

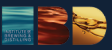
# The IBD Virtual Event 36th BIENNIAL CONVENTION

**ASIA PACIFIC SECTION**



**SPEAKER INFORMATION**

FEBRUARY 23 - 24, 2021 | VIRTUAL CONVENTION



## Table of Contents

[Professor Charles Bamforth](#)

[Richard Boughton](#)

[Jaydeep Chatterjee](#)

[Professor Michelle Colgrave](#)

[Dr Colin Court](#)

[Eddie Douglas](#)

[Celina Dugulin](#)

[Insa Errey](#)

[Dr Evan Evans](#)

[Dr Alexander Feiner](#)

[Weronika Filipowska](#)

[Professor Glen Fox](#)

[Graeme Gibson](#)

[Dr Mark Goldsmith](#)

[Russell Gosling](#)

[Tully Hadley](#)

[Sarah Haigh](#)

[Bert Hanssen](#)

[Alyce Hartvigsen](#)

[Dr Crispin Howitt](#)

[Philippe Janssens](#)

[Axel Jany](#)

[Katie Jessup](#)

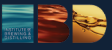
[Dr Jatin Kala](#)

[Dr Timothy Hobley](#)

[Andrew Klein](#)

[Sarah Laing](#)

[Dr Aldo Lentini](#)



[James Ludford-Brooks](#)

[Barry McGuire](#)

[David Medlyn](#)

[Rhiannon Mensforth](#)

[Dr Garry Menz](#)

[Andrew Mieleniewski](#)

[David Moody](#)

[Matt Morisey](#)

[Douglas Murray](#)

[Dr Mitchell Nye-Wood](#)

[Tim Penton](#)

[Jason Perrault](#)

[Dr Grzegorz Rachon](#)

[Gianmaria Ricciardi](#)

[Ralf Scheibner](#)

[Richard Searle](#)

[Phil Sexton](#)

[Donovan Sparks](#)

[Roy Spee](#)

[Dr Doug Stewart](#)

[Dr Jeff Stewart](#)

[Dr Sue Stewart](#)

[John Stuart](#)

[Sean Symons](#)

[Danielle Tromp](#)

[Paul Van Der Vyver](#)

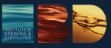
[Simon Wade](#)

[Professor Graeme Walker](#)

[Dr Emma Walker](#)

[Stuart Whytcross](#)

[Colin Wilson](#)



[Leonie Wong](#)

[Questions?](#)

### **Main Session & Panel Presentations**

Main session presentations (plenary & concurrent) and Panel session presentation will be made available to view by visiting the virtual “Auditorium” throughout the “live days” of the convention as well as up to one-month post event.

### **View-On-Demand Presentations**

View-On-Demand presentations will be made available to view by visiting the “View-On-Demand Room” throughout the “live days” of the convention as well as up to one-month post event.

### **Poster Presentations**

Poster presentations will be made available to view by visiting the “Poster Hall” throughout the “live days” of the convention as well as up to one-month post event.



## Professor Charles Bamforth

Distinguished Professor Emeritus, UC Davis  
Senior Quality Adviser, Sierra Nevada Brewing Company



### Bio

Dr Charlie Bamforth has been part of the brewing industry since 1978. Formerly with the Brewing Research Foundation (International) and Bass in the UK, he was lead professor of brewing at UC Davis for 20 years from 1999. He is Distinguished Professor Emeritus at UC Davis and also Honorary Professor with the University of Nottingham in England, as well as Senior Quality Advisor to Sierra Nevada Brewing Company. He is the author of numerous articles, papers and books on beer and soccer.

## Keynote Presentation (Track 1)

### Session 2

#### Presentation Topic

Trends in the brewing industry

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 10:08 - 10:10

#### Presentation Abstract

The world has turned upside down in many ways when it comes to brewing. Who would have foreseen the day when people would consider beers loaded with gunk to be things of beauty? At least they are beers, though. What gives with the churning out of alternative beverages from our breweries? Is anything fair game in the pursuit of profit? What genuinely is a healthy choice when it comes to adult beverages? Who are the neo-prohibitionists of the modern era? Will consolidation and acquisition ease off? And how much more momentum is there in the “craft” sector? Where and when is the next technological leap going to be taken? Do we foresee truly disruptive change, or will we inch forward with gradual process evolution? What can we expect in the brewing world post-Covid? What are the key underpinning requirements for tomorrow’s brewing world? How will the brewers of tomorrow be educated?

## Concurrent Session (Track 1)

### Session 8 - Barley & Flavour

#### Presentation Topic

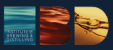
Flavor stability: a realistic target?

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 07.00 – 07.30

#### Presentation Abstract

Benjamin Franklin did not say “Beer is proof that God loves us”, but he did say, recognizing Daniel Defoe, that “In this world nothing can be said to be certain, except death and taxes”. Franklin was obviously missing



out one other thing that we can be sure of: the flavor of beer changes with time. It can be argued that this can be a good thing – e.g. in very alcoholic beers and in products deliberately aged in wood. For most beers, however, it is undesirable. So how much do we really know about how the shelf life of beer can be genuinely enhanced? Can a brewer really aspire to having flavor robust beer? And in what ways have so many of the prior studies been naïve and unhelpful? Critical inspection of so much of the literature in this challenging area reveals serious problems with the organoleptic methodology. Just what is the reality?

### Panel Session (Track 1)

#### Session 10

##### Presentation Topic

Where has all the research gone?

##### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 09.30 – 11.00

### Richard Boughton

Brewmaster & CEO, FlavorActiV



##### Bio

Richard began his career as corporate brewmaster within a global brewing Group before investing in and joining FlavorActiV as CEO. Today Richard steers FlavorActiV's globally located team, providing leading-edge sensory and freshness quality systems for the world's leading multi-beverage brand owners.

### Concurrent Session (Track 2)

#### Session 6 – Brewing Quality

##### Presentation Topic

Analysing brewing processes to optimise freshness and extend shelf-life

##### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 16.20 – 16.50

##### Presentation Abstract

Today we see intense competition between beer brands but also with the beer category versus other beverages, for "market share of throat." While many beverages remain flavour stable for months, we know beer and juices lose freshness due to flavour change within a few weeks of packaging. Previous technical papers have reported on possible causes and solutions from process optimisation, plant design and materials specifications.

This paper will focus on learnings gained from several brewery studies involving the measurement of free radicals. While the technology of electron spin resonance (ESR) is not new, its application to deliver



increased shelf-life as measured by expert sensory panels is novel. The author will present data collected from several breweries highlighting the process stages before fermentation and not just afterwards where the sharpest focus is usually applied.

In contrast to most previous ESR studies, this paper will show the correlation between radicals and sensory values and provide the reader with a stepwise approach to extending shelf life by retaining freshness and flavour stability to safeguard shelf life.

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### Jaydeep Chatterjee

Senior Application Specialist - Brewing, IFF (International Flavors and Fragrances)



#### Bio

Jaydeep Chatterjee graduated from Jadavpur University, India, with a degree in Food Technology and Biochemical Engineering. He is a Master Brewer from IBD and has over 25 years' experience in brewing and biotechnology industry. Jaydeep joined DuPont in 2016 and is based out of Thailand. He has worked in Asia Pacific, Europe, Middle East and Africa. His primary area of expertise is raw material optimization and experimenting with beers using locally grown raw materials.

### Concurrent Session (Track 2)

#### Session 9 – Brewing Process 1

#### Presentation Topic:

Brewing more sustainably

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 08.40 – 09.10

#### Presentation Abstract:

DuPont Nutrition & Biosciences is a pioneer in providing enzymatic solutions to the Food & Beverages industry, as well as a wide range of other industries, such as animal nutrition, biorefineries and detergents industry.

Keeping United Nations Sustainable Development Goals, DuPont is addressing seven of the goals through cost effective enzymatic solutions. The seven goals where DuPont is focusing are zero hunger, sustainable cities and communities, good health and wellbeing, clean water and sanitation, affordable and clean energy, responsible consumption and climate action.

DuPont carries an extensive portfolio of Brewing and Distilling enzymes currently offering solutions for:

1. Efficient starch liquefaction,
2. Raw material optimization and free amino nitrogen generation
3. Filtration enhancement through viscosity reduction,
4. Saccharification and attenuation improvement
5. Diacetyl control and
6. Malting enhancement.

The DuPont team of brew masters and brewing experts is continuously working with brewers to reduce greenhouse gas emissions, save water and energy, brewing great and consistent tasting beers using locally grown, unmalted raw materials. Moreover, with these solutions, brewers may also address some of the most pressing UN sustainability goals. Future innovations from the DuPont brewing enzymes team will focus more on addressing UN sustainability goals and flavor design and control. Follow us on

<https://www.dupontnutritionandbiosciences.com/brewing.html>

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## Professor Michelle Colgrave

Edith Cowan University



### Bio

Michelle Colgrave is a Professor of Food and Agricultural Proteomics at CSIRO and holds a joint appointment at Edith Cowan University. Michelle uses proteomics, the study of proteins, using mass spectrometry (MS), to help identify key proteins that will benefit Australia's food and agriculture industries and improve human health. Professor Colgrave's contributions include the identification of novel proteins, characterisation of their function and post-translational modifications, as well as development of MS-based quantitative assays for food and beverage products.

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## Concurrent Session (Track 1)

### Session 12 – Malt & Barley

#### Presentation Topic:

Gluten reduction strategies for barley and beer

#### Date & Time of Presentation (Perth Time GMT+8)

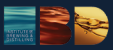
Wednesday, 24 February 2021: 12.30 – 13.00

#### Presentation Abstract:

Coeliac disease (CD) affects ~70 million people globally. When CD patients ingest gluten, it triggers an inappropriate auto-immune reaction resulting in intestinal inflammation and damage. The only treatment is lifelong avoidance of dietary gluten. The worldwide market for gluten-free products is predicted to grow by ~25% to over US\$7 billion by 2022. Gluten-free foods are commonplace as baked goods, snacks and beverages such as beer. For a beer to be deemed "gluten-free", it can be brewed with a gluten-free starting material (e.g. millet or sorghum). Another option that has been employed is the use of enzymes such as prolyl endoprotease and/or proprietary processing that aim to degrade or remove the gluten proteins via filtration. Current antibody-based methods (ELISA) for gluten measurement can be non-specific or show cross-reactivity. The use of ELISA to measure hydrolysed gluten, as present in fermented products such as beer, is a topic of hot debate. Liquid chromatography mass spectrometry (LC-MS) offers an alternative for detection of the presence/absence and quantitation of gluten in beer.

In this presentation, a novel ultra-low gluten (ULG) barley variety in which the hordein (gluten) content was reduced to below 5 ppm using traditional breeding strategies will be described. By employing advanced





proteomics analysis, it was possible to select the lines which showed the lowest gluten content and validate the low gluten content of the finished product. Moreover, our recent findings using LC-MS enabled the detection of hydrolysed gluten in gluten-reduced beers that are labelled as <20 ppm as judged by ELISA.

Keywords: barley, gluten, Coeliac disease (CD) proteins, proteomics, mass spectrometry (MS), data-independent acquisition (DIA) MS

### Panel Session (Track 1)

#### Session 10

##### Presentation Topic

Where has all the research gone?

##### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 09.30 – 11.00

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### Dr Colin Court

Senior Program Leader RD&E AP & GC, Ecolab Pty Ltd



##### Bio

Dr. Colin Court is responsible for driving Ecolab's innovation in food and beverage segments throughout Asia Pacific and Greater China. His specialties include the brewery and beverage industries as well as antimicrobial, conveyor lubrication and CIP applications. Colin's qualifications include B.Sc (Chemistry, 1st Class Honours) & Ph.D. (Physical Chemistry). Colin joined Ecolab in early 2000 as a Research & Development Chemist. Since joining Ecolab, he has filled numerous Australia/New Zealand and Asia Pacific innovation leadership roles, including Manager of Ecolab's China Technical Centre in Shanghai. Currently his title is Senior Program Leader R&D.

### Concurrent Session (Track 2)

#### Session 13 – Hygiene & Quality

##### Presentation Topic:

Using per-sulphonated oleic acid for brewery sanitizing and disinfection

##### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 14.20 – 14.50

##### Presentation Abstract:

Peroxisulphonated oleic acid (PSOA) is a novel, patented peracid chemistry developed by Ecolab. PSOA is a renewably sourced (palm or tallow-based) multi-functional compound with bleaching, surfactant, and

antimicrobial properties. Among the numerous potential applications of PSOA is as a sanitizing and disinfectant agent for the food and beverage industry.

When combined with other peracids PSOA formulations have high efficacy against a broad spectrum of microflora including yeasts and molds. These combinations are also especially effective against biofilms.

Sanitizing formulations that include PSOA have improved chemical effluent profiles over most traditional peracid formulations, as they contain no phosphorus, reduced levels of petroleum derived materials, and have a negligible impact on anaerobic waste water treatment systems. The pH of sanitizing formulations containing PSOA is generally less than 3, resulting in the improved ability to remove mineral stone.

As well as having a favorable environmental profile and superior kill rates over a wide spectrum of organisms, PSOA based sanitizers show little or no effect on beer head retention, chill haze, product pH or beer taste. They also have a much reduced odour compared to the fatty acid based sanitisers prevalent in the brewery industry today.

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## Celina Dugulin

Research associate - EJDFoodSci PhD Candidate, School of Biosciences (Division of Food Sciences)



### Bio

Celina Dugulin attained a bachelor's and master's degree in Nutritional Science specialising in Molecular Nutrition at the University of Vienna. In 2013 she completed an internship in Montreal, Canada at Lallemand, within the R&D department, investigating brewing yeast. Upon returning to Austria she continued to work for Lallemand in Vienna working part time as quality control assistant for baking and wine yeast. Since 2017 she is part of the European Joint Doctorate in Food Science funded by the Marie Skłodowska-Curie grant, Horizon 2020 and is studying for a joint doctorate in Brewing Science at the University of Nottingham and KU Leuven.

## Poster Session

### Presentation Topic

Brewing with 100 % green malt: process development and technical challenges

### Date & Time of Presentation

This session is available to view by visiting the "Poster Hall" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

Brewing with undried, germinated (green) malt has the potential to lower energy and water usage in the malting and brewing chain. However, doing so introduces new technical, as well as biochemical (flavour) challenges. The malting barley variety French Etincel was sourced from Boortmalt, Antwerp. Beers were prepared using 100% green malt (n = 3) or kilned pilsner malt (n = 3) prepared from the same batch in each case utilising the pilot brewery at KU Leuven, brewing at 50% total capacity (2.5 hL). Three further pairs of beers were brewed whereby the green malt was pre-steeped under de-aerated water for 1 hour; this procedure had previously been shown to lower LOX activity in green malt. The milling of green malt used a wet disc mill (Meura) in conjunction with lipoxygenase hostile mashing parameters; mashing in at >63°C, pH: 5.2, under oxygen-limited conditions. The resulting mash was then filtered using a membrane assisted thin bed filter. Samples were collected throughout the brewing process and compared with wort and beer samples produced using kilned pilsner malt, brewed under the same brewing conditions (other than the amount of brewing liquor).



Six green malt beers were brewed with acceptable specifications in terms of pH, alcohol content and colour. No significant taints or obvious defects were detected in green malt beer compared to reference beers. Increased S-methyl methionine levels were detected in beers made from green malt, however DMS concentrations in the finished beers did not differ significantly from the reference brews. Although further process optimisation is required, we proved that acceptable, potable beers can be brewed using 100% green malt.

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### Insa Errey

Operations Reliability Leader, Lion



Insa has a bachelor's degree of Chemical and Biomolecular Engineer, and an IBD Diploma in brewing. During her time at Lion Insa has taken on various roles of Packaging Team Leader, Improvement Engineering roles, Operations Project Lead and most recently moving to NZ as Operations Reliability Leader. Insa has worked on numerous projects with the highlights being the commissioning and optimisation of Tooheys and XXXX waste water treatment plants and the creation of Tooheys Greenhouse Gas Reduction Strategy which expanded to Insa leading and implementing a network energy reduction collaboration

#### Bio

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### Concurrent Session (Track 1)

#### Session 14 – Sustainability 2

#### Presentation Topic:

Developing a brewery network best practice approach to energy efficiency

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 14.30 – 15.00

#### Presentation Abstract:

The abstract will be uploaded once available.

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## Dr Evan Evans

Consultant, University of Adelaide



### Bio

Evan graduated with a B.Agr.Sc. in 1986, followed by a Ph.D. in 1990, both at the University of Melbourne. In 1992, he joined the University of Adelaide where he developed his interest in malting barley and brewing. Between 2002-2013 he relocated to the University of Tasmania working towards improving malt quality to improve beer quality and the efficiency of the brewing process. Dr Evans has authored more than 50 peer reviewed papers on brewing and malt quality issues. In 2005, Dr Evans was made a Fellow of the Institute of Brewing and Distilling.

## Concurrent Session (Track 1)

### Session 12 – Malt & Barley

#### Presentation Topic:

Malting quality during the malting process, barley to kilned malt

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 13.00 – 13.30

#### Presentation Abstract:

This investigation presents a holistic and comprehensive assessment of the step-wise changes in barley quality during the malting process for multiple batches of two Australian malting varieties (Buloke and Gairdner), in two modern, commercial-scale pneumatic malthouses. The study analysed and compared malting plant and variety with respect to basic changes in malt quality for protein (total protein, KI and FAN), fermentability (AAL and DP enzyme levels), extract yield, along with the filtration indicators (lautering efficiency, viscosity and b-glucan). Novel and intriguing observations were observed between barley and malt KI, DP enzyme kilning thermostability and the relationship between lautering efficiency, viscosity and b-glucan. Overall, comparing the two malt plants, it was observed that although malt batches and varieties followed different malting pathways, the finished and kilned malt ended up with satisfactory malt quality in terms of FAN, viscosity, friability, fermentability and extract. The patterns do however indicate there were potential opportunities for maltsters to improve the targeting of malt quality specifications.

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## Dr Alexander Feiner

Plant Science and Breeding, Hopsteiner



### Bio

Grown up on a hop farm in Germany, Dr. Alexander Feiner started his studies of Agricultural Management at the University of Applied Science Weihenstephan, Germany, in 2005. Followed by a six-month internship at the Hopsteiner Research Station in Yakima, USA, in 2010, he started his MSc. in Agricultural Management at the Technical University Munich. After finishing his studies in 2012, he became Head of Hopsteiner Breeding in Europe. In 2014 he began his PhD at the Martin-Luther-University Halle and at the Leibniz Institute of Plant Biochemistry working on metabolomics and genetics in hop, which he successfully completed in 2020.

## Concurrent Session (Track 2)

### Session 4 – Hops

#### Presentation Topic:

The application of metabolomics and genomics in hop breeding

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 14.10 – 14.40

#### Presentation Abstract:

The major goal of hop breeding is to develop new competitive varieties for an efficient and resource-saving hop industry. Resistance to diseases, pests and changing climatic conditions as well as consistency in yield and quality are specific breeding targets. An important tool to master these requirements is the implementation of molecular genetics and metabolomics. Studying the relationship between metabolite content levels and trait expression enables the identification of molecular processes involved in resistance against abiotic and biotic stress.

For example, downy mildew caused by *Pseudoperonospora humuli* generates significant losses in hop cone yield and quality as well as potential crown death. Therefore, in the present study, a F1 hop population was inoculated with the fungus *P. humuli* under ex situ conditions. The inoculation led to both variation in specialized metabolites and downy mildew resistance. Following an untargeted metabolomics approach and using correlation analysis, a small number of metabolites with potential protective function against downy mildew were identified. These metabolites were even correlated in the mock plant set suggesting that downy mildew resistance is established prior contact with the pathogen. The genome-wide association study detected a co-localization of the major downy mildew resistance locus and the correlated metabolite markers, providing evidence that the main contribution to resistance is mediated by these metabolites, in a heritable way.

This kind of novel metabolic and genetic markers provide a better understanding of the underlying resistance mechanism for a precise selection of crossing partners and progeny in hop breeding in the future.

## Weronika Filipowska

Research associate - EJDFoodSci PhD Candidate, Lab of Enzyme-, Fermentation- and Brewing Technology



### Bio

Biotechnologist, graduated BSc in 2015 and MSc in 2016 at Wroclaw University of Environmental and Life Sciences, Poland. Currently Marie Sklodowska-Curie Fellow within European Joint Doctorate in Food Science (EJDFoodSCI) project. PhD student at the Laboratory of Enzyme, Fermentation and Brewing Technology at KU Leuven, Belgium. PhD student at Bioenergy & Brewing Science Department at University of Nottingham, United Kingdom. Interested in relation between malting process and beer flavour instability.

## Poster Session

### Presentation Topic

Identification of critical factors in malt production related to beer flavour (in)stability

### Date & Time of Presentation

This session is available to view by visiting the "Poster Hall" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

Weronika Filipowska<sup>1</sup>, Irina Bolat<sup>2</sup>, Paula Bustillo Trueba<sup>1</sup>, Maciej Ditrych<sup>1</sup>, Barbara Jaskula-Goiris<sup>1</sup>, Gert De Rouck<sup>1</sup>, Guido Aerts<sup>1</sup>, Luc De Cooman<sup>1</sup>

<sup>1</sup> KU Leuven, Department of Microbial and Molecular Systems (M<sup>2</sup>S), Cluster for Bioengineering Technology (CBET), Laboratory of Enzyme, Fermentation and Brewing Technology (EFBT), Technology Campus Ghent, Gebroeders De Smetstraat 1, 9000 Ghent, Belgium;

<sup>2</sup> Boortmalt NV, Zandvoort 2, Haven 350/bus 1, 2030 Antwerp, Belgium

During storage, beer flavour deteriorates as a result of various (bio)chemical reactions undergoing in the closed beer package. The appearance of these off-flavours is associated with the increase in the concentrations of the so-called staling aldehydes, which depends on various factors i.a. applied wort and beer production process, quality of raw materials, etc. From the perspective of the brewing process, malt has been recognised as the major source of marker aldehydes and their precursors (e.g. amino acids, LOX, cysteinylated aldehydes, etc.). The content of these compounds can be affected by the malting regime. Therefore, the objective of this research was to identify the critical factors in malt production related to the formation of marker aldehydes and their corresponding bound-state forms.

The identification was carried out by: 1) multivariate data analysis of malts produced by applying various malting technologies and 2) monitoring the entire malting process on industrial scale. Multivariate comparison of various malting treatments (e.g. kilning off at different temperatures, sulfuring during drying, etc.) points to heat load and grain modification as the critical factors of malting related to the formation of free and cysteinylated aldehydes. Monitoring of the entire malting process, showed a significant increase in free Strecker aldehydes in the last stage of kilning. From this stage on, a rapid increase in the levels of these compounds was observed, reaching its maximum in the finished malt with rootlets. Similar behaviour was observed in the case of cysteinylated Strecker aldehydes, whose formation coincided with the increase in the levels of their corresponding free forms.

In conclusion, this study points to heat load and grain modification as the most significant factors in relation to the formation of staling marker aldehydes and their cysteinylated forms in malting process.

## Professor Glen Fox

Anheuser-Busch Endowed Professor Malting & Brewing Science, University of California



Professor Glen Fox is the Anheuser-Busch Endowed Professor of Malting and Brewing Science at the University of California, USA. He has many years' experience working with barley breeding programmes, and malting and brewing industries in Australia and overseas. With these companies he has worked focused on the influence of barley quality on malting and brewing quality. He is a Fellow of the Institute of Brewing and Distilling. Professor Fox has over 250 book chapters, journal articles and conference presentations. He has also supervised over 50 post-graduates students mostly in the area of barley and malt quality

### Bio

#### Concurrent Session (Track 1)

##### Session 8 – Barley & Flavour

#### Presentation Topic:

The changes in the barley proteome during malting

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 07.30 – 08.00

#### Presentation Abstract:

Barley protein content is considered critical in selecting suitable loads for malting. While a single value for protein content is used such as 10.0%, this number is made up of hundreds of individual proteins. The proteins undergo modifications as well as new proteins being expressed during malting. Our study explores changes in the proteome of a single variety during the malting process between two malthouses. Barley expressed protein such as LTP and Serpins were present during the malting process and these survive into beer, albeit with slight modifications to the protein structure. There were significant new proteins expressed during steep and germination with enzymes being synthesized including alpha-amylase, limit dextrinase and some proteases. The bigger differences were usually between the stages of malting, ie steeping, germination and kilning while there were less differences in between the malthouses the proteins expressed, although the abundance of individual proteins varied between malthouses. We constantly rely on total malt protein and soluble wort protein to give an indication of malt modification. But these don't give any indication of the abundance of hundreds of proteins that will contribute to beer processing and beer quality. While the technology is not readily available for routine testing of malt and beer, the use of proteomics continues to improve our understanding of the changes in protein composition during malting and brewing and quality.

#### Panel Session (Track 1)

##### Session 10

**Presentation Topic**

Where has all the research gone?

**Date & Time of Presentation (Perth Time GMT+8)**

Wednesday, 24 February 2021: 09.30 – 11.00

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**Graeme Gibson**

Area Leader Brewing, Lion



Graeme Gibson - 2005 Bsc Hons in Brewing and Distilling from Heriot Watt. IBD Diploma in Brewing.

Has worked for Lion for 12 years in various roles including NPD, Packaging and Group Quality. Based at the Lidcombe Brewery managing day to day running of the teams in the Brewing Department.

Frank Markham – 2002 Master Brewer from the Institute of Brewing and Distilling

Has worked for Bass, Coors, Lion and SABMiller across all disciplines, and continents, and is currently the Quality and Technical Director back at Lion

**Bio****Poster Session****Presentation Topic**

Fermentation monitoring using existing pressure transmitters

**Date & Time of Presentation**

This session is available to view by visiting the “Poster Hall” throughout the “live days” of the convention as well as up to one-month post event.

**Presentation Abstract**

Authors

Graeme Gibson – Brewing Area Leader -Lidcombe Brewery – Lion.

Frank Markham – Quality & Technical Director – Lion Supply Chain.

The aim of this poster is to show how Fermentation rates can be accurately monitored using existing Pressure transmitters in Fermentation vessels.

According to Pascal’s law Hydrostatic pressure can be calculated using the following equation,

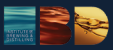
$$\Delta P = \rho g(\Delta h)$$

The fermenters at Tooheys use this principle to determine Liquid height using the Specific Gravity of the liquid and the measured Pressure at the base of the tank.

The liquid height and tank dimensions are then used to calculate a volume in the tank.

As the  $\rho$  value changed so did the volume of the tank, it was corrected every 12 hours when the operators measured the Gravity on the bench top Density meter. Most noticeable after a weekend when no measurements were taken.





When investigating options for automating density measurements an idea formulated. What if the tank volume didn't change then we could re-arrange Pascals principle to calculate  $\rho$ .

$$\rho = \Delta P / (g * h)$$

The pressure is measured and recorded via the transmitter constantly, g never changes and if h is a constant then the change in pressure is directly caused by the Specific Gravity change due to fermentation.

Using a SQL Report Builder which pulls the pressure readings from the site SCADA control server we were able to monitor Fermentation rates in real time and reduce sampling significantly. Previously it was averaging 12 samples per FV fill now it is 3 samples per FV fill.

This work was completed for \$15K compared to the \$650K proposed Capital investment required to retrofit the FV's we with new steady state Refractometers.

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### Dr Mark Goldsmith

Senior Manager - Raw Materials, Carlton & United Breweries



#### Bio

Mark is a fellow of the IBD with over 25 years of brewing experience working with Carlton United Breweries, Foster's, SAB Miller and Anheuser-Bush InBev. He has worked in quality assurance, production, R & D and brewery support. Mark gained his PhD for an investigation into the mechanism and control of lightstruck formation in beer and won the Eric Kneen Memorial Award in 2006 for recognition of excellence in scientific publication from the Journal of the American Society of Brewing

Chemists. He is currently the Brewing Materials Manager for CUB and also a member of the Barley Australia Board.

#### Co-Presenter Michael Neville

Michael is a 4<sup>th</sup> generation participant in Australian Agriculture and has been working within the industry all his working life. He has been directly involved in corporate agriculture since 1998 developing scaled landscapes for Australian Superannuation Investments such Retail employees Superannuation Trust (REST) developing grazing country into an efficient rain fed cropping enterprises and Vic Super, a public sector industry fund where his brief was to rejuvenate, change a farming system and develop a sustainable landscape team culture to operate 3500 ha of irrigated agriculture enterprises including processing tomatoes, cotton, conventional & organic cereal production and eco system protection. He comes from a strong family background in agriculture starting in his earlier years in the mid north of South Australia.

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### Concurrent Session (Track 1)

#### Session 12 – Malt & Barley

#### Presentation Topic:

Developing a local organic malt barley supply chain

**Date & Time of Presentation** (Perth Time GMT+8)

Wednesday, 24 February 2021: 13.30 – 14.00

**Presentation Abstract:**

Following the successful launch of Pure Blonde Organic Lager, CUB has partnered with Wedgetail Food & Fibre and Kilter Rural to produce a local source of organic malting barley. Together with Boortmalt we have built a certified local organic malt barley supply chain to provide a high quality sustainable alternative to imported malt.

Farm management practices used to grow organic crops and the points of difference to traditional cropping are described. The use of modern technology, land regeneration for organic crops and highly efficient irrigation practices maximising the return on water assets are also discussed.

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**Russell Gosling**

Head Brewer - Little Creatures Fremantle

**Bio**

Russ is the Head Brewer at Little Creatures Brewing – Fremantle. He arrived in Western Australia from the UK in 2005 - with a backpack and a post graduate degree in Brewing & Distilling Science from Heriot Watt University, Edinburgh - and has been there ever since. Little Creatures is the seventh Brewery Russ has worked for having previously been employed at: Everard's Brewery LTD, Thomas Hardy Services LTD, Thomas Hardy Brewing & Packaging LTD, Fuller Smith & Turner PLC, Ushers of Trowbridge PLC and Harvey & Sons Lewes LTD.

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**Poster Session****Presentation Topic**

Sandpit to marketing – think big and never settle

Subtitle: Nurturing a Brewers Sandpit: the creative hub at the core of our NPD enterprise

**Date & Time of Presentation**

This session is available to view by visiting the “Poster Hall” throughout the “live days” of the convention as well as up to one-month post event.

**Presentation Abstract**

Beer makes everything better: but how do we effectively bring new Beers to market with consideration and purpose to meet our customer's growing needs, for today and tomorrow, and for the better?

Craft Brewers tend to focus on emulating US trends – and then, executing outcomes via ‘*brewing by committee*’ - this involves a group of Brewers sitting around a table and quarrelling for some considerable time, until much compromise is reached, and glasses drained; with no Brewer being entirely happy. The outcome is then tainted with some reproach. Tasty - but with a certain torture involved.

But is there an alternative way? One that allows Brewers to explore their creativity - to make beers that interest them – where those Beers are fuelled by marketing insights? A project at Little Creatures was undertaken in 2019, to develop formal process to combine two streams of thought - Needs (insights/trends from marketing) and Seeds (conceptual ideas from Brewers) - to create an innovation pipeline of concepts: a documented bank of ideas with associated recipes. Needs & Seeds is an arrangement where Brewers ideas and marketing insights, align together, to develop an exploration pathway for our Brewers to

contemplate and explore in their Sandpit. This project involved installing a *tinker kit* at the Brewery – our Brewers Sandpit – a creative hub where they can effectively explore and play with their ideas. This Sandpit is now the core of how we deliver our innovations to market.

The intent is that this process will generate an ongoing suite of matched ‘needs & seeds’ which we can be successfully commercialised: in doing so, this should deliver better outcomes for our customers.

**Key Words**

*innovation, NPD, creativity, marketing*

**Acknowledgements**

Lion, Kirin, wonderful Brewers and filthy marketers.

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**Tully Hadley**

Chair - IBD Asia Pacific Section Board of Management

**Bio**

Tully Hadley is the current Chair of The Board of Management of the IBD Asia Pacific Section. He has been a board director since 2017 having previously served on the IBD Asia Pacific Section Strategic Planning Committee. Tully has been an IBD member since 2003, and holds his General Certificate, Diploma and Masters in Brewing through the IBD. Tully commenced his brewing career at the Matilda Bay Brewery in Fremantle and has since worked in multiple breweries around Australia as well as internationally with SABMiller and AB Inbev. Tully is currently the Director of Food Safety and Quality at Lion.

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**Welcome & IBD Updates (Track 1)****Session 1****Presentation Topic:**

IBD Asia Pacific Update

**Date & Time of Presentation (Perth Time GMT+8)**

Tuesday, 23 February 2021: 08.25 – 08.45

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## Sarah Haigh

Technical Officer, Lion Pty Ltd.



### Bio

Sarah Haigh is a Technical Officer and Brewing Team leader at Lion Pty Ltd, and is based in Adelaide at the West End Brewery. Her role includes leading a brewing team, New Product development support, Quality system admin, and technical support at the West End Brewery.

Sarah has a Bachelor of Nutrition and Food Science, UniSA, Adelaide and is currently studying a Diploma in Brewing, IBD. She has worked in the brewing industry for 8 years in various roles – Technical Officer, Packaging Quality Leader, Technical Learning Writer, and Brewing Team Leader.

## Poster Session

### Presentation Topic

Preparing for gluten free products in a brewery

### Date & Time of Presentation

This session is available to view by visiting the “Poster Hall” throughout the “live days” of the convention as well as up to one-month post event.

### Presentation Abstract

The West End Brewery in Adelaide has traditionally been a beer brewing facility, along with production of a small volume of ciders and RTDs (ready to drink). The opportunity arose to brew a newly developed gluten free rice-based product in the form of a seltzer at West End. The brewery needed to ensure it could produce the product without any gluten cross-contamination. Having a cider stream at the brewery with dedicated tanks and linework made the task somewhat easier, reducing the pathways that were shared with gluten containing products.

A technical risk assessment was performed to identify hazards, risk and controls. This included a robust method for identifying the flow paths for materials and products. Included assessments were raw material analysis, storage and handling procedures, maintenance procedures, cleaning and hygiene checklists, training and education, 5S GMP updates, a robust and thorough gluten testing regime (including adjuncts & CIP validation), and HACCP assessment. It is vital to have reliable control samples for gluten testing validation, interlocks and controls to prevent cross contamination, process stage checks and balances, team member engagement and a process for knowledge building.

The project has been successful based on the testing results all being negative for gluten to date. This has also been validated by testing of Cider products we have been producing for some time that follow the same process and flow paths as the gluten free product.

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## Bert Hanssen

Board Member Research & Development, OneCircle



### Bio

Bert is one of the founding fathers of OneCircle (formerly Lightweight Containers).

He is the inventor and developer of KeyKeg®, the leading one way PET keg, and actively participated in its market launch and market development with major brands.

Bert has over 25 years of experience in the packaging industry and graduated as an aeronautical engineer in plastic materials design and manufacturing at the Delft University of Technology.

Since 2016 Bert has been the driving person behind the product's sustainability and its fit in the circular economy making OneCircle at the forefront thereof.

## Concurrent Session (Track 1)

### Session 14 – Sustainability 2

#### Presentation Topic:

A circular economy for plastic kegs, a complex compound thermoplastic

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 16.00 – 16.30

#### Presentation Abstract:

##### PROBLEM

The used plastic kegs in the beverage industry is close to 65,000 tonnes. The recycling rate of plastics in Europe is approximately 42%. In Australia the plastics recycling rate in 2018 was 9.4%.

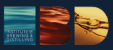
In Australia, plastic kegs end up in commercial plastic waste streams, with no clear path to product circularity.

##### PURPOSE

To demonstrate that innovative product design can help to facilitate a circular solution, and in some circumstances plastic can be more sustainable than steel.

##### METHOD

1. Life Cycle Analysis (LCA) Plastic Kegs Vs Steel Kegs.  
Compare a well designed plastic keg vs steel kegs under varying logistics conditions.
2. Case Studies of plastic circularity solutions in Europe.
3. Case Study of Paper Cup Recycling in Australia.



4. Case Study. Design and material selection impacts of use in supply chain and end of life product circularity.
5. Sustainability benefits of using recycled plastics vs. virgin plastic material in new products.

### RESULTS

1. Product design and material selection plays an important role in the circulatory and recyclability of plastic kegs.
2. Plastic kegs offer Brewers a better overall sustainable outcome when used in conjunction with steel kegs.
3. EU and Australian regulations have a large impact on plastic product design.
4. Innovative solutions providers are already facilitating circular economy solutions in Australia.
6. Demand for recycled plastics needs to be lead by government.

### CONCLUSION

Plastics are a viable and important packaging material and offers advantages over steel and glass. Used plastic is a material resource that can be used in the manufacture of further products.

Sustainability and circularity requires the help of the global community with a common goal to leave the world a better place.

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## Alyce Hartvigsen

Iso-mix & Fermentation Manager, Alfa Laval Copenhagen A/s



### Bio

Alyce Hartvigsen was born in the United States, and received her B.SC. in Chemical Engineering at Case Western Reserve University in 1988. She moved to Denmark in 1997, and since 2012 she has worked with Alfa Laval as Iso-Mix and Fermentation Manager in the Brewery Systems department, focusing on developing and promoting applications for rotary jet mixing within the brewing industry. She works closely with end-users in the commissioning and process optimization of the systems, and with several colleagues has developed the Iso-Mix External Drive (IMXD) system for optimization of the dry hopping process in larger beer volumes.

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## Concurrent Session (Track 2)

### Session 4 – Hops

#### Presentation Topic:

Efficient dry hopping of larger beer volumes with IMXD

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 13.40 – 14.10

#### Presentation Abstract:

Dry hopped beers continue to enjoy popularity worldwide, and an increasing number of larger brewers are implementing the practice. However, there are a number of process challenges associated with the

automation and scale-up of dry hopping techniques in larger breweries. These include introduction of the hop pellets into the fermentation/maturation tanks without excessive oxygen pick-up, effective extraction of the aroma compounds into large volumes of beer, removal of the hop particles from the product while minimizing product loss, and efficient CIP of the system. While a number of commercial dry-hopping solutions have been offered in recent years, most exhibit capacity limitations, are difficult to clean by automated CIP process and are challenging to integrate into automated modern breweries. Using Alfa Laval's Iso-Mix External Drive (IMXD) System, a growing number of breweries have succeeded in optimizing the dry hopping of larger beer volumes, enjoying shorter in hop residence times, significant reductions in product losses and the elimination of process issues such as blockages from hop slugs. During the development and implementation of the IMXD technology, Alfa Laval has accumulated valuable experience with the dry hopping process, particularly on a large scale. In this presentation, we will discuss the particular challenges of dry hopping, how IMXD can be used to optimize the process, and the considerations required to ensure successful implementation of the IMXD system at a particular site.

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## Dr Timothy Hobley

Associate Professor, Technical University of Denmark



Associate professor Timothy Hobley gained his Ph.D. degree in Chemical Engineering from the University of Melbourne in 1997. Subsequently he was a post-doctoral researcher in Lund, Sweden before moving to the Technical University of Denmark in 1999, where he is currently employed at the National Food Institute. During his career he has conducted research in fermentation and downstream processing, which in later years has been combined to study the beer brewing process, particularly the development of new unit operations and the processing of brewing by-products. The work is based in the department's microbrewery which is approved for food production..

### Bio

### Concurrent Session (Track 1)

### Session 14 – Sustainability 2

#### Presentation Topic:

Fractionating special malt spent grains to give food ingredients

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 15.00 – 15.30

#### Presentation Abstract:

Extremely large amounts of brewers spent grains are produced each year, all year round and over the whole world. With the increasing focus on environmental sustainability and feeding the growing population, there is an accelerating interest in using spent grains to produce foods, drinks and ingredients, rather than animal food or waste. For processing spent grains to be economically sustainable, new technologies are also needed, such as the recently reported rotary drum press.

In this presentation, we extend our recent work and investigate how the rotary drum press can be used to produce a filtrate and a filter cake, in which functional compounds have been enriched. Brewers spent grain (100-600 kg) generated from production of beer with special malts was sourced from two local

microbreweries. Two rotary drum presses (1 tonne/h) were used sequentially, one with a 750 micron and 1000 micron filter followed by one with a 100 micron and 300 micron filter to give enrichment of selective components. The concentrations of protein, sugars and amino acids were measured, which can be used to identify applications of the fractions as food ingredients.

## Poster Session

### Presentation Topic

Pesticides introduced by Adjuncts: Their Fate during Beer Brewing

### Date & Time of Presentation

This session is available to view by visiting the "Poster Hall" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

Will be uploaded as soon as possible - please revisit

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## Dr Crispin Howitt

Group Leader, Csiro Agriculture & Food



### Bio

Crispin completed his PhD at ANU working on respiratory pathways in cyanobacteria. His first postdoctoral fellowship was in the US. In 2000 he moved to CSIRO and began working on cereals, with his research focus being the modification of grain composition to enhance end product quality or enhance nutritional properties. He currently leads the New Markets group at CSIRO.

## Poster Session

### Presentation Topic

Kebari® barley: moving beyond beer

### Date & Time of Presentation

This session is available to view by visiting the "Poster Hall" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

Using conventional breeding strategies CSIRO developed a barley variety ("Kebari®") that contains nearly undetectable gluten levels (<5 ppm), which is well below the Codex recommendation of 20 ppm for gluten-free foods. The first version was developed in a malting background, and a beer called "Pionier" made from Kebari® was launched in Germany in 2016. However the primary purpose of developing Kebari® was to provide people with coeliac disease (CD) who must avoid gluten, and those who choose to avoid gluten, with an alternative gluten free grain to enhance the variety and nutritional value of their diets. We have developed a hull-less version of Kebari® that can be consumed as a whole grain and small-scale trials have shown it can be rolled, flaked and extruded.

Prior to COVID-19 a clinical trial to determine the safety of Kebari® for coeliac patients and whether its fibre-containing characteristics improve large bowel health, commenced, but has since been put on hold.

Conclusions: This study will be the first clinical evaluation of Kebari® and is expected to demonstrate that the new barley is safe for coeliacs and has potential to improve the diet and gut health of those who avoid consuming gluten-containing foods. There is considerable commercial potential as the market for GF products is growing rapidly and CSIRO and The Healthy Grain (<https://www.thehealthygrain.com/food-health/>) are working to bring this product to market.

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## Philippe Janssens

Technical Manager for Brewing, Fermentis



### Bio

**Philippe Janssens** is Fermentis' Technical Manager for Brewing. He is Belgian, graduated from the Catholic University of Louvain -la- Neuve as a Bio- Engineer, followed by a Masters in Malting & Brewing Science. Philippe has acquired a long experience of more than 30 years in the brewing industry. First as a brewer in Africa and Belgium where he ran the pilot facility of ABInBev for the longest part of his career. Secondly as a

Patent Engineer for ABInBev and for private practice; and finally as a business development manager in the hop industry for about 7 years. Philippe joined Fermentis, a Business unit of Lesaffre group, as "Technical Manager, Brewer" in 2016

**Simon Jeanpierre (Q&A only).** As Technical Sales Support for Fermentis, Simon supports the regional sales team in Asia Pacific. His role is all about sharing the technical knowledge between Research & Development, and the Sales team on the market.

Simon discovered beer in his family kitchen in Belgium and is passionate about it ever since. He has previously worked in business development of biotechnologies and technical solutions for beverages in Europe & Asia. He also did some research work at SAB-Miller South Africa on the improvement of beer stability during ageing. Simon holds a Master degree in Chemical Engineering & Bachelor degrees in Industrial Science & in Chemistry.

## Concurrent Session (Track 2)

### Session 6 – Brewing & Quality

#### Presentation Topic:

No and Low-alcohol beer production through fermentation

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 15.50 – 16.20

#### Presentation Abstract:

Consumer demand for lower alcohol products is an innovation driver in the brewing today industry. The presentation will present techniques to produce low alcoholic beers. Fermentis have researched techniques



for producing low alcohol beer without using post-fermentation physical separation. Firstly, the presentation will present the selection criteria and results obtained with a new maltose negative *Saccharomyces cerevisiae* var. *chevalieri* yeast. Secondly it will present brewing techniques and results achieved using conventional maltose positive *Saccharomyces pastorianus* and *Saccharomyces cerevisiae*. Finally, it will compare these two approaches and make recommendations on their implementation in industrial and small-scale breweries.

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## Axel Jany

International Customer Consultant, Weyermann Speciality Malts



### Bio

Axel Jany is the teamleader of the International Customer Consultants at Weyermann® Specialty Malts in Bamberg, Germany. As a trained brewer and maltster with a brewmaster degree from VLB Berlin, Axel has over 32 years of professional brewing experience and he is the technical link between the Weyermann® customers around the globe and the famous malthouse in Bamberg. Axel and his team offer customer support, such as recipe development as well as giving brewing and distilling advice. As a certified Doemens beer sommelier, he also judges at international beer events.

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## Concurrent Session (Track 1)

### Session 5 – Distilling 1

#### Presentation Topic:

Distilling whisky and beer based spirits by craft brewers

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 13.30 – 14.00

#### Presentation Abstract:

Craft brewing and craft distilling is developing and growing together. Brewers do barrel aged beers in used spirit barrels and even some distillers are using new barrels which contained stout before the whisky enters the barrel. Also, more craft breweries look into distilling spirits to broaden their product portfolio.

A distillery adjacent to the brewery can of course distill beers, but with the brewer's knowledge of mashing and lautering, as well as already having this equipment to prepare a whisky mash, a craft whisky production might be a more valuable business addition.

With the ongoing worldwide Gin and Whisky trend, how does a start up craft distillery create a quality spirit, while adhering to the "3 year in a barrel" rule for calling it Whisky?

Weyermann does not only produce malts for breweries (and brews on a 2.5 hl pilot brewery on a daily basis), but also operates a 300 liter pot whisky distillery on site. A single malt whisky newmake or white dog

benefits very much from quality ingredients. With the use of flavourful specialty malts, a craft distillery can offer a high-quality product at a time, where other whiskys might need another few more years in the barrel.

The aim of our Weyermann distillery is to gain knowledge, develop whisky recipes for craft distilleries and use the facility as a hands-on training and seminar site for customers around the globe.

The paper will describe firsthand experience distilling set ups for brewers, shows recipes and results.

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## Katie Jessup

Product Development Specialist, Carlton & United Breweries



### Bio

Katie Jessup graduated from the University of Melbourne with a Bachelor of Chemical Engineering (Honours) and a Diploma in Modern Languages (German). She started her career as a graduate engineer in the SAB Miller Graduate Program, during which she completed her Diploma of Brewing and received the JJ Morrison Scholarship from the IBD. Following this she worked at the Carlton and United Breweries Abbotsford site as a Brewing Area Manager and Brewing Engineer. More recently she has taken on the position of Product Development Specialist working in the Zone Innovation and Technology team and is completing her Master Brewer qualification.

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## Concurrent Session (Track 2)

### Session 11 – Brewing Process 2

#### Presentation Topic:

Organic production integration into an existing brewery

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 11.50 – 12.20

#### Presentation Abstract:

As health and wellbeing trends change, organic produce segments are becoming increasingly important to the consumer and their health lifestyle. In order to maintain share of throat amongst this segment, CUB identified an opportunity to strengthen the Pure Blonde Portfolio by introducing an 'Organic' claim to the brand.

The Abbotsford brewery embarked on a project to integrate organic production into its main brewing and cider facility, with the aim of utilising as much of the current infrastructure, asset base and workforce as possible, to brew and package an organic beer and cider. The project was approached in three distinct phases, the first being to develop both the beer and cider at a pilot scale, the second to achieve organic certification and finally to be able to produce these on an industrial scale.

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## Dr Jatin Kala

Murdoch University, Perth



### Bio

Dr Jatin Kala is a climate scientist with a PhD from Murdoch University in Western Australia and his research focus is on how the land and the atmosphere interact with each other. He uses state of the art land surface models coupled to atmospheric models to answer various scientific questions on this topic.

## Singular Session (Track 1)

### Session 3 – Sustainability 1

#### Presentation Topic:

Regional climate projections for Australia and possible implications for the brewing industry

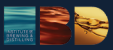
#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 12.00 – 12.30

#### Presentation Abstract:

Global climate models are used to make projections of future climate change over the next 20 to 100 years. However, these models generally have very coarse spatial resolutions of 100 to 250 km, and this has limited value for decision making at the regional scale, as important factors such as land-use and topography are not adequately resolved. Fortunately, regional climate models can be used to downscale these global models down to resolutions of 5 to 10 km, and this allows for an improved representation of atmospheric processes which matter at the regional scale, such as sea-breeze, localized storms, etc. In this talk, I will present regional climate projections of future climate change for different regions of Australia from regional climate simulations using state-of-the art regional climate models. I will discuss implications for agriculture and how this may affect the brewing industry.

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## Andrew Klein

Master of Ceremony



### Bio

Andrew is one of Australia's leading Professional Conference MCs and a Pitching & Presentation Skills speaker, trainer and writer, working on conferences (back in the 'good old days' when OS travel was allowed!!!) around the Asia-Pacific

region as well as the US and South Africa. Since March 2020, he now works from his home office or local studios! A former corporate lawyer, Andrew quit the law in the late 90's before starting up his own business as a corporate trainer and speaker. As an MC, Andrew brings his casual yet corporate style to proceedings and is well-known on the conference circuit for his revealing speaker introductions, his improvisational skills and ability to adapt to different audiences. Having worked (pre-Covid) on several virtual events, appeared on TV many times and presented countless webinars, he has, like all of us, been on a steep learning curve the past year and has since hosted a wide variety of conferences and events online. He is now very comfortable to say he is "Virtually an MC". Andrew's hobbies include shaving his head, walking his dog Pebbles and trying to convince his wife and 3 kids that he has a real job.

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## Sarah Laing

Associate Director Brewing & Quality, Carlton & United Breweries



### Bio

Sarah Laing is the Brewing Manager for CUB's Abbotsford Brewery. A brewer, Chartered Chemical Engineer and Registered Professional Engineer Queensland (RPEQ), Sarah project managed the \$13M brewing upgrade of Yatala Brewery in 2018, which included installation of beer dealcoholisation capability.

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## Concurrent Session (Track 2)

### Session 9 – Brewing Process 1

#### Presentation Topic:

Environment and safety considerations for beer dealcoholisation

**Date & Time of Presentation** (Perth Time GMT+8)

Wednesday, 24 February 2021: 08.10 – 08.40

**Presentation Abstract:**

Non-alcoholic beers have taken off in Europe and are gaining interest elsewhere in the world. Dealcoholisation of beer via vacuum stripping is commonly utilised technology for production of non-alcoholic beer. Implementation of a vacuum stripping beer dealcoholisation process requires up front decisions on beer recipe, desired hazardous area rating, allowable utility consumption and intended use of the alcohol by-product. Clear understanding of these parameters is necessary for making a technical determination of suitability of dealcoholisation vendor package plants. Carlton & United Breweries installed beer dealcoholisation capability at their Yatala Brewery in 2018. This paper covers the safety and environmental factors used in the design, construction and operation of the Yatala project. The safety items to be covered include IECEx hazardous area certification, compliance to AS/NZS 60079 Explosive atmospheres, hazardous area zoning, flammability of alcohol product, coolant selection and management, layout, access and ergonomics and requirement for HAZOP. The environmental design items covered include use of the alcohol for either energy recovery or sale, and consumption of the utilities steam, electricity, coolant and water.

**Dr Aldo Lentini**

Senior Industry Technology Manager, Novozymes

**Bio**

Aldo has a Ph.D. in Bio-Organic Chemistry and Biochemistry specializing in Carbohydrates, Proteins and Biological Enzyme Technology. Has had over 32 years' experience within the brewing/beverage industry (Beer, Cider, Wine, Spirits, Juices) specializing in Raw Materials, Brewhouse, Fermentation, Yeast Management, Flavour Development/Control/Stability. Providing technical brewing support (NPD and Process innovation and improvement projects) and Quality Management systems within Australia and Internationally. Aldo is also a Fellow of the Institute of Brewing and Distilling and on the Examiners Board. Currently Aldo is the Senior Industry Technology Manager – Beverages (Brewing, Distilling, Wine and Juice) for Novozymes - Asia Pacific region.

**Concurrent Session (Track 2)****Session 9 – Brewing Process 1****Presentation Topic:**

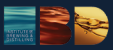
Infusion mashing using malted barley with high gelatinizing solid adjuncts

**Date & Time of Presentation (Perth Time GMT+8)**

Wednesday, 24 February 2021: 07.40 – 08.10

**Presentation Abstract:**





High gelatinizing adjuncts are often used in brewing to reduce costs and adapt features such as drinkability, flavor, taste and mouthfeel to brand-typical expectations. The most common high gelatinizing adjuncts are corn (maize), rice, sorghum and cassava. Traditionally these adjuncts require an exclusive cereal cooking step for starch gelatinization before it is added to the mash tun (Decoction mashing), which leads to an increase in time, costs, manpower and complexity. To improve the level of Brewhouse efficiency as well as lower mash cycle times, costs and complexity in the mashing process, a novel enzyme, such as Ceremix Flex® is utilized to allow for infusion mashing containing both these high gelatinizing adjuncts together with malted barley. The resulting wort has a similar sugar profile to that achieved when using decoction mashing. Besides running an infusion mashing of the mixed malt/adjunct mash, Ceremix Flex® also enables the brewer to run parallel streams of the adjunct and malt mash which in the extreme case are then united in the boiling kettle. This paper discusses the use of and the outcome of using Ceremix Flex® during mashing, when producing worts from various types of solid adjuncts and at different malt to adjunct ratios.

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### James Ludford-Brooks

Senior Process Associate, Beca



#### Bio

James Ludford-Brooks CPeng MIChemE is an engineering manager with over 20 years' experience in delivering sustainable hygienic process engineering solutions from concept to completion, specializing in hygienic process engineering design & management in Brewing and Distilling.

### Concurrent Session (Track 2)

#### Session 11 – Brewing Process 2

#### Presentation Topic:

Is your brewery trying to tell you something?

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 12.20 – 12.50

#### Presentation Abstract:

Reconnecting with your plant - rapid data capture techniques to enable engineering projects

Data is everywhere, but how do we capture and use it to our advantage? To be useful, data is often required to be obtained from multiple sources and interpreted to magnify the result.

Whether you have established engineering standards, drawings and up to date layouts, or find yourself in need of better plant information as you continue to grow organically, there are simple, cost effective solutions available to benchmark your current plant and build for the future.

Beca will demonstrate how rapid data capture tools can be used to enable projects for existing and greenfield projects, as well as providing plant operational teams with relevant technical and operational

information in real time, to deal with plant trouble shooting and maintenance. Practical examples from projects executed by Beca across brewing and distilling will include:

- 360 imaging and GPS location with 'Roundme'
- 3D scanning - Basic BLK review and accurate laser point cloud survey scanning to create interactive, dimensionally accurate plant and Asset Information Models
- Site remote viewing, interactive site induction and hazard register development, utilising 'Fulcrum' geolocation application
- Realtime process visualisation between 3D model, Process & Instrumentation Diagrams (P&ID's) and Plant Control Systems
- Plant Capacity and Logistics modelling

When you're marching, you're not fighting - these technologies contribute to significantly less travel time and reduced environmental impact during design and ongoing operation, allowing collaborative working over extended distances, and brings multidisciplinary teams together to provide the optimum results and connectivity for organisations across the globe.

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## **Barry McGuire**

**Balladong, Wadjuk, Nyungar Representative**



### **Bio**

Barry McGuire is a Balladong, Wadjuk, Noongar who is highly regarded as a public speaker, facilitator and negotiator. Barry has worked as a consultant and cultural advisor for Local, State, and Federal Government. In addition to his role as Managing Director of Redsphear Safety and Chairman to Safespear Pty Ltd. He is currently a member of the cultural advisory board to the Chevron Corporation and he is a Director to the Spear Foundation a not for profit organisation providing cultural understanding and support to organisations working with the Aboriginal community in the metro areas. This allows him to exercise his passion for sharing cultural understanding and safety across all nations of Australia.

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## **Welcome & IBD Updates (Track 1)**

### **Session 1**

#### **Presentation Topic:**

Acknowledgement of People of the World

#### **Date & Time of Presentation (Perth Time GMT+8)**

Tuesday, 23 February 2021: 08.20 – 08.25

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## David Medlyn

Technical Brewer, Coopers Brewery



David Medlyn graduated as an electrical engineer in Adelaide in 1989 and started his brewing journey with Coopers in 1994 as a control systems specialist. David helped Coopers automate their brewhouse, lager cellar and homebrew extract evaporation plant at Leabrook where he discovered his passion for brewing. He then assisted Coopers greatly in their move to the current Regency Park site where he joined full time in 2002. Starting within their engineering team he has led many process improvement and automation projects while gaining his IBD Brewing Diploma in 2005. He has been Cooper's Technical Brewer since 2012.

### Bio

#### Concurrent Session (Track 2)

#### Session 9 – Brewing Process 1

##### Presentation Topic:

A comparative study of Krones Poseidon™ dynamic fermentation contrasted to conventional fermentation and conditioning in cylindroconical vessels

##### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 07.10 – 07.40

##### Presentation Abstract:

Coopers Brewery have commissioned the retrofitting of eight fermenters with Krones Poseidon dynamic fermentation alongside an identical set of eight cylindroconical vessels. A comparative study of beer fermentation has been conducted using an ale yeast with low flocculation and a lager yeast with high flocculation. Performance had been assessed in regard to:

- attenuation rate,
- yeast health and cropping,
- diacetyl production and reduction,
- management of cold break and turbidity,
- management of dry hopping,
- ester profile and flavour,

This is a production scale experiment conducted over 9 months. Dynamic fermentation was used in several different ways and the pros and cons of each will be discussed. An assessment will be given of the potential reductions in loss of product, and costs.

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## Rhiannon Mensforth

Microbiologist, Lion Pty Ltd.



Rhiannon Mensforth started her career in the brewing industry as a Microbiologist after completing a Bachelor of Nutrition and Food Science at the University of South Australia in 2013. She is now two thirds of her way through her IBD Brewing Diploma - Currently completing her final Module (Process and Packaging Technology).

She has worked at multiple breweries including West End Brewery (SA), Tooheys Brewery (NSW) in Quality and Brewing roles and is now the Microbiologist at Little Creatures Geelong Brewery (VIC) where she has set up a new Microbiology lab, in house testing and standards on site.

### Bio

## Poster Session

### Presentation Topic

Best practice management of microbiology in a craft brewery

### Date & Time of Presentation

This session is available to view by visiting the "Poster Hall" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

Routine microbiological quality testing is essential for maintaining product quality and needs to be set at a standard (best practice) and monitored. Microbiological contamination including bacteria, wild yeast and mould can originate from a variety of sources in the brewing process including raw materials, air/environment, additives and pitching yeast cultures. Inefficient cleaning of tanks, linework, valves, heat exchangers and packaging equipment can also allow microorganisms to grow and consequently contaminate product. Microbiological controls include training of personnel in order to have confidence in the results; optimised cleaning procedures including temperature, chemical concentration, duration and flow rate of the solution; and monitoring of microbiological results and performance to ensure continuous improvement.

Microbiological testing is invaluable when performed at all stages of production and provides an indication of plant hygiene/cleanliness; quality of raw materials; type of organism present (spoilage/non-spoilage); culture yeast purity; and effectiveness of CIP regimes.

## Dr Garry Menz

Brewing Manager - Cascade, Carlton & United Breweries



### Bio

Garry Menz is the Brewing Manager at Cascade Brewery in Tasmania. He has been with CUB for 10 years in various roles in brewing and quality across multiple breweries. He is an IBD Master Brewer, and completed a PhD in Brewing Microbiology at Federation University. He holds a Bachelor of Applied Science (Food Science & Technology) (Honours) and a Bachelor of Management (Marketing).

## Panel Session (Track 1)

### Session 10

#### Presentation Topic

Where has all the research gone?

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 09.30 – 11.00

## View-On-Demand Session

#### Presentation Topic

Fresh is best - dissolved oxygen reduction in bright beer

#### Date & Time of Presentation

This session is available to view by visiting the "View-On-Demand Room" throughout the "live days" of the convention as well as up to one-month post event.

#### Presentation Abstract

The dissolved oxygen level in bright beer is a key quality parameter that is critical to the freshness and shelf life of the beer. Breweries strive to avoid contact of beer with oxygen post fermentation in order to reduce off flavour due to oxidation, allowing the beer to stay fresher for longer.

Problem solving guided by the PDCA (Plan Do Check Act) methodology was undertaken at Cascade Brewery (Tasmania, Australia), with the aim of reducing the dissolved oxygen content in bright beer. This presentation shares the improvements in beer freshness made at Australia's oldest brewery through this process. Practical insights for avoiding dissolved oxygen pickup are detailed, and the benefits of connecting with and engaging operational teams in problem solving activities is demonstrated.

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## Andrew Mieleniewski

Global BDM, Briggs Of Burton Plc



### Bio

Andrew leads the business development and technical sales for Briggs' business globally. Andrew is a professional engineer with 30 years' experience in the food and drink industries. Andrew holds an MEng in Chemical Engineering from the University of Nottingham and is a Chartered Engineer with the Institute of Chemical Engineers.

## Concurrent Session (Track 1)

### Session 5 - Distilling 1

#### Presentation Topic

Automating copper pot still operation in malt whisky production

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 14.00 – 14.30

#### Presentation Abstract

The operation of a malt whisky distillery has traditionally required manual supervision of the operations of mashing, fermenting, and distillation. The heavy manual supervision leads to added costs and inconsistencies in operation and therefore manufacturers have looked to automate these operations.

One area of particular focus is the control of the distillation in the pot stills with the operator supervising the heating to the still (to prevent carry over of liquid into the condenser) and manually controlling the separation of different 'cuts' of the distillate. Dividing the distillate into separate cuts ('foreshots', 'spirit cut', and 'feints') takes place in a routing and sampling station known as a 'spirit safe'. Operator experience combined with manually sampling the distillate (dilution test, thermometer reading, and spirit density measurement via hydrometer) is used to determine the cuts and requires the presence of an operator at the spirit safe for most of the operation.

The presentation describes how the application of in-line instrumentation to the operation and control of the pot still operation in conjunction with an automated control system has allowed the operation of the stills and the separation of the cuts to become an automated operation and enabled improvements in product quality and reductions in manning in Scottish malt whisky distilleries.

Automation of the pot still operation is a prerequisite to implement more complex still operations such as implementing energy saving technology such as Thermal Vapour Recompression (TVR).

## View-On-Demand Session

#### Presentation Topic

Modelling raw material conversion and energy consumption during mash cooking

### Date & Time of Presentation

This session is available to view by visiting the “View-On-Demand Room” throughout the “live days” of the convention as well as up to one-month post event.

### Presentation Abstract

The cost impact of substituting less expensive or local materials in the mashing and conversion of raw materials can be relatively easily assessed but the corresponding impact on processing cost (changes in hot water usage, energy requirements, cost of processing) can be more complicated for the average brewery to evaluate.

Optimum solutions for different mash bills can only be evaluated by combining knowledge of the equipment capability (heating/mixing effectiveness), processing conditions (mash/water ratios, temperature, time), and use of processing aids (e.g. brewing enzymes). Briggs (as a specialist process engineering company) and DuPont (as a company producing portfolio of specialist brewing enzymes) have had cooperated to develop tools to evaluate the impact of different mashing regimes.

The presentation/paper describes how the application of engineering and brewing principles can be combined to model (or simulate) the impact in energy cost (and carbon footprint) of processing different raw material mashing bills in a typical mash conversion vessel and cereal cooker combination.

The model allows dynamic simulations of different mashing conditions and presents this information graphically. Grist compositions are simulated using standard data or inputted using user specified data. The outputs are visualized in Sankey Diagram, energy and water usage are compared, relative changes per unit weight of extract calculated, cost change per unit volume of product predicted, as well as an indication of the impact on the carbon footprint.

To demonstrate the use of this model a number of different processing scenarios are evaluated.

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## David Moody

Barley Breeder, Intergrain Pty Ltd



David Moody is a barley breeder from the company InterGrain, based in Perth, Western Australia. David has a 30-year career in plant breeding and plant genetics, the majority of which has focused on barley variety development. He has become Australia’s most successful barley breeder, with approximately 60% of the national area in Australia sown to his varieties. David’s research interests are in the areas of malting quality, crop physiology, stress tolerance and farming systems. He has a Bachelor of Agricultural Science degree and an Honours Degree in Agricultural Biochemistry from the University of Adelaide.

### Bio

**Singular Session (Track 1)**

**Session 3 – Sustainability 1**

**Presentation Topic:**

Barley breeding in an environment of sustainability

**Date & Time of Presentation** (Perth Time GMT+8)

Tuesday, 23 February 2021: 12.30 – 13.00

**Presentation Abstract:**

Barley breeding companies must address sustainability in terms of breeding business longevity, farmer profitability and environmental management, and the requirements of customers demanding a lower environmental footprint from the agricultural supply chain. These objectives must be achieved during a period of significant climate change.

Fortunately, both the business model for plant breeding in Australia and new technologies are available to support the innovation required to address these issues.

The End Point Royalties (EPRs) has provided successful breeding companies with the capacity to invest in new technologies to support variety development. Foremost amongst these technologies are the “omics” – genomics, phenomics and proteomics which will be complemented with the potential use of gene editing technologies.

In this paper, the research being conducted by InterGrain supporting the development and use of these technologies will be described. These research outputs will ensure genetic gains from breeding can be maintained in the long term, future varieties released are adapted to a changed climate, and these varieties suit the quality requirements of the malting and brewing industries including a requirement for lower energy use during processing.

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## Matt Morisey

General Manager - Operations, Gage Roads Brewing Company



**Bio**

Matt has been in the brewing industry for 20 years the past ten have been with Gage Roads and is currently the General Manager - Operations. Matt's brewing experience started at Matilda Bay as part of the quality team and across a decade branched out to several operational roles. As side from brewing Matthew has held operational and technical roles in other industries. He holds a Bachelor's of Science from Murdoch University and recently completed a Diploma of Leadership and Management.

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## Concurrent Session (Track 2)

### Session 13 – Hygiene & Quality

**Presentation Topic:**

Improvements made from aseptic filling at Gage Roads

**Date & Time of Presentation** (Perth Time GMT+8)

Wednesday, 24 February 2021: 14.50 – 15.20

**Presentation Abstract:**

Gage Roads has a commitment to producing the highest quality products in Australia.

After a strategic review, the brewery decided to invest in upgraded filling capability to aseptic filling equipment for both bottles and cans. This is an ambitious goal for a brewery producing 15 million litres annually but we stand by our motto of “Brewed by Fussy Bastards”! The brewery also exclusively supplies products to one of the world’s premier stadiums - Optus Stadium.

To achieve this goal we extensively modified the site to accommodate the installation of a new bottle and can filler with addition to integrate the can filler into the existing automated packaging line.

We have seen a marked improvement in the organoleptic profile of beer being produced with the new equipment. The products are also having improved shelf stability.

Additionally, with our passion to continually improve product quality we also installed flash pasteurisation to replace the tunnel pasteurisation and upgraded our centrifuge to improve liquid quality and yield.

For extra complexity this upgrade occurred during the height of the Australia summer where beer consumption increases dramatically with associated production increase to meet consumer demand. To achieve this was an exceptional feat without disruption to the supply chain for our products.

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**Douglas Murray**

President, IBD/Diageo Plc

**Bio**

Involved in the Spirits industry since 1972 initially in Scotch but now all types of distilled spirits. Expert in spirit drinks production from raw materials to final product. President and Fellow of the Institute of Brewing and Distilling and a member of the board of examiners. Keeper of the Quaich. Based at Diageo Global Technical Centre in Scotland, where his knowledge is used to deliver innovation and technical developments for distilled and matured spirits within the Global business. His work has a truly global remit. Master Distiller and Blender for Diageo.

**Welcome & IBD Updates (Track 1)****Session 1****Presentation Topic:**

IBD Presidential Address

**Date & Time of Presentation (Perth Time GMT+8)**

Tuesday, 23 February 2021: 08.45 – 09.00

**Concurrent Session (Track 1)****Session 7 – Distilling 2****Presentation Topic:**

Development of flavour through distillation and maturation

**Date & Time of Presentation (Perth Time GMT+8)**

Tuesday, 23 February 2021: 16.00 – 16.30

**Presentation Abstract:**

This presentation on flavour creating is based on innovation and research carried out over the last 45 years. The presentation guides the distiller through the various operational opportunities that impact on the final style and flavour of the spirit beverage being produced. The topics cover raw materials preparation, milling, mashing, fermentation and distillation before moving into the area of cask selection and maturation. The talk concentrates on flavour from a scotch whisky perception but is equally relevant to all other types of distilled spirit. The opportunities range from initial design features to more subtle changes that can be done to existing plant operational procedures.

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**Dr Mitchell Nye-Wood**

Research Assistant, Edith Cowan University

**Bio**

Dr Mitchell Nye-Wood is an early career biomedical scientist researching proteins in food and agricultural products at Edith Cowan University, Perth WA. He has recently used cutting edge mass spectrometry based proteomics to identify the proteins present in barley and malt, and observe the differences in abundance that exist between varieties.

**Concurrent Session (Track 1)****Session 8 – Barley & Flavour****Presentation Topic:**

Proteomics analysis of barley malt proteins linked to beer flavour

**Date & Time of Presentation (Perth Time GMT+8)**

Wednesday, 24 February 2021: 08.30 – 09.00

**Presentation Abstract:**

Barley is rich in protein, carbohydrates, dietary fibre, minerals, and vitamins. It is also the basic raw material used for brewing. Malting is a complex process that aims to modify the physical structure of the barley grain and stimulate enzyme production or release leading to cell-wall degradation and protein solubilisation with



minimal starch breakdown. Malt flavour, colour and composition differ by variety (genotype), but also by environment.

In this study, two LC-MS/MS approaches employing multiple reaction monitoring (MRM) and a data-independent acquisition strategy were used to quantify the complex protein mixtures present in four barley varieties that yielded different flavour profiles. The grain proteomes were characterised by high resolution LC-MS/MS with proteins identified from the Poaceae subset of proteins from the Uniprot-KB database. Subsequently, a quantitative LC-MS approach termed Sequential Window Acquisition of All Theoretical Mass Spectra (SWATH-MS) was employed to measure the protein level differences between these barley varieties and associate these with sensory and metabolomic data.

Keywords: barley, malting, flavour, proteins, proteomics, mass spectrometry (MS), data-independent acquisition (DIA) MS

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## Tim Penton

General Manager, Taverner's Brewery



### Bio

Tim started at Tasmanian brewer, J Boag & Son, in 1986, before moving to Brewing Research

Foundation in the UK as Head Brewer, then in 1995 returned to Boags as Brewing Manager. In 2008 he became Project Manager for Selbourne Biological, building a facility to produce antidotes for Ricin and Botulinum. In 2013 he moved to Australian Honey Products as General Manager, including brewing honey beers. An active member of IBD since 1987, serving on

- London Section Analytical Sub-committee 1993-1994
- Professional development Committee since 2001
- Asia Pacific Section Committee 2004-2009
- Convention Organising Committee 2005-2006
- Regional Coordinator for Tasmania since 2015

## View-On-Demand Session

### Presentation Topic

Brewing with Honey - dare to BEE different!

### Date & Time of Presentation

This session is available to view by visiting the "View-On-Demand Room" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

Brewing with honey is not new, it is believed to be the oldest form of alcohol production dating back more than 9000 years. The Middle Ages saw the combination of honey with malt to produce Braggot. These Medieval Ales had up to 50% malt content. As craft beers have become popular, honey again has been introduced into the mix. However, consumer's general knowledge of honey is usually restricted to the sweet light tasting multiflora honey found in supermarkets that magically stay liquid forever. But this isn't the full story. The range of monofloral honey found around the world produces a staggering range of flavours and

colours. Honey contains numerous Volatile Organic Compounds (VOCs) of which over 100 different types have been found. Each honey has a unique combination of these VOCs producing flavour notes such as spicy, musky, toffee, malty, caramel and liquorice to mention just a few. Using these diverse range of honeys, matched to varying beer styles, presents an opportunity to produce some amazing beers. The challenge is to communicate and educate the consumer on what to expect given their limited exposure to the world of honey and what it can add to a great beer.

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## Jason Perrault

CEO, Yakima Chief Ranches, Llc



### Bio

Jason Perrault is a hop breeder and farmer from the Yakima Valley. He is currently CEO of both Perrault Farms and Yakima Chief Ranches. As a fourth-generation farmer, Jason is deeply devoted to bringing long term sustainability and value to the hop industry through innovative breeding and management that will positively impact future generations. As a breeder for Yakima Chief Ranches and their partner company Hop Breeding Company, he is proud to have played an active role in the development of several novel hop brands including Simcoe®, Palisade®, Warrior®, Ahtanum®, Citra®, Mosaic®, Ekuanot®, Loral®, Sabro™, and Pahto™.

## Concurrent Session (Track 2)

### Session 4 - Hops

#### Presentation Topic:

Hop breeding innovations for better beer

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 13.10 – 13.40

#### Presentation Abstract:

Over the past decade hop usage in brewing has changed dramatically. Research on the compounds driving hop flavor and aroma has increased as a result thus dramatically improving our knowledge of the subject. Production of these compounds by the hop plant is via complex pathways that are primarily determined by the genetics of the plant. Hop geneticists are therefore able to select for these traits of interest in an effort to improve or enhance hop flavor and aroma via plant breeding. This presentation will discuss the process of breeding new hop varieties and will outline the philosophies, processes and tactics involved with bringing new hop varieties to brewers. Five experimental hop varieties will be featured that are all creating marked differentiation in hops and brewing. The presentation will focus on the stories of each of these hops, the technical breeding lineage as well as current examples of some of the impacts these hops have had on beer and the brewing industry.

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## Dr Grzegorz Rachon

Project Manager, Campden BRI



Grzegorz Rachon was awarded Masters Degree in Food Technology and Nutrition at the University of Life Sciences in Lublin (Poland) in 1998. 20 years later he becomes Doctor of Agriculture and Food, completing the AFTP (Advanced Food Training Partnership) at the University of Reading and the University of Birmingham (United Kingdom). Grzegorz has over 15 years of industry experience in Food, Drink and Pharmaceutical microbiology working for Leatherhead Food Research, Nelsons Natural World and Thermo Fisher Scientific - Oxoid. Currently, he is employed by the Campden BRI in Brewing Division at Nutfield site as a Project Manager/Microbiologist and he is responsible for hygiene auditing, process validation trials and stability of traditional (beer, cider) and novel beverages like Kombucha, water kefir.

### Bio

#### Concurrent Session (Track 2)

#### Session 13 – Hygiene & Quality

#### Presentation Topic:

Challenging the assumptions around pasteurisation requirements of beer spoilage bacteria

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 15.50 – 16.20

#### Presentation Abstract:

Current recommendations for beer pasteurisation are based on the study in 1951 by Del Vecchio and co-workers. In this work, 14 beer spoilage bacteria were screened for their ability to grow or survive in ale and stout together with the determination of their thermo tolerance at 60°C. Using a capillary tube method, the D-value (decimal reduction time) and z-value (temperature resistance coefficient) of the three thermo tolerant bacteria (*Acetobacter pasteurianus*, *Lactobacillus brevis* and *Lactobacillus hilgardii*) were determined. Validation of pasteurisation at a range of pasteurisation units (PU) in packaged product were performed in a tunnel pasteuriser. This study showed that eight of the 14 microorganisms were able to grow in both beer styles, whilst different thermo tolerances were observed amongst the spoilage bacteria. Effective pasteurisation of the selected microorganisms was achieved at significantly lower PU values than those recommended by the European Brewery Convention Manual of Good Practice. In package pasteurisation conducted at 1.6 PU resulted in greater than an 8-log reduction in viable cell numbers, resulting in 'commercial sterility'. Although this study demonstrated that successful pasteurisation was achieved for vegetative cells at significantly lower PU values than those recommended, further studies are required to demonstrate the optimal level of pasteurisation for spore forming bacteria and for yeast.

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## Gianmaria Ricciardi

Technical Manager - Italy, Lallemand Brewing



### Bio

Gianmaria Ricciardi started his own experience in the brewing industry when studying Food Technology and Biotechnology at the University of Perugia (Italy). He had the opportunity to develop the theory behind this industry working with the Italian Brewing Research Centre part of the same Athenaeum, and having an internship at Birra Peroni S.r.l. in Rome. He completed his degree in 2012. From 2011, he worked as Head Brewer for a few craft breweries in Italy and the UK. Gianmaria currently occupies the position of Technical Sales Manager for Lallemand Brewing to service and support the brewing industry.

## View-On-Demand Session

### Presentation Topic:

Biotransformers...Hop flavours in disguise!

### Presentation Abstract:

Hoppy beers are beer styles defined by higher hopping rates. Generally defined as IPAs, the modern IPA family includes a diverse range of beer styles that are all defined by their very prominent hoppy character. This beer family, including all different interpretation, cover for a big chunk of the market, and our work, at Lallemand Brewing, is to provide the right tools to brewers to brew great beers and achieve always a higher quality of the finished beer. The choice of yeast strain is an important consideration in brewing any IPA style. Each yeast strain produces unique flavour compounds that directly impact the aroma of the final beer, from relatively neutral to more fruity esters. Recent research is uncovering how different yeast strains can influence flavour and aroma by interacting with specific hop-derived flavour compounds, a process called biotransformation. The Lallemand Brewing R&D lab has identified specific enzyme activities in several LalBrew® Premium strains that are important for biotransformation, including  $\beta$ -glucosidase and  $\beta$ lyase. The combination of primary yeast metabolism and secondary interactions with hop compounds (biotransformation) will determine the flavour and aroma of the finished beer. Armed with this data, the brewer is well equipped to choose the best yeast for each IPA style. Lallemand Brewing is at the forefront of hop flavour and aroma research, and we are happy to provide to the market with different solutions including exogenous enzymes such as the ABV Aromazyme, a pure  $\beta$ -glucosidase enzyme which gives the brewer greater control over biotransformation activity.

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## Ralf Scheibner

Department Manager Membrane Filtration Manager at GEA Group AG



### Bio

Study of process technology at the University of Karlsruhe (TH) finalized with degree diploma engineer (Dipl. Ing. Verfahrenstechnik). After professional engagement on the enduser side for membrane and MBR technology, joined GEA Wiegand GmbH in the department process engineering for membrane filtration units in the year 2002 as project engineer. Takeover of the membrane department at GEA Wiegand in the year 2010..

## Concurrent Session (Track 2)

### Session 11 – Brewing Process 2

#### Presentation Topic:

The Dealcoholisation of Beer with the new GEA AromaPlus Technology

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 13.20 – 13.50

#### Presentation Abstract:

GEA will give an overview on the latest development for the new GEA AromaPlus membrane technology to dealcoholize beers to  $\leq 0,5\%$  abv or down to  $\leq 0,05\%$  abv with no thermal stress and high retention of flavor compounds.

The consumption of alcohol-free and low alcohol beer is believed to see continuous growth due to consumers seeking for alternatives to alcoholic or unhealthy sugary beverages. Dealcoholized beer can be produced through two primary methods as either biological methods (e.g. stopped fermentation) or technical methods with thermal dealcoholization (e.g. evaporation or distillation under vacuum) and cross flow membrane filtration. The membrane based approach can be using nanofiltration or preferably reverse osmosis to produce dealcoholized beer at cold operating temperatures. The new GEA AromaPlus membrane process ensures preservation of the vital ingredients responsible for beer's sensory characteristics such as flavor and color. The GEA AromaPlus development launched on BrauBeviale 2016 is involving a specially selected reverse osmosis membrane for the cold dealcoholization of beer with preserving most of the natural beer flavours while delivering an optimized performance. That AromaPlus technology now enables brewers first time to produce non-alcoholic beers  $< 0.05\%$  abv with the natural beer aroma.

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## Richard Searle

General Manager Australia, Micro Matic Pty Ltd



### Bio

Richard Searle joined Micro Matic in September 2017 as General Manager, Australia; responsible for sales and service in Australia, New Zealand and the southern Asia Pacific region. Richard graduated from Heriot-Watt, with MSc. Brewing, joining Charles Wells Brewery in 1988. Working in brewing and packaging, he obtained IBD Master Brewer and moved to Australia in 1997. Based in Sydney, for over 20 years he has worked for many key suppliers to the industry. With Micro Matic, he continues to support the IBD, of which he has been a member for 30 years, as a member of the NSW Regional Committee.

## Concurrent Session (Track 2)

### Session 6 – Brewing & Quality

#### Presentation Topic:

Challenges in connecting your customers to brewery quality draught beer

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 15.20 – 15.50

#### Presentation Abstract:

Draught beer is the most profitable and environmentally sustainable way of connecting your customers, both retailers and end consumers, with Brewery Quality beer. However studies have shown that up to fifty percent of Draught beer can be negatively affected by quality issues in Trade, from poor hygiene (equipment and glasses), temperature and gas pressure. These problems if not addressed will only be amplified by the continuing current trends to smaller venues requiring larger choice of beverages on tap and leading to lower through-put per tap. The growth of mid-strength / non-alcohol beers and live yeast, mixed culture or flavoured beverages, add their own hygiene and quality issues. This paper reviews the current challenges and trends in Draught beer dispense, including the continued move to smaller twenty litre slim kegs (which will be further boosted by recent changes to Australian excise rules) and the various technologies that are available and being adopted to meet them.

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## Phil Sexton

Founder & CEO Matilda Bay Brewing



### Bio

Phil joined the brewing industry (Swan) in 1975 after completing a BSc at the University of Western Australia. He completed an MSc (Malting, Brewing and Fermentation Science) at the University of Birmingham (England) in 1981 and co-founded the Matilda Bay Brewing Company in 1983. Around the same time, he commenced external Oenology and Viticulture studies at Charles Sturt University and commenced planting the Devils Lair Vineyard in Margaret River. After the public takeover of Matilda Bay by Carlton and United Breweries (1990), Phil stood down as Executive Chairman and focussed upon Devils Lair as well as some restaurant, bar and coffee interests in Perth. In 1994-96, Phil moved to Portland Oregon to help a friend resuscitate the Bridgeport Brewery as well as expand a much larger brewery in Texas. Bridgeport IPA evolved out of this project. Returning to Australia, he sold Devils Lair and

moved to the Yarra Valley to commence planting vineyards that are now the centrepiece of his Giant Steps/Innocent Bystander business based in Healesville. While developing the Yarra Valley vineyards, Phil joined some of his Matilda Bay colleagues and friends to become the Starbucks franchisees for Australasia; a project that ran aground late one night in a bar in Seattle while they were at “Starbucks School”...and emerged the following morning as a new project (Little Creatures) to build a specialized craft brewery in Perth “to attend to unfinished business after the Matilda Bay takeover”. Little Creatures focussed upon naturally conditioned ales, arguing that this is what craft brewing needed to differentiate itself from large-scale commercial brewers. Little Creatures went on to build an open fermenter brewery (White Rabbit) in Healesville alongside Phil’s winery (so he could watch over) and in 2013, was acquired by Lion, where it now forms centre stage in their craft-brewing group. A side project during the late 90’s saw Phil assisting friends in the design and establishment of the Trumer Brauerei in Berkley Ca. A beer still nominated as his favourite (alongside Sierra Pale and, curiously, Budweiser (“now that’s skill and art...seriously”). Nowadays, Phil lives in the Yarra Valley and remains focussed upon (still) trying to prove that you can make a profit in the wine industry (so far, he hasn’t), drinks craft beer, listens to music and dreams of the day he can go sailing. He has no idea how he has ended up involved in/driving the revitalisation of Matilda Bay (2019) apart from it being “unfinished business”.

### Keynote Presentation (Track 1)

#### Session 2

#### Presentation Topic:

Keynote Presentation

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 09.45 – 10:08

## Donovan Sparks

Capability and Knowledge Leader, Lion Beer Australia



### Bio

Donovan is the Lion Capability and Knowledge Leader. He graduated from the University of Port

Elizabeth with a BSc Hons (Biochemistry). Donovan joined SABMiller in 1994 and occupied roles at 5 Breweries with his last two prior to leaving SABMiller being that of Head Brewer at the Ibhayi and Newlands Breweries. He completed his IBD Diploma in 1995 and the IBD Master Brewer in 2008. In 2013, he completed a MSc in Brewing Science through the University of Nottingham with his research topic being: "The impact of a simmer boil on key quality attributes of wort and finished beer". This work was the basis for SABMiller (ABInbev) to globally introduce and commercialise an alternate boiling process. In 2015, Donovan joined Lion as Head Brewer at the XXXX Brewery in Milton. In September 2018, he moved into his current role.

## View-On-Demand Session

### Presentation Topic

Expanding brewing knowledge across levels and functions

### Date & Time of Presentation

This session is available to view by visiting the "View-On-Demand Room" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

In conjunction with the knowledge attained as a result of achieving the Institute of Brewing and Distilling certification, Lion required an in-house program in order to entrench and accelerate Brewing technical capability. The Lion Brewing Gold program was conceptualised in 2015. The initial premise was that the program was an available resource for Brewing Leaders who wanted to utilise it to build technical knowledge in team members. More recently the strategy has changed; it is now mandatory to complete for the majority of roles in Brewing and is standardised for the Lion network. Brewing Gold consists of 3 levels – Fundamentals of Brewing, Experienced Brewer and Master Brewer. Each of these levels consists of detailed modules, underpinning knowledge requirements and all have a link to the IBD examinations; The General Certificate, Diploma, and Master Brewer certifications respectively. Over 50 Brewing team members have achieved certification in the program to date. The enablers for success transverse mentoring by others, on the job training, e-learning, group training, formative and summative assessments and use of technical information and literature. The program has the flexibility to allow capability build to be available for the numerous roles within the Brewing and Beverage function but also other functions in the business too. The program has had a direct impact on the performance of those who have completed it and has brought about learning in both a collaborative and individual manner.

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## Roy Spee

Sales Manager CO<sub>2</sub> & Biogassystems at Pentair Haffmans



### Bio

Roy studied Industrial Engineering at the Institute of Advanced Technology in Tilburg the The Netherlands and obtained an MBA at the University of Hasselt in Belgium. Prior to my job at Pentair Haffmans I worked in The Oil & gas industry at Weir The Netherlands and in the Feed industry at Geelen Counterflow covering the Asia/Pacific region. At this moment, I work 12 years for Pentair Haffmans and I have a global responsibility for the product line CO<sub>2</sub> recovery for breweries.

## Concurrent Session (Track 1)

### Session 14 – Sustainability 2

#### Presentation Topic:

Utilizing CO<sub>2</sub> from own fermentation is also valid for smaller breweries

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 15.30 – 16.00

#### Presentation Abstract:

CO<sub>2</sub>mpactBrew is a plug-and-play, containerized, CO<sub>2</sub> recovery solution especially designed for small and mid-size breweries. It offers fast installation and easy relocate within a short time without compromising on quality and reliability.

By recovering your own CO<sub>2</sub>, you eliminate emissions (odors) from your fermentation process, which might otherwise require additional precautions, and CO<sub>2</sub> availability in time, based on your own known source.

#### Process description

The gas from the fermentation vessels are led to the brewery's installed foam trap before the raw gas is washed in a water scrubber, in order to remove any alcohols and sugar aerosols.

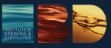
The gas is then compressed in three stages to approx. 39-46 bar(g) / 565-667 psig by two CO<sub>2</sub> compressors, and led into a high-pressure water scrubber to remove oxygenates such as alcohol, acetaldehyde, and acetyl acetate.

Prior to liquefaction, the gas is dried in the dehydrator and finally purified in the distillation column reducing the O<sub>2</sub> content to < 5 ppm.

The liquid CO<sub>2</sub> is now flashed to approx. 17 bar(g) / 246 psig, the vapour fraction is lead back to the 2-stage compression while the liquid CO<sub>2</sub> is finally led to storage at approx. 15 bar(g) @ -27°C / 218 psig @ -16.6°F. Cooling is carried out using the brewery's main refrigeration plant to supply the after coolers and condenser on the plant.

#### Advantages sum-up

- Reducing CO<sub>2</sub> footprint by recovering your own CO<sub>2</sub>
- Self-sufficient CO<sub>2</sub> production
- Known CO<sub>2</sub> source



- Plug-and-play solution
- Simple and limited maintenance
- No hazardous refrigerant system inside container
- 40' high cube container setup
- O<sub>2</sub> < 5 ppm
- Eliminates emissions (odor) from fermentation
- Remote service for efficient production

Keywords: Sustainable CO<sub>2</sub>, utilize own CO<sub>2</sub>, CO<sub>2</sub> for small breweries, CO<sub>2</sub> recovery, containerized CO<sub>2</sub> technology

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## Dr Doug Stewart

Maltings Manager - Coopers Brewery



### Bio

Dr Doug Stewart graduated from the University of Sydney with a degree in Agricultural Science and was awarded the Sydney University Medal. He went on to complete a PhD at the same institution, receiving the Queen's Trust Award at the completion of his doctorate.

Doug completed post-doctoral studies at Michigan State University and the University of Adelaide involved with starch metabolism and the impact of

malt quality on beer filtration, respectively. He was awarded the Institute of Brewing Centenary Scholarship in 1999 to study at Brewing Research International, Nutfield, Surrey.

Dr Stewart joined Coopers original maltings, Adelaide Malting Company, in 2000 as Quality Manager. The business transitioned to Joe White Maltings, where Doug progressed to General Manager Technical, undertaking a range of duties over 15 years, including production, research and development and responsibility for the technical and technical sales aspects of the business.

Doug moved to Coopers Brewery in 2014 for the new maltings project. Now with the maltings complete, he is responsible for all aspects of procurement, operations and sales and marketing.

Dr Stewart was made a Fellow of the Institute of Brewing and Distilling in 2015.

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## Panel Session (Track 1)

### Session 10

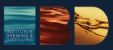
#### Presentation Topic

Where has all the research gone?

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 09.30 – 11.00

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## Dr Jeff Stewart

Senior Technical Brewer, Lion Pty Ltd.



### Bio

Jeff Stewart is a Senior Technical Brewer with Lion, based in Sydney. Analytical testing has always been close to his heart ever since starting in the brewing industry 30 years ago.

He divides his time between raw material quality and coordination of specialized laboratory support services for breweries in the Lion network.

Oversight of nutrition information on Lion's brands and substantiation of associated claims is a significant part of his role. He was heavily involved in assembling Lion's background information on the residual sugar content its beers for several marketing campaigns.

## Poster Session

### Presentation Topic

The not so sweet taste of success

### Date & Time of Presentation

This session is available to view by visiting the "Poster Hall" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

In 2015, Lion launched its 'Beer the Beautiful Truth' marketing campaign which set out to provide consumers with nutrition information about the beers in its Australian portfolio. Nutrition information panels on product labelling were accompanied by claims about carbohydrate, energy and sugar content.

Such claims needed to be backed up with results from analytical testing so that Lion could show that these were robust. The most stringent 'sugar-free' claim was set at 99.9% requiring analytical capability at below 0.1 g/100 mL for each of the individual residual sugars present in beer. Lion set up in-house analytical capability for low level sugar analysis using ultraperformance liquid chromatography. Large numbers of samples were analysed to provide statistically robust datasets so that sugar-free claims could be substantiated for each beer carrying a claim.

Residual sugar levels in beer are dependent on a range of factors including raw materials, processing conditions, yeast type and yeast health. They vary from batch to batch for a given beer and, to take account of this variation, Lion initially made 'on-average' claims. Regular testing was maintained to ensure their validity and currency.

In a small number of instances, brands demonstrated occasional significant variation in residual sugar levels. Whilst these did not invalidate the on-average sugar-free claims, Lion was keen to understand and then control these anomalies. Several causal factors were identified and highlight the importance of adherence to best practice in fermentation management and yeast husbandry to ensure consistently low residual sugar levels.

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## Dr Sue Stewart

Research Fello School of Agriculture, Food and Wine, University of Adelaide



### Bio

Dr Stewart began her professional life in Veterinary Science research before moving into crop research 22 years ago. Sue was initially involved in wheat genomics, before moving to barley breeding and research in 2009 where she was responsible for the identification and characterisation of novel germplasm that led to the release of the barley variety 'Admiral', a new low carbon footprint barley variety. Currently Dr Stewart is working on the malt flavour and aroma project at the University of Adelaide that commenced in August 2018. This project aims to identify the compound group(s) responsible for the differences in flavour of malt from different barley varieties.

## Concurrent Session (Track 1)

### Session 8 – Barley & Flavour

#### Presentation Topic:

Barley derived flavours in wort and beer

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 08.00 – 08.30

#### Presentation Abstract:

What is meant by flavour? This is a very complex question that many people have tried to explain. Flavour is essentially our combined perception of taste, aroma and mouth feel (tactile) properties. It adds to our enjoyment of beer which involves detection of a large number of contributing chemicals through interactions with olfactory and taste receptors in the nose and mouth. It is known is that you can impart flavour to beer by altering the malting regime, the choice of yeast and hop or specialty malt. Although barley malt is the material backbone of all beers, barley variety has largely been overlooked with respect to the factors contributing to flavour difference. However, Maris Otter, a variety bred at Cambridge, UK and released in 1965 produces beer with distinct flavour. A brewing trial completed by the Brewing Research Institute (UK) for Robin Appel (2013) established that Maris Otter had a nutty character not present in several contemporary varieties of the time. However, the source of this flavour has not yet been determined. Maris Otter is still grown today and is highly sort after despite a significant premium paid by craft brewers and home brewers. The objective of this project is to determine if barley variety can lead to detectable differences in beer flavour. The malt was nano-brewed to produce wort resulting in 700 mL beer. The finished beer was assessed by the Coopers Brewery tasting panel for sensory evaluation, along with wort made from the same varieties. Samples were then analysed by GC-MS to describe the differences detected by the tasting panel could be explained by differences in their chemical profiles.

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## John Stuart

Grains And Oilseeds Specialist, Graincorp



### Bio

John Stuart has been working in the Australian grains industry since 1980 where he started as a maltster with Barrett Burston Malting Co. In 1988 he commenced various quality management positions with the Barley Marketing Board of NSW, the NSW Grains Board, GrainCo and with his current employer GrainCorp Operations. John has travelled extensively throughout China over the last 29 years, as well as Japan and South East Asia liaising with maltsters, brewers, barley pearlers, Shochu makers, Chinese Baiju makers, wheat millers and stockfeeders and was on the Board of Barley Australia for 10 years.

## View-On-Demand Session

### Presentation Topic

Our humble barley

### Date & Time of Presentation

This session is available to view by visiting the "View-On-Demand Room" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

The physiological traits of barley are impacted by such a vast array of environmental weather events from sowing through to grain filling and harvesting. Malting barley varieties and qualities vary dramatically across so many Australian geographies that impact the internal starch makeup and cell wall structure of kernels. Malting barley is harvested and stored in different storage types and conditions whilst we hope to maintain a healthy germinative viability during months of deliveries to maltsters.

This paper describes, in layman's terms, the often forgotten role of the health of the microscopically thin pericarp and testa layers which encase the embryo of barley kernels, and how they play a vitally important role in the storage, handling, malting and brewing successes and challenges of our malting barleys across different geographies.

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## Sean Symons

IBD Convention Chair



### Bio

Sean began brewing for the Hahn Brewing company in Sydney Australia in 1996-2002 before transferring to the Tooheys brewery, part of the

Lion Group where he held role of Brewing and Packaging team leader until 2006. He then moved to Vietnam and built the microbrewery Louisiane Brewhouse in Nha Trang, before returning to Australia in 2008 as Process Improvement Leader at the Castlemaine XXXX Brewing in Brisbane Australia, and Brewing Manager of the Swan Brewery in Perth until March 2013. He has held the position of Chief Judge of the Royal Perth Beer Show from 2010 until 2015. He currently serves on the committee of the Perth Royal Beer show, and is committee chairman for the IBD Convention 2021 in Perth Australia. Sean is currently Head brewer and founder of White Lakes Brewing company in Perth, Western Australia, he holds a Bachelor of Environmental Science from the University of Sydney and a Diploma in Brewing.

## Welcome & IBD Updates (Track 1)

### Session 1

#### Presentation Topic:

Convention Welcome from Perth

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 08.15 – 08.20

## Danielle Tromp

Technical Specialist, Pall Corporation



### Bio

Danielle is the Technical Specialist for Food & Beverage ANZ at Pall Corporation. Danielle received a Bachelor of Biological Sciences from La Trobe University and pursued Honours and PhD studies in Microbiology prior to being appointed Associate Lecturer at La Trobe University. After 9 years in academia, Danielle transitioned to a Laboratory Supervisor role at a dairy manufacturing plant. With an interest in improving microbiological quality in a high-risk facility, Danielle refined the microbiological testing plan, developing a comprehensive environmental monitoring and raw material testing program.

Keen to broaden her knowledge into the beverage industry, Danielle joined Pall in 2017.

### Concurrent Session (Track 2)

#### Session 13 – Hygiene & Quality

##### Presentation Topic:

How to keep control of what's lurking in your beer

##### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 15.20 – 15.50

##### Presentation Abstract:

Long shelf-life in beer is directly linked to a product free of any beer-spoilage microorganisms. While large brewing companies operate their own microbiological testing laboratories, microbial control is often difficult for small to mid-sized breweries as microbiological testing is performed by external laboratories on a less frequent basis. This exposes small and mid-sized breweries to greater risk of recalls and complaints due to microbial contamination, which is a major disadvantage in comparison to large brewing companies. As the detection, identification and removal of spoilage microorganisms is critical for process control and prevention of economic loss, the disadvantage to small and mid-sized breweries can be overcome by combining rapid analytical methods with intelligent quality control strategies. Specific PCR technologies are engineered towards easy operation and require no detailed scientific knowledge of handling and identifying microorganisms. Analysis costs are low and results are more reliable and achieved faster in comparison to traditional methods.

While filters can provide microbial protection for finished product, appropriate CIP processes and filter handling practices are also crucial for effective quality control. Monitoring the performance of filters, in addition to appropriate cleaning, sanitization and storage of filters during periods of non-use are important aspects of process control. This paper describes how to establish an effective quality control strategy, including sampling plans for microbial contamination for small and mid-sized brewers, based on utilization of modern PCR technology.

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## Paul Van Der Vyver

Brewing Leader, Lion Pty Ltd.



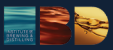
### Bio

Name: Paul van der Vyver

Title: Brewing Leader

Education: Master's in Brewing Science (MSc) from the University of Nottingham. IBD diploma

Paul is the Brewing Leader at West End Brewery in Adelaide. He has 20 years' experience in the Brewing Industry which stretches across three International Breweries in three countries. One of his most memorable work experiences was commissioning a Greenfields Brewery in Namibia and setting up the structures to deliver the KPI's of a fully-established Brewery. In the first year of production this Brewery achieved first place in



taste awards held between 25 Breweries in the group.

### Poster Session

#### Presentation Topic

Crossflow filtration runlength improvement

#### Date & Time of Presentation

This session is available to view by visiting the "Poster Hall" throughout the "live days" of the convention as well as up to one-month post event.

#### Presentation Abstract

The Castlemaine Perkins Brewery in Brisbane uses Pall PROFi® membrane filters to filter Maturation beer en-route to Bright Beer. The filtration run lengths between CIP's were not meeting the original design criteria for the filters and were lower than seen at other comparable Lion sites. A project team was formed to investigate opportunities to improve this critical output. The team employed the DMAIC tool (Define, Measure, Analyse, Improve & Control) to systematically work through improvement actions. Some potential reasons were ruled out quite early through analysis of inputs to the system e.g.  $\beta$ -glucan levels in the beer, CIP effectiveness of the filter membranes. Non-microbiological particles reaching the filters were the most likely reason, based on turbidity results post PROFi centrifuge, and microscopic haze analysis of this beer. The trub levels in yeast crop and beer transferred into maturation were higher than good practice would suggest, and this fine protein-polyphenol material could not completely be removed by the PROFi centrifuges. A literature search revealed that a key function of trub formation was enabled by a wort pH of approx. 5.2. Other important factors considered by the team were kettle finings dosing rate, time of addition, salt concentrations, hot wort clarity, malt variety & malt modification, level of cold break protein, wort gravity and wort polyphenol levels. The pH of the cooled wort was found to be higher than desired, mainly due to the alkalinity of Brisbane water, which was approx. 75 mg/L. The wort calcium levels were being managed through the addition of calcium salts in the water, but this water treatment was not enough to achieve the required pH. Trials were carried out to dose a food grade phosphoric acid in both the mash tun & end of kettle boil to achieve the required pH at both these points. Kettle finings dosing rates were also optimised for all wort types through the empirical "jar" tests. The resulting beer was then analysed for trub content that was subsequently being presented to the PROFi filters. The project has delivered significant improved filterability results with a 90% improvement in filterability (hL/CIP), and the consequent reduction in membrane replacement costs, CIP chemicals usage, beer loss and energy use. The risk to production downtime through filter room throughput was also reduced.

## Simon Wade

Learning Development Manager, IBD



### Bio

Simon graduated with an Honours degree in Microbiology and joined South African Breweries in 1983 as a trainee. Many moves and job roles later, he joined Professor Barry Axcell's team to establish the global brewing function for SABMiller. In 2006 he moved to Sydney in a yeast production role as Global Technology Director for AB Mauri, before returning to SABMiller in London in 2008 as Global Director of Brewing. After leaving SABMiller in 2016, he joined the IBD in 2017. Simon has additionally studied at Heriot Watt and has a Masters in Operations Management from the University of Cape Town.

## View-On-Demand Session

### Presentation Topic

In search of the modern learner

### Date & Time of Presentation

This session is available to view by visiting the "View-On-Demand Room" throughout the "live days" of the convention as well as up to one-month post event.

### Presentation Abstract

In 2015, the publication of an infographic by the consulting group Bersin by Deloitte captured the attention of a global audience of learning practitioners as it portrayed the many challenges and changes that the so-called 'Modern Learner' was going through. Terms such as 'distracted', 'overwhelmed' and 'impatient' were clues to the fact that the modern learner in the workplace managed only to find an average of 1% of a work week to devote to their professional development.

Amidst many competing forces, organisations and individuals need to find ways to learn effectively as the environment in which they operate is changing rapidly. The Institute of Brewing & Distilling is itself caught up with this changing world, and this paper will examine some of the current trends five years on from the Bersin report.

Awareness of these trends is important for both individuals and businesses concerned with learning new capabilities. The IBD as a learning provider has been fortunate to be connected to some outstanding global learning organisations and professionals, and this has helped shape our response to supporting the modern learner. An overview of IBD's response will be presented based on four key areas:

Technology – harnessing the opportunities that technology developments provide,

Content - how traditional content has been improved and our plans for 2020 and beyond,

Learner engagement – helping people learn effectively, and finally

Professional development – recognition that whilst passing exams is important, development after that to support personal growth and business success is vital.

Keep connected, keep learning!

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## Professor Graeme Walker

Abertay University



### Bio

Graeme Walker completed his PhD in Yeast Physiology in 1978 from Heriot-Watt University and was conferred DSc by Abertay University in 2004. He has been an active member of the Institute of Brewing & Distilling since 1973 and was elected as Fellow of the IBD in 2009. Graeme is Professor of Zymology at Abertay University in Dundee, Scotland where he directs a yeast research group focusing on brewing and distilling related topics. Martina Daute, the co-author of this presentation, is a PhD student at Abertay University working in collaboration with the Scotch Whisky Research Institute.

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## Concurrent Session (Track 1)

### Session 5 – Distilling 1

#### Presentation Topic:

Diverse yeasts for distilled spirit fermentations

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 14.30 – 15.00

#### Presentation Abstract:

The yeast species, *Saccharomyces cerevisiae*, represents the premier industrial microorganism for alcohol fermentations and for brewing and distilling, many different strains of *S. cerevisiae* are selected based on efficiency of substrate conversion to alcohol, and for flavour attributes. However, several diverse non-*S. cerevisiae* yeast species can be exploited to contribute interesting flavour and aroma characteristics to alcoholic beverages. These include yeasts such as: *Brettanomyces* and *Saccharomycodes* spp. for production of specialty “sour” and low-alcohol beers, respectively; *Metchnikowia* and *Torulaspora* spp. for commercial wine production; and *Kluyveromyces* spp. in cheese whey fermentations for production of distilled spirits. For whisky production from cereal substrates, especially in Scottish distilleries, a limited number of commercial strains of *S. cerevisiae* predominate due to their rapid alcohol production properties and for reasons of tradition. There is currently scope to employ more flavoursome yeasts for certain distilled spirits and this presentation will focus on our research to evaluate non-*Saccharomyces* yeasts for Scotch whisky fermentations to impart desirable aroma and flavour congeners. Results will be presented from trial fermentations using diverse yeast species together with analytical and sensory data of subsequent distillates. This presentation will highlight the opportunities of exploiting yeast biodiversity for production of distilled spirits and will discuss the fermentation challenges compared with the use of more conventional distilling yeast strains.

Acknowledgements: We thank John Grigor from Abertay University and Frances Jack, Jane Walker, Irene Baxter and Barry Harrison from The Scotch Whisky Research Institute for collaboration on this project.

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## Dr Emma Walker

Whisky Technical Expert, Diageo



### Bio

Dr Emma Walker is a Whisky Technical Specialist at Diageo - one of 12 Master Blenders responsible for Diageo's Scotch Whisky portfolio. After completing her PhD in Chemistry, Emma joined the Whisky Specialist Team, spending 4 years learning about whisky flavour from fermentation to blending before working in Production; managing the quality labs at Leven SPA and Cameronbridge Distillery, then managing Knockando Distillery. Emma returned to the Whisky Specialist Team, working on Johnnie Walker Blue Label and Johnnie Walker Innovations, before leading the Whisky Specialist Team for 1 year, and now leading Strategic and Technical Whisky project delivery.

## Concurrent Session (Track 1)

### Session 7 – Distilling 2

#### Presentation Topic:

The art of whisky blending and single malt selection

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 15.30 – 16.00

#### Presentation Abstract:

Whisky has been made in Scotland for centuries, and creating whisky is the perfect balance between art and science, tradition and progress.

At every stage of the whisky making process, skilled craftspeople balance traditional techniques and generations of knowledge and experience, with new production methods while building greater scientific understanding of the development of flavour at every stage

- From the distilleries in fermentation and distillation,
- To maturation in hand crafted casks,
- Analysis of spirit and whisky using scientific techniques and organoleptic assessment,
- To creating whiskies, through balancing scientific understanding of flavour creation with the artistic understanding of layering and combining diverse flavours and styles.

I will discuss the flavour creation in our different distilleries, from creating lighter style spirit to smoky complex flavours, and how these flavours develop in maturation in different cask types, and how we bring these flavours together to produce diverse flavours and whiskies for our customers around the world.

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## Alan Williamson

Commercial Director of Sales, Bairds Malt



### Bio

Alan has a Law degree from Glasgow University and then qualified as a Chartered Accountant with PWC.

Having worked in the industry for over 20 years for Diageo and SAB Miller in finance and procurement roles, Alan joined Bairds in 2018 after working for Schill Malz in Germany and our sister company, Canada Malting.

## Concurrent Session (Track 1)

### Session 7 – Distilling 2

#### Presentation Topic:

The re-invigoration of UK distilling malt market

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 16.30 – 17.00

#### Presentation Abstract:

Over the last 30 years the Distilling market in UK (Scotland) has grown from requiring 300,000 tonnes per annum to the primary UK malt market consuming ~900,000 tonnes today.

This focus on distilling malt production has resulted UK plant breeders developing malting barley lines that are low protein accumulators, non GN producers that are capable of producing highly modified malt that is capable of supplying high extract/high spirit yield potential.

Scottish single malt is legally defined as the spirit production of a single distillery that is produced using only 3 ingredients, water, malted barley & yeast which is matured in an oak cask for a minimum of 3 years within a warehouse in Scotland.

In the past, flavour exploration focussed on the relationship between the barrel and spirit. Most recently, Distillers have been resurrecting heritage varieties by partnering with maltsters and growers to bring these niche varieties back to life.

We can also see the influences of other drinks industries beginning to immerge. From the introduction of speciality malts to whisky that are most commonly used in beers to the idea of terroir that's largely associated with the production of wine. As Maltsters we play a large part in facilitating these ideas and connecting the dots from farm to spirit.

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## Stuart Whytcross

Co-owner & Grower, Voyager Craft Malt



### Bio

Stuart is a registered grain grower, having managed farming practices to produce high quality cereal grains for the past 25 years on his family's property in Barellan. As Co-Founder and director of Voyager Craft Malt, Stuart has been able to bring together his passion for Agriculture, Education and Craft Beer and Spirits in a highly unique and innovative business. Stuart's passion for his hometown and region is no more evident in role of project coordinator, and founder of the Not for Profit Barellan Beer Project, set up to raise funds for his community and give identity to the town's main commodity of cereal grain.

## Concurrent Session (Track 1)

### Session 12 – Malt & Barley

#### Presentation Topic

Unique and sustainable on-farm craft malting for industry

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 12.00 – 12.30

#### Presentation Abstract:

Gifted 50 acres of his family's fourth generation farm for his twelfth birthday, Stuart has been growing a diverse range of cereal grains for the past 25 years. A keen interest in beer and spirits saw him and his childhood friend and farming neighbour, Brad Woolner, establish Australia's first on-farm craft malthouse, five years ago in the Riverina NSW. Voyager Craft Malt now supplies more than 100 breweries, distilleries and bakeries across Australia with a vast array of sprouted and malted products, all grown sustainably in close proximity to their custom designed Malt house.

This presentation will touch briefly on the Voyager Craft Malt story and their unique and sustainable on-farm malting process. Delving deeper into what craft malting is by highlighting successful partnerships and collaborations between brewers, farmers, maltsters and consumers who grow and create a range of innovative malted products for specialty beers and spirits.

Finally Stuart will discuss the promising future of craft malting in Australia and the opportunities that exist for brewers to engage with their local growers and maltsters to discover malt provenance and grain terroir.

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## Colin Wilson

Managing Director, Totally Natural Solutions Ltd



### Bio

Colin Wilson obtained a Chemistry degree from Edinburgh University and completed a Masters in Chemical Technology and Management, before commencing an industrial career specialising in natural product chemistry. In 2016 he was made a Fellow of the Royal Society of Chemistry. In 2005, as Operations Director for Botanix Ltd, a Barth Haas company, he implemented world-class manufacturing systems to this specialist hop company. In 2013, he established Totally Natural Solutions Ltd, a UK based natural hop extracts company. This innovative business specialises in providing brewers with high quality, natural hop aroma and flavour extracts for late and dry hopping.

## Concurrent Session (Track 2)

### Session 4 - Hops

#### Presentation Topic

Developing fermented hop character in beer using hop oil extracts in beer

#### Date & Time of Presentation (Perth Time GMT+8)

Tuesday, 23 February 2021: 14.40 – 15.10

#### Presentation Abstract

Hop Oil extracts are widely used throughout the brewing industry to add hop aroma and flavour efficiently to beer. They are used post fermentation to add standardised hop aroma profiles consistently.

Totally Natural Solutions in collaboration with Coopers Brewery have looked at the sensory effects and value creation of additions of hop oil extract into primary and secondary fermentation, whilst retaining process control and consistent final beer sensory profile.

With the continued rise of innovative beer styles in craft brewing and dry hopping prevalence, the use of hop oils to deliver true fermented hop character is a valuable innovation. Reduction in dry hopping beer losses as well as better utilisation make for a more sustainable hop industry.

The opportunity to further innovate with the influence of yeast strain and malt variety across a range of beer styles was investigated to optimise point of addition and dose rates to deliver desirable hop character.

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## Leonie Wong

BDM - Food & Beverage, Siemens



Leonie Wong is responsible for Food and Beverage Business Development in Australia and New Zealand for Siemens. Leonie holds a Bachelor of Engineering (Infomechatronics) from Queensland University of Technology. Her involvement in this market encompasses working with consultants, OEM's, integrators and manufacturers to have access and understanding of the technologies and proven solutions that Siemens can offer in this space. She facilitates ideation and co-creation workshops to help translate the concepts of Digitalization and Industry 4.0 into actionable plans that will allow manufacturers to adapt to the evolving marketplace, transform and lead in their respective fields.

### Bio

#### Concurrent Session (Track 2)

#### Session 11 – Brewing Process 2

#### Presentation Topic:

Avoiding digital disappointment: digital transformation in brewing and distilling

#### Date & Time of Presentation (Perth Time GMT+8)

Wednesday, 24 February 2021: 12.50 – 13.20

#### Presentation Abstract:

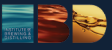
Brewers and distillers of all sizes need to innovate in order to provide a quality product. Innovation is not limited to creative recipe development but also should be considered in the manufacturing process. Incorporating technology into your operations drives efficiency, quality and productivity when done properly, and the challenge is how to identify the best technological innovations for you.

How do you identify the innovations that are right for your operation and turn them into reality with the right return on investment? Digital transformation is something that can and should be embraced by everyone in your business. Siemens has been supporting companies with navigating the digital transformation journey and this presentation will share our stories of supporting manufacturers both big and small with adopting Industry 4.0 and address:

- What is Industry 4.0 and digitalization and why it will help companies not just survive, but thrive
- How do you go from an idea to a reality
- How do you overcome resistance to change
- Data and digital twins
- Case study of Constellation Brands Nava Brewery

Key words: Digital Transformation, Industry 4.0, digital twin, data, change management, automation

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## Questions?

Please contact us with any questions or queries. We are here to help.

### **TRIBE - Travel & Events**

Martin Klopfer & Felicity Smith

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