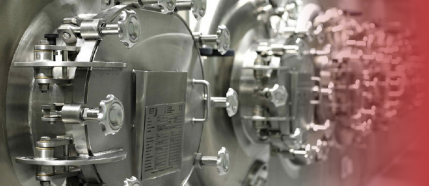

BioTalk

Biological Manufacturing Excellence

23rd - 24th September 2019
Berlin, Germany

Global Manufacturing Strategies

DAY ONE

07.45 - 08.30 **REGISTRATION**

08.30 - 08.40 **WELCOME & CHAIRPERSON'S OPENING REMARKS FOR DAY ONE**
Felix Oehme, VP Head of Biological Development, **Bayer**

08.40 - 09.15

Factory of the Future 1 – Technology Innovations to Expedite Global Biologics Development
- State-of-the-art technology platforms have been established to expedite global biologics development from discovery to commercialization.
- Technology innovations will be highlighted for improving development efficiencies and reducing timelines from DNA to IND from a typical duration of 18 months to 7-9 months.
- Technology Innovations also are being used for reducing the manufacturing costs by implementing the next generation continuous bioprocessing solution called WuXiUP with ultra-high productivity.

Weichang Zhou, Ph.D., Senior Vice President, Biologics Development and Manufacturing, **Wuxi Biologics**

09.15 - 09.50

How to exit a commercial roller bottle process and fix the quality attributes for a complex protein. A joined Up- and Downstream Approach.
- 2nd Gen Process Development (from roller bottles into bioreactors) for a complex non mab like protein
- Significant Yield Increase and Cost Reduction
- Joined Up- and Downstream approach to keep Quality Attributes within commercial range
- Challenges during Upscale and Lessons Learned

Daniel Fleischanderl, Head, Upstream Process Development & **Dominik Mittergradnegger,** Head of Downstream Process Development Austria, **Takeda**

09.50 - 10.40 **COFFEE BREAK & MEETINGS**

Downstream Processing

Upstream Processing

10.40 - 11.15

Validation of next gen depth filter technology in a commercial downstream process
- Current situation
- Proposed situation
- Small scale development
- Upscaling and Large scale validation
- Conclusion and take home messages

TBC, Process Engineer, Manufacturing Science & Technology (MSAT), **Sanofi Genzyme**

Common denominators of process and life cycle control strategies
- Capture your process knowledge in Digital Twins
- Accelerate time to clinic by Digital Twin controlled experimental designs
- Deploy your knowledge in real time model predictive control architectures enabling continuous manufacturing
- Identify holistically relevant process parameters and anticipate life cycle variabilities using integrated digital twins

Prof. Dr. Christoph Herwig, Head Biochemical Engineering, **TU Wien**

11.20 - 11.55

iSKID Continuous Integrated Manufacturing System
- Biopharma markets are evolving through the duality of precision medicines and novel blockbusters, requiring flexible manufacturing approaches
- Continuous Manufacturing will complement, and may one day disrupt, established fed batch manufacturing
- Traditional challenges of continuous perfusion, such as high media volumes, can be overcome
- Full integration and automation is essential
- Our platform maximizes robustness and flexibility in multi-product settings

Samet Yildirim, Manager, Global Technology Management Biopharma Business Unit, **Boehringer Ingelheim**

Vaccine development and manufacturing in the era of acceleration and Industry 4.0
- Significant demand and pressure on vaccine industry prompts faster adoption of new technologies
- Industry 4.0 presents opportunities in every aspects of the vaccine life cycle
- Challenges to initiate and sustain transformation for vaccine development and manufacturing
- A fine balance between acceleration and transformation
- Case studies on development and implementation

Hao Chen, Head of Cell & Viral Drug Substance, **GSK**

11.55 - 12.55

One to One Meetings
- Downstream/Upstream Process Technology Platforms
- Specialised cell culture media
- Single-use & Disposable Technologies
- Smart Manufacturing Technologies - Technology Transfer
- Facility Management & Integration
- Capacity & Facility Design
- Multi product facilities
- Energy & Operational Efficiency
- Lean/Transformational Change - Operational Excellence
- Continuous Improvement / Manufacturing Processing
- PAT & MES, Automation and Process Control Excellence
- QbD
- Quality Assurance & Quality Systems
- Regulation - Rapid Release Testing
- Finance / Inward & Foreign Investment
- cGMP - Contract, External Manufacturing Services
- Biogenerics/Biobetters
- Personalised Medicines
- Cell & Gene Therapy
- Fill and finish
- Cold chain
- Microbial Process Development and Production

11.55 - 12.25

Bulk filling: The application of automation and control to the filling process.
- At the bulk filling stage the product is at its highest cost per ml
- Losses at this stage have a serious negative impact on the COGS
- Through automation bulk filling can be simplified, standardised and de-risked
- Utilising single use technology to protect the patient, the operator and the product.

12.25 - 12.55

Future trends perspectives and insights on biomanufacturing
- Major market trends, market growth and new modalities
- Risk factors in biomanufacturing
- Capacity planning: new approaches and technologies
- Process intensification

12.55 - 13.45 **NETWORKING LUNCH**

Downstream Processing

Upstream Processing

13.45 - 14.20

Simulation Tools in Biotechnology
- Implementation of modelling and simulation tools in biotechnology
- What can biotechnology learn from the automotive industry?
- First steps towards an "Insilico Process Development"
- Examples of the biotech industry (e.g. Chromatography Modelling)

Dr. Martin Poggel, Head of Downstream Technologies & Analytics, **Bayer**

Ambr15 high throughput model development for perfusion
- A high-throughput (HT) cell culture model has been established for the support of perfusion-based cell culture processes operating at high cell densities.
- Varied different type of models has been evaluated with pro and con
- The established model was able to apply in varied application such as clone screening, medium development, and new process development etc.

14.25 - 15.00

Process development approaches to continuous capture and connected downstream
- Retrofitting a discrete fed-batch process into a continuous capture / connected downstream process
- Strategies and challenges in process characterization
- Case study

Mathias Goebel, Senior Scientist, **Novartis**

Implementation of HTST Media Treatment for Legacy Commercial Cell Culture Processes
- The implementation strategy for HTST treatment of media and feeds for commercial cell culture processes is described in detail
- A risk-based approach was developed to determine the study design and identify appropriate mitigations prior to full-scale implementation
- A bridging study was conducted for a laboratory-scale HTST unit to establish a scale-down model to support future screening studies
- Operational challenges were encountered on the large-scale HTST unit which had an impact on process performance. Results of the investigation and associated corrective actions are described

15.05 - 15.40

Impurity Control Strategies and Challenges in Impurity Reduction Studies
- Different impurity control strategies
- Pro's and con's for different strategies
- Case study: Antifoam reduction study
- Technical and analytical challenges met in reduction study

Markus Eser, Lab Head Downstream Development, **Bayer AG**

Success stories and learnings building a strong upstream manufacturing platform
- How to cope with growing variability in molecule formats
- Transferring knowledge from research to development to production
- Fast to clinic
- Seamless transition to GMP and commercial
- Beyond fed-batch

Raphael Voges, Associate director early stage USP development, **Boehringer Ingelheim**

15.40 - 16.30 **COFFEE BREAK & MEETINGS**

16.30 - 18.00

One to One Meetings
- Downstream/Upstream Process Technology Platforms
- Specialised cell culture media
- Single-use & Disposable Technologies
- Smart Manufacturing Technologies - Technology Transfer
- Facility Management & Integration
- Capacity & Facility Design
- Multi product facilities
- Energy & Operational Efficiency
- Lean/Transformational Change - Operational Excellence
- Continuous Improvement / Manufacturing Processing
- PAT & MES, Automation and Process Control Excellence
- QbD
- Quality Assurance & Quality Systems
- Regulation - Rapid Release Testing
- Finance / Inward & Foreign Investment
- cGMP - Contract, External Manufacturing Services
- Biogenerics/Biobetters
- Personalised Medicines
- Cell & Gene Therapy
- Fill and finish
- Cold chain
- Microbial Process Development and Production

16.30 - 17.00

A New Generation of Agarose Beads
- Next generation resin for downstream processing
- Advanced resin technology for continuous and batch manufacturing
- Increased process productivity & economy
- Ultra-high capacities on Protein A resin above 80 g/l

17.00 - 17.30

Scalable Single-Use Platform for Intensified Downstream Processing
- Upstream Process Intensification places additional demands on Downstream Processing
- Cost-effective solutions for high cell density clarification
- Single-use, scalable Membrane Adsorbers can be easily adapted into connected/continuous DSP
- Extended-use Virus filters challenge traditional approach

17.30 - 18.00

Using Alluvial Filtration as an Effective and Economical Solution for Midstream Clarification
- Alluvial filtration compare to other technologies
- Economic approach for Midstream 7 Clarification
- Robust technology – easy scalable

18.05 - 18.35

Factory of the Future 2 – The future of pharmaceutical production using the example of the GSK Marburg Site transformation
- Trends in the pharmaceutical market. What challenges do (bio-) pharmaceutical producers in Germany have to face?
- The Marburg Transformation – "Turning old into new"
- Development of a vaccines manufacturing platform – Was all this planned?
- Criteria for long-term competitiveness

Dr. Jan Weber, Head of Manufacturing Strategy & Production Systems, **GSK**

18.35 **CHAIRPERSON'S CLOSING REMARKS AND END OF DAY ONE**

18.45 **NETWORKING DRINKS RECEPTION**

Please note: agenda and speakers are subject to change

DAY TWO

08.30 - 08.35 **CHAIRPERSON'S OPENING REMARKS FOR DAY TWO AND SUMMARY OF DAY ONE**
Felix Oehme, VP Head of Biological Development, **Bayer**

08.35 - 09.10

Factory of the Future 3 – Plant Design Philosophy and Technology Transfer Strategy for a Large Scale Commercial Monoclonal Antibody Process
- Design Basis for a new facility to manufacture a large volume commercial Mab
- Utilizing Data Management and Digital tools as part of facility design concept
- Outlining a complex node to node technology transfer
- Validation strategy to meet an aggressive timeline

Harish Santhanam, Sr. Principal Scientist- Biologics Manufacturing and Digitization/Data Management, **MSD Ireland**

09.10 - 09.45

Novel and Innovative Characterization Methodology to Optimize Scale Up Strategies for Bioreactors
- Mapping "zoning effects" in E.Coli fermenters.
- Optimization of a CHO USP
- Scale down and scale up strategies in combination with CFD studies.
- Prediction of kLa – values with the help of "Big Data"

Florian Krainer, Cooperation Supervisor,Institute of Molecular Biotechnology, **TU Graz**

Bioprocessing in the digital age – paving the path towards industry 4.0 through smart digital technologies for biopharma
- Challenges in digitalization and big data analytics in biopharma
- Enabling role of domain knowledge versus standard statistics
- Potential for value creation based on advanced modelling technologies as well as their integration with sensors and robotic platforms
- Industrial use cases for the successful implementation of smart digital technologies for biopharma

Michael Sokolov, Postdoctoral Fellow and Lecturer, **ETH Zurich**

Downstream Processing

Upstream Processing

09.50 - 10.25

Designing "Quality by Design"
- QbD represents a heavy workload, takes time and costs a lot. However, benefits largely outweigh the costs
- QbD is not a goal in itself, it is only a methodology that support a reliable process development, leading to process robustness, understanding and increase safety for patients
- The presentation will illustrate a coupole of case studies that « demistify QbD » and highlight advantages of designing QbD as an integral part of process initial development and lifecycle management

Alain Bernard, Head of Global Biotech Process Development, **RU Pharma**

Complete single-use upstream workflow from process development to clinical manufacturing to rapidly advancing biologics programs
- Single-use high-throughput bioreactor systems greatly increase development capability and efficiency
- Detailed bioreactor characterization effort enables seamless scale-up and process transfer from high-throughput mini-bioreactors to clinical scale at 2,000 L
- Streamlined workflow leads to rapid and efficient FIH process development
- Potential acceleration to late stage development and characterization using the same single-use equipment and methodology

10.25 - 10.45 **COFFEE BREAK & MEETINGS**

10.45 - 12.15

One to One Meetings
- Downstream/Upstream Process Technology Platforms
- Specialised cell culture media
- Single-use & Disposable Technologies
- Smart Manufacturing Technologies - Technology Transfer
- Facility Management & Integration
- Capacity & Facility Design
- Multi product facilities
- Energy & Operational Efficiency
- Lean/Transformational Change - Operational Excellence
- Continuous Improvement / Manufacturing Processing
- PAT & MES, Automation and Process Control Excellence
- QbD
- Quality Assurance & Quality Systems
- Regulation - Rapid Release Testing
- Finance / Inward & Foreign Investment
- cGMP - Contract, External Manufacturing Services
- Biogenerics/Biobetters
- Personalised Medicines
- Cell & Gene Therapy
- Fill and finish
- Cold chain
- Microbial Process Development and Production

10.45 - 11.15

End-to-End Processing of Biopharmaceuticals – Options for scale-up and/or scale-out strategies
- End-to-end processing may embrace batch, continuous or hybrid technologies
- Single-use technologies enable proven scale-up and then scale-out
- Significant productivity improvements may be achieved through effective process design
- Using a toolbox approach to develop and scale-up a process enables productivity improvements across a broad range of advanced biologics modalities

11.15 - 11.45

Chromassette®: A stackable chromatography cassette enabling next-generation bioprocessing
- A stackable, single-use and pre-packed chromatography cassette with a supported bed (Chromassette®) is a novel product concept in DSP, addressing the current key challenges in manufacturing
- Chromassette combines the separation capabilities of chromatography resins with the convenience of a pre-packed, modular cassette as shown in a range of application examples

11.45 - 12.15

A new generation of Enterprise Systems
- Paperless validation
- Fully Automated
- Validation to decommissioning
- Validation through frameworks
- Risk assessments

12.15 - 13.05 **NETWORKING LUNCH**

Please note: agenda and speakers are subject to change

Downstream Processing

Upstream Processing

13.05 - 13.40

Next generation downstream process – manufacturing of biologics in a continuous way
- Fully connected continuous downstream process for monoclonal antibodies
- Integrated advanced analytical tools for real time monitoring
- Complete single use setup and increased flexibility
- Reduced costs and environmental impacts
- High productivity

Gorazd Hribar, Project manager nextBioPharmDSP, Principal Scientist, **Novartis**

Challenges during the Development of a High Cell Density Continuous (HCD) Upstream Process'
Continuous (HCD) Upstream Process' An Integrated Continuous Bioprocess (ICB) is aimed to have a higher productivity, smaller footprint, fully disposable and higher cost efficiency process. During the development of a HCD continuous upstream process, the following challenges are encountered:
- Impact of the quality and quantity of cryopreserved cells
- Development of media able to support high cell density cultures
- Availability of rapid analytical tools which are capable to measure CQAs at small harvest quantities
- Micro control of a continuous cell culture process
- Minor equipment failure leads to serious impact on performance
- Challenges and importance of PAT during small scale runs

By selecting appropriate process conditions and define their operational ranges, a robust and steady-state process with a duration of multiple weeks, can be developed at small scale
Steven Husson, Process Engineer, Manufacturing Science & Technology (MSAT), **Sanofi Genzyme**

13.45 - 14.20

Parallelized DSP steps with a single-skid at pilot-scale: manufacturing strategies, buffer platforms and equipment integration
- We performed advanced trials of a pilot-scale equipment allowing several DSP steps to be performed at the same time
- The strategy employed was: multi-column capture step, followed by an automated viral inactivation step, followed by a depth filtration step paired with an ion exchange chromatography step
- We also tested several features of the equipment to apply different buffer platform strategies: 1X buffers, in-line dilution and an advanced inline buffer conditioning

Nicolas-Julian Hilbold, DSP Innovation Scientist, **Merck**

Presentation title: Bio-Process Fermentation optimization: the CPV added value
- Continued process verification basis
- Data driven decision-making
- Incoming materials monitoring in upstream areas of bioprocess
- Example of process optimization starting by routine trending activities and cross-functional team work

Francesco Carpitella, MSAT Mfg. Support Manager Primary Ops, & **Stefano Calo**, MSAT Product Steward, **GSK**

14.25 - 14.55

One to One Meetings
- Downstream/Upstream Process Technology Platforms
- Specialised cell culture media
- Single-use & Disposable Technologies
- Smart Manufacturing Technologies - Technology Transfer
- Facility Management & Integration
- Capacity & Facility Design
- Multi product facilities
- Energy & Operational Efficiency
- Lean/Transformational Change - Operational Excellence
- Continuous Improvement / Manufacturing Processing
- PAT & MES, Automation and Process Control Excellence
- QbD
- Quality Assurance & Quality Systems
- Regulation - Rapid Release Testing
- Finance / Inward & Foreign Investment
- cGMP - Contract, External Manufacturing Services
- Biogenerics/Biobetters
- Personalised Medicines
- Cell & Gene Therapy
- Fill and finish
- Cold chain
- Microbial Process Development and Production

14.25 - 14.55

Digitising the entire Validation Life Cycle: a productivity leap
- Traditional paper/hybrid manual validation processes are not efficient, not cost effective, not scalable and with high risks
- Digital and paperless has become a strategic focus, driven by data integrity concerns and compliance risks
- > 60% of global Pharma/ Biotech companies are actively looking to digitize the entire Validation Lifecyle
- Learn first-hand experienced how a leading global Biotech considered, evaluated, implemented and scaled its eVal solution across its entire organisation
- With detailed results, ROI and considerable cost & productivity savings

15.00 - 15.15 **COFFEE BREAK**

15.15 - 15.50

Factory of the Future 4 – Technical trends and concepts in modern bioprocessing facilities
- Hybrid solutions
- Digital strategies and automation
- Process intensification
- Buffer handling

Stefan Schmidt, COO – Head of Operations, **BioAtrium**

15.50 **CHAIRPERSON'S CLOSING REMARKS**

15.55 **CLOSE**