South Bend, IN 46628, U.S.A.; +1.574.210.9979; Web: www.brewersclarex.com. DSM Food Specialties is a global supplier of food ingredients. We offer a range of brewing enzymes and support from our global team of brewmasters to ensure you gain maximum control over your production processes, improve your brewing efficiency, and deliver consistently clear, higher quality beer at a lower cost.
- 512 DuPont Industrial Biosciences**, 4300 Duncan Avenue, St. Louis, MO 63110, U.S.A.; +1.314.659.3100; Fax: +1.314.659.5728; Web: www.dupont.com; Facebook: @dupontco; Twitter: @DuPont_News. DuPont is addressing the world's brewing challenges by offering a wide range of bio-based ingredients, enzymes, and antimicrobials to provide safer, healthier and more nutritious beverages. Through close collaboration with customers, DuPont combines knowledge with a passion for innovation to deliver unparalleled value to the marketplace.
- 506 DuPont Tate & Lyle Bio Products Company, LLC**, 198 Blair Bend Drive, Loudon, TN 37774, U.S.A.; 1.866.404.7933; Web: www.duponttateandlyle.com. DuPont Tate & Lyle Bio Products manufactures Susterra propanediol, food-safe glycol that is used as the primary ingredient in heat transfer fluids as a higher performing alternative to propylene glycol. The low-viscosity profile of Susterra propanediol enhances pump power consumption, flow rates, and pumping efficiencies, which can reduce maintenance costs.
- 313 EAGLE Certification Group**, 123 Webster Street, Dayton, OH 45402, U.S.A.; 1.800.795.3641; Web: www.eaglecertificationgroup.com; Email: info@eaglecertificationgroup.com. EAGLE Certification Group has been providing personalized, value-added third-party certification services for international standards since 1994. Industry-experienced auditors help clients maximize their investment through conformance analysis and constructive feedback with a focus on continuous improvement, sustainability, and customer satisfaction. EAGLE Certification Group includes EAGLE Registrations, Inc., and EAGLE Food Registrations.
- 217 Ecolab**, 370 Wabasha Street N., St. Paul, MN 55102, U.S.A.; 1.800.352.5326; Web: www.ecolab.com. As the leading global provider of sanitation, water management and wastewater programs, and pest elimination services to the brewery industry, the Ecolab team provides expertise and solutions to help customers produce safer, high quality products, improve operational efficiency, and enhance environmental stewardship with water and energy reduction solutions.
- 418 Elementar Americas, Inc.**, 520 Fellowship Road, D408, Mount Laurel, NJ 08054, U.S.A.; +1.856.787.0022; Web: www.elementarAmericas.com; Email: steve.sharp@elementarAmericas.com. Elementar makes world class analyzers for protein determination and measuring other organic elements. With small footprints and easy to operate and maintain, our analyzers are ideal for determining protein/nitrogen and other elements for food stuff, pharmaceuticals, and flavorings. Automated sampling and robust software help keep your lab productive and accurate.
- 518 EMG International, Inc.**, P.O. Box 1600, Media, PA 19063, U.S.A.; +1.484.840.0800; Web: www.emgint.com. EMG is an environmental engineering company with a focus on wastewater treatment and energy recovery for the food and beverage industry. EMG provides turnkey services for wastewater treatment systems based on EMG's Anaerobic Fluidized Bed Digester (AFBD) technology which has been successfully applied at various food and beverage manufacturing facilities.
- 606 Endress+Hauser**, 2350 Endress Place, Greenwood, IN 46143, U.S.A.; 1.888.ENDRESS; Web: us.endress.com; Facebook: @EndressHauser; Twitter: @Endress_US. Endress+Hauser is one of the largest instrument manufacturers in the United States' industrial automation industry—specializing in automation solutions for the chemical, food and beverage, oil and gas, water and wastewater, life sciences, power and energy, primaries, and pulp and paper industries.
- 521 Enzyme Development Corporation**, 505 Eighth Avenue, 15th Floor, New York, NY 10018, U.S.A.; +1.212.736.1580 ext. 247; Web: www.enzymedevelopment.com. EDC has been serving the needs of brewers since 1953 and provides a broad range of enzymes and the experience and knowledge to enhance your operation.
- 321 EP Minerals**, 9785 Gateway Drive, Reno, NV 89521, U.S.A.; +1.775.824.7624; Web: www.epminerals.com; Email: julie.brown@epminerals.com; Facebook: @EP-Minerals; Twitter: @EPMinerals. EP Minerals specializes in diatomaceous earth (DE) filter aids for brewing. Used worldwide by the most experienced brewers, our Celabrew DE is a natural “low metals” filter aid that removes fine particles from beer without affecting the color, flavor, or body of the beer. For more information, visit www.epminerals.com.
- 414 Esau & Hueber GmbH**, Kapellenweg 10, Schrobenuhen 86529, Germany; +49.8252.8985-0; Fax: +49.8252.8985.85; Web: www.esau-hueber.de; Email: info@esau-hueber.de. Esau & Hueber is acting as a global full-range supplier of brewhouses up to 250 bbl. and complete process technology for the cold block area. The formidable range includes specialist systems like System Nerb brewhouse technology, TurboAir wort-aeration, carbonation and nitrogenation; MicroProp, CraftProp and FlexiProp yeast-management; and WinBrew controls.
- 121 FILTEC**, 3100 Fujita Street, Torrance, CA 90505, U.S.A.; 1.888.434.5832; +1.310.257.2102; Fax: +1.310.530.1000; Web: www.filtec.com; Email: askfiltec@filtec.com. Founded in 1958, FILTEC is a leading provider of inline inspection and quality control solutions for breweries large and small. We provide fill level inspection, filler management systems, DUD detection, laser coding, and case inspection. Local FILTEC support is available in every domestic market and on every continent.
- 109 First Key Consulting**, 2300 – 1066 West Hastings Street, Vancouver, BC V6E 3X2, Canada; +1.604.273.8884; Web: www.firstkey.com; Email: heather.pilkington@firstkey.com. First Key is the leading global brewing industry consulting firm. We have worked in over 50 countries and have assembled some of the most talented, interesting, and experienced consultants to provide clients independent, comprehensive, and integrated solutions in every area of their business.
- 520 Five Star Chemicals & Supply, Inc.**, 4915 E 52nd Avenue, Commerce City, CO 80022, U.S.A.; +1.303.287.0186; Web: www.fivestarchemicals.com; Email: support@fivestarchemicals.com; Facebook: @fivestarchemicals. We provide cleaners, sanitizers, parts, and supplies for breweries.

- 203 Flottweg Separation Technology, Inc.**, 10700 Toebben Drive, Independence, KY 41051, U.S.A.; +1.859.448.2300; Fax: +1.859.448.2333; Web: www.flottweg.com; Email: sales@flottweg.net. With over 40 years of experience in the U.S. and Canadian markets, Flottweg offers high performance industrial centrifuges, belt presses, and complete custom-designed processing systems for all types of liquid–solid and liquid–liquid–solid separation applications.
- 310 Fulton Companies**, 972 Centerville Road, Pulaski, NY 13142, U.S.A.; +1.315.298.5121; Web: www.Fulton.com; Facebook: @FultonBoiler; Twitter: @FultonBoiler. Fulton supports the brewing and distilling industries with processing equipment sized for small-batch brewhouses scaled up to large-volume breweries. Our boilers provide advantages that meet the unique demands of the market, with a heavy focus on efficiency, consistency, and performance.
- 504 GEA Group**, 9165 Rumsey Road, Columbia, MD 20145, U.S.A.; 1.844.432.2329; +1.845.384.9200; Web: www.gea.com; Email: sales.unitedstates@gea.com. The GEA portfolio includes over 50 solutions developed to meet the needs of today’s brewers. At GEA, we can design and engineer turnkey breweries and also provide individual solutions and components to enhance the performance of existing operations. Our wide range of products is supported with a superior service commitment.
- 221 GERSTEL, Inc.**, 701 Digital Drive, Suite J, Linthicum, MD 21090, U.S.A.; +1.410.247.5885; Fax: +1.410.247.5887; Web: www.gerstelus.com; Email: sales@gerstelus.com; Facebook: @GERSTELUS.; Twitter: @GERSTEL_USA. Sample prep workstations and integrated analytical solutions for LC, GC, GC/MS, and LC/MS. GERSTEL systems enable ultra-low detection levels in matrices while increasing sample throughput, handle difficult sample preparation, and analyze sample types complete with software integration (Agilent, AB SCIEX, LECO, ThermoFisher). Premier Solution Partner for Agilent Technologies.
- 308 GKD-USA, Inc.**, 825 Chesapeake Drive, Cambridge, MD 21613, U.S.A.; +1.410.221.0542; Fax: +1.410.221.0544; Web: www.gkdusa.com; Email: sales@gkdusa.com. Since 1925, GKD Gebr. Kufferath AG has set standards as a developer and manufacturer of precise technical filter media for industrial filtration processes. Our state-of-the-art looms and weaving technology provide robust, high quality filter cloth, and fabricated NEVERLEAK filter leaves for precoat and pressure filtration.
- 412 Gusmer Enterprises**, 1165 Globe Avenue, Mountainside, NJ 07092, U.S.A.; +1.908.301.1811; Fax: +1.908.301.1812; Web: www.gusmerbeer.com; Email: sales@gusmerenterprises.com; Facebook: www.facebook.com/Gusmer-Enterprises-Inc-297966976981310; Twitter: @gusmerbeer. For over 90 years, Gusmer has taken a revolutionary approach to serving the brewer’s vision. It’s why Gusmer offers a full line of solutions for the brewing industry including fermentation and processing aids, filtration media and equipment, analytical products and instrumentation, processing equipment, and analytical laboratory services.
- 404 Hach**, 5600 Lindbergh Drive, Loveland, CO 80538, U.S.A.; +1.970.663.1377; Web: www.hach.com; Facebook: @HachCompany; Twitter: @HachCompany. Hach has been helping the brewing industry for over 60 years. We know quality matters—not just at the end of your line, but more importantly when and where your customer takes their first sip. As a craft brewer, flavor stability and shelf life are critical to your brand and business.
- 112 Hamilton Company**, 4970 Energy Way, Reno, NV 89502, U.S.A.; 1.800.648.5950; Fax: +1.775.858.3028; Web: www.hamiltoncompany.com/sensors; Email: sensors@hamiltoncompany.com. High dissolved oxygen (DO) can impact the taste and shelf life of your product. Designed for at-line as well as laboratory use, the Beverly™ Portable DO Monitor provides accurate measurement in a rugged design. A Visiferm sensor with built-in intelligence lies at the heart of the unit. With easy calibration, quick response time down to ppb levels, and simple maintenance, the Beverly is the ideal tool for your DO monitoring needs.
- 303 HEUFT USA, Inc.**, 2820 Thatcher Road, Downers Grove, IL 60515, U.S.A.; +1.630.968.9011; Fax: +1.630.968.8767; Web: www.heuft.com; Email: usa@heuft.com. HEUFT is a premier supplier of inspection equipment to the beer industry. HEUFT has excelled in providing solutions for sustainable quality inspection for both bottles and cans. Our product line covers full and empty container inspection, full case and empty case inspection, and sorting, laning, and rejection systems.
- 501 Hopsteiner**, 655 Madison Avenue, New York, NY 10021, U.S.A.; 1.800.339.8410; +1.212.838.8900; Fax: +1.212.593.4238; Web: www.hopsteiner.com; Email: sales@hopsteiner.com; Facebook: @Hopsteiner; Twitter: @Hopsteiner. Please join us to evaluate new and experimental hops including the varieties Denali, Eureka!, Lemondrop, and Calypso. Curious about CO₂ hop extract, pure hop oils, isomerized hop products or Tetra? Please visit to learn more about these products. Hopsteiner Quality...The Proof Is In The Pour.
- 403 Hydro Dynamics—Apotech**, 8 Redmond Court N.W., Rome, GA 30165, U.S.A.; +1.706.234.4111; +1.734.455.7770; Fax: +1.706.234.0702; Web: www.hydrodynamics.com; Email: dmancosky@hydrodynamics.com; Twitter: @shockwavepower. Cavitation hop extraction has the potential to decrease hops, both bittering and aroma, by 50% or more without losing flavor. When the ShockWave Power cavitation technology is applied to the brewing processes, combined with expertise in hop utilization, brewers can produce beers with less hops and the same great flavors.
- 407 Hygiena**, 941 Avenida Acaso, Camarillo, CA 93012, U.S.A.; +1.805.388.8007; 1.888.494.4362; Web: www.hygiena.com; Email: info@hygiena.com; Twitter: @HygienaUSA. Recognized worldwide for accuracy, ease of use, and affordability, Hygiena’s ATP Sanitation Monitoring System is used extensively throughout food and beverage industries to validate sanitation protocols and determine whether equipment is truly clean. The EnSURE Monitoring System measures ATP from surface and liquid samples. Free trials are available!
- 517 Industrial Test Systems, Inc.**, 1875 Langston Street, Rock Hill, SC 29730, U.S.A.; +1.803.329.9712; +1.704.921.1999; Web: www.sensafe.com; Email: info@sensafe.com; Facebook: @exactidip; Twitter: @smartbrewkit. The new Smart Brew kit uses the eXact iDip, the first portable meter designed for the craft brew market that calculates important brewing values with no math! It tests water quality parameters using a simple process. Paired with a smart device, it gives instantaneous software updates, market versatility, and customization.
- 519 InnovaPrep**, 132 East Main Street, Drexel, MO 64742, U.S.A.; +1.816.619.3375; Web: www.innovaprep.com; Email: info@innovaprep.com. The InnovaPrep Concentrating Pipette is a small automated bio-concentrator that rapidly concentrates liquid samples for direct detection of spoilage organisms or other particle-based contamination. It concentrates in minutes allowing concentration factors of several orders of magnitude. No enrichment or centrifugation required. Improves lab efficiency and workflow for same shift results.

- 422 Invisible Sentinel**, 3711 Market Street, Suite 910, Philadelphia, PA 19104, U.S.A.; +1.215.966.6118; Web: www.invisiblesentinel.com; Email: info@invisiblesentinel.com. brewPAL, by Invisible Sentinel, is a game-changing quality management tool for rapid detection of *Pediococcus* and *Lactobacillus*. This system allows for on-site testing with sample to results in under 3 hours. Our new test kits for wild yeast detection, brewDEK and brewBRUX, operate on the same robust, accurate platform.
- 415 John I. Haas, Inc.**, 1600 River Road, Yakima, WA 98902, U.S.A.; +1.509.469.4000; Web: www.johnihaas.com; Email: Roy.Johnson@johnihaas.com. As a leading global hops supplier, we share your passion for creating flavors that people love. To learn more about our passion for providing you with the products, tools, services, and supply assurance you need to brew great beer, visit us at booth 415.
- 500 Kagetec Industrial Flooring**, 24631 Saint Benedict Road, Jordan MN 55352, U.S.A.; +1.612.435.7640; Web: www.kagetecusa.com; Email: info@kagetecusa.com; Facebook: www.facebook.com/kagetec. Kagetec provides chemical resistant, hygienic, industrial flooring systems consisting of slip resistant ceramic tile and integrated stainless steel drains. We have more than 25 years of experience in the food and beverage industry. Let Kagetec help you with one of the most critical areas of your facility.
- 103 Kronos Inc.**, 9600 South 58th Street, P.O. Box 321801, Franklin, WI 53132-6241, U.S.A.; +1.414.409.4000; Fax: +1.414.409.4100; Web: www.kronos.com; Email: salesusa@kronosusa.com. Kronos is a leading manufacturer of integrated brew houses, bottling lines, IT systems, and automated warehouse management solutions. Kronos will feature its brewing process systems that cover all aspects of brewing, from malt intake to filtered beer, including brew house and filter plants, as well as fermentation and storage cellars.
- 421 Kusters Water**, 101 Zima Park Drive, Spartanburg, SC 29301, U.S.A.; +1.609.433.7183; Web: www.kusterswater.com. Kusters Water is an industry leader, offering superior products to the brewing industry. Kusters specialties include headworks, DAF systems, clarifiers, thickeners, screw presses, and the CSO Terminodour odor control system. Kusters Water's ISO 9001 Certified manufacturing facility, in Spartanburg, SC, provides in-house fabrication, UL listed controls, and product assembly.
- 101 LECO Corporation**, 3000 Lakeview Avenue, Saint Joseph, MI 49085, U.S.A.; +1.269.985.5496; Fax: +1.269.982.8987; Web: www.leco.com; Email: info@leco.com. LECO's separation science products resolve complex samples and pioneer high-sample throughput using GCxGC, GCxGC-TOFMS, and GC-TOFMS. High Resolution TOFMS systems offer an unprecedented combination of speed, resolution, mass accuracy, and dynamic range. A unique combination of easy-to-use software and advanced instrumentation provide an innovative solution for today's most demanding applications.
- 107 LGC Standards**, 276 Abby Road, Manchester, NH 03103, U.S.A.; +1.603.622.7660; Fax: +1.603.622.5180; Web: www.lgcstandards.com; Email: lgcusa@lgcgroup.com; Facebook: @LGCgroup; Twitter: @LGCstandards. LGC Standards LGC Standards is an ISO accredited provider of proficiency testing services and manufacturer of certified reference materials to more than 10,000 laboratories worldwide. Our beverage PTs include those for brewing analytes, malt analytes, and alcoholic drinks. We provide CRMs for beer, wine, and alcoholic and nonalcoholic beverages.
- 618 Loeffler Chemical Corporation**, 200 Great Southwest Parkway, Atlanta, GA 30336 U.S.A.; +1.404.629.0999; Fax: +1.404.629.0690; Web: www.loefflerchemical.com; Email: info@loefflerchemical.com. Loeffler Chemical Corporation is the premier provider of sanitation chemicals and services to the brewing industry. In addition to a complete line of sanitation products, Loeffler offers enzymes, fining agents, and stabilizers, as well as draft line cleaning equipment and chemicals. Featured will be a water-free, food-grade line lube.
- 409 Logos Biosystems**, 7700 Little River Turnpike, Suite 207, Annandale, VA 22003, U.S.A.; +1.703.622.4660; +1.703.942.8867; Web: www.logosbio.com; Email: info@logosbio.com; Facebook: @logosbiosystems; Twitter: @LogosBiosystems. Logos Biosystems is dedicated to the development and commercialization of innovative technologies to support the life science research community. Since 2008, Logos Biosystems has been developing a series of automated systems and imaging instruments for laboratories engaging in research with a cellular and molecular emphasis.
- 516 LPR Construction Co.**, 1171 Des Moines Avenue, Loveland, CO 80537, U.S.A.; +1.970.663.2233; Web: www.lprconstruction.com; Email: marmstrong@lprconstruction.com. LPR recognizes the numerous challenges facilities management professionals face. Cost reduction, productivity, and income acceleration are now basic expectations. We can partner with you to drive business value and make sure you aren't stressed about maintenance, small capital projects and other facility management issues.
- 515 Malteurop North America**, 3830 West Grant Street, Milwaukee, WI 53215, U.S.A.; 1.844.546.MALT; +1.414.671.1166; Fax: +1.414.671.1385; Web: www.malteurop.com; Email: customerservice.mena@malteurop.com; Facebook: @craftmastermalt; Twitter: @craftmastermalt. Malteurop North America produces basic brewers' and distillers' malts and premium kilned Karamel, Crystal, Roasted, and other specialty malts. In 2015, we launched Craft Master Malt, our line of premium special malts for craft brewers, and also began marketing special premium roasted malts from The Swaen, produced in Kloosterzande, Holland.
- 115 McRae Integration Ltd.**, 34 Meridian Road, Toronto, ON N0B 2K0, Canada; +1.416.201.1435; Web: www.meridianbrewsoft.com; Email: Info@meridianbrewsoft.com. McRae Integration offers project management plus controls and automation engineering to the brewing industry. McRae is a ROCKWELL Recognized System Integrator. McRae is also the developer and supplier of Meridian BrewSoft—brewing controls as well as BrewSight reporting services.
- 119 Meura**, Rond-Point JB Meura, 1, Péruwelz 7600, Belgium; +32.69.886.988; Fax: +32.69.886.980; Web: www.meura.com. Meura specializes in the design and manufacturing of brewhouse technologies, strongly supported by its R&D center, Meura Technologies & Services. During this WBC, we'll be pleased to present you our latest innovations: The Meura 2001 Hybrid, the Meurabrew, and our revolutionary concept in terms of energy savings: the Meurastream.
- 213 Milne Fruit Products**, 804 Bennett Avenue, Prosser, WA 99350, U.S.A.; +1.509.786.2611; Web: www.milnefruit.com; Email: sales@milnefruit.com. Since 1956, Milne has been providing the industry with high-quality fruit and vegetable ingredients. From apples to watermelons, we are able to provide your juice solution. Milne manufactures NFC, concentrate, puree, and organic items in both frozen and aseptic packaging ranging from 5 gallon fills to bulk tankers.

- 610 Miura America Co., Ltd.**, 1900 The Exchange SE, Suite 330, Atlanta, GA 30339, U.S.A.; 1.888.309.5574; Web: www.miuraboiler.com; Facebook: @MiuraAmerica; Twitter: @Miura_Steam. Miura is committed to developing, manufacturing, and servicing the most efficient steam, hot water, and modular boiler systems in the world. Miura boilers meet lower NOx standards, reduce maintenance and monitoring needs, and reduce space requirements. Our boilers continue to push the boundaries of what efficiency really means.
- 408 Munters Corporation**, 79 Monroe Street, Amesbury, MA 01913, U.S.A.; +1.978.241.1100; Web: www.munters.com; Email: dhinfo@munters.com; Facebook: @muntersglobal; Twitter: @MuntersCorp. The brewing industry requires precise temperature and humidity conditions during production. Without them, the sensitive brewing process and its ingredients can be compromised with the presence of condensation, mold, and bacteria. Munters dehumidification technology provides precise and consistent temperature and humidity control to help maintain product quality and integrity.
- 309 Neogen Corporation**, 620 Leshar Place, Lansing, MI 48912, U.S.A.; +1.517.372.9200; 1.800.234.5333; Fax: +1.517.372.0108; Web: www.neogen.com; Email: foodsafety@neogen.com; Facebook: @NeogenCorp; Twitter: @neogen.com. Neogen's rapid beverage safety tests includes: Reveal 3-D for Total Milk Allergen, which screens for milk residue in liquids, CIP rinses, and on surfaces; BetaStar, which detects beta-lactams in milk in minutes; Soleris, a rapid optical testing system that accurately detects microbial contamination; and AccuPoint Advanced ATP Sanitation Monitoring System.
- 316 Newlands Systems**, 602-30731 Simpson Road, Abbotsford, BC V2T 6Y7, Canada; +1.604.850.7799; Web: www.nsbrew.com. Since 1990, Newlands Systems has distinguished itself as the premiere North American brewing equipment manufacturer. Newlands boasts a long history with every brew system and has the brewing experience, engineering and technical background, and skilled craftsmanship to build your custom stainless steel brewery.
- 602 Nexcelom Bioscience**, 360 Merrimack Street, Building 9, Lawrence, MA 01843, U.S.A.; +1.978.327.5340; Fax: +1.978.327.5341; Web: www.nexcelom.com; Email: sales@nexcelom.com; Facebook: @nexcelom; Twitter: @nexcelom. Nexcelom's Cellometer X1/X2 image cytometers are simple-to-use cell counters optimized for yeast samples, automating cell counting procedures by obtaining accurate counts, viability and cell size in less than 30 seconds and only 20uL of sample. Fluorescence detection capabilities enable fast and simple determination of viability and vitality for brewing fermentation.
- 400 optek-Danulat, Inc.**, N118W18748 Bunsen Drive, Germantown, WI 53022, U.S.A.; 1.888.837.4288; Web: www.optek.com; Email: brew@optek.com; Facebook: @optek; Twitter: @optek. Precise control of color, haze, and yeast and solids concentration. Optek's inline photometers and insertion probes control fermentation, filtration, separation, yeast pitching, wort color and clarity, DE and PVPP dosing, and more. Achieve uninterrupted processing of your best possible product with reduced product loss, improved profitability, and greater efficiency.
- 214 Orbijet Technologies, Inc.**, 15200 Middlebrook Drive, Suite E, Houston TX 77058, U.S.A.; +1.281.218.9400; +1.713.513.5884; Web: www.orbijet.com; Email: info@orbijet.com. A leading manufacturer of tank cleaning equipment and systems for the internal cleaning of tanks for process, storage, and transportation. Orbijet is a world leader in tank cleaning technology and undisputed experts in external drive tank cleaning technology.
- 507 Pall Corporation**, 25 Harbor Park Drive, Port Washington, NY 11050, U.S.A.; 1.866.905.7255; Web: www.pall.com/foodandbev; Email: foodandbeverage@pall.com. Pall Food and Beverage provides filtration products and services to ensure product quality and maintain process reliability in beverage and food production. Our solutions also assist in consumer protection, the reduction of operating costs, and waste minimization.
- 622 Palmer Canning Systems**, 3759 N Ravenswood Avenue, Suite 233, Chicago, IL 60613, U.S.A.; +1.773.463.7714; Fax: +1.773.463.7740; Web: www.palmercanning.com; Email: info@palmercanning.com. Counter Pressure Canning Systems and Seaming Technology for beer. Complete lines range from 45–300 CPM for most can sizes. Equipment provided includes de-pal, twist rinse, conveyance, CraftBloc monobloc fillers/seamers, dryers, accumulation, and fill detection. High quality manufacturing and technology with hygienic design, low oxygen pickup, and consistent seams.
- 210 Parallel Products**, 401 Industry Road, Suite 100, Louisville, KY 40217, U.S.A.; +1.502.471.2444; Web: www.parallelproducts.com. Parallel Products specializes in the reclamation of unsellable beverage products. We keep unwanted beverage products out of our landfills, protecting your brand name and image. Our TTB Compliance & Tax Recovery Department can assist you with the recovery of your FET and TTB Tax Credit Recovery for alcoholic beverage products.
- 219 Peco|InspX**, 1050 Commercial Street, San Carlos, CA 94070, U.S.A.; +1.510.226.6686; Fax: +1.510.226.6687; Web: www.peco-inspx.com; Email: jennifer.giunta@peco-inspx.com. The Peco|InspX Corporation is a leading provider of advanced technology inspection solutions for the food and beverage industries. Headquartered in San Carlos, California, Peco|InspX specializes in accurate high-speed package inspection in machines that are easy to use with a low cost of ownership.
- 104 Pentair**, 293 Wright Street, Delavan, WI 53115, U.S.A.; +1.262.725.9026; Web: <http://foodandbeverage.pentair.com>; Email: snainfo@pentair.com. Pentair's sustainable brewing solutions integrate Haffmans' quality control equipment, "plug-and-play" units for water-deaeration, blending and carbonation, and CO₂ recovery systems, Sudmo's innovative valve technology to increase efficiency and reduce "snake pits" in the cellar, diatomaceous earth (DE)- and chlorine-free Beer Membrane Filtration (BMF), and solutions for water and wastewater treatment.
- 522 PerkinElmer, Inc.**, 940 Winter Street, Waltham, MA 02451, U.S.A.; +1.781.663.6900; Web: www.perkinelmer.com. PerkinElmer, Inc., is a global leader focused on improving the health and safety of people and their environment. With our analytical instrumentation and leading laboratory services, we focus on improving the integrity and safety of the world we live in.
- 302 Petainer Manufacturing USA Inc.**, 515 N. River Street, Batavia, IL 60510, U.S.A.; +1.630.454.4336; Web: www.petainer.com; Email: andres.jensen@petainer.com; Twitter: @Petainer. Taking beer, wine, and cider to the four corners of the world, tap into new markets with Petainer. Petainer's innovative PET kegs allow you to deliver beer, wine, and cider anywhere in the world at a fraction of the previous cost.

- 410 PONNDORF Anlagenbau GmbH**, Leipziger Str. 374, Kassel, Hessen 37123, Germany; +49.561.5114.10; Fax: +49.561.5114.24; Web: www.ponndorf-gmbh.com; Email: s.ullah@ponndorf-gmbh.de. PONNDORF Anlagenbau GmbH is a family-owned internationally operating company. We specialize in engineering and manufacturing of wet spent grains systems. Our customized solutions for breweries include: pneumatic conveyors, buffers and silos, silo discharging devices, dewatering screw presses, and indirectly heated driers.
- 405 PQ Corporation**, PO Box 840, Valley Forge, PA 19482, U.S.A.; +1.610.651.4200; Fax: +1.610.251.5249; Web: www.pqcorp.com. PQ's BRITESORB silica gels meet the needs of brewers the world over and provide selective chillproofing performance with excellent filtration characteristics. The gels remove only the proteins that cause chill-haze, not those that stabilize foam. PQ BRITESORB beer stabilizers: the clear choice for world-class beer.
- 319 Profamo Inc.**, 26329 Basswood Avenue, Rancho Palos Verdes, CA 90275, U.S.A.; +1.941.284.7990; Web: www.profamo.com; Email: info@profamo.com. Profamo supplies QA/process control equipment, keg lines, and spices. Amongst our offerings are Rotech's electronic test keg, which will tell you everything about the cleaning, sterilization, and filling of your kegs. Sigrist's turbidity meters. Lambrechts keg lines. ISS micro u-tube density meters. Pfeuffer's Friabilimeter and Tannometer. AII's CO₂ Purity analyzer.
- 307 ProLeiT Corp.**, 100 S Saunders Road, Suite 150, Lake Forest, IL 60045, U.S.A.; +1.224.880.6536; Email: corp@proleit.com. ProLeiT offers process control technology with integrated MES functions for the brewing industry. Our process control system brewmaxx has more than 700 installations worldwide, one of the leading industry solutions and perfectly tailored to the day-to-day operations in breweries. brewmaxx enables innovative, user-oriented solutions like no other PCS system.
- 417 Proximity Malt LLC**, 644 South 5th Street, Milwaukee, WI 53204, U.S.A.; +1.414.755.8392; +1.414.514.2214; Web: www.proximitymalt.com; Email: malt@proximitymalt.com. Proximity Malt LLC will maintain and sustain access to local grains for quality malt processing, at a scale that provides consistency, efficiency, and variety in malt sourcing for craft brewers. From Monte Vista, CO, and Laurel, DE, Proximity will provide brewers with a local supply of malted and roasted grains.
- 605 Rheonix Food & Beverage**, 10 Brown Road, Suite 103, Ithaca, NY 14850, U.S.A.; +1.607.257.1242; Web: www.rheonix.com; Email: info@rheonix.com. Rheonix, Inc. is committed to making molecular testing available to people everywhere. Our beer spoilage assay is automated, rapid, and has the broadest detection capabilities in the market, detecting not only microorganisms, but also specific hops resistance genes. Our assay is available as a testing service, instrument rental or purchase.
- 222 Rice Bran Technologies**, 6720 N. Scottsdale Road, Suite 390, Scottsdale, AZ 85253, U.S.A.; 1.888.757.7731; +1.602.478.7256; Web: www.ricebrantech.com; Email: r-ray@ricebrantech.com. Rice Bran Technologies is showing a new and novel way to get increased hop utilization and optimization. Stop by our booth to see how our "ProRyza Brew" can be used to make your hops more efficient and cost-effective. See how simple chemistry = better tasting beers.
- 517 Sealed Air Corporation Food Care Division**, 8215 Forest Point Blvd., Charlotte, NC 28273, U.S.A.; 1.800.391.5645; Web: www.sealedair.com/foodcare. Sealed Air Food Care proudly offers Cryovac packaging, materials and packaging equipment and Diversey hygiene solutions to the global food and beverage industries. Our solutions deliver value to enhance food safety and operational efficiency, extend shelf life, and help build brands.
- 611 Separator Technology Solutions**, 2591 Nicholson Street, San Leandro, CA 94577, U.S.A.; +1.559.253.3699; Web: www.sts200.com; Email: sales_us@sts200.com. The STS System is well established in recent years as the market-leading centrifuge for high-value beverages, including the U.S. wine and craft beer industries. We are pleased to present the STS System to the wider U.S. brewing market. STS range of compatible GEA Westfalia spares with up to 50% savings.
- 312 Separators, Inc.**, 5707 W. Minnesota Street, Indianapolis, IN 46241, U.S.A.; 1.800.233.9022; +1.260.402-2018; Fax: +1.317.484.3755; Web: www.separatorsinc.com; Email: botter@sepinc.com. Separators, Inc., is North America's leading independent centrifuge service provider specializing in the remanufacturing of Alfa Laval, Tetra Pak, and Westfalia centrifuges. Separators, Inc. offers 24/7 service, repairs, and spare parts. Industries served: dairy, beverage—including beer and wine, rendering, edible oils, pharmaceutical, biofuels, and industrial fluids.
- 411 Shimadzu Scientific Instruments, Inc.**, 7102 Riverwood Drive, Columbia, MD 21046, U.S.A.; +1.410.381.1227; 1.800.477.1227; Fax: +1.410.381.1222; Web: www.shimadzu.com; Email: webmaster@shimadzu.com; Facebook: @shimadzucorp; Twitter: @shimadzussi. Shimadzu provides total support for beer analysis from farm to stein. From determining color, IBU, alcohol content, and diacetyl levels to more advanced ingredient and chemistry analyses, our wide array of analytical instruments can address the R&D, production, quality, and troubleshooting requirements of any brewery, small or large.
- 209/211 Siebel Institute and Lallemand Brewing**, 900 N. North Branch Street Suite 1N, Chicago, IL 60614, U.S.A.; +1.312.255.0705; +1.847.284.2337; Fax: +1.312.255.1312; Web: www.siebelinstitute.com; Email: info@siebelinstitute.com. The Siebel Institute of Technology and World Brewing Academy offer more brewing-related courses than any other school. Our campus-based and web-based programs cover the full range of brewing-related subjects, offering world-class training that ranges from the fundamentals of brewing to advanced-level programs. We also offer onsite training, consulting, yeast management and production, lab services, and laboratory media. Lallemand Brewing offers products for a wide range of brewing applications including a growing selection of high-performance dry yeast products that cover a complete cross-section of popular brewing styles. Lallemand also offers yeast nutrients to help maximize your fermentation performance and beer quality.
- 502 Siemens Industry, Inc.**, 11612 Lilburn Park Road, St. Louis, MO 63146, U.S.A.; 1.800.241.4453; Web: <http://usa.siemens.com/foodbev>; Email: fbvss.industry@siemens.com; Facebook: @siemensii; Twitter: @siemensii. With the fully scalable architecture of the SIMATIC portfolio, craft brewers can create the same high-quality, consistent product. The SIMATIC portfolio contains everything from instrumentation, drives, I/O devices, and process automation for control of the brewhouse and cellars to factory automation products for control of packaging lines and ancillary equipment.

- 215** **Simpsons Malt**, Tweed Valley Maltings, Berwick-Upon-Tweed, Northumberland, TD15 2UZ, United Kingdom; +44 (0)1289 330033; Web: www.simpsonsmalt.co.uk; Email: PLSimpson@simpsonsmalt.co.uk; Facebook: @simpsonsmalt; Twitter: @SimpsonsMalt. Simpsons Malt is exceptionally high quality malt made from superior grade two-row UK malting barley. Brewers choose Simpsons Malt because of its high quality, flavor, and the expertise that has been handed down through five generations since 1862. Chew the malt and taste the difference on Booth number 215.
- 323** **Skalar Inc.**, 5012 Bristol Industrial Way, Suite 107, Buford GA 30518, U.S.A.; 1.800.782.4994; +1.770.416.6717; Fax: +1.770.416.6718; Web: www.skalar.com; Email: info@skalar-us.com; Facebook: @SkalarAnalytical. Automated beer and malt analyzers according to ASBC and EBC approved methodologies. SAN++ wet chemistry analyzer for IBU/Bitterness, SO₂, beta-glucan, FAN, alpha amylase, diastatic power, LOX, soluble protein, pH, color, and many others. Also, Skalar Robotics for automated IBU/Bitterness in small batches and Skalar Primacs Nitrogen combustion analyzer for protein.
- 218** **StainlessDrains.com**, P. O. Box 1278, Greenville, TX 75403, U.S.A.; 1.888.785.2345; Web: www.stainlessdrains.com; Email: shelia@stainlessdrains.com; Facebook: @stainlessdrainscom; Twitter: @stainlessdrains. Stainless steel trench drains, area drains, clean outs and P-Traps. We make everything to customers' specifications. Ship most orders in 10 full working days. Made in the U.S.A.
- 523** **Steinfurth, Inc.**, 11390 Old Roswell Road, Ste. 126, Alpharetta, GA 30009, U.S.A.; +1.678.500.9014; Fax: +1.678.840.7744; Web: www.steinfurth.com; Email: info@steinfurth.com. Steinfurth is known as an innovator in the area of automated instruments and solutions for combined quality control on beverages and beverage packages. Consequently the company invests in R&D and continues to offer innovative products—all developed in close cooperation to the global players in the beverages industry.
- 509** **Symbiont Science, Engineering and Construction, Inc.**, 6737 W. Washington St., Suite 3440, Milwaukee, WI 53214, U.S.A.; +1.414.291.8840; Web: www.symbiontonline.com. Symbiont: an engineer-led design/build firm specializing in the brewing industry. Capabilities include facility expansion, process design and modifications, utility design and upgrades, water and wastewater treatment, and energy efficiency. Installation of several waste-to-energy projects.
- 212** **Thermo Fisher Scientific**, 490 Lakeside Drive, B10, Sunnyvale, CA 94085, U.S.A.; +1.408.481.4275; Web: www.thermofisher.com/gallery; Email: analyze@thermofisher.com; Facebook: @thermoscifood; Twitter: @thermosci_pi. Thermo Scientific Gallery Plus Beermaster is a benchtop photometric system dedicated for beer, wort, and malt analysis. Speed and flexibility are achieved with automated features. Simultaneous determination of several analytes from a single sample is possible with first results available in as little as ten minutes. If you are interested in more in-depth analysis, we also have our Integriion Ion Chromatography system, which can be used for ions, carbohydrates, and organic acids analysis.
- 604** **Veolia Water Technologies**, 913 Industrial Park Drive, Vandalia, OH 45377 U.S.A.; +1.937.890.4075; Fax: +1.937.890.9925; Web: www.veoliawatertech.com; E-mail: craig.jolley@veolia.com. The high demand of water in brewing makes it a significant cost and quality factor. Veolia Water Technologies understands these demands, helping small and large breweries
- with tailored, technically proven solutions for saving energy, reducing discharge costs, recovering water, and reducing the manufacturing impact on the environment.
- 113** **VLB Berlin**, Seestrasse 13, Berlin 13353, Germany; +49.30.45080-0; Fax: +49.30.453.60.69; Web: www.vlb-berlin.org; Email: brewmaster@vlb-berlin.org; Facebook: @vlb-berlin. Research, teaching, consulting, information, and service for the brewing, malting, and beverage industries and distillers since 1883.
- 305** **Weber Scientific**, 2732 Kuser Road, Hamilton, NJ 08691, U.S.A.; 1.800.328.8378; +1.609.584.7677; Fax: +1.609.584.8388; Web: www.weberscientific.com/beer-testing; Email: info@weberscientific.com; Facebook: www.facebook.com/Weber-Scientific-182912275172824. Discover why Weber Scientific is a favorite supplier to the brewing industry. You'll find much of what you need by browsing our extensive online buyer's guide. Plus you'll save money with Weber Scientific. You're encouraged to compare our low prices to what you are currently paying.
- 204** **Weyermann Specialty Malts**, Brennerstrasse 17-19, Bamberg 96052, Germany; +49.951.93220.12; Fax: +49.951.93220.970; Web: www.weyermannmalt.com; Email: info@weyermann.de. Weyermann, now in its fourth generation as a successful family business, has been bringing color and flavor to beer since 1879. Built on a tradition of quality, consistency, and service, Weyermann offers more than 85 different malt varieties to brewers all around the world, in 135 countries, on all continents!
- 122** **Wilbur-Ellis Co.**, 1114 Washington Avenue, #201, Golden, CO 80401, U.S.A.; +1.303.993.6411; Web: <http://wilbur-ellisfeed.com>; Email: wecobrewerysolutions@wilburellis.com. Wilbur-Ellis brings over 80 years of experience in providing innovative solutions and value-added ingredients for the livestock and food industries in North America. We are your distributor of brewery co-products. Our team takes a professional approach to marketing brewer's wet grains and provides solutions to liquid co-products as well.
- 600** **Zee Company, A Member of The Vincit Group**, 412 Georgia Avenue Suite 300, Chattanooga, TN, 37403, U.S.A.; 1.800.782.0233, Fax: +1.423.702.8912; Web: www.vincitgroup.com; Email: james.diamantis@vincitgroup.com; Facebook: @vincitgroup. We love beer, and we love people who brew it. That's why we've spent over 40 years developing sanitation programs that protect your brews and protect your brand. Talk to us about our state-of-the-art solutions. We're confident they'll make facing your brewery's challenges much easier. Cheers!
- 301** **ZIEMANN HOLVRIEKA GmbH**, Schwieberdinger Strasse 86, Ludwigsburg 71636, Germany; +49.0.7141.408.0; Web: www.ziemann-holvrieke.com. From the brewhouse to the bright beer tank cellar—ZIEMANN HOLVRIEKA offers tailor-made solutions for small craft and large-scale breweries' malt intake mills, mashing vessels, lautertuns, mashfilters, wortkettles, whirlpools, wort cooling systems, fermentation, storage, brightbeer, yeast, and water tanks as well as the required process technology.

Posters

Posters are on display throughout the congress in the Plaza Foyer and Plaza Court 2 and 3.

Poster Schedule:

Sunday, August 14	7:00–8:00 a.m. 9:30–11:00 a.m. 11:30 a.m.–2:00 p.m.	Poster Speaker Breakfast Poster Set-up Poster Session • 12:30–1:00 p.m. Authors present at odd-numbered posters • 1:00–1:30 p.m. Authors present at even-numbered posters
Monday, August 15	11:30 a.m.–2:00 p.m.	Poster Session • 12:30–1:00 p.m. Authors present at even-numbered posters • 1:00–1:30 p.m. Authors present at odd-numbered posters
Tuesday, August 16	11:30 a.m.–2:00 p.m. 2:00–2:30 p.m.	Poster Session • 12:30–1:00 p.m. Authors present at odd-numbered posters • 1:00–1:30 p.m. Authors present at even-numbered posters Poster Takedown

Poster Titles

Analytical

Moderators: Kimberly Bacigalupo, Sierra Nevada Brewing Co.; Aaron Golston, Lagunitas Brewing Co.; Dan Vollmer, Anheuser-Busch Inbev

71. Application of metabolomics to understand the contribution of barley to beer chemistry and flavor. *Harmonie Akers, Colorado State University*
72. Aiding the brewer in the struggle against dissolved oxygen with the Anton Paar CBox. *Nick Bigham, Rahr & Sons Brewery*
73. Characterization of the difference between the aroma profiles of beer brewed from sorghum and barley malts. *Drew Budner, Coastal Carolina University*
74. Beeromics: Untargeted chemical profiling reveals a novel contextual understanding of beer properties. *Duncan Cameron, University of Sheffield*
75. Establishment and practical comparison of methods to measure lactic acid and acetic acid in sour wort and sour beers. *Lucas Chadwick, Bell's Brewery Inc.*
76. Analysis and applications of free amino nitrogen in craft beer using the ninhydrin method. *Jeffrey Cohen, Stone Brewing Co.*
77. The chemical fingerprint of beer from a single experiment with minimum sample preparation—A rapid quantitative molecular analysis by 1H NMR spectroscopy. *John Edwards, Process NMR Associates*
78. Depletion of water as a source for beer brewery through freeze crystallization. *Lars Erlbeck, University of Applied Science*
79. The use of novel, fluorescent biosensors to measure *Aspergillus niger* prolyl endoprotease activity and substrates in beer over time. *Matthew Farber, University of the Sciences*
80. Non-invasive, selective measurement for CO₂ in package expands brewers' quality control toolbox. *Roland Folz, Pentair*
81. Effects of proteolytic malt modification on beer quality. *Martina Gastl, Chair of Brewing and Beverage Technology, Technische Universität München—Weihenstephan*
82. Untargeted metabolomic profiling of an amber ale fermented with four different yeast strains. *Karen Fortman, White Labs*
83. Determination of lower boiling volatiles in beer by headspace GC/MS: 2015 BCOJ collaborative work. *Sayuri Kato, Kirin Company, Ltd.*
84. Volatilome profiling of brewing yeasts toward their potential in craft brewing. *Meike Kliche, Technische Universität München*
85. Update on an alternative method to measure alpha-acid utilization: Isomerized alpha-acids in beer and subsequent spectrophotometric measurement. *Scott Lafontaine, Oregon State University*
86. Assaying hops and beers with SFE followed by flash LC or UHPLC. *Phillip Liescheski, Teledyne Isco*
87. Gas chromatographic-flame ionization investigation of 1,2-propylene glycol in packaged and in-process beer samples. *Laura Marques, Molson Coors Canada*
88. Comparison of the aroma profiles of hops by TD-GC-TOF MS and soft electron ionization. *Laura McGregor, Markes International*
89. Determination of iron concentrations in beer through key steps in the brewing and packaging processes using iron analysis by ferrozine. *Natalie Nienaber, Stone Brewing*
90. The forcing test to estimate beer stability—Influencing parameters and optimization potential. *Roland Pahl, VLB Berlin*
91. Determination of alpha- and beta-acid concentrations in type-90 hop pellets by near infrared (NIR) spectroscopy and chemometric analysis. *James Redwine, Kalsec, Inc.*
92. Dynamic light scattering and the confirmation of nanobomb theory in primary gushing. *David Riveros, KULeuven*
93. Unraveling the complexity of Belgian beers. *Miguel Roncoroni, KULeuven*

94. Novel “green chemistry” high-throughput chromatography strategies for investigating ABV, SRM, and protein and polysaccharides in beer. *J. Ray Runyon, SOLVE Research and Consultancy LLC*
95. Gushing prediction based on the headspace pressure growth. *Petr Kosin, Budejovicky Budvar, N.C.*
96. What is unique in Belgian dry-hopped beers? *Carlos Silva Ferreira, Université Catholique de Louvain*
97. Tales from the brewing analytics lab: Past problems rising again along with new issues to investigate. *Darrin Smith, Eastern Kentucky University*
99. Studies of cell wall degradation in different barley varieties—The effect of substrate structure and enzymatic activity. *Daniele Stock Leh, Technische Universität München*
100. Detection of storage-dependent hop oxidation by direct thermal desorption of hop solids for use with GC-FID and GC-MS. *Brett Taubman, Appalachian State University*
101. In-line coagulation monitoring of beer haze using spectrally resolved back scattering sensors in beer. *Tobias Teumer, University of Applied Science*

Brewery Safety

Moderator: Rich Michaels, Matt Brewing Co.

102. The hop disintegrator—A solution providing more work safety and product quality. *Michael Dillenburger, Dillenburger & Hertel GmbH*

Brewhouse Operations

Moderator: Rich Michaels, Matt Brewing Co.

105. Input error prevention system at Asahi Breweries, Ltd. *Kazumasa Kosuga, Asahi Breweries, Ltd.*
106. How to pick the best solution for your brewery floor. *Bob Rudow, Argelith Ceramic Tiles, Inc.*
107. The brand new fully automated 8-l-small-scale-brewhouse of the Weihenstephan research brewery. *Johannes Tippmann, Technische Universität München—Weihenstephan*
108. Gentle and smart—Final wort treatment by means of a dynamic coolship. *Michael Kurzweil, ZIEMANN HOLVRIEKA GmbH*

Cleaning & Sanitation

Moderator: Rich Michaels, Matt Brewing Co.

109. Surface-active technology provides a step change in the use of single-phase acid cleaner with CIP of cellar tanks under CO₂ atmosphere. *Oscar Medina, Ecolab*
110. Effective does not always mean efficient—New approaches to cleaning fermentation and storage tanks. *Matthias Schneider, Lechler GmbH*
111. Cleaning of mash loaded woven filter media by pulsed and continuous jets. *Roman Werner, Chair of Brewing and Beverage Technology, Technische Universität München*

Engineering

Moderator: Rich Michaels, Matt Brewing Co.

112. New world cooperation, changing the way the spirit lives again. *Joe Carbott, Schoolcraft Brewery*
113. Design for maintainability: The new secret cost reduction for breweries. *Louis Houle, Systemex Industrial Consulting*

Enzymes, Extracts, Other Ingredients

Moderator: Rich Michaels, Matt Brewing Co.

115. Evaluation of adjunct factors blocking high adjunct ratio wort separation in the high-gravity beer brewing process. *Qi Li, Jiangnan University*
116. Alcohol-free wheat beer: Optimizing the brewing process and product quality with sour wort. *Birgit Schnitzenbaumer, Doehler GmbH*

Finishing and Stability

Moderator: Rich Michaels, Matt Brewing Co.

117. Innovation in beer clarification and stabilization using DE-based adsorbents. *Nathan Dias, Imerys Filtration Minerals*
118. Flash pasteurization: How long is the optimal heat-holding time/temperature for achieving the best beer quality? *Henri Fischer, Kronen Inc.*
119. Beer haze stabilization made simpler. *Wilbert Heijne, DSM Food Specialties*
120. Pectin and gallotannin/pectin combination as alternative fining agents to reduce maturation time and improve filtration performance. *Thomas Kunz, Chair of Brewing Science, Technische Universität Berlin*
121. Novel options for stabilization of beer. *Kiel Moore, Ashland Inc.*
122. True sample-to-results molecular analysis of multiple species associated with beer spoilage. *Peter Trabold, Rheonix Corporation*
123. First approved results of developing a new filter aid based on viscose fibers. *Fred Scheer, Kronen Inc.*
215. Sapporo’s consistent endeavor for improvement of beer foam stability. *Takeshi Nakamura, Sapporo Breweries Ltd.*

Food Safety

Moderator: Rich Michaels, Matt Brewing Co.

124. NBB-PCR—A reliable, fast, and universal enrichment broth for PCR detection of beer spoiling microorganisms. *Sabine Mueller, Doehler GmbH*

Hops

Moderators: Rich Michaels, Matt Brewing Co.; Molly Browning, Trophy Brewing Company

125. Screening for 34 pesticides in hops using GC-MS/MS. *Robert Clifford, Shimadzu Scientific Instruments*
126. Analysis of “the big four” heavy metals in hops by graphite furnace atomic absorption and cold vapor mercury. *Robert Clifford, Shimadzu Scientific Instruments*

127. High sensitivity analysis of pesticides in dried hops cones and hops pellets by liquid chromatography-triple quadrupole mass spectrometry. *Robert Clifford, Shimadzu Scientific Instruments*
129. Comparison of characteristics of taste and polyphenols in beer using different hop varieties. *Takamasa Hasegawa, Suntory Beer Ltd.*
130. Dry-hopping's effect on beer foam. *John Maye, Hopsteiner*
131. Loral HBC 291—A new flavor hop variety. *Tim Kostelecky, John I. Haas, Inc.*
132. A novel approach to increase hop efficiency. *Rick Ray, Rice Bran Technology*
134. Maximizing hop polyphenols extraction during the boiling process. *Salvatore Sparacio, SIMATEC Beer Plant Engineering & Manufacturing*
135. Development of a new quantitation method for polyfunctional thiols and its application for investigation of the characteristic aroma of “flavor hops.” *Koji Takazumi, Frontier Laboratories of Value Creation, Sapporo Breweries, Ltd.*
136. Development of a novel hop extract comprising humulinic acids as principal constituents. *Yoshimasa Taniguchi, Central Laboratories for Key Technologies, Kirin Company, Limited*
137. Fifty ways of green—Hop dosing strategies and their equipment. *Udo Funk, ZIEMANN HOLVRIEKA GmbH*
138. Effects in beer hopped with German Perle and Czech Saaz pellet hops with three different HSI values. *Sebastian Hinz, Barth Innovations*
- Malt and Grains**
Moderators: *Molly Browning, Trophy Brewing Company; Johannes Tippmann, Weihestephan*
139. Malt contributions to beverage flavor. *Cynthia Almaguer, Chair of Brewing and Beverage Technology, Technische Universität München*
140. Response surface and kinetic modeling of the oxidation of dimethyl sulfide in malt model solutions. *Matthias Baldus, Technische Universität Berlin*
141. Cold extraction of malt components and their use in brewing applications. *Dan Bies, Briess Malt & Ingredients Co.*
143. First evidence of cysteinylated and glutathionylated precursors of 3-mercaptohexan-1-ol in malts: Toward a better aromatic potential management? *Laurent Dagan, Nyseos*
144. No barley, no beer: Why the U.S. needs to support growers to keep raising malting barley. *Steven Edwardson, North Dakota Barley Council*
145. Malting barley evaluation—Influence of the mashing procedure on malt quality criteria. *Martina Gastl, Chair of Brewing and Beverage Technology, Technische Universität München—Weihestephan*
146. Specialty malt acidity. *Jordon Geurts, Briess Malt & Ingredients*
147. Barley beer flavor—An Oregon promise. *Dustin Herb, Oregon State University*
148. Effects of L-cysteine on the malt quality during germination. *Shumin Hu, Tsingtao Brewery Co. Ltd.*
149. OptiScreen—Base investigations for a mycotoxin screening sensor system usable in industrial grain sorting. *Thomas Kunz, Chair of Brewing Science, Technische Universität Berlin*
150. Special malt production—Selective steering of the roasting process to reduce prooxidative effects of roasted malt. *Thomas Kunz, Chair of Brewing Science, Technische Universität Berlin*
151. Rapid performance assessment of barley and malt in the malting and brewing process by near infrared diffuse reflectance spectroscopy. *Yueshu Li, Canadian Malting Barley Technical Centre*
152. Quality potential of a new Canadian hullless malting barley variety. *Yueshu Li, Canadian Malting Barley Technical Centre*
153. Prediction of wort-sensitive protein from malt. *Jia Liu, Tsingtao Brewery Co. Ltd.*
154. Effects of fungicide and plant growth regulator applications on the quality of barley and malt. *Tricia McMillan, Canadian Grain Commission*
155. Effect of crop residue, nitrogen rate, and fungicide application on malt barley productivity and malting quality. *Thomas Turkington, Agriculture and Agri-Food Canada*
156. Effect of seed source on malting quality and yield of malting barley. *Thomas Turkington, Agriculture and Agri-Food Canada*
157. Control of *Fusarium* sp. growth on barley and malt by means of chlorine dioxide. *Kris Krüger, Sealed Air Corp.*
158. Malting conditions for the evaluation of rye (*Secale cereale*) genotypes. *Yujuan Wang, North Dakota State University*
159. Prospective of demand for malting barley and malt quality for the global brewing industry. *Peter Watts, Canadian Malting Barley Technical Centre*
160. Small malt plant technology and first results—Set-up and operation of a craft malthouse. *Sebastian Wolfrum, Bull Durham Beer Co. and Epiphany Craft Malt*
161. The interaction between barley protein composition and starch structure: Effects on in vitro digestion of starch. *Wenwen Yu, University of Queensland*
162. Comparison of brewing performance using 100% unmalted grains: Barley, wheat, oat, and rye. *Shiwen Zhuang, Technical University of Denmark*
- Nutrition & Health**
Moderator: *Johannes Tippmann, Weihestephan*
163. Hop phytoestrogens to prevent dysbiosis of intestinal microbiota due to estrogen loss. *Alison Hamm, Colorado State University*
165. Non-alcoholic beer: Only the inactive descendant of alcohol-containing beer? Growing evidence of physiological effects of non-alcoholic beer by ingredients other than alcohol. *Johannes Scherr, Technische Universität München*

Packaging (Bottles, Draft, and Cans)

Moderator: Johannes Tippmann, Weihenstephan

40. Scalping of hop volatiles from beer into crown cork liner polymers and can coatings. *Frank-Jürgen Methner, Technische Universität Berlin*
166. A novel pasteurizer treatment program allows full warranty coverage for polypropylene mat top belts in brewery pasteurizers—And it's green and sustainable. *Jack Bland, ChemTreat*
168. Heat shrink sleeve label technologies. *Ben Ritter, Accraply, Inc.*

Sensory

Moderator: Rebecca Newman, Summit Brewing Co.

169. Hop tea sensory method. *Amanda Benson, Deschutes Brewery*
170. Identifying and controlling the formation of compounds that affect the metallic flavor of beer. *Norio Doi, Asahi Breweries Ltd.*
171. The language of hops—How to assess hop flavor in hops and beer. *Georg Drexler, Barth Haas Group*
172. Aligning sensory and analytical best practices for monitoring beer flavor stability. *Boris Gadzov, FlavorActiV Ltd.*
173. The use of a functional carbohydrate to positively impact the sensory characteristics of beer. *Scott Helstad, Cargill, Inc. Corn Milling North America*
174. Evaluating real sensorial stability. *Petr Kosin, Budejovicky Budvar, N.C.*
175. The hot steep sensory method: A rapid and standardized sensory evaluation method for malt flavor. *Cassandra Liscomb, Briess Malt & Ingredients Co.*
176. Sensory thresholds of hop volatile compounds in beer. *Meghan Peltz, Sierra Nevada Brewing Co.*
177. Mechanism for fishy aftertaste formation in beer and seafood pairing. *Hiroyuki Yoshimoto, Research Laboratories for Alcoholic Beverage Technologies/Kirin Company, Limited*

Sustainability

Moderator: Johannes Tippmann, Weihenstephan

178. Comparison of conventional aerobic and high-rate anaerobic digester systems for brewery wastewater treatment. *Manaf Farhan, EMG International, LLC.*
179. High-rate anaerobic digester systems for brewery wastewater treatment and electricity generation. *Manaf Farhan, EMG International, LLC.*
180. Treating brewery wastewater with new physical/chemical technology. *Jason Fox, ClearCove, Inc.*
182. How integrated process controls with digital in-line instrumentation supports cost control and quality management in the cloud of IoT/Industry 4.0. *Holger Schmidt, Endress+Hauser Messtechnik GmbH*
183. Sustainability of malt barley production in the U.S. *Collin Watters, Montana Wheat and Barley Committee*

Utilities Management

Moderators: Rich Michaels, Matt Brewing Co.; Johannes Tippmann, Weihenstephan

114. Don't stunt your growth! Make sure you control the risks associated with critical utilities. *Louis Houle, Systemex Industrial Consulting*
185. Desiccant dehumidification in breweries: Mold and fungus prevention, food safety and energy savings. *David Summers, Alfa Laval Kathabar Inc.*

World Class Manufacturing

Moderator: Johannes Tippmann, Weihenstephan

186. High performance graphics—Leading the brewer to faster and more reliable actions in critical situations. *Martin Lutz, ProLeiT Corp*

Yeast, Fermentation, and Microbiology

Moderators: Patricia Aron, Rahr Corporation; Rebecca Newman, Summit Brewing Co.; Dan Vollmer, Anheuser-Busch Inbev; Sylvie Van Zandycke, DSM Food Specialties

187. Taxonomic study of a novel beer-spoilage *Lactobacillus* species closely related to *Lactobacillus rossiae*. *Yuki Asakawa, Asahi Breweries, Ltd.*
188. Tasting terroir: Sensory and alcohol analysis of locally isolated wild yeast. *Michael Balla, The College of Saint Rose*
189. The impact of yeast assimilable nitrogen concentration and composition on fermentation kinetics and hydrogen sulfide production during cider fermentation. *Tom Boudreau, Virginia Tech*
190. Elucidation and biodiversity of bacterial communities within the phyllosphere of *Humulus lupulus* L. *Scott Britton, Duvel Moortgat, NV*
191. A rapid viability validation method of flash pasteurized yeast using Cellometer image cytometry. *Leo Chan, Nexcelom Bioscience*
193. Intracellular gas bubble formation by the genus *Saccharomyces* is related to gas release. *Lukas Marthinus Du Plooy, University of the Free State*
194. Evaluation of culture medias (YM and YNB) and copper sulfate concentrations for wild yeast detection. *Madelyn Espinosa, Molson Coors Brewing Company*
195. Dynamic fermentation: Optimizing yeast viability and system performance. *Alyce Hartvigsen, Alfa Laval Copenhagen A/S*
196. Elucidation of the ester formation mechanism in top fermenting yeast. *Chie Hayashi, Suntory Beer Limited*
197. Application of Plackett-Burman experimental design for investigating the effect of wort amino acids on lager yeast fermentation performance and beer flavor production. *Yang He, Tsingtao Brewing Ltd.*
198. Rapid and simple method to assess the beer-spoilage potential of yeasts. *Kyoko Hiratsuka, Kirin Company, Limited*
199. Yeast uptake of iron, copper, and manganese and the subsequent impact on the flavor stability of beer. *David Jenkins, University of Nottingham*

200. Metabolism of maltotriose and higher molecular weight glucose polymers by yeast in the *Brettanomyces* family. *Kent Johnson, Westminster College—Salt Lake City*
201. The potential of MALDI-TOF MS for sensotyping of brewing yeasts. *Alexander Lauterbach, Lehrstuhl für Technische Mikrobiologie, Technische Universität München*
202. Production and characterization of limonoid-rich finger citron beer. *Yongxian Li, Jiangnan University*
203. Generation of novel strains of low-alcohol-producing brewing yeast by selection for alcohol dehydrogenase-defective mutants. *Bryant Lo Re, Westminster College—Salt Lake City*
206. Mechanical characterization of individual brewing yeast cells using MEMS: Cell rupture force and stiffness. *Andrew MacIntosh, Dalhousie University*
207. Characterization of fermentations using wild mixed cultures and the effect of bittering hops. *Matthew McCarroll, Southern Illinois University*
208. Screening for the brewing ability of non-*Saccharomyces* yeasts and optimization of fermentation performance of one *Torulaspota delbrueckii* strain found suitable for beer production. *Martin Zarnkow, Research Center Weihenstephan for Brewing and Food Quality, Technische Universität München*
209. Mitochondrial development during brewery yeast handling. *Eoin Moynihan, University of Nottingham*
210. Capturing terroir: Isolation and characterization of local wild yeast. *Kari Murad, The College of Saint Rose*
211. Role of glutathione synthesis and recycling on fermentation efficiency and flavor compound production. *Christian Paumi, Eastern Kentucky University*
212. Compositional and ultrastructural characterization of the SMA strain of *Saccharomyces pastorianus*. *Greg Potter, Dalhousie University*
213. Establishment of the method to control fermentation temperature precisely in cylindroconical tanks. *Katsuyuki Seki, Asahi Breweries, Ltd.*
214. A new lab-scale method for determining pasteurization requirements in breweries using the highly tolerant surrogate organism *Zygosaccharomyces bailii*. *Chris Smart, Campden BRI*
216. Application of near-infrared spectroscopy (NIRs) for on-line determination of critical process parameters and their potential use for a novel feedforward control strategy. *Lucas Vann, North Carolina State University*
218. Protocol optimization of recovering and culturing yeast from bottled beer. *Helene Ver Eecke, Metropolitan State University of Denver*
219. Adding citrus flavor and sweetness to beer using wine yeast. *Dandan Wei, Research Laboratories for Alcoholic Beverage Technologies, Kirin Company, Limited*
220. Phenotypic microarray: A high-throughput screening tool for evaluation of desirable brewing traits in novel yeast strains. *Stuart Wilkinson, University of Nottingham. International Centre for Brewing Science (ICBS)*
221. Harnessing flavor diversity in yeast strains from the Allegheny Mountains. *Matthew Winans, West Virginia University*
222. Validation of yeast cell analysis using automated image cytometry. *Andrew Yourick, Colorado State University*
223. Evaluation of degermed corn grits as adjunct in high-gravity beer brewing. *Linjiang Zhu, Jiangnan University*

Supplier Posters

Moderators: *Scott Britton, Duvel Moortgat, NV; Andy Tveekrem, Market Garden Brewery*

224. Determining the effects on yeast cell size and count when varying orifice tube size using the Coulter Principle. *Ashley Lovering, Micromeritics Instrument Corporation*
225. Novel automated method to measure malt diastatic power. *Liisa Otama, Thermo Fisher Scientific*
226. New automated robotic analyzer for IBU, pH, color, and FAN, all according to ASBC Methods. *Mark Payne, Skalar*
227. Classification of beer types. *Yusuke Takemori, Shimadzu Corporation*
228. Rapid and precise analysis of alcohols and diacetyl in beer using the latest gas chromatograph technologies. *Yusuke Takemori, Shimadzu Corporation*
229. Fast and reliable screening and identification of the most relevant beer spoilage bacteria plus detection of spoilage yeasts in beer by real-time PCR. *Sarah Borg, BIOTECON Diagnostics*
231. Flavored brand flexibility in new and operating facilities, meeting the challenge of increasing brand flavor and style diversity. *Joe Kolodzinski, Symbiont Science, Engineering and Construction, Inc.*
232. Connecting the brewhouse with the office—MES solution for a brewery. *Jay Johnson, Kronos Inc.*
233. Beverage gas dissolution utilizing pre-centrifuge. *Brian Loughrey, TechniBlend ProBrew*
234. Equal percentage flow characteristics using a butterfly valve. *David Schmelig, David Alan Products, LLC*
235. The use of ozone technology in brewery cleaning and sanitation operations: Opportunities for streamlining clean-in-place systems. *John Lindam, Ozone Tech Systems OTS AB*
236. Enzymatic diacetyl control without compromising beer quality. *Tove Bladt, DuPont Nutrition Biosciences ApS*
239. Detection of glass bottle defects prior to filling. *Jeff DeVoy, HEUFT USA, Inc.*
240. Use of microscopic pressurized shockwaves generated by controlled cavitation as a non-shear method for increased extraction of alpha-acids and conversion into IBUs. *Santiago Gomez, Apotek Solutions, LLC*
241. The Montana MiniMalter: A tool for applied brewing research. *Thomas Blake, Western Feedstock Technologies*
242. Craft malting—Extend your creativity. *Johannes Preiß, Kaspar Schulz*

243. Packaging evaluation in quality control of beverages—Growing importance of packaging evaluation in combination with the quality control on bottled beverages. *Johann Angres, Steinfurth, Inc.*
244. Applications of machine learning and graphical databases on human sensory and production data for detection, prediction, back-tracing, and mitigation of flaws, taints, and contaminations. *Zachary Bushman, Analytical Flavor Systems*
245. Beer flaw identification using a novel sensory data collection and processing technique. *Jason Cohen, Analytical Flavor Systems*
246. The Beer Flavor Map: A new tool for bringing modern science to flavor analysis. *Nicole Garneau, Flavor Lab, LLC*
247. Incorporating hop flavoring into retail cider. *Lindsey Kirchner, Kalsec, Inc.*
248. Flavor standards for beer mix products. *Craig Thomas, Cara Technology Limited*
250. Onsite, distributed resource recovery at craft and large-scale breweries. *William Dean, Cambrian Innovation*
251. Management of surplus yeast in modern breweries. *Alexander Gertsman, Flottweg Separation Technology*
252. Alternative approach for continuous (main)beer fermentation. *Robert Kulozik, Kronen Inc.*
253. A new PCR-based method for the early detection and identification of spoilage yeast in wine, beer, and alcohol-free beverages. *Vincent Ulve, Pall GeneDisc Technologies*

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Organization

The BCOJ was established within the BAJ, the latter consisting of Japan's 5 major breweries, SAPPORO BREWERIES LTD., SUNTORY BEER LTD., Kirin Company, Limited., ASAHI BREWERIES, LTD., and ORION BREWERIES, LTD. The BCOJ is composed of Board of Directors, Secretariat, Analysis Committee, and Program Committee. Regional beer producers are not represented by the BAJ.

Objectives and Activities

- (1) To standardize analytical methods for the evaluation of materials and products adopted in beer brewing and other related industries
 - Publication of Methods of Analysis of BCOJ (Revised edition)
 - Publication of BCOJ Microbiology Methods
 - Publication of BCOJ Sensory Analysis Methods
 - Publication of Brewing and Packaging
- (2) To facilitate scientific and technological research through mutual communication among beer brewing industry specialists
 - Organization of the Annual Meeting (1991-)
- (3) To work in collaboration with other foreign and domestic organizations
 - Cooperative Agreement with ASBC (1998-)
 - Declaration of Partnership with EBC (2001-)

The 26th Annual Meeting

- (1) Schedule: Thursday 10 and Friday 11 of November 2016
- (2) Site: Seiryō Kaikan
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For further information, please contact the BCOJ.

<http://www.brewers.or.jp/bcoj/bcoj-en.html>

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