



IfGB
Institut für
Gärungsgewerbe
und Biotechnologie
zu Berlin

5th BioProScale Symposium

Innovative scale up and scale down for bioprocess intensification

Programme

- + Industrial scale biotechnology
- + Bioprocess development and automation
- + Bioprocesses for a circular economy
- + Single use bioreactors and applications
- + Biotechnology in Latin America
- + Microsensors for bioprocesses
- + Process analytical technologies



 www.biopro-scale-conference.org

VENUE: LANGENBECK-VIRCHOW-HAUS, LUISENSTR. 58/59, 10117 BERLIN, GERMANY

TUESDAY, 20 MARCH 2018

OPENING SESSION

Historical Lecture Hall (2nd floor)

- 13:00 **Welcome address and introduction**
Peter Neubauer, Department of Bioprocess Engineering, TU Berlin, Germany
- 13:20 **Plenary talk: Accelerated process development: How cell culture automation takes upstream process development to the next level (L01)**
Carsten Musmann, Roche Diagnostics GmbH, Penzberg, Germany
- 14:05 *Short break*

SESSION 1A: INDUSTRIAL SCALE BIOTECHNOLOGY

Chair Sjef Cornelissen / Peter Neubauer

Historical Lecture Hall (2nd floor)*Abstracts see page 12-14*

- 14:15 **Keynote talk: From pilot to production: scaling industrial fermentation processes for enzyme production (L02)**
Sjef Cornelissen, Novozymes A/S, Copenhagen, Denmark
- 14:45 **Investigation of population heterogeneity caused by insufficient mixing in large-scale bioreactors (L03)**
Alexander Niess, University of Stuttgart, Germany
- 15:05 **Response of *Yarrowia lipolytica* to physico-chemical oscillations: Understating the cross-link between glucose availability and morphology (L04)**
Asma Timoumi, Université de Toulouse, France
- 15:25 **Metabolic diversity of 1,4-butanediol producing *E. coli* with respect to oxygen oscillations (L05)**
Viola Pooth, Forschungszentrum Jülich, Germany
- 15:45 **Industry talk**
- 15:50 *Coffee break and poster session and exhibition*

SESSION 2A: INDUSTRIAL SCALE BIOTECHNOLOGY

Chair Sjef Cornelissen / Peter Neubauer

Historical Lecture Hall (2nd floor)*Abstracts see page 16-19*

- 16:35 **Keynote talk: Bioprocess optimization through yeast-derived nutrients selection is critical for probiotics industrial manufacturing (L10)**
Alain Sourabié, Procelys (Lesaffre Group), Maisons-Alfort, France
- 17:05 **Pragmatic scale-down approaches in downstream processes for shortening innovation cycles in industrial biotechnology (L11)**
Sven Hansen, Evonik Technology and Infrastructure GmbH, Germany

SESSION 1B: BIOPROCESS DEVELOPMENT

Chair Marco Oldiges / Matthias Gimpel

Room Bernhard von Langenbeck (1st floor)*Abstracts see page 14-16*

- 14:15 **Keynote talk: Design of novel *Pichia pastoris* promoters with high performance in methanol-free fed batch (L06)**
Brigitte Gasser, BOKU Wien, Austria
- 14:45 **Effect of the different strain production kinetics in Bioprocess Development for recombinant protein production with *Pichia pastoris* (L07)**
Xavier Garcia-Ortega, Universitat Autònoma de Barcelona, Spain
- 15:05 **Model-based prediction of temperature and pH shift to increase volumetric productivity of a CHO cell fed-batch process (L08)**
Katrin Paul, TU Wien, Austria
- 15:25 **Stable animal cell growth in perfusion processes: Using on-line permittivity sensors to control cell-specific perfusion rates (L09)**
Alexander Nikolay, Max Planck Institute for Dynamics of Complex Technical Systems Magdeburg, Germany
- 15:45 **Industry talk**
- 15:50 *Coffee break and poster session and exhibition*

SESSION 2B: SPECIAL SESSION ITN RAPID BIOPROCESS DEVELOPMENT

Chair Timo Hardiman / Stefan Junne

Room Bernhard von Langenbeck (1st floor)*Abstracts see page 20-22*

- 16:35 **Mechanistic models for design, monitoring, and control (L17)**
Krist Germaey, Technical University of Denmark, Denmark
- 17:05 **Scaling down further: Model-based study of scale-up effects in mini-bioreactors (L18)**
Emmanuel Anane, TU Berlin, Germany

TUESDAY, 20 MARCH 2018

17:25	Flexible biotechnology production – Considering variable upstream options (including transgenic plants and cell based) and innovative downstream Technology (L12) <i>Dirk Steinhäuser, Glatt Ingenieurtechnik GmbH, Germany</i>	17:25	Bioprocess scale-down strategy based on a novel automated CFD based compartmentalization technique (L19) <i>Gisela Nadal-Rey, Technical University of Denmark, Denmark</i>
17:45	Integrated product and process development to produce a cold-water protease for liquid laundry products (L13) <i>Antony Calabria, DuPont</i>	17:45	pH gradients in a 700 L lactic acid bacteria cultivation: Validation of computational fluid dynamic and compartment modelling (L20) <i>Robert Spann, Technical University of Denmark, Denmark</i>
18:05	Total process integration of upstream and downstream processing of monoclonal antibodies (L14) <i>Martin Kornecki, Clausthal University of Technology, Germany</i>	18:05	Cocci chain length distribution of Streptococcus thermophilus: Suitable gradient-induced stress indicator and scaling parameter (L21) <i>Klaus Pellicer Alborch, TU Berlin, Germany</i>
18:25	Industrial scale-up of the production of low cost poly(3-hydroxybutyrate-co-4-hydroxybutyrate) in Halomonas bluephagenesis TD40 based on "blue-biotechnology" via cell-growth adapted fermentation process optimization (L15) <i>Jianwen Ye, Tsinghua University Beijing, China</i>	18:25	A CFD model for the investigation of the sublimation phenomena during freeze-drying of lactic acid starter cultures (L22) <i>Teresa Melo de Carvalho, Technical University of Denmark, Denmark</i>
18:45	Mixing and fluid dynamics characteristics in conventional and single use bioreactors for improved design and scalability (L16) <i>Martina Micheletti, University College London, UK</i>	18:45	Moving bioprocessing into the cloud and towards big data – the first steps (L23) <i>Eric Abellan, Infors AG</i>
19:05	Industry talk	19:05	Industry talk
19:10	Industry talk	19:10	Industry talk

EVENING PROGRAMME

19:15	Poster session, Exhibition and Welcome Reception <i>at the convention site</i>
21:30	<i>End of the day</i>

WEDNESDAY, 21 MARCH 2018

PLENARY TALK

Historical Lecture Hall (2nd floor)

9:00 **Metabolic engineering and systems biology: Driving the microbial chassis into the future (L24)**
Chris Brigham, Wentworth Institute of Technology, Boston, USA

9:45 *Short break*

SESSION 3A: BIOPROCESSES FOR A CIRCULAR ECONOMY

Chair Joachim Venus / Sebastian Riedel

Historical Lecture Hall (2nd floor)*Abstracts see page 24*

9:55 **Keynote talk: Process and product development, scale-up and implementation of applications for the use of by-products (L25)**
Thomas Grimm, ANiMOX GmbH, Berlin, Germany

10:25 **Polyhydroxyalkanoate production from biogenic waste streams (L26)**
Sebastian Riedel, TU Berlin, Germany

10:45 **Enabling of the industrial processing of P(HB-co-HHx) by compounding and reduction of recrystallization (L27)**
Christoph Hein, Fraunhofer IPK, Germany

11:05 **Industry talk**11:10 *Coffee break and poster session and exhibition*

SESSION 3B: SINGLE USE BIOREACTORS AND APPLICATIONS

Chair Stuart Stocks / Anna Maria Marbà

Room Bernhard von Langenbeck (1st floor)*Abstracts see page 25-26*

9:55 **Keynote talk: Application of single-use bioreactors beyond common cell line cultivation (L28)**
Nico Oosterhuis, Celltainer Biotech BV, The Netherlands

10:25 **Analysis of mixing behaviour and microcarrier suspension in a rocking single use bioreactor with in situ imaging methods (L29)**
Robert Panckow, TU Berlin, Germany

10:45 **Multiphase CFD simulations for supporting microcarrier-based human mesenchymal stem cell process development (L30)**
Valentin Jossen, Zurich University of Applied Sciences Zurich, Switzerland

11:05 **Industry talk**11:10 *Coffee break and poster session and exhibition*

SESSION 4A: BIOTECHNOLOGY IN LATIN AMERICA

Chair Daniela Almeida / Juan Antonio

Historical Lecture Hall (2nd floor)*Abstracts see page 26-27*

11:15 **Keynote talk: Genome-scale metabolic reconstruction of *Streptomyces clavuligerus* as a tool for the identification of novel strain improvement (L31)**
Rigoberto Rios-Esteva, Universidad de Antioquia, Medellin, Colombia

13:25 **Obtaining an empirical model for k_La in stirred tank bioreactors of 7.5 and 80 L (L32)**
Luisa Fernanda Rojas, Universidad de Antioquia, Medellin, Colombia

12:45 **Anti malaria and anti cancer compounds production through plant cell culture in bioreactors (L33)**
Fernando Orozco-Sánchez, Universidad Nacional de Colombia, Colombia

13:05 **Tba (L34)**
*tba*13:25 *Lunch break and poster session and exhibition*

SESSION 4B: SINGLE USE BIOREACTORS AND APPLICATIONS

Chair Regine Eibl / Stefan Junne

Bernhard von Langenbeck Hall (1st floor)*Abstracts see page 27-28*

11:15 **Keynote talk: Single-use and sustainability: Continued studies emphasizing LCA tools (L35)**
William Whitford, GE Healthcare

13:25 **Numerical analysis of hydrodynamics in a standard stainless steel and a single-use bioreactor by means of an Euler-Lagrange approach: Comparison of flow, pH and mechanical stress (L36)**
Angélique Delafosse, Université de Liège, Belgium

12:45 **Rocking *Aspergillus*: Controlled cultivation of *Aspergillus niger* in a wave-mixed bioreactor for the production of secondary metabolites (L37)**
Tutku Kurt, TU Berlin, Germany

13:05 **Utilization latest state-of-art of disposable bioprocesses for production of high quality recombinant proteins (L38)**
Juozas Šiurkus, Thermo Fisher Scientific, Vilnius, Lithuania

13:25 *Lunch break and poster session and exhibition*

WEDNESDAY, 21 MARCH 2018

SESSION 5A: BIOTECHNOLOGY IN LATIN AMERICA

Chair Rigoberto Rios / Anika Bockisch

Historical Lecture Hall (2nd floor)

Abstracts see page 29-30

- 14:55 **Keynote talk: High yield plasmid DNA production under oxygen limitation using microaerobically induced replication (L39)**
Alvaro Lara, Universidad Autónoma Metropolitana-Cuajimalpa, Mexico
- 15:25 **Relationship between morphology and clavulanic acid production by *Streptomyces clavuligerus* in a single-use rocking bioreactor (L40)**
Howard Ramirez-Malule, Universidad del Valle, Cali, Colombia
- 15:45 **Experiences during the construction and operation of a pilot scale anaerobic digester plant for fruit waste treatment in Ecuador (L41)**
Daniela Almeida Streitwieser, Universidad San Francisco de Quito, Ecuador
- 16:05 **BIOGASTIGER®-System – Turning global organic waste streams into smart and clean energy (L42)**
Pierre Haider, FWE GmbH, Marktrechwitz, Germany / Karen Guerrero, FWE GmbH, Quito Ecuador
- 16:25 *Coffee break and poster session and exhibition*

SESSION 6A: BIOPROCESSES FOR A CIRCULAR ECONOMY

Chair Saija Rasi / Sebastian Riedel

Historical Lecture Hall (2nd floor)

Abstracts see page 32-33

- 16:55 **Keynote talk: Seeing the scaling up- and down of biorefinery (L47)**
Jyri Maunuksela, Natural Resources Institute Finland, Jyväskylä, Finland
- 17:25 **Supplementing carbon sources with residues (L48)**
Friedrich Streffer, LXP Group GmbH, Berlin, Germany
- 17:45 **From waste to value: Green chemical production in mixed microbial cultures (L49)**
Helena Junicke, Technical University of Denmark, Lyngby, Denmark
- 18:05 **Keynote talk: Feedstock tolerance of continuous mode fermentation using agri-food residues (L50)**
Joachim Venus, ATB Potsdam, Germany

EVENING PROGRAMME

- 19:30 **Conference Dinner**
Brauhaus Lemke am Alexanderplatz
- 22:30 *End of the day*

SESSION 5B: MICROSENSORS FOR BIOPROCESSES

Chair Mario Birkholz / Anders Henriksen

Bernhard von Langenbeck Hall (1st floor)

Abstracts see page 30-31

- 14:55 **Keynote talk: An autosampling micro-analyzer – Functions, performance, and prospects (L43)**
Gerhard Jobst, Jobst Technologies GmbH, Freiburg, Germany
- 15:25 **Development of a portable multi-parameter biosensor set-up for monitoring of biogas processes (L44)**
Johanna Pilas, FH Aachen, Germany
- 15:45 **Miniaturized spherical sensor probes for bioreactors (L45)**
Tim Lauterbach, TU Dresden, Germany
- 16:05 **Studies on the metabolic activity of microorganisms utilizing light-addressable potentiometric sensors (LAPS) (L46)**
Shahriar Dantism, FH Aachen, Germany
- 16:25 *Coffee break and poster session and exhibition*

SESSION 6B: MICROSENSORS FOR BIOPROCESSES

Chair Mario Birkholz / Anders Henriksen

Historical Lecture Hall (2nd floor)

Abstracts see page 33-34

- 16:55 **Keynote talk: Standards and guidelines for microfluidic interconnections, building blocks and verification testing (L51)**
Henne van Heeren, enablingMNT -the Netherlands-, The Netherlands
- 17:25 **"Pipe based bioreactors" as tool for miniaturization and numbering up of bioprocesses (L52)**
Stefan Wiedemeier, ibaHeiligenstadt, Germany
- 17:45 **Droplet-based microfluidics and mass spectrometry: Detection of metabolites in nano-/picoliter reactors (L53)**
Konstantin Wink, Universität Leipzig, Germany
- 18:05 **Keynote talk: Minimalistic impedance instrumentation for process monitoring (L54)**
Uwe Pliquett, iba-Heiligenstadt, Germany

THURSDAY, 22 MARCH 2018

OPENING TALK

Historical Lecture Hall (2nd floor)

9:00 **Industrial scale process optimization for manufacturing of scFv-class antibody (L55)**

Guido Seidel, Wacker Biotech GmbH, Jena, Germany

9:45 *Short break*

SESSION 7A: PROCESS ANALYTICAL TECHNOLOGIES

Chair Alain Sourabié / Anika Bockisch

Historical Lecture Hall (2nd floor)

Abstracts see page 35-36

9:55 **Keynote talk: Controlling microbial population at a single cell resolution: From cybergenetics to bioprocess engineering (L56)**

Frank Delvigne, University of Liège, Belgium

10:25 **Budding index, a real-time parameter for monitoring (L57)**

Anna Maria Marbà Ardébol, TU Berlin, Germany

10:45 **In-line determination of spectral light distribution and biomass production in photobioreactors by fibre-optical methods: Spatially distributed light sensing and photon density wave spectroscopy (L58)**

Stephanie Schönfelder, University of Potsdam, Germany

11:05 *Coffee break and poster session and exhibition*

SESSION 7B: AUTOMATED BIOPROCESS DEVELOPMENT

Chair Krist Gerney / Nico Cruz

Room Bernhard von Langenbeck (1st floor)

Abstracts see page 36-37

9:55 **Multi-feed simultaneous saccharification and fermentation: Model-based development of high gravity lignocellulose-based bioprocesses (L59)**

Carl Johan Franzén, Chalmers University of Technology, Sweden

10:25 **Entering the next dimension: Microfluidic single-cell analysis of bacterial interaction (L60)**

Alina Burmeister, Forschungszentrum Jülich, Germany

10:45 **Using integrated process modelling towards understanding process variation across unit operations (L61)**

Christopher Taylor, Exputec GmbH, Vienna, Austria

11:05 *Coffee break and poster session and exhibition*

SESSION 8A: PROCESS ANALYTICAL TECHNOLOGIES

Chair Peter Götz / Anna Maria Marbà-Ardébol

Historical Lecture Hall (2nd floor)

Abstracts see page 37-39

11:55 **Tandem talk: Laser-based in situ back reflection analysis of particle sizes during feedstock pre-treatment by multi capture signal interpretation (L62)**

Stefan Junne, TU Berlin, Germany & Herrmann B. Schwartz, Sequip GmbH Düsseldorf, Germany

12:20 **Comparison of vibrational spectroscopic techniques for PAT in industrial biotechnology (L63)**

Edo Becker, Keit Spectrometers

12:40 **In situ Raman spectroscopy as a promising PAT tool for monitoring of macro and micro-heterogeneity of antibody glycosylation (L64)**

Meng-Yao Li, LRGP, France

13:00 **SERS and Time-Gated (TG-SERS) Raman spectroscopy as advanced PAT tools for monitoring of lactic acid bacteria fermentations (L65)**

Martin Kögler, VTT, Oulu, Finland

13:20 *Lunch break and poster session and exhibition*

SESSION 8B: AUTOMATED BIOPROCESS DEVELOPMENT

Chair Carl Johan Franzén / Florian Glauche

Room Bernhard von Langenbeck (1st floor)

Abstracts see page 39-40

11:50 **Keynote talk: Beyond miniaturization and parallelization: Standard and tailor-made automated workflows for smart microbial bioprocessing (L66)**

Marco Oldiges, Forschungszentrum Jülich, Germany

12:20 **Model based design of experiments for high throughput bioprocess development (L67)**

Mariano Nicolas Cruz Bournazou, TU Berlin, Germany

12:40 **Mastering the digital transformation challenge in biopharmaceutical processing (L68)**

Michael Sokolov, ETH Zürich, Switzerland

13:00 **From automated genetic element screening to automated early stage bioprocess development in miniaturized stirred-tank reactors (L69)**

Nils Janzen, Boehringer Ingelheim RCV GmbH & Co KG, Vienna, Austria

13:20 *Lunch break and poster session and exhibition*

THURSDAY, 22 MARCH 2018

SESSION 9A: BIOPROCESS DEVELOPMENT

Chair Frank Delvigne / Matthias Gimpel

Historical Lecture Hall (2nd floor)*Abstracts see page 40-42*

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| 14:20 | Keynote talk: Taking the microbial perspective: Computational fluid dynamics for bioprocesses design, operation and optimization (L70)
<i>Cees Haringa, DSM Biotechnology Center, Delft, The Netherlands</i> |
| 14:50 | CFD-based strategy to optimize the impeller design for mesenchymal stem cells cultures in bioreactors (L71)
<i>Céline Loubière, Université de Lorraine, Metz, France</i> |
| 15:10 | CHO cell-free protein synthesis for mammalian protein production and future bioprocess development (L72)
<i>Lena Thoring, Fraunhofer IZI-BB, Potsdam, Germany</i> |
| 15:30 | Reactors for electrobiotechnology: Upgrading bioreactors for bioelectrosynthesis (L73)
<i>Luis Rosa, Helmholtz Zentrum für Umweltforschung, Germany</i> |
| 15:50 | Keynote talk: Opportunities and challenges of model-based control of pellet growth in industrial-scale penicillin fermentation (L74)
<i>Timo Hardiman, Sandoz, Kundl, Austria</i> |
| 16:20 | Closing remarks
<i>Peter Neubauer, TU Berlin</i> |
| 16:30 | <i>End of conference</i> |

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Institut für Gärungsgewerbe und Biotechnologie zu Berlin (IfGB)
c/o Versuchs- und Lehranstalt für Brauerei in Berlin (VLB) e.V.
Seestraße 13, 13353 Berlin, Germany

Technische Universität Berlin – Institute of Biotechnology
Chair of Bioprocess Engineering, Prof. Dr. Peter Neubauer
Ackerstrasse 76, 13355 Berlin, Germany

Geschäftsführer: Dr.-Ing. Josef Fontaine
Ust.-IdNr.: DE 136 621 351, Steuernummer: 640/50721