

Conference Program



15th to 17th of November 2022

Graz, Austria

The **PICHIA 2022** is held together with the **esib - the European Summit of Industrial Biotechnology** - which takes place from the **14th to the 16th of November 2022** at the **Messe Graz**. The esib is the European communication platform for industrial biotechnology, which not only covers science but also deals with industrial needs and hopes, economic demands, funding resources, or political aspirations and still leaves space for networking and recreation.

The **PICHIA 2022** from the **15th to the 16th of November 2022** that is connected to the esib covers many exciting topics reaching from Pichia proteins for food, biopharmaceuticals to new Pichia methods and technologies. On the **17th of November**, we invite the Pichia community to a deep science session on the **PICHIA 2022 PLUS ONE DAY** at the **Hotel Weitzer**. During this day experts from academia and industry will share their insight into the newest scientific approaches and findings regarding bioprocess engineering, secretion, new aspects of the Pichia genome, and synthetic biology.

Scientific Committee

Brigitte Gasser, University of Natural Resources and Life Sciences, Vienna (BOKU), Austria

Anton Glieder, Graz University of Technology, Austria

Sanne Jensen, Novo Nordisk A/S, Denmark

Knut Madden, BioGrammatics, Inc., United States

Kjeld Olesen, Novo Nordisk A/S, Denmark

Xavier Garcia Ortega, Universitat Autònoma de Barcelona, Spain

Markus Spiertz, SeSam-Biotech GmbH, Germany

Organizers

The PICHA 2022 is organized by the “Christian Doppler Laboratory for Innovative *Pichia pastoris* Host and Vector systems” (TU Graz) and the “Christian Doppler Laboratory for Growth-decoupled Protein Production in Yeast” (BOKU Vienna) in collaboration with the Austrian Centre for Industrial Biotechnology (acib GmbH).



Main Sponsors:



Supporters:



Day 1: 15th of November

13:30– 14:00 | PICHIA 2022 OPENING

Anton Glieder, Associate Professor at Graz University of Technology, Graz, Styria, Austria and Founder of busy GmbH, Hofstätten an der Raab, Styria, Austria

Tom Chappell, Co-founder and Principal at BioGrammatics, Carlsbad, California, United States

“Opening words and introduction to PICHIA 2022”

14:00– 15:30 | TOPIC 1: (BIO-) MATERIALS AND CHEMICALS, BIOPOLYMERS MADE BY PICHIA

The desire to uncouple the need of animal farming and production of highly demanded animal derived materials and products, as well as to implement environmentally friendly bioprocesses with reduced CO₂ footprint and independence from fossil resources drive new developments in industrial biotechnology and enable new products and industrial design. How can *Pichia pastoris* contribute to these needs? How can we benefit towards a change to a CO₂ neutral bioeconomy?

Lixin Dai, Senior Director of Biotechnology at Modern Meadow, Nutley, New Jersey, United States

“Production and characterization of a recombinant protein in *Pichia pastoris*”

Özge Ata, University assistant at the Department of Biotechnology at the University of Natural Resources and Life Sciences (BOKU), Vienna, Austria and Senior Scientist at acib GmbH, Austria

“Conversion of CO₂ into organic acids by synthetic autotrophic yeast”

16:00– 18:00 | TOPIC 2: FOOD & FEED PRODUCTS

Leghemoglobin from Impossible Food demonstrated the demand for novel food ingredients and the technical, legal and economic feasibility of new commercial processes and products for fermentation enabled food production employing *Pichia pastoris*. What's coming next?

Laura Navone, R&D Director of Eden Brew, Brisbane, Queensland, Australia

“Shaping the future of milk with Pichia”

Ranjan Patnaik, CTO at EVERY™, South San Francisco, California, United States

“Large-scale manufacturing of egg proteins by precision fermentation”

Andrea Camattari, Senior Director of Organism Engineering at Ginkgo Bioworks, Inc., Boston, Massachusetts, United States

“Making biology easier to engineer: unlocking the potential of accelerated DBTL cycle”

Alex Berlin, Founder, CEO & CTO at Solar Biotech, Inc., Norton, Virginia, United States

“Scaling up synthetic biology industrial products in a disrupted global supply chain environment”

Day 2: 15th of November

10:00–
12:00

TOPIC 3: PICHIA METHODS AND TECHNOLOGIES

To unlock the full potential of *Pichia pastoris* as host for biotechnological applications a continuous evolution of the tools and methods for genetical manipulation and cultivations process is required. The four presentations of this session promise an update on the latest developments and will provide a glimpse on what we can expect in future.

Rochelle Aw, Postdoctoral researcher at Northwestern University, Evanston, Illinois, United States and Imperial College London, London, United Kingdom

“Utilising *Pichia pastoris* cell-free protein synthesis for the production of vaccine targets”

Florian Weiss & Andrea Hönikl, PhD candidates at Graz University of Technology, Graz, Styria, Austria

“CRISPR/MAD7 technologies for *P. pastoris* genome and transcriptome engineering”

Juan Moreno-Cid, Bioprocess Specialist & Fermentation Tech. Expert at Bionet Engineering, San Javier, Región de Murcia, Spain

Tangential-flow filtration as an alternative to centrifugation for biomass clarification in *Pichia pastoris* cultures”

Mohammad Barshan-Tashnizi, Assistant Professor at University of Tehran, Tehran, Iran

“The effect of oxidative stress tolerance on the production of heterologous protein in *Pichia pastoris*”

14:00–
18:00

TOPIC 4: NEW (PHARMACEUTICAL) PRODUCTS MADE BY PICHIA

Most pharmaceutical antibodies are produced by CHO cell lines. Are we going to change this with new antibody formats and -products. Can we make use of the specific technological advantages of Pichia? How can we provide better and more economic and dynamic solutions in an ongoing SARS-CoV-2 crisis? Can we still improve the secretion efficiency for pharmaceutical proteins? How about new opportunities by providing pure and medically active food components to support human health and well-being?

Nico Callewaert, Director of VIB Center for Medical Biotechnology and Professor of Biochemistry and Biotechnology at Ghent University, Ghent, Belgium

“Neo-glyco-engineered VHH antibodies from *Pichia* for chemo-orthogonal coupling”

Mehmet Inan, Professor at the Faculty of Engineering, Department of Food Engineering and Department of Food Technology at the Akdeniz University, Antalya, Turkey

“Process development and cGMP manufacturing of an effective recombinant COVID-19 vaccine”

Alison Arnold, Head of Fermentation Development at Ingenza Ltd., Edinburgh, Scotland, United Kingdom

“Industrial bioprocesses where switching to the use of *Pichia pastoris* led to improved performance”

Kenneth Wolfe, Professor at the UCD School of Medicine and the Conway Institute at the University College Dublin, Dublin, Ireland

“QTL analysis of protein secretion in *K. phaffii*”

Amanda Fischer, Director of Precision Fermentation at TurtleTree, Davis, California, United States
“Lactoferrin- a new category of recombinant food proteins”

Aid Atlic, Senior Scientist at VALIDOGEN GmbH, Raaba-Grambach, Styria, Austria
“High-productivity methanol-free protein production processes with *P. pastoris*”

19:00**PICHIA DINNER POWERED BY VALIDOGEN**

Networking event with dinner at the Gansrieglhof, a typical local Buschenschank, in Weiz.
(Complementary for participants of the **PICHIA 2022 PLUS ONE DAY**)
“<https://gansrieglhof.at>”

Day 3: 17th of November

09:00–
10:00

TOPIC 5: SECRETION

A reason why *Pichia pastoris* is often preferred over other microbial host in biotechnological applications is the yeasts' ability to secrete high titers of recombinant protein with high purity to the extra cellular environment. Although mostly very similar technologies are evaluated for protein secretion by *P. pastoris*, the speakers in this session will offer alternatives and demonstrate that optimizing the secretion process is critical for maximizing the productivity of *P. pastoris*.

Jennifer Staudacher, PhD candidate in the Christian Doppler Laboratory for Growth-decoupled Protein Production in Yeast hosted by the University of Natural Resources and Life Sciences, Vienna (BOKU), Vienna, Austria

“Going beyond the limit: impact of increasing global translation activity on the productivity of recombinant secreted proteins in *Pichia pastoris*”

Pau Ferrer, Associate Professor at Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Catalonia, Spain

“Driving proteins through the co-translational translocation pathway for improved protein secretion in *P. pastoris*”

10:00–
10:30

COFFEE BREAK POWERED BY MODERN MEADOW

10:30–
12:00

TOPIC 6: NEW ASPECTS OF THE PICHIA GENOME

New products made by *Pichia pastoris* received FDA approval and GRAS status in the past years. Legal approval, as well as modern research relies on detailed information about the genome of *P. pastoris* and possible side products, originating from the host. Genome sequence data with high coverage and new genome annotations became available in the past years and enable -omics based research and reliable characterizations of host- and expression strains and also of products and their final formulations. Expression bottle necks can be identified, and the benefits of diverse host strain lines might contribute to a next generation of host – and production strains. But do we already know everything and how similar or diverse are the different common strains and how big is the impact of applied engineering technologies on the host genome?

Christoph Kiziak, Principal Scientist at Lonza AG, Visp, Switzerland

“Pichia production host engineering by systemic host changes”

Marina Jecmenica, PhD candidate at the University of Natural Resources and Life Sciences, Vienna (BOKU), Vienna, Austria

“*Komagataella phaffii*: QTL mapping for strain development”

Veronika Schusterbauer, PhD candidate at bisy GmbH, Hofstätten an der Raab, Styria, Austria

“Whole genome sequencing analysis of effects of CRISPR/Cas9 in *Komagataella phaffii*: A buddi(ng yeast) in distress”

Bernd Mitic, PhD candidate at the University of Natural Resources and Life Sciences, Vienna (BOKU), Vienna, Austria

“Metabolomics and metabolic engineering reveals a hidden methanol, formate and CO₂ assimilation pathway in *Komagataella phaffii* – the oxygen-tolerant reductive glycine pathway”

**12:00–
13:30****LUNCH POWERED BY RCT****13:30–
15:00****TOPIC 7: SYNTHETIC BIOLOGY & METABOLIC ENGINEERING**

Going beyond protein secretion and manufacturing of intracellular proteins by *Pichia pastoris* we just start to discover the benefits of this expression platform for small molecule manufacturing and new opportunities for protein production by engineered metabolic pathways. Do we have the right tools for metabolic engineering and synthetic biology for small molecule manufacturing. What do we know about existing metabolic pathways and the hidden potential of *P. pastoris*? Will we be able to provide economic new biomanufacturing routes for natural small molecules to generate more safe and reliable alternatives to limited supply by extraction from plants or animal sources or can we even provide a more diverse and more useful diversity of potential APIs by engineered *Pichia* strains?

Gita Naseri, Synthetic Biologist at Max Planck Unit for the Science of Pathogens, Berlin, Germany and Institut für Biologie, Humboldt-Universität zu Berlin, Berlin, Germany
“*Pichia pastoris* for sustainable manufacturing of alkaloid drugs”

Charles Moritz, PhD candidate at the University of Natural Resources and Life Sciences (BOKU), Vienna, Austria
“Engineering *Adh2* for improved methanol utilization in *Komagataella phaffii*”

Anita Emmerstorfer-Augustin, BioTechMed-Graz Young Researcher Group Leader at Graz University of Technology, Graz, Styria, Austria
“Auxin-induced degradation of target proteins in *K. phaffii*”

**15:00–
15:30****COFFEE BREAK POWERED BY MODERN MEADOW****15:30–
17:00****TOPIC 8: BIOPROCESS ENGINEERING**

New strains, proteins and chemicals, made by *Pichia pastoris* open new opportunities for medical treatments, industrial manufacturing, nutrition and even (biomedical-) material sciences. But what else is needed to realize early-stage ideas and dreams and to translate product inventions into innovations in our daily life? Bioprocess technologies and Downstream Processing are often areas of industrial and secret know how. How can we benefit from the scientific knowledge in the *Pichia* community to change our dreams to reality in near future?

Patrick Fickers, Professor at University of Liège, Walloon Region, Belgium
“Is medium heterogeneity really a problem in large scale bioreactor?”

Stefan Hauer, Research Assistant at ZHAW, Wädenswil, Zürich, Switzerland and TU Wien, Vienna, Austria
“Applying Dynamic Time Warping to Machine Learning based Automation of *Pichia pastoris* Fermentations”

Julian Kopp, Postdoctoral researcher at the Institute of Chemical, Environmental and Bioscience Engineering, Research Division Integrated Bioprocess Development at TU Wien, Vienna, Austria
“Dynamamic feeding for *Pichia pastoris*”



Arnau Gasset, PhD candidate at Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Catalonia, Spain

"AI Models applied in RQ control to optimize recombinant protein production in *Pichia pastoris*"