TH INTERNATIONAL TRENDS IN BREWING
Ghent, Belgium, April 8th-12th 2018
SYMPOSIUM PROGRAM

OPPORTUNITIES THROUGH INNOVATIVE INGREDIENTS & TECHNOLOGIES

“Early Bird” Registration Fee until March 9th, 2018
Dear colleagues in malting and brewing,

On behalf of the Organizing and Scientific Committees, it is our great pleasure to invite you to the International Malting and Brewing Symposium ‘13th Trends in Brewing’, which is jointly organized by KU Leuven (Belgium), Technical University Berlin (Germany), University of Nottingham (United Kingdom), Oregon State University (United States of America), and the Italian Brewing Research Centre (CERB, University of Perugia). The ‘13th Trends in Brewing’ will take place from 8 until 12 April 2018 at the KU Leuven Technology Campus Ghent, situated near the renowned historical centre of Ghent city.

More than ever, maltsters and brewers are constantly looking for process and product innovation in order to obtain premium quality beers showing both pleasant and novel flavour profiles within a wide range of levels of alcohol. Therefore, “Opportunities through innovative ingredients and technologies – recipes, better practices and challenges” was selected as the central theme of the 13th Trends in Brewing. Major topics comprise challenges of the future (both analytical and process-based), breeding in brewing (in particular regarding microorganisms), hops, botanicals, herbs and spices, alternative sources of extract and emerging grains, useful microorganisms in malting and fermentation technology, emerging beers, and innovative processing in malting and brewing, including a round-table session to discuss on membrane filtration in particular (for more detailed information: www.trendsinbrewing.org). Clearly, whereas the aim is to explore and figure out an array of opportunities in different areas of malting and brewing, ‘moving science into practical solutions’ (i.e. searching for workable solutions for problems encountered in daily practice) remains the major objective of the symposium, in accordance with previous editions of Trends in Brewing.

The congress is aimed to bring together malting and brewing researchers, scientists, and technologists from universities, companies and institutes to provide them a unique international platform for sharing new ideas and discovering promising trends and developments in malt and beer production. Scientific findings and technological advances will be presented through invited lectures, peer-reviewed lectures and posters, in combination with an extensive technical exhibition. The symposium will also allow to visit local industrial breweries, and, evidently, to find out the fascinating richness of Belgian beer culture.

By combining the scientific program with a variety of social events, we are convinced that the 13th Trends in Brewing - similar to previous editions with more than 400 attendants - will be a unique opportunity to exchange ideas and contacts, and to consolidate our continuous efforts for innovation in malting and brewing.

We are very much looking forward to meeting you!

Prof. Luc De Cooman
Chair of the Symposium
12°P SPONSORS

chocolats@coffee kindly offered by:
REGISTRATION ONLINE

Registration is only possible via www.trendsinbrewing.org

REGISTRATION FEES

<table>
<thead>
<tr>
<th>Ticket Type</th>
<th>Early Bird Registration until March 9, 2018</th>
<th>Standard Rate after March 9, 2018</th>
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<tbody>
<tr>
<td>Full Conference ticket</td>
<td>€ 720</td>
<td>€ 850</td>
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<tr>
<td>Lecturer / Poster presenter / Chair</td>
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<td>€ 350</td>
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<tr>
<td>Student registration*</td>
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<td>€ 350</td>
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<tr>
<td>Retired professional</td>
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<td>€ 350</td>
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<tr>
<td>One day ticket</td>
<td>€ 300</td>
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<tr>
<td>One day ticket incl. symposium dinner</td>
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*Student fees are applicable only to full-time students. Students must provide a proof of their student status (student ID or certificate). Student registration will be validated upon receipt of the proof of status.
### SYMPOSIUM PROGRAM

#### Sunday, April 8th, 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>10.00 - 19.00</td>
<td>Technical and Poster Exhibition Set-up</td>
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<tr>
<td>17.00 - 21.00</td>
<td>Symposium Registration, Get Together Party</td>
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#### Monday, April 9th, 2018

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<tr>
<th>Time</th>
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<tr>
<td>8.00 - 18.00</td>
<td>Registration</td>
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<tr>
<td>9.00 - 18.00</td>
<td>Technical and Poster Exhibition</td>
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**SYMPOSIUM OPENING**

9.00 - 9.30

Welcome Address and Introduction to the Symposium

*Frank Baert, KU Leuven, Belgium*

*Luc De Cooman, KU Leuven, Belgium*

**KEYNOTE LECTURES: OPPORTUNITIES THROUGH INNOVATIVE INGREDIENTS & TECHNOLOGIES – RECIPES, BETTER PRACTICES AND CHALLENGES**

**Chair: Luc De Cooman, KU Leuven, Belgium**

9.30 - 10.00

**IL.01 Global trends in beer consumption and production**

*Jo Swinnen, KU Leuven, Belgium*

10.00 - 10.30

**IL.02 Alternative grains**

*To be confirmed*

10.30 - 11.00

Coffee break

11.00 - 11.30

**IL.03 Beer & Botanicals**

*David Grinnell, The Boston Beer Company, USA*

11.30 - 12.00

**IL.04 Change is inevitable, including beer flavour**

*Charlie Bamforth, University of California, Davis, USA*

12.00 - 13.00

Lunch

13.00 - 14.00

Technical Exhibition and Poster Discussion

**SESSION 1: CHALLENGES**

**Chair: Guido Aerts, KU Leuven, Belgium**

14.00 - 14.30

**IL.05 Draught beer quality**

*David Quain, University of Nottingham, United Kingdom*

14.30 - 14.55

**AL.01 Freeze crystallization as promising next-generation water purification technology**

*Lars Erlbeck, University of Applied Sciences Mannheim, Germany*

14.55 - 15.20

**AL.02 Applications of optical process spectroscopy in brewing processes**

*Matthias Rädle, University of Applied Sciences Mannheim, Germany*
<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>15.20 – 16.10</td>
<td>Coffee break</td>
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</table>
| 16.10 – 16.35 | AL.03 A kinetic framework for predicting beer flavour stability  
Paul Hughes, Oregon State University, USA |
| 16.35 - 17.00 | AL.04 Automatable multi-enzyme measurement in malted barley and predictive models for filterability and fermentability  
Claudia Cornaggia, Megazyme, Ireland |
| 17.00 – 17.15 | POSTER SELECTION FOR SHORT ORAL PRESENTATION  
Chair: David Quain, University of Nottingham, United Kingdom |
| 17.15 – 18.00 | Poster Discussion and Technical Exhibition                           |
| 18.00 – 18.30 | OFFICIAL WELCOME BY DANIËL TERMONT, mayor of Ghent and LUC SELS, Rector of KU Leuven |
| 18.30 – 21.00 | Drink and Walking Dinner at the Technical Exhibition                |

**Tuesday, April 10th, 2018**

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>8.00 – 18.50</td>
<td>Registration</td>
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<tr>
<td>8.30 – 18.50</td>
<td>Technical and Poster Exhibition</td>
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</table>
| 8.30 – 9.00 | IL.06 A systems approach to generate superior beer yeasts  
Kevin Verstrepen, KU Leuven, Belgium |
| 9.00 – 9.25 | AL.05 Enhanced wort fermentation with de novo lager hybrids adapted to high ethanol environment  
Krisster Krogerus, VTT Technical Research Centre of Finland Ltd, Finland |
| 9.25 – 9.50 | AL.06 Understanding the impact of mitochondrial functionality and morphology on petite production  
Eoin Moynihan, University of Nottingham, United Kingdom |
| 9.50 – 10.20 | Coffee break                                                        |
| 10.20 – 10.45 | AL.07 Variation within brewing yeast populations  
Stephanie Brindley, University of Nottingham, United Kingdom |
| 10.45 – 11.10 | AL.08 Characteristics of two new Huell aroma varieties – no flavour hops this time  
Andreas Gahr, Hopfenveredlung St. Johann GmbH, Germany |
| 11.10 – 12.00 | POSTER PRESENTATIONS  
Chair: David Quain, University of Nottingham, United Kingdom |
| 12.00 – 13.00 | Lunch                                                               |
| 13.00 – 14.00 | Technical Exhibition and Poster Discussion                          |
SESSION 3: HOPS, BOTANICALS & FRUITS
Chair: Paul Hughes, Oregon State University, USA
14.00 – 14.25 AL.09 Investigation of the impact of different aromatisation technologies on the coriander-derived flavour of craft beers
Gert De Rouck, KU Leuven, Belgium
14.25 – 14.50 AL.10 Hidden hop aroma compounds – how to squeeze your hops
Christina Schönberger, Barth-Haas Group, Germany
14.50 – 15.15 AL.11 Dry-hopping – techniques, efficiency and economics
Ray Marriott, Totally Natural Solutions Ltd, United Kingdom
15.15 – 15.45 Coffee Break

SESSION 4: GRAINS
Chair: Barbara Jaskula-Goiris, KU Leuven, Belgium
15.45 – 16.10 AL.12 The flavour properties of roasted malts: a gas chromatography – olfactometry study
Hebe Parr, University of Nottingham, United Kingdom
16.10 – 16.35 AL.13 Alternative raw materials for gluten-free beer
Ombretta Marconi, University of Perugia, Italy
16.35 – 17.00 AL.14 Contribution of small and large barley starch granules to maltose production during mashing
Niels Langenaeken, KU Leuven, Belgium
17.00 – 17.25 AL.15 Structural change of barley starch during malting and its effects on the production of fermentable sugars
Wenwen Yu, University of Queensland, Australia
17.25 – 17.50 AL.16 Effect of malting on commercial green lentils and their suitability for wort production
Jonas Trummer, University of Agriculture in Krakow, Poland
17.50 – 18.50 Poster Discussion and Technical Exhibition

Wednesday, April 11th, 2018
8.00 – 17.15 Registration
8.30 – 17.15 Technical and Poster Exhibition

SESSION 5: MICROORGANISMS IN MALTING AND FERMENTATION TECHNOLOGY
Chair: Frank Lynch, Lynch Technical & Innovation Services Ltd., Ireland
8.30 – 8.55 AL.17 Active dry yeast: study of the impact of no hydration before pitching on fermentation
Philippe Janssens, Ferments, France
8.55 – 9.20 AL.18 From kombucha to beer – the application of non-
Saccharomyces yeasts isolated from kombucha in the production of a non-alcoholic beer
Konstantin Bellut, University College Cork, Ireland
9.20 – 9.45 AL.19 Production of low-alcohol and alcohol-free beer with Pichia Kluyveri yeast
Sofie Saerens, Chr. Hansen A/S, Denmark
9.45 – 10.10 AL.20 Strong-flavored beers made with the natural hybrid of Saccharomyces cerevisiae x Saccharomyces Kudriavzevii
Sylvie Van Zandycke, Lallemand Brewing, USA
<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>10.10 – 10.40</td>
<td>Coffee Break</td>
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| 10.40 – 11.10 | **SESSION 6: EMERGING BEERS**  
  Chair: Christian Riemerschmid von der Heide, Siebel Institute of Technology, Canada |
| 10.40 – 11.10 | IL.07 A walk through wood  
  William Mitchell, Will and Spirit Limited, Scotland |
| 11.10 – 11.35 | AL.21 Introducing woody character in craft beer via the use of oak wood extract  
  Sofie Bessaert, KU Leuven, Belgium |
| 11.35 – 12.00 | AL.22 The new emerging Italian beer style. The case of Italian Grape Ale  
  Giovanni De Francesco, University of Perugia, Italy |
| 12.00 – 13.00 | Lunch                                        |
| 12.30 – 13.30 | Technical Exhibition and Poster Discussion   |
| 13.30 – 14.00 | **SESSION 7: PROCESSING**  
  Chair: Jessika De Clippeleer, Ghent University, Belgium |
| 13.30 – 14.00 | IL.08 Diacetyl, still an issue in lager brewing?  
  Esko Pajunen, EsConBrew, Finland |
| 14.00 – 14.25 | AL.23 A flexible malting system that bridges the gap for craft brewers to meet high malting standards  
  Rob Liedl, NSI Newlands, Canada |
| 14.50 – 14.50 | AL.24 CAVIBEER®: harnessing the power of hydrodynamic cavitation in the beer sector  
  Francesco Meneguzzo, Institute of Biometerology, National Research Council, Italy |
| 14.00 – 15.15 | AL.25 Upscaling of an innovative sustainable boiling technology and validation of the impact on thermal load and volatile composition in wort  
  David De Schutter, AB Inbev, Belgium |
| 15.15 – 15.45 | Coffee Break                                |
| 15.45 – 17.00 | **SESSION 8: PROCESSING - ROUND-TABLE**  
  Chair: Frank Methner, Technical University of Berlin, Germany |
| 15.45 – 17.00 | AL.26 Thermal treatment versus sterile filtration – a comparison on flavor, microbial safety and energy  
  Reiner Gaub, Pall GmbH, Germany |
| 15.45 – 17.00 | AL.27 Tackling the cost of microbial stabilization head on  
  Daniel Vecsey, Parker Domnick Hunter, United Kingdom |
| 15.45 – 17.00 | AL.28 Opportunities of hygienic membrane filtration  
  Jorg Zacharias, KRONES AG, Germany |
| 15.45 – 17.00 | AL.29 Clarification of rough beer by cross-flow microfiltration: application of static turbulence promoter  
  Áron Varga, Szent István University, Hungary |
| 15.45 – 17.00 | AL.30 Smart engineering and standardization as catalyst for innovation in the brewing industry – the newest craft beer membrane filter as example  
  Roland Folz, Pentair Process Technologies, The Netherlands |
TECHNICAL VISITS
Thursday April 12th, 2018

17.00 – 17.15  CLOSING SESSION
   Chair: Luc De Cooman, KU Leuven, Belgium

18.00 – 24.00  Symposium Dinner at the “Handelsbeurs” Ghent Centre

Thursday, April 12th, 2018

TECHNICAL VISITS

9.00  Departure of the busses to the companies:
   Brewery St. Feuillien | Brewery Van Honsebrouck | Brewery Eutropius

14.00 – 15.00  Arrival at the KU Leuven Technology Campus, Ghent

Belgian Specialty Beers
Every day, several Belgian beers will be served in the exhibition hall.
TECHNICAL EXHIBITION

<table>
<thead>
<tr>
<th>Company</th>
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<td>belgian beer TECHNOLOGY TEAM</td>
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<td>Lallemand Brewing</td>
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(As of February 1st 2018)
1. AROXA
2. Georg Fisher
3. Anton Paar
4. Franke/Blefa
5. Interscience
6. Shimadzu
7. Actemium
8. Yakima Chief - Hopunion
9. Pall
10. NSI-Newlands
11.
12.
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15.
16. Lallemand Brewing
17. UN Nottingham
18. EJD FoodSci
19. Dingemans Maltings
20. BC-Diagnostics
21. EFC
22.
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24.
25. AXA - glass
26. Comptoir Agricole - HopFrance
27. Brauwelt
28. Fermentis
29. APT - Belgium
30. Hamilton
31. Cargill
32. CoEnCo
33. Agidens
34. LA Biosystems
35. Lechler
36. Pentair
37. Alfa Laval
38. Flavor Activ
39. Packo
40. R-Biopharm AG
41. GEA
42. Barth Haas Group
43. De Swaen
44. Weyermann

Free booths
Travel Information

By Air
Belgium’s International Airport is situated in Brussels-Zaventem, only 45 minutes away from Ghent and has flights from over 80 destinations, operated by more than 140 international and regional airline companies. For Europe, Brussels Airlines provides an interesting budget option called b.light economy. Charleroi (Brussels South) is another Belgian Airport serving several European destinations through low-budget companies such as Ryanair and Wizz Air. Both airports have direct or easy train connections to Ghent (Sint-Pieters). More info and booking: http://www.brusselsairport.be or http://www.charleroi-airport.com

By Public Transportation
Take the train until Ghent. There are two railway stations in Ghent. Station Sint-Pieters, Ghent: Continue with tram 1, 4, or bus 65. Station Dampoort, Ghent: Continue with bus 3, 17, 18, 38, 39.

By Car
E17 exit Gent Centrum/other directions
Take the direction “other directions” and follow the small ring in the direction of Eeklo. Continue until the street “Nieuwe Wandelings” (Carrefour on the corner) and there turn right. Then continue straight on until the third traffic lights. Turn left there, and the KU Leuven Technology Campus Ghent is on your left side.

E40 Brussels-Aalst
You take the exit “Merebeke” and then take the direction “R4- direction Eeklo”. You continue for several km over the R4 until you reach the exit “Blaarmeersen”. There you have to follow the direction “Gent”. This brings you to the Drongensesteenweg. Continue on the Drongensesteenweg until the small ring around Ghent (traffic lights). There you turn right and continue until the first traffic lights. Turn left there. Then continue straight on until the third traffic lights. Turn left there, and the KU Leuven Technology Campus Ghent is on your left side.

Insurance
Registration fees do not include insurance of any kind. It is strongly recommended that all delegates take out their own travel and medical insurance prior to coming to the congress. The organizers will not take any responsibility for any participant failing to insure.

Payment
The registration is only complete when payment has been received. Keep in mind that payment can take several working days (up to 10 days for participants outside Belgium). All Early Bird payments should be received before March 9, 2018.

Cancellations
Registered symposium participants who cannot attend the symposium will receive a refund of the registration fee as follows:
Receipt of cancellation by February 1, 2018: refund of 100% of the registration fee minus an administrative fee of € 50.00.
Receipt of cancellation by March 1, 2018: refund of 50% of the registration fee.
Receipt of cancellation after March 1, 2018: no refund.

Symposium Venue
The symposium will take place at the KU Leuven Technology Campus Ghent, Gebroeders De Smetstraat 1, B-9000 Ghent (Belgium).

Symposium Language
The symposium language is English. Simultaneous translations will not be provided.

Symposium Documentation
The abstracts will be published in the final symposium program that delegates will receive at the registration desk. All scientific contributions of the symposium will be available on a memory stick and will be handed over to the participants.

Registration Fees
The registration fees (in EURO) can be found on page 6. Registration should be done via the congress website www.trendsinbrewing.org

Registration Desk
The registration desk will be open as follows:
Sunday, 8 April 2018: 17.00 – 21.00 h
Monday, 9 April 2018: 08.00 – 18.00 h
Tuesday, 10 April 2018: 08.00 – 18.50 h
Wednesday, 11 April 2018: 08.00 – 17.15 h
Thursday, 12 April 2018: 08.30 – 09.00 h

Exhibition
The exhibition will be located in Hall B at the Technology Campus Ghent of KU Leuven. The Welcome Party, coffee breaks and lunch breaks will also take place in this area. Detailed information can be found on the symposium website.

The exhibition opening hours are:
Sunday, 8 April 2018: 17.00 – 21.00 h
Monday, 9 April 2018: 09.00 – 18.00 h
Tuesday, 10 April 2018: 08.30 – 18.50 h
Wednesday, 11 April 2018: 08.30 – 17.15 h

Dress Code
The dress code is business casual for the evening events.

Hotel Reservation
Several rooms will be available in different hotels. Information on hotels and accommodation is available on the symposium website. The hotel must be booked by the participant.
Ghent is a historic city, yet at the same time a contemporary one. The modern daily life of the city’s active inhabitants plays itself out against a gorgeous historical backdrop. In Ghent, they live, work and enjoy life over and over again each day. A businessman with an iPhone walks along the distinctive Graslei, crosses the Lys and enters his stylish four-star hotel hiding behind a medieval facade. Dozens of pavement cafes invite you to discover Ghent’s specialities.

**Graslei-site** (1)
Two wonderful rows of houses are reflected in the water of the Lys. Young and old alike enjoy the first rays of sunshine. There is much laughter, lazing about and fun. This is the beating heart of Ghent’s city centre.

**Kouter-site** (2)
If you suddenly decide to wander over the Kouter, make sure it is on Sunday morning. At the weekly flower market, you’ll come across the real locals. On arrival they enjoy a delicious espresso and before they go delight in a fresh oyster and glass of white wine at the Blauwe Kiosk.

**Great Butchers’ Hall** (3)
The Great Butchers’ Hall dates back to the 15th century, when meat halls were indoor market places with centralised sales to monitor the freshness and quality of the meat.

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**HOTELS**
HAS TO BE BOOKED BY PARTICIPANT! PLEASE USE BOOKING CODE ON WEBSITE (www.trendsinbrewing.org) TO OBTAIN A REDUCTION. All hotel info is available on the symposium website.

1. Sandton Grand Hotel ReyHof ****
2. NH Gent St Pieters ****
3. Hotel de Flandre ****
4. Ghent-River-Hotel ****
5. Hotel Gravensteen ***
6. Novotel ***
7. Ibis Gent Centrum Kathedraal ***
8. KU Leuven Technology Campus Ghent
Organized by:

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The Italian Brewing Research Centre
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