

# 6<sup>th</sup> BioProScale Symposium

Three-day online symposium about industrial scale bioprocess intensification from process development to large-scale understanding

# Scale-up and scale-down for accelerated bioprocess development and optimisation

Live Programme: 29 to 31 March 2021

Access to the Convention Site: Friday, March 26, 2021, 10:00 (CET) until Tuesday, April 6, 2021, 22:00 (CEST)

ONLINE EVEN

**REGISTRATION: WWW.BIOTECHNOLOGIE.IFGB.DE/BIOPROSCALE2021** 

www.bioproscale-conference.org

VENUE: VLB VIRTUAL CAMPUS (ONLINE EVENT)

LANGUAGE: ENGLISH

V 24/03/2021 - 11:30



## aquilabiolabs





## **Exhibitors & Sponsors**





ENPRESS<sup>©</sup>

Advanced Ready-to-use Culture Media











## eppendorf



## One for All

SciVario<sup>®</sup> twin – Innovative, Intuitive, Intelligent

It does not matter with which organism you are working now, or in the future. SciVario twin is our intelligent solution for your changing needs. Learn more at:

#### www.eppendorf.com/scivario

Eppendorf<sup>®</sup>, the Eppendorf Brand Design, BioBLU<sup>®</sup>, SciVario<sup>®</sup> and VisioNize<sup>®</sup> are registered trademarks of Eppendorf AG, Germany. All rights reserved, including graphics and images. Copyright © 2021 by Eppendorf AG.



#### **MONDAY, 29 MARCH 2021**

#### WELCOME ADDRESS AND PLENARY TALK

10:00	Welcome address and introduction
	Peter Neubauer, Berlin, Germany

- 10:20 Plenary talk: Zero concepts in bioprocessing – towards the ultimate performance (PL01) Henk Norman, DSM, The Netherlands
- Break & exhibition 11:05

#### **SESSION 1A**

#### INDUSTRIAL-SCALE BIOPROCESSING AND SCALE DOWN

- Chair Stefan Junne, TU Berlin
- 11:35 Keynote talk: Digital twins for improved bioprocess operation? (L01)
  - Krist V. Gernaey, Technical University of Denmark, Denmark
- Towards increased stability in large-scale 12:05 bioreactors by bacterial co-cultures (LO2) Pauli Losoi, Tampere University, Finland
- 12:25 Dynamic genome scale modeling of Streptomyces clavuligerus metabolism for studying ist metabolic performance under different shear stress conditions (L03)

David Gómez-Rios, Universidad de Antioquia, Colombia

12:45 Break, poster session & exhibition

#### **SESSION 2A**

#### INDUSTRIAL SCALE BIOPROCESSING AND SCALE DOWN

- Fabian Schröder, TU Berlin Chair
- 14:30 Keynote talk: New experimental methods for detecting heterogeneous flow structures in bioreactors pave the way for a more reliable scale-down and scale-up (L07)

Michael Schlüter, TU Hamburg, Germany

- 15:00 CFD-based dynamic compartment modelling for the time-series prediction of gradients in industrial-scale aerobic fed-batch fermentation processes (LO8) Gisela Nadal Rey, Technical University of Denmark, Denmark
- 15:20 Heat balance and CFD coupling strategy for the scale-up of an innovative bioleaching process (L09) Céline Loubiere, Bureau de Recherches Géologiques et Minières, Orléans, France
- 15:40 CFD and mass transfer in industrial gas-lift reactors for syngas fermentation (L10) Lars Puiman, Delft University of Technology, The Netherlands
- Break, exhibition & virtual Get-together 16:00
- 17:00 Poster discussion 1: Poster 1-4 Moderation: Tolue Kheirkhah, TU Berlin
- 18:00 Poster discussion 3: Poster 9–12 Moderation: Niels Krausch, TU Berlin

#### **Best Presentation Award** sponsored by:



#### SESSION 1B

#### **PROCESS ANALYTICAL TECHNOLOGIES (PAT)**

- Chair Theresa Menzel, TU Berlin
- 11:35 Keynote talk: Interfacing single cell technologies for stabilizing microbial cell population incontinuos cultivation (LO4) Frank Delvigne, Université de Liège, Belgium
- 12:05 Continuous E. coli bioprocessing: Monitoring of subpopulations and how to deal with them (L05) Julian Kopp, TU Wien, Austria
- 12:25 What is beyond the average - a step toward quantifying the specific reactivity of single cells? (L06)
  - Martin Schirmer, University Leipzig, Germany
- Break, poster session & exhibition 12:45

#### **SESSION 2B**

#### **PROCESS ANALYTICAL TECHNOLOGIES (PAT)**

- Marion Longis, TU Berlin Chair
- 14:30 Keynote talk: PAT for the assessment of population heterogeneity in scale up and down (L11) Stefan Junne, TU Berlin, Germany
- 15:00 In-line application of Photon Density Wave spectroscopy as a PAT sensor in high-cell-density bioprocesses: Monitoring of E. coli growth and PHA formation in R. eutropha (L12)

Björn Gutschmann, TU Berlin, Germany

- Thomas Schiewe, Universität Potsdam / innoFSPEC, Germany
- 15:20 Design and development of electrochemical sensors for bioprocess monitoring (L13) Aliyeh Hasanzadeh, Technical University of Denmark, Denmark
- 15:40 Control and optimization of polyhydroxyalkanoates production at pilot plant scale in real-time (L14) Silvia Ochoa, Universidad de Antioquia, Colombia
- Break, exhibition & virtual Get-together 16:00
- 17:00 Poster discussion 2: Poster 5–8 Moderation: Fatemeh Nejati, TU Berlin
- 18:00 Poster discussion 4: Poster 13–16 Moderation: Lucas Kasparsetz, TU Berlin

#### REGISTRATION: WWW.BIOTECHNOLOGIE.IFGB.DE/BIOPROSCALE2021

<sup>19:00</sup> End fo day 1

#### TUESDAY, 30 MARCH 2021

#### **OPENING AND PLENARY TALK**

#### 10:00 **Opening** Peter Neubauer, TU Berlin, Germany

10:05 Plenary talk: Systematic bioprocess devlopment in advanced microtiter plate and shake flask culture systems with online monitoring and feeding options Industrial scale bioprocessing and scale down (PLO2) Jochen Büchs, RWTH Aachen, Germany

10:50 Break & exhibition

## SESSION 3A

### INDUSTRIAL-SCALE BIOPROCESSING AND SCALE DOWN

- Chair Joana Carvalho Pereira, TU Berlin
- 11:20 Keynote talk: Exploiting Scale-down Tests for Engineering a Robust E. coli Host as a Platform for Industrial Production Processes (L15) Ralf Takors, University of Stuttgart, Germany
- 11:50 Investigation of scale dependent factors in industrial human milk oligosaccharide production (L16) Greta Gecse, Technical University of Denmark
- 12:10 Secretory protein producing Bacillus subtilis: Withstanding process inhomogeneities expected in a large-scale stirred tank bioreactor (L17) Marco Oldiges, Forschungszentrum Jülich, Germany
- 12:30 Break, poster session & exhibition

### SESSION 4A

#### **BIOPROCESSES FOR A CIRCULAR ECONOMY**

- Chair Matthias Gimpel, TU Berlin
- 14:30 Keynote talk: Potential of genome and proteomereduced strains for protein and plasmid DNA production (L21)

Alvaro R. Lara, Universidad Autonoma Metropolitana-Cuajimalpa, Mexico

15:00 Scale-down of high cell density Fab production in E. coli (L22)

Florian Mayer, University of Natural Resources and Life Sciences, Vienna, Austria

15:20 N-1 perfusion-based lgG productions in stirred single-use bioreactors (L23)

Jan Müller, Zurich University of Applied Sciences, Switzerland

- 15:40 **Evaluation of the clavulanic acid production integrating process simulation and systems biology (L24)** *Rigoberto Rios Estepa, Universidad de Antioquia, Colombia*
- 16:30 Break, exhibition & virtual Get-together
- 17:00 **Poster discussion 5: Poster 17–20** Moderation: Eike Janesch, TU Berlin
- 18:00 **Poster discussion 7: Poster 25–28** Moderation: Lara Santolin, TU Berlin
- 19:00 End fo day 2

#### SESSION 3B INDUSTRIAL-SCALE BIOPROCESSING AND SCALE DOWN

- Chair Sebastian Riedel, TU Berlin
- 11:20 Keynote talk: Feedstock potential and valorisation of organic side-streams for value-added products (L18)

Saija Rasi, Natural Resources Institue Finland, Finland

- 11:50 Scale up from the cellar the LX-Process as pretreatment for microbial conversion (L19) Friedrich Streffer, LXP Group GmbH, Germany
- 12:10 Upscaling butanol production using mixed microbial cultures (L20) Tiago Pinto, Technical University of Denmark, Denmark
- 12:30 Break, poster session & exhibition

#### SESSION 4B <u>MICROFLUID S</u>YSTEMS

Chair Mario Birkholz, IHP-Leibniz

- 14:30 Keynote talk: High-throughput single-cell-resolution microfluidics to accelerate microbial bioproduction bioprocess development (L25) Arum Han, Texas A&M University, USA
- 15:00 Seperation of microalgae and polystyrene particles by dielectrophoresis (L26) Danai Malti, TU Berlin, Germany
- 15:20 Dynamic microfluidic single-cell cultivation: Growth of Corynebacterium glutamicum at fluctuating environmental conditions (L27) Sarah Täuber, Bielefeld University, Germany
- 15:40 Reproducing dynamic environment in microfluidic single-cell cultivation based on computational lifeline analysis (L28)

Phuong Ho, Forschungszentrum Jülich, Germany

- 16:30 Break, exhibition & virtual Get-together
- 17:00 **Poster discussion 6: Poster 21–24** Moderation: Marie-Therese Schermeyer, TU Berlin
- 18:00 **Poster discussion 8: Poster 28–32** Moderation: Annina Kemmer, TU Berlin
- 19:00 End fo day 2

#### WEDNESDAY, 31 MARCH 2021

#### **OPENING AND PLENARY TALK**

#### 10:00 Opening

Peter Neubauer, TU Berlin, Germany

10:05 Plenary Talk: Digitalization platform and supervisory control for continuous integrated manufacture of monoclonal antibodies (PL03)

Massimo Morbidelli, Politecnico di Milano, Italy

10:50 Break & exhibition

#### SESSION 5A HIGH-THROUGHPUT BIOPROCESSING AND AUTOMATION

- Chair Sebastian Hans, TU Berlin
- 11:20 Keynote talk: Robot and machine learning assisted protein engineering on the high-throughput screening platform LARA (L29)

Mark Dörr, University Greifswald, Germany

- 11:50 Towards accelerated bioprocess development: Using cell-free protein synthesis to screen for promising biocatalysts (L30) Katrin Rosenthal, TU Dortmund, Germany
- 12:10 Fed-batch like microtiter cultivations as highthroughput screening tool for E. coli production process development (L31)

Mathias Fink, University of Natural Resources and Life Sciences, Vienna, Austria

Break, poster session & exhibition 12:35

#### SESSION 6A

#### HIGH-THROUGHPUT BIOPROCESSING AND AUTOMATION

- Chair Stefan Born, TU Berlin
- Keynote talk: Smart digital solutions for USP and 14:30 DSP to master bioengineering challenges towards industry 4.0 in biopharma (L35)

Michael Sokolov, DataHow / ETH Zürich, Switzerland

Keynote talk: The CompuGene automated platform 15:00 for the construction and characterization of genetic parts and microbial cell factories (L36) Johannes Kabisch, TU Darmstadt, Germany

15:30 Modelling approaches with a fully-automated microbial fermentation platform (L37)

Vignesh Rajamanickam, Boehringer Ingelheim, Vienna, Austria

- 15:50 Towards an autonomous model based high throughput bioprocess development and clone discrimination (L38) Sebastian Hans, TU Berlin, Germany
- 16:10 Break & exhibition

#### PLENARY TALK AND CLOSING

16:30	Plenary talk: Integrated and Networked Systems and Processes – A Perspective for Digital Transformation in (Bio) Process Engineering (PL04)
	Michael Malwala, BAM, Germany

17:15 Closing remarks / Best Poster & Presentation Award Peter Neubauer, TU Berlin, Germany

#### **SESSION 5B MODELING BIOPROCESSES**

- Chair Nicolas Cruz Bournazou, TU Berlin
- 11:20 Keynote talk: Improvements for scalability of Lagrangian-Eulerian approaches for tracking lifelines of single cells in large bioreactors (L32)

Matthias Reuss, University of Stuttgart, Germany

11:50 Black box modelling approaches to judge a yeast extracts influence on microbial growth and production (L33)

Stefanie Kaul, Hamburg University of Applied Sciences, Germany

- 12:10 On the modelling of microbial population dynamics using partial differential equations (L34) Jerome Morchain, Toulouse Biotechnology Institute, France
- 12.35 Break, poster session & exhibition

#### **SESSION 6B**

#### **BIOPROCESSES FOR A CIRCULAR ECONOMY**

Chair Björn Gutschmann, TU Berlin

Keynote talk: Process development of polyhydro-14:30 xyalkanoate (PHA) bioplastics production from lipid based waste and raw materials (L39)

Sebastian L. Riedel, TU Berlin, Germany

Usage of mealworms to recover and purify polyhy-15:00 droxyalkanoate granules from Cupriavidus necator cells (L40)

Kumar Sudesh, Universiti Sains Malaysia, Malaysia

- 15:30 **Extraction of chitin from American lobster (Homarus** americanus) shells and fabrication of membranes for potential biomedical use (L41) Christopher Brigham, Wentworth Institute of Technology, USA
- 15:50 Low quality by-products for high quality products Processing strategy and application development for the circular economy (L42) Thomas Grimm, Animox GmbH, Germany

16:10 Break & exhibition

#### **SCIENTIFIC POSTERS**

- **P01 Design and upscaling of Pseudomonas putida fermentations for robust biomanufacturing** Jesper W. Jensen et al, Technical University of Denmark
- P02 Insights into the role of sigma factor orf21 in clavulanic acid production by Streptomyces clavuligerus ATCC27064 Patiño Cervantes L.F. et al, Universidad de Antioquia,

Colombia

PO3 Genome mining of Streptomyces strains and its potential to identify new compounds with antimicrobial activity Carlos Caicedo-Montoya et al Universidad de Antioquia,

Colombia

- PO4 Cell-free bosynthesis of the nonribosomal peptide antibiotic valinomycin Jian Li, ShanghaiTech University
- P05 Development of a P. pastoris strain for the recombinant production of peptide-based antibiotics in eukaryotic cells

Lisa Michel et al, Hamburg University of Applied Sciences

- PO6 Experimental studies on the isolation of photobiont and mycobiont partners of lichens for controlled cocultivation and production of secondary substances Zakieh Zakeri et al, TU Berlin
- P07 Comparison of different analytical methods for the assessment of viability during the production and storage of yeast preparations Martin Senz et al, VLB Berlin
- PO8 Applying Dielectrophoresis to Improve a Microring Resonator Biosensor Platform Anders Henriksson et al, TU Berlin
- **P09 Effect of oscillatory cultivation conditions on the** macromorphology in Yarrowia lipolytica cultivations Jasmina Cziommer et al, TU Berlin
- P10 Control of macromorphology and the implications on product formation in Aspergillus niger Tolue Kheirkhah et al, TU Berlin
- P11 Cultured meat production in a 2D rocking bioreactor Tobias Höing, MosaMeat
- P12 From micro to macro: a study on the volumetric power input in microtiter plates and its use as a strategy for scale-up in downstream processing Ignacio Montes-Serrano et al Austrian Centre of Biotechnology
- P13 Towards smart factories: Data-driven modeling approaches in bioprocessing Jonathan Sturm, Westfälische Hochschule Recklinghausen
- P14 A novel gradient-based monitored dark fermentation of biogenic feedstocks for material use in plug-flow reactors

Marion Longis et al, TU Berlin

- P15 BioProdPacific: A platform to accelerate the design of integrated and sustainable bioprocesses in Colombia Erika Y. Ortiz et al, Universidad Icesi, Colombia
- P16 A small-scale hydrocyclone system as a biotechnological application for continuous cell separation Huschyar Al-Kaidy et al, Beuth University of Applied Sciences Berlin

- P17 Optimization of H2-sensing regulatory hydrogenase production from Ralstonia eutropha in Escherichia coli Qin Fan et al, TU Berlin
- P18 Evaluation of microbial hydrolysis for anaerobic digestion in a plug-flow reactor Theresa Menzel et al, TU Berlin
- P19 Exploring the potential of biofilms for fermentationbased biomanufacturing Pascal S. Leonov et al, Technical University of Denmark
- P20 Production of enzyme laccase at pilot scale by using loofah-immobilized biomass of Ganoderma chocoense Natalia Andrea Llanos et al, Universidad Icesi, Colombia
- P21 Integration of a robotic small-scale bioreactor system as a prerequisite for a selflearning and autonomous cultivation platform Lucas Kaspersetz et al, TU Berlin
- **P22** Importance of oxygen signal shape matching for robust parameter estimation in bioprocess development Judit Aizpuru et al, TU Berlin
- P23 Determination of plasmid mutation rates in Escherichia coli using an automated high-throughput Quasi-Turbidostat Matthias Gimpel et al, TU Berlin
- P24 Feasibility analysis of a non-stirred miniature bioreactor

Jonathan Poit et al, TU Berlin

P25 Developing a unified IT Platform covering the whole development cycle – A Case study for Enzyme Production

Simon Seidel et al, TU Berlin

P26 Reproducing dynamic environment in microfluidic single-cell cultivation based on computational lifeline analysis

Phuong Ho et al, Forschungszentrum Jülich

- P27 Rapid and cost-effective fabrication of microchromatography integrated with microelectrode impedance sensor for determination and characterization of column efficiency and effluent Amin Javidanbardan, Universidade de Lisboa, Portugal
- P28 Advanced robotic workflows for integrating mass spectrometry based multi-component analysis into metabolic phenotyping Alexander Reiter et al Forschungszentrum Jülich
- P29 From screening to production: a holistic approach of high-throughput model-based screening for recombinant protein production Niels Krausch et al. TU Berlin
- P30 An automated method that enables high-throughput screening of knockout libraries with focus on industrial important metabolic cell properties Fabian Schröder et al, TU Berlin
- P31 The batch brewing process represented by a mechanistic model Maximilian Schmacht, VLB Berlin
- **P32** Unraveling the microbial dark matter using picolitre gel droplets Bianka Kästner et al, Beuth University of Applied Sciences, Berlin

### Best Poster Award sponsored by: **eppendorf**