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Conference program - Cell Culture Engineering XVIII

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Program

Cell Culture Engineering XVIII

April 23-28, 2023

Grand Fiesta Americana Coral Beach Hotel
Cancun, Mexico

Conference Chairs

Chetan Goudar
Amgen, USA

Laura A. Palomares
UNAM, Mexico

Tongtong Wang
Genentech, USA



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Grand Fiesta Americana Coral Beach Cancún

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Engineering Conferences International (ECI) is a not-for-profit global engineering conferences program, originally established in 1962, that provides opportunities for the exploration of problems and issues of concern to engineers and scientists from many disciplines.

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A warm welcome to CCE-XVIII, the 18th Cell Culture Engineering conference!

As we reflect on the 35th anniversary of the CCE conference and the circumstances since CCE-XVI (Tampa, 2018), we owe gratitude to Gargi Maheshwari, Jamey Young, Tim Charlebois and other community members whose contributions towards CCE-XVII provided the foundation for us to build on for CCE-XVIII. Nearly all the registered participants for CCE-XVII chose to defer their registration to CCE-XVIII, a gesture we deeply appreciate, and which has also inspired us and the session, poster, and workshop chairs to develop a compelling program for CCE-XVIII. With ~450 participants from 22 countries and representation across academia, government, and industry, CCE-XVIII reflects the diversity of our vibrant community.

We are excited about the conference program which includes the CCE award lecture by Manuel Carrondo, the Martin Sinacore award lecture by Pooja Jambunathan and Madhuresh Sumit, and keynote presentations by Alison Moore, Guangoing Gao, and Ray Deshaies. The oral sessions include 47 full-length and 11 brief poster talks, and the workshop sessions are comprised of 8 topics that span the breadth of our field. The poster sessions include 252 posters that were carefully selected from a large list of submissions. Recognizing recent progress in the commercialization of multispecifics, we have a session dedicated to this topic with talks ranging from protein design to product commercialization. Our industry stepped up to the challenges posed by the pandemic and learnings from that in the context of the broader portfolio will be discussed in one of the workshops.

We thank the numerous CCE-XVIII sponsors whose contributions enable participation of our academic colleagues and students. Chairs across the early career, workshop, poster, and oral sessions have volunteered their time to assemble high quality presentations that reflect the breadth and diversity of our community. The ECI team, including Barbara Hickernell, Kathy Chan, Kevin Korpics, and Tressa D'Ottavio, is the invisible hand behind every ECI conference, and we have benefited immensely from their expertise as we navigated through the complex CCE-XVIII logistics.

CCE-XVIII was heavily oversubscribed and with the intent to preserve the spirit of the conference, we limited participation to ~450 and regret not accepting several colleagues who wished to participate. Given the complex logistics associated with the cancellation of CCE-XVII, it took us longer than usual to formally notify all participants and we appreciate your patience and understanding.

Your safety is a top priority. Transportation arrangements have been made from the airport to the conference venue and all conference-related activities will be within the conference hotel. In addition, COVID-19 has not disappeared, and we encourage everyone to take commonsense precautions and especially encourage participants who may be immune-compromised to continue to wear a mask even though all conference participants have been vaccinated.

Thanks for your interest in the conference. It's been 5 years since we have been together as a community, and we are delighted to see all of you in Cancun. We look forward to an exciting technical program and opportunities to interact and reconnect.

Laura, Tongtong, and Chetan

Cell Culture Engineering Series History

Cell Culture Engineering I (1988)
Anthony Sinskey and Wei-Shou Hu
Palm Coast, Florida

Cell Culture Engineering II (1990)
Anthony Sinskey and Wei-Shou Hu
Santa Barbara, California

Cell Culture Engineering III (1992)
Michael Flickinger
Palm Coast, Florida

Cell Culture Engineering IV (1994)
Barry Buckland, Theodora Bibila, Wei-Shou Hu
San Diego, California

Cell Culture Engineering V (1996)
Barry Buckland, Theodora Bibila
San Diego, California

Cell Culture Engineering VI (1998)
Jeff Chalmers, Rob Arathoon
San Diego, California

Cell Culture Engineering VII (2000)
Bill Miller, Richard Schoenfeld
Santa Fe, New Mexico

Cell Culture Engineering VIII (2002)
Mike Betenbaugh and John Aunins
Snowmass, Colorado

Cell Culture Engineering IX (2004)
Octavio Ramirez and Lynne Krummen
Riviera Maya Cancun, Mexico

Cell Culture Engineering X (2006)
James Piret and Konstantin Konstantinov
Whistler, British Columbia, Canada

Cell Culture Engineering XI (2008)
Peter Gray and Carole Heath
Coolum, Queensland, Australia

Cell Culture Engineering XII (2010)
Kelvin Lee and Dana Andersen
Banff, Alberta, Canada

Cell Culture Engineering Series History

(continued)

Cell Culture Engineering XIII (2012)

Matt Croughan and Mark Leonard
Scottsdale, Arizona

Cell Culture Engineering XIV (2014)

Amine Kamen and Weichang Zhou
Quebec City, Quebec, Canada

Cell Culture Engineering XV (2016)

Robert Kiss, Sarah Harcum and Jeff Chalmers
La Quinta, California

Cell Culture Engineering XVI (2018)

Anne Skaja Robinson, Raghavan Venkat and Gene Schaefer
Tampa, Florida

Cell Culture Engineering XVII (canceled)

Tim Charlebois, Jamey Young and Gargi Maheshwari

2021 Cell Culture Engineering Award Winner

Manuel Carrondo

- **Professor of Chemical and Biochemical Engineering, Universidade Nova de Lisboa**
- **Founder of iBET - Instituto de Biologia Experimental e Tecnológica and GenIBET Biopharmaceuticals**



Manuel Carrondo's over thirty years of service to cell culture is due to strong partners and supporters of iBET – Instituto de Biologia Experimental e Tecnológica, which he founded in Oeiras, near Lisboa in 1989 (www.ibet.pt).

Daniel I.C.Wang gave Manuel the entrance to the CCE “boiling pot” he directed at MIT's BPEC (visiting in 1984 and 1988) and its outstanding network. Joachim Klein, director of Gesellschaft für Biotechnologie Forschung, Braunschweig, GBF (now Helmholtz) (visiting 1989) opened the door to the European biotechnology core. Both kept membership of iBET's Scientific Advisory Board for almost twenty years, proposing challenging ideas and broadening iBET's operation. John Aunins, Danny's ex-Ph.D. student and iBET champion, exposed iBET to Merck & Co, where Barry Buckland was building the “industrial” CCE powerhouse, while Hansjörg Hauser, molecular cell and virus geneticist at GBF contributed the “bio” to the “technology” at iBET. Over the last decade, Clive Wood (BI) became a key supporter for Translational Medicine inroads at iBET

Having been able to motivate top students into Ph.D.'s., Manuel could afford “risk taking” in process development – from perfusing and purifying retroviral vectors (late 90's) to expanding and differentiating hESC (mid 2000's), always bridging USA and EU partnerships, as CCE was absent in Portugal. José Luís Moreira (2014), first CCE Ph.D. student and enthusiastic “icebreaker” and Paula Alves, iBET's CEO since 2012, deserve special mention.

In 2006, Manuel founded GenIBET Biopharmaceuticals (www.genibet.com), a spin-off to produce proteins, cells and viruses for phase I/II clinical trials. Joerg Reinhardt, then COO at Novartis, committed Siena vaccine team to be GenIBET's launching partner. The scientific, technological and personal trust the iBET/GenIBET team built with very knowledgeable partner companies made the risk pay for various oncolytic viruses or the first and following mRNA lots for Moderna (2015-2018) as well as Seres C. difficile microbiome product (2016-ongoing).

Process development areas impacted by Manuel include:

Monoclonal antibodies: (from 1990) effects of culture systems and hydrodynamics, cell lines, cell aggregation and substrate metabolism on product quality including glycosylation profile.

Viruses: (from 1994) as competition in Mabs became too strong for a small lab, iBET transitioned to viruses, applying them for candidate vaccines and gene therapy. Adeno-, baculo-, retro-, lenti-, and adeno associated viruses have been targeted for process development, both up- and downstream, continuous process integration being a current target.

The baculovirus – insect cell platform has also been extensively developed for production of proteins and viral like particles (VLPs).

Cells as tools for research and Cell Therapy: (from 1996) Neuron and astrocyte aggregates were perfused as 3D cell culture systems for in vivo NMR studies. Such assemblies became well established at iBET which now also covers, eg., liver, heart or complex co-cultures of primary and/or stem and cancer cell 3D models, completed with immune cells. After MSCs and iPSCs differentiation and expansion, processes for cell therapy were made more robust, including use of continuous operations in both up – and downstream, facilitating process integration and thus sterile operation.

Mentorship and service: Attracting, training and, whenever possible, maintaining highly qualified and committed scientists at iBET has been a key goal. The 37 Ph.D. students, plus masters and postdocs, made Manuel's career shine, co-wrote 250 papers and contributed to a globally well-known and trusted iBET! Manuel has been strongly committed to the European Society of Animal Cell Technology (ESACT) since 1995 and various Engineering Conference International (ECI) biotechnological series.

This prestigious award recognizes outstanding contributions to the field of Cell Culture and is given bi-annually at the Cell Culture Engineering conference. Former recipients: Wei-Shou Hu (2002), Eleftherios T. Papoutsakis (2004), W. Robert Arathoon (2006), Martin Fussenegger (2008), Michael J. Betenbaugh (2010), James M. Piret (2012), Jeffrey J. Chalmers (2014), Konstantin B. Konstantinov (2016) and William Miller (2018).

2021 Martin Sinacore Young Investigator Award Co-Winners



Pooja Jambunathan



Madhuresh Sumit

Pooja Jambunathan works in Biologics Process Development and Commercialization group at Merck, where she supports commercialization and lifecycle activities for biologics. She joined Merck in 2017 after completing her Ph.D. in Chemical Engineering at the University of Minnesota. Since joining Merck, she has led a geographically diverse team to develop a global scale-down model across multiple small-scale labs to troubleshoot manufacturing investigations and to mitigate supply chain risks thus ensuring uninterrupted supply of the blockbuster immune-oncology drug Keytruda to patients worldwide. Her role as the upstream lead for technology transfer of processes to external contract manufacturing organizations (CMOs) and internal manufacturing sites has helped to increase process understanding and robustness for existing and future commercial biologics.

Pooja has a strong understanding of global healthcare issues in emerging countries and a strong technical knowledge for global drug development considering geographic and organizational diversities. She has made positive impact on a global level working with NGO partners to improve access and affordability of essential medicines in Tanzania. During this assignment, her leadership and dedication to global health led to capacity gains and improved access to healthcare for the local communities in Tanzania.

As an Equity, Diversity, and Inclusion (ED&I) champion, Pooja has led teams both at Merck and in graduate school aimed at making the workplace a connected and diverse community where individuals can bring their full selves to work. As a Women's group coordinator in graduate school, she organized outreach programs at local schools to encourage young girls to join STEM field. Currently she leads a cross-departmental team that focuses on addressing workplace diversity through participation in ED&I conferences and raising ED&I awareness through facilitated workshops.

Madhuresh Sumit joined the Upstream Process Development group at Pfizer in 2016 after completion of a Chemical Engineering Masters and a Biophysics PhD at the University of Michigan – Ann Arbor. In his PhD work, Madhuresh employed mathematical modeling and cell culture

experimentation to dissect temporal dynamics and information processing mechanisms in a mammalian cell signaling pathway.

At Pfizer, Madhuresh worked in collaboration with MIT on Post-translational Modification (PTM) project that resulted in significant advancement in precision control of N-glycosylation in CHO cell culture using systems and synthetic biology approaches. Madhuresh developed systems biology tools and mathematical models for accurate prediction and pro-active control of temporal variations in N-glycans in the recombinant proteins produced in CHO cells during a fed-batch process.

Furthermore, has contributed significantly to the *in-silico* modeling and big data analytics in upstream bioprocessing in various industry consortia. In addition to engaging in research and technical development over his ~4-year industrial career, Madhuresh has played a key-role in the advancement of multiple innovative molecules in Pfizer's early-stage pipeline.

Previous winners of this award are Colin Clarke (Dublin City University, Ireland), Corinne Hoesli (McGill University, Canada), Huong Le (Amgen) and Amanda M. Lewis (Bristol-Myers Squibb).

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Schedule and Posters

Cell Culture Engineering XVIII

April 23-28, 2023

**Grand Fiesta Americana Coral Beach Hotel
Cancun, Mexico**



Engineering Conferences International

Room locations and notes

- General Sessions will be held in Grand Coral 2 & 3.
- Poster Sessions will be in the Grand Coral 1 and Grand Coral Foyer. Authors of even-numbered posters are asked to stay with their presentations on Sunday and Tuesday evenings, and authors of odd-numbered posters are asked to stay with their presentations on Monday and Wednesday evenings.

Posters must be taken down at the conclusion of the poster session on Wednesday evening.
- Workshop locations will be announced on site and posted on the conference app as soon as they are confirmed.
- All breakfasts will be in Viña del Mar. Lunches will be in La Joya Restaurant and Viña del Mar.
- Coffee breaks will be in the Grand Coral Foyer.
- Dinners on Sunday, Monday and Wednesday will be on the Sunset & Veranda Terrace. The banquet dinner on Thursday will be in the Grand Coral Ballroom.
- Dinner on Tuesday is on your own at any of the hotel restaurants.
- The ECI office is in the Coral Conference Center.
- The Board of Directors room is available for small *ad hoc* meetings during the week. Please see ECI staff if you would like to schedule a meeting.
- Covid-19 precautions: Covid-19 has not gone away and we request that you be mindful of those who may be particularly vulnerable. Please bring your own test kits and masks. ECI will have a limited number of masks on hand. Masks are not required but we encourage you to use them particularly during poster sessions as there is typically a great deal of close-up discussion. If you are not feeling well, please remain in your room.
- Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.
- Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).
- Speakers – Please leave discussion time as previously directed by your session chair.
- Please do not smoke at any conference functions.
- Turn your mobile telephones to vibrate or off during technical sessions.
- After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.
- Emergency Contact Information: Because of privacy concerns, ECI does not collect or maintain emergency contact information for conference participants. If you would like to have this information available in case of emergency, please use the reverse side of your name badge.

Saturday, April 22, 2023

- 17:00 Early career preconference registration ([Grand Coral Foyer](#))
- 17:30 – 19:30 **Early Careers Preconference (ECP) Crash Courses** ([Coral Kingdom Ballroom](#))
(*Sponsored by AbCellera Biologics Inc.*)

Sunday, April 23, 2023

- 10:00 – 13:00 Preconference International Biomanufacturing omics workshop ([Coral Garden 3](#))
- 08:00 – 14:30 **Early Careers Preconference (ECP) Crash Courses** ([Coral Kingdom Ballroom](#))
- 12:30 – 17:30 Poster set-up ([Grand Coral Foyer and Grand Coral 1](#))
- 14:00 – 16:45 **Conference Check-In** ([Grand Coral Foyer](#))
- 14:30 – 15:30 Early Career Preconference Flash talks
- 15:30 – 16:45 Early Career Preconference Icebreaker/ Networking
- 16:45 – 17:00 CCE Conference Welcome Remarks ([Grand Coral 2 & 3](#))
ECI Liaison (Michael Betenbaugh, Johns Hopkins University, USA)
CCE Chairs
- 17:00 – 17:45 **Keynote 1**
“Cell Culture Engineering” and what this means for the future of medicine
Alison Moore, Allogene Therapeutics, USA
- 18:00 – 19:30 Dinner ([Sunset & Veranda Terrace](#))
- 19:30 – 21:30 **Poster Session (even-numbered posters)**
Sponsored by NIIMBL
Chairs: **Karthik Jayapal, Merck & Co., USA**
Shawn Lawrence, Regeneron Pharmaceuticals, Inc., USA
Olivier Henry, Polytechnique Montreal, Canada
Yao-Ming Huang, Eli Lilly & Co., USA

We would like to acknowledge the contributions from CCE XVII Chairs who built a strong program.

Monday, April 24, 2023

- 06:30 – 08:00 **Breakfast** (*Viña del Mar*)
- 08:00 – 08:45 **Keynote 2**
Human gene therapy – Principles, history, state of the art, challenges and approaches
Guangping Gao, University of Massachusetts Medical School, USA
- Session 1: Multispecific Modalities: Commercialization Successes & Future Trends**
Sponsored by Amgen and Genentech
Chairs: Inn Yuk, Genentech, USA
 Alan Dickson, University of Manchester, United Kingdom
- 08:45 – 08:50 **Session introduction**
- 08:50 – 09:10 **Insights into bispecific antibody development, characterization, and manufacture**
Latonia Harris, Janssen R&D, Johnson & Johnson, USA
- 09:10 – 09:30 **Continuous improvement in bispecifics manufacturing: Advantages and disadvantages of 2-cell vs. 1-cell culture process**
Jessica Wu, Genentech, USA
- 09:30 – 09:50 **Regeneron bispecific molecule structure begets platform production process compatibility**
Shawn Lawrence, Regeneron Pharmaceuticals, USA
- 09:50 – 10:10 **Challenges and successes in developing and manufacturing multiple formats of bispecific antibodies**
Weichang Zhou, WuXi Biologics, China
- 10:10 – 10:40 Coffee Break
- 10:40 – 10:55 **Transforming molecule selection and process development through attribute focus and the deployment of high-performance computing tools**
Neeraj Agrawal, Amgen, USA
- 10:55 – 11:00 **Poster Talk: Fine tuning of plasmid design to generate tailored CHO cell lines for production of bi- and multispecifics**
Anett Ritter, Novartis Institutes for BioMedical Research, Switzerland
- 11:00 – 11:05 **Poster Talk: Co-culturing cell lines for efficient manufacture of multispecifics**
Dawn Eriksen-Stapleton, Pfizer, USA
- 11:05 – 11:10 **Poster Talk: Analysis of production bottlenecks in BiTE molecules producing CHO Cells**
Tobias Jerabek, University of Applied Sciences Biberach, Germany
- 11:10 – 11:25 **Cellular demands of secreted protein products – systems and synthetic biology improve quality and titer**
Johan Rockberg, KTH, Sweden

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Monday, April 24, 2023 (continued)

11:25 – 11:40 **Building one block at a time toward complex biologics using cell-free protein synthesis process**
Marcella Yu, Sutro Biopharma, USA

12:00 – 13:30 Lunch ([La Joya and Viña del Mar](#))

13:30 - 15:00 Workshops (4 concurrent workshops)
Chairs: Margarida Serra, iBET, Portugal
Anurag Khetan, Bristol-Myers Squibb, USA

Workshop 1: Advances and Challenges with Tech Transfer, Scale-up, and Comparability ([Grand Coral 2 & 3](#))

Sponsored by Biomarin

Chairs: Diana Ritz, GSK, USA
Claudia Berdugo, Catalent, USA
Kelly Wiltberger, Biogen, USA

Workshop 3: Opportunities and Challenges to Bring Clinical and Commercial Cell and Gene Therapies to More Patients

([Coral Garden Ballroom – 2nd Floor](#))

Sponsored by Eppendorf AG and Novo Nordisk

Chairs: Andy Snowden, Janssen, USA
Sean Palecek, University of Wisconsin, USA
Mercedes Seguar, ElevateBio, USA

Workshop 4: Acceleration to the Clinic and Market in the Post-COVID Era

([Tuscany Trattoria Restaurant – Lobby Level](#))

Sponsored by Astrazeneca

Chairs: Nick Abu-Absi, Abbvie, USA
Weichang Zhou, WuXi Biologics, China
Shahid Rameez, Merck, USA

Workshop 5: Advances in Cell Engineering and Alternate Expression Systems ([Coral Kingdom – 2nd Floor](#))

Sponsored by FUJIFILM Irvine Scientific and Janssen Pharmaceuticals

Chairs: Christina Alves, Takeda, USA
Susan Sharfstein, SUNY Polytechnic Institute, USA
Ana Coroadinha, iBET/ITQB-NOVA, Portugal

15:00 – 15:30 Coffee Break

Session 2: Cell Line Development: Current State and Future Directions

Sponsored by Pfizer

Chairs: **Zhimei Du, Landmark Bio, USA**
Mark Smales, University of Kent, United Kingdom
Jamey Young, Vanderbilt University, USA

15:30 – 15:35 Session Chair opening remarks: Zhimei Du and Jamey Young

15:35 – 15:55 **Cell line technologies for speed-to-clinic and commercial production of biologics**
Gang Chen, Regeneron Pharmaceuticals, Inc., USA

15:55 – 16:15 **Newly-established Chinese hamster-derived cell line for protein production**
Takeshi Omasa, Osaka University, Japan

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Monday, April 24, 2023 (continued)

- 16:15 – 16:35 **Engineering of Chinese hamster ovary cell lipid metabolism results in an expanded ER and enhanced recombinant biotherapeutic protein production**
James Budge, University of Kent, United Kingdom
- 16:35 – 16:55 **Chromosomal instability drives convergent and divergent evolution toward advantageous inherited traits in mammalian CHO bioproduction lineages**
Meiping Chang, Merck Research Lab, USA
- 16:55 – 17:15 **What's in a Phenotype?**
Nicole Borth, BOKU University and Austrian Center of Industrial Biotechnology, Austria
- 17:15 – 17:20 **Poster Talk: Rebuilding CHO again and again: Development of a species agnostic modular cell line development platform for cultivated meat**
Kim Le, Upside Foods, USA
- 17:20 – 18:00 Free time
- 18:00 – 19:30 Dinner ([Sunset & Veranda Terrace](#))
- 19:30 – 21:30 **Poster session (odd-numbered posters)**
Sponsored by Kerry
Chairs: **Karthik Jayapal, Merck & Co., USA**
Shawn Lawrence, Regeneron Pharmaceuticals, Inc., USA
Olivier Henry, Polytechnique Montreal, Canada
Yao-Ming Huang, Eli Lilly & Co., USA

Tuesday, April 25, 2023

- 07:30 – 08:30 Optional breakfast conversation for diversity, equity, and inclusion ([Coral Garden Ballroom](#))
- 06:30 – 08:45 **Breakfast** ([Viña del Mar](#))
- Session 3: Systems and Synthetic Biology for Improved Cell Culture Performance**
Sponsored by Abbvie and Bristol-Myers Squibb
Chairs: **Bhanu Mulukutla, Pfizer, USA**
Nicole Borth, BOKU University and Austrian Center of Industrial Biotechnology, Austria
- 08:45 – 08:50 Session introduction
- 08:50 – 09:10 **Systems and synthetic biology approaches towards optimization of N-glycan sialylation**
Jack Scarcelli, Pfizer Inc., USA
- 09:10 – 09:30 **What does a cell need for efficient protein secretion: Deciphering, modeling, and augmenting the CHO machinery**
Nathan Lewis, University of California, USA
- 09:30 – 09:50 **GalMAX: Model-inspired glycoengineering for biopharmaceutical quality assurance**
Ioscani Jiménez del Val, College Dublin, Ireland
- 09:50 – 10:10 **Synthetic cell lines for recombinant AAV production**
Wei-Shou Hu, University of Minnesota, USA
- 10:10 – 11:00 Coffee Break
- 11:00 – 11:20 **Feedback-responsive cell factories for biomanufacturing**
Laura Segatori, Rice University, USA
- 11:20 – 11:30 **The microRNA landscape of the extracellular vesicles generated by Chinese hamster ovary cells under normal and stressed conditions**
Eleftherios Papoutsakis, University of Delaware, USA
- 11:30 – 11:40 **Metabolic engineering of high-productivity CHO host lines for biomanufacturing**
Jamey Young, Vanderbilt University, USA
- 11:40 – 11:50 **Biologics 4.0: Emergence of the CHO Biofoundry**
Lars Nielsen, University of Queensland, Australia
- 11:50 – 12:00 **Transcriptomics guided mechanistic metabolic model for perfusion culture process**
Veronique Chotteau, KTH, Sweden
- 12:00 – 13:30 Lunch ([La Joya and Viña del Mar](#))

We would like to acknowledge the contributions from CCE XVII Chairs who built a strong program.

Tuesday, April 25, 2023 (continued)

Session 4: Analysis and Control of Cell Culture-based Manufacturing

Chairs: **Marcella Yu, Sutro Bio, USA**

Sarika Mehra, IIT Bombay, India

Sponsored by Merck and Co., Inc. and Regeneron

- 13:30 – 13:35 Session Introduction
- 13:35 – 13:55 **Effective cell culture operations by implementing accurate, non-invasive determination of the critical process parameter pH in Roche's Drug Substance Network**
Christian Klinger, Roche, Germany
- 13:55 – 14:15 **Real-time data-driven and multi-scale model-guided system for bioprocess digital twin platform**
Dong-Yup Lee, Sungkyunkwan University, South Korea
- 14:15 – 14:35 **Upstream control strategy development for afucosylated species in mAb biomanufacturing**
Jianlin Xu, Bristol-Myers Squibb, USA
- 14:35 – 14:55 **Bioreactor scale induced alteration in cell metabolic state can impact amino acid misincorporations in recombinant proteins produced in CHO cells**
Shanta Boddapati, Seattle Genetics, USA
- 14:55 – 15:15 **Machine learning and advanced data analytics automating the exploitation of Raman spectroscopy: From micro-scale to large-scale operation**
Stephen Goldrick, University College London, United Kingdom
- 15:15 – 15:35 **Advanced control of glycosylation and titer in fed-batch monoclonal antibody production**
Anne Robinson, Carnegie Mellon University, USA
- 15:35 – 15:40 **Poster Talk: Achieving product quality targets while maintaining high titer in CHO cell culture processes**
Ryan Graham, Genentech, Inc., USA
- 15:40 – 15:45 **Poster Talk: Short chain fatty acids produced by CHO cells enhance their specific productivity in fed-batch cultures**
Cameron Harrington, Pfizer, USA
- 15:45 – 17:00 **Poster Session (even-numbered posters) / Coffee**
Sponsored by Cytiva
Chairs: **Karthik Jayapal, Merck & Co., USA**
Shawn Lawrence, Regeneron Pharmaceuticals, Inc., USA
Olivier Henry, Polytechnique Montreal, Canada
Yao-Ming Huang, Eli Lilly & Co., USA
- Evening *Dinner on your own at hotel restaurants*

We would like to acknowledge the contributions from CCE XVII Chairs who built a strong program.

Wednesday, April 26, 2023

06:30 – 08:00 **Breakfast** ([Viña del Mar](#))

08:00 – 12:00 Networking time

11:00 – 12:00 Coffee Break ([Grand Coral Foyer](#))

12:00 – 13:30 **Workshops (4 concurrent workshops)**
Chairs: Margarida Serra, iBET, Portugal
Anurag Khetan, Bristol-Myers Squibb, USA

Workshop 2: How Can We Leverage Learnings from Standard Biologics and Biosimilars to Develop and Characterize New Biologic and Cell/Gene Therapies?

Sponsored by Gilead Sciences, Inc.

Chairs: Arthi Narayanan, Genentech, USA
Octavio T. Ramirez, Universidad Nacional Autonoma de Mexico, Mexico
Yao-Ming Huang, Eli-Lilly, USA

Workshop 6: Industry 4.0: Big Data, Machine Learning and Artificial Intelligence in Cell Culture

Sponsored by GSK and Sartorius Stedim Biotech GmbH

Chairs: Seongkyu Yoon, University of Massachusetts, Lowell, USA
Madhuresh Sumit, Sanofi, USA
Ravali Raju, Amgen, USA

Workshop 7: Perfusion Technology: Challenges and Future Strategies

Sponsored by Merck

Chairs: Leda Castilho, Federal University of Rio de Janeiro, Brazil
Michael Borys, Bristol-Myers Squibb, USA
Veronique Chotteau, KTH Royal Institute of Technology, Sweden

Workshop 8: Actionable 'omics in Cell Culture and Bioprocessing: Best Practices and Opportunities

Sponsored by Biogen and Thermo Fisher Scientific

Chairs: Nathan Lewis, University of California, San Diego, USA
Paula Meleady, Dublin City University, Ireland
Henry Lin, Sanofi, USA

13:45 – 14:30 **Martin Sinacore Award Lectures**
Accelerated process development and commercialization - Bringing life-saving drugs to market
Pooja Jambunathan, Merck, USA

Mechanistic insights into N-glycosylation microheterogeneity of recombinant proteins produced in cell culture

Madhuresh Sumit, Pfizer, Inc., USA

14:30 – 15:30 Break

Session 5: CCE for Cell-based Therapies

Chairs: **Krishnendu Roy, Georgia Institute of Technology, USA**
John Moscariello, Bristol-Myers Squibb, USA

Sponsored by Sanofi

15:30 – 15:35 Session Introduction

We would like to acknowledge the contributions from CCE XVII Chairs who built a strong program.

Wednesday, April 26, 2023 (continued)

- 15:35 – 15:55 **Rapid, scalable, cost-effective process for generation of stably integrated chimeric antigen receptor (CAR) engineered T-cells by “Gene Writing”: An all RNA approach, without need for use of viral vectors or nucleases**
Madhusudan V. Peshwa, Tessera Therapeutics, USA
- 15:55 – 16:15 **AI-enabled biomanufacturing**
Stephen Balakirsky, Georgia Institute of Technology, USA
- 16:15 – 16:35 **Adaptive T cell processing through integrated process analytical technologies**
Ivie Aifuwa, Bristol-Myers Squibb, USA
- 16:35 – 16:45 **Differential effects on natural killer cell production by membrane-bound cytokine stimulations**
Zhimei Du, Landmark Bio, USA
- 16:45 – 16:55 **A soft sensor of cell concentration in a perfusion bioreactor via a digital twin**
Joseph Egan, University College London, United Kingdom
- 16:55 – 17:05 **Advancing manufacture of hiPSC-derived hepatocytes with improved functionality: A nature-inspired protocol**
Margarida Serra, iBET, Portugal
- 17:05 – 17:15 **Process analytical utility of Raman spectroscopy for cell therapy manufacturing**
James Piret, University of British Columbia, Canada
- 17:15 – 17:25 **Engineered T-cell therapy: State of the science**
Susan Abu-Absi, 2seventy bio, USA
- 18:00 – 19:30 Dinner ([Sunset & Veranda Terrace](#))
- 19:30 – 21:30 **Poster session (odd-numbered posters)**
Sponsored by Wuxi Biologics and KBI Biopharma, Inc.
Chairs: **Karthik Jayapal, Merck & Co., USA**
Shawn Lawrence, Regeneron Pharmaceuticals, Inc., USA
Olivier Henry, Polytechnique Montreal, Canada
Yao-Ming Huang, Eli Lilly & Co., USA

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Thursday, April 27, 2023

- 06:30 – 08:00 **Breakfast** ([Viña del Mar](#))
- 08:00 – 08:45 **Keynote 3**
Multispecificity -- The future of molecular medicines
Ray Deshaies, Head of Global Research, Amgen
- Session 6: Production of Viral Vectors and Other Emerging Therapeutic Modalities**
Sponsored by Eli Lilly and Company and Takeda Pharmaceuticals
Chairs: **Scott Estes, Asimov, USA**
Paula Alves, iBET, Portugal
- 08:45 – 08:50 Session Introduction
- 08:50 – 09:10 **Advancing the productivity, robustness, and scalability of AAV production process by transient transfection in suspension cell culture**
Jenny Shupe, Biogen, USA
- 09:10 – 09:30 **A hot new bioprocess strategy to improve small EV production**
Kerstin Otte, University of Applied Sciences Biberach, Germany
- 09:30 – 09:50 **Development of a Subclonal host cell line for AAV production**
Saurabh Sen, Sanofi, USA
- 09:50 – 09:55 **Poster Talk: Influenza A virus OP7 defective interfering particles: Cell culture-based production and antiviral efficacy in vivo**
Lars Pelz, Max-Planck Institute Magdeburg, Germany
- 09:55 – 10:00 **Poster Talk: On the AAVenue to success: Advances in technologies for AAV production**
Sandra Klausing, Sartorius, Germany
- 10:00 – 10:45 Coffee Break
- 10:45 – 11:05 **Development of a second-generation lentiviral vector to reduce COGM while meeting both vector and CAR T cell CQAs**
Julia Proctor, Bristol-Myers Squibb, USA
- 11:05 – 11:25 **Rapid cell culture process optimization and scale-up for production of two replicating viral vector COVID-19 vaccine candidates**
James Wagner, Merck, USA
- 11:25 – 11:45 **Overcoming barriers in viral vector manufacturing: Small molecule targeting of antiviral defences**
Jean-Simon Diallo, Virica Biotech, Canada
- 11:45 – 11:50 **Poster Talk: Towards large-scale production of human-induced pluripotent stem cell-derived extracellular vesicles in stirred-tank bioreactors**
Ana Meliciano, iBET/ITQB-NOVA, Portugal
- 11:50 – 11:55 **Poster Talk: Design space determination and process optimization of product quality attributes in transient rAAV manufacturing**
Seongkyu Yoon, University of Massachusetts Lowell, USA

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Thursday, April 27, 2023 (continued)

- 11:55 – 12:00 **Poster Talk: Conditioned medium derived from murine BM-MSCS cultured as spheroids exhibit in vitro immunomodulatory capacity**
Claudia Altamirano, Pontificia Universidad Católica de Valparaíso, Chile
- 12:00 – 13:30 Lunch ([La Joya and Viña del Mar](#))
- Session 7: Cell Culture for Integrated and Continuous Bioprocessing**
Sponsored by Boehringer Ingelheim and Lonza
Chairs: **Massimo Morbidelli, Politecnico di Milano, Italy**
Henry Lin, Sanofi, USA
Jason Walther, Sanofi, USA
- 13:30 – 13:35 Session Introduction
- 13:35 – 13:55 **Maintaining productivity over extended durations for perfusion processes**
Paul Gramlich, Amgen, USA
- 13:55 – 14:15 **Scaleable microscale perfusion systems for yeast and mammalian cells to accelerate process development of bioproducts**
María del Carme Pons Royo, BOKU University and Austrian Center of Industrial Biotechnology, Austria
- 14:15 – 14:35 **On digital bioprocessing for manufacturing intelligence: Application of process analytical technology (PAT) and process data analytics (PDA) for upstream process development and intensification**
Ricardo Suárez-Heredia, Sanofi, USA
- 14:35 – 14:45 **Development of a highly concentrated perfusion medium supplement to decrease media demand leveraging a newly designed 250 mL single use perfusion bioreactor**
Mona Bausch, Merck KGaA, Germany
- 14:45 – 15:05 **Ultra-intensified intermittent-perfusion fed-batch (UIIPFB) process quadrupled productivity of a bispecific antibody**
Jun Tian, WuXi Biologics, China
- 15:05 – 16:00 Coffee Break
- 16:00 – 17:00 **CCE Award Lecture**
Cell Culture and Social Engineering
Manuel Carrondo, IBET - Instituto de Biologia Experimental e Tecnológica, Portugal
- 17:00 – 18:30 Break
- 18:30 – 19:30 Reception ([Grand Coral Foyer](#))
- 19:30 – 21:30 Banquet ([Grand Coral Ballroom](#))

Friday, April 28, 2023

- 06:30 Breakfast ([Viña del Mar](#)) & Departures

We would like to acknowledge the contributions from CCE XVII Chairs who built a strong program.

Poster Presentations

- 1 **Case study: Optimization stage of a bispecific DART® molecule identified dissolved carbon dioxide (dCO₂) is a critical upstream process parameter for growth, productivity and scalability**
Nathalie Gerassimov, MacroGenics, USA
- 2 **Adeno-associated virus production in suspension cell culture using Eppendorf bioprocess control systems and BioBLU® single-use bioreactors**
David Solbach, Eppendorf SE, Germany
- 3 **The impact of expression vector position on transgene transcription allows for rational expression vector design in a targeted integration system**
Kathryn Beal, Pfizer, Inc., USA
- 4 **Co-culturing cell lines for efficient manufacture of multispecifics**
Dawn Eriksen-Stapleton, Pfizer.com, USA
- 5 **Analysis of production bottlenecks in BiTE® molecules producing CHO cells**
Tobias Jerabek, University of Applied Sciences Biberach, Germany
- 6 **From nanoliter to large-scale bioreactors: How integrated technologies bring antibody treatments to patients faster**
Véronique Lecault, AbCellera, Canada
- 7 **Fast track fed-batch culture development for COVID-19 vaccine clinical study**
Joon-Chul Lee, Korea Institute of Industrial Technology, KITECH, South Korea
- 8 **Polyclonal production of antibodies using CHO cell line mixtures**
Anna Christina Adams, Technical University of Denmark (DTU), Denmark
- 9 **Designing a highly productive next generation CHO fed batch platform**
Kyle McElearney, Amgen, USA
- 10 **Rescue protein production with effector gene determination in CHO cells**
Ece Cagdas, Denmark Technical University, Denmark
- 11 **Design, expression, and characterization of an asymmetric bispecific antibody fused to a scFv shuttle for brain uptake**
Juan Carlos Rivera, Instituto de Biotecnología, Universidad Nacional Autónoma de México, Mexico
- 12 **Designing a CHO protein production platform using multi-omics technology**
Chengjian Tu, Thermo Fisher Scientific, USA
- 13 **Streamlining T cell engager development with a diverse panel of fully human CD3-binding antibodies, bispecific engineering technology, and an integrated discovery engine**
Swapnil Bhargava, AbCellera, Canada
- 14 **Mitigating development risk of complex modalities during early-stage cell line development**
Ren Liu, MSD, USA
- 15 **WITHDRAWN**

- 16 **Fucosylation inhibitor development for producing afucosylated antibodies**
Lakshmi Kandari, Bristol Myers Squibb, USA
- 17 **A production-adapted, multi-auxotrophic, CHO cell line for reducing monoclonal and bispecific antibody cell line development timelines**
James Ravellette, Merck, USA
- 18 **High throughput analysis for cell line development**
Saloni Khurana, IGM Biosciences, USA
- 19 **Process for generation of high-producing CHO cell lines for biomanufacturing of biologics using our CHOrcTA platform**
Simon Joubert, National Research Council of Canada, Canada
- 20 **Identifying early predictors of instability in CHO cell lines using the Berkley Lights Beacon® Optofluidic System**
James Donaldson, University of Edinburgh, United Kingdom
- 21 **Engineering Chinese Hamster Ovary cells for enhanced protein secretion**
Mauro Torres, The University of Manchester, United Kingdom
- 22 **Power of platform to accelerate therapies beyond a pandemic**
Ronan Kelly, Eli Lilly & Company, USA
- 23 **Engineering CHO cell lines for the production of biosimilars of murine cell derived reference products**
Shivani Gupta, Amgen, USA
- 24 **Novel directed evolution platform for creating high-productivity cells for therapeutic protein production, virus production, and other processes**
Larry Forman, CHO Plus, USA
- 25 **A novel system for glycosylation engineering by natural and artificial micrnas**
Kerstin Otte, University of Applied Sciences Biberach, Institute for Applied Biotechnology (IAB), Germany
- 26 **Fine tuning of plasmid design to generate tailored CHO cell lines for production of bi- and multispecifics**
Anett Ritter, Novartis Institutes for BioMedical Research, Switzerland
- 27 **WITHDRAWN**
- 28 **Rebuilding CHO again and again: Development of a species agnostic modular cell line development platform for cultivated meat**
Kim Le, Upside Foods, USA
- 29 **Modulation of sialic acid content for enzyme fusions using combinatorial approach of cell line engineering and process development**
Yashas Rajendra, Denali Therapeutics, USA
- 30 **High yielding large-scale transient expression of Biotherapeutics in CHO: Beyond preclinical development**
Anurag Khetan, Bristol-Myers Squibb, USA
- 31 **WITHDRAWN**

- 32 **Omics-based characterization of random transgene integration sites from CHO production cell lines**
Sofie O'Brien, Seagen, USA
- 33 **High ER content and upregulated UPR pathway render a unique CHO host with high antibody productivity and product quality**
Ren Liu, MSD, USA
- 34 **Engineered transposon for improved cell line development**
Kristi Daris, Amgen, USA
- 35 **Characterization of extrachromosomal circular DNA (eccDNA) structure, function, and dynamics in a CHO K-1 clone**
Dylan Chitwood, Clemson University, USA
- 36 **Identification of transgene integration sites, their structure and epigenetic status with Cas9-targeted nanopore sequencing in CHO cells**
Nicolas Marx, University of Natural Resources and Life Sciences, Austria
- 37 **Genome-wide CRISPR-Cas9 screen identifies hyperosmotic stress responsive genes in Chinese hamster ovary cells**
Su Hyun Kim, KAIST, South Korea
- 38 **NextGen Sequencing (NGS) platform and applications in cell line development**
Ying Shen, Takeda Development Center Americas, Inc., USA
- 39 **Characterization of neutralizing human anti-tetanus monoclonal antibodies produced by stable cell lines**
Ana Maria Moro, Instituto Butantan, Brazil
- 40 **Finding the ideal: Single-cell cloning and seamless media transitions**
Michelle Sabourin, Cytiva, USA
- 41 **Automation of a cell culture process with lager vessels**
Tibor Anderlei, Adolf Kuhner AG, Switzerland
- 42 **Enhancing recombinant protein and viral vector production in mammalian cells by targeting the YTHDF readers of N6-methyladenosine in mRNA**
Niall Barron, NIBRT, Ireland
- 43 **CRISPR activation screening of dormant genes to improve secretory capacity in CHO cells**
Johan Blatt Rojek, DTU Bioengineering, Denmark
- 44 **Dynamic regulation of mitochondrial metabolism as a strategy to maximize mAb production in industrial CHO cell cultures**
Kevin Ruiz-Marquez, Vanderbilt University, USA
- 45 **WITHDRAWN**
- 46 **Transposase-mediated transgene integration for rapid generation of high-producing stable cell lines**
Lauren Kraft, Janssen R&D, USA

- 47 **Applying synthetic biology and computational biology to advance biologics expression platforms**
HaeWon Chung, Asimov, USA
- 48 **Development of a high throughput CHO cell glycosylation enzyme Mrna expression profiler**
Shivani Gupta, Amgen, USA
- 49 **Use of stable CHO pools and CHO TGE to accelerate SARS-CoV-2 vaccine development**
Yves Durocher, National Research Council Canada, Canada
- 50 **Novel cell engineering platform for increasing specific productivity of CHO cells for therapeutic antibody production in fed-batch cultures**
Kathy Ngo, CHO Plus, Inc., USA
- 51 **WITHDRAWN**
- 52 **Cell lines development through targeted integration involving a CRISPR-Mad7-based system in CHO-DG44**
Dubhe Beatriz Bulte Ocaña, Technical University of Denmark (DTU), Denmark
- 53 **Transcriptional response to recombinant protein production in isogenic multi-copy CHO cells**
Giulia Scapin, Technical University of Denmark (DTU), Denmark
- 54 **A microplate-based assay for analyzing purity and mispairing of bispecifics and other complex molecules in cell culture samples**
Sebastian Giehring, PAIA Biotech GmbH, Germany
- 55 **Prediction of CHO cell line stability using expression of DNA repair genes**
Lauren Cordova, University of Delaware, USA
- 56 **Methylation inhibition for coping with epigenetic-based heterogeneity of CHO cell subclones and improving recombinant MAB production**
Octavio Ramírez, Biotechnology Institute, Universidad Nacional Autónoma de México, Mexico
- 57 **Simultaneous genetic engineering and culture media manipulation improve rh-EPO productivity through lactate re-metabolization on CHO cell culture**
Oscar Gatica, Pontificia Universidad Católica de Valparaíso, Chile
- 58 **Further accelerating cell Line development and CMC timeline: The journey from COVID to non-COVID programs**
Sam Zhang, WuXi Biologics, China
- 59 **High-throughput clone ranking method for rapid clone selection**
Zoe Horton, Takeda, USA
- 60 **Hybrid cell line development system utilizing site-specific integration and methotrexate-mediated gene amplification in Chinese Hamster Ovary cells**
Jae Seong Lee, Ajou University, South Korea
- 61 **A mathematical modeling framework for determining the probability of obtaining a clonally-derived mammalian cell line**
Jennitte Stevens, Amgen Inc, USA

- 62 **Development of a high-density CHO-C system enables rapid protein production in 10 days**
Joyce Chao-Yi Teng, Development Center for Biotechnology, Taiwan
- 63 **Subcellular fractionation coupled to shotgun proteomics allows the identification of novel targets of the classical secretion pathway associated with increased productivity in recombinant CHO cells**
Norma A. Valdez-Cruz, Universidad Nacional Autónoma de México, Mexico
- 64 **CRISPR/Cas9 as a tool to correct point mutations in a recombinant monoclonal antibody gene in the genome of CHO cells**
Daniel Barreto-Cabrera, Instituto de Biotecnología, Universidad Nacional Autónoma de México, Mexico
- 65 **Assessment of cloning efficiency and error rates of different single-cell dispensing and high-resolution imaging technologies**
Olga Rimkevich, Alkermes, USA
- 66 **Investigating "Difficult-to-Express" mAb frameworks in transient and site-specific integration-based CHO expression systems**
Alana Szkodny, University of Delaware, USA
- 67 **Enabling pandemic speed to clinic for SARS-CoV2 neutralizing antibodies**
Peter Onyskiw, Bristol Myers Squibb, USA
- 68 **Profiling Inc-RNA in CHO cells using NGS technologies**
Caterina Ruggeri, University of Natural Resources and Life Sciences - BOKU, Austria
- 69 **Beyond exponential phase: Metabolic phenotypes in the stationary phase of CHO cell cultures**
Jerneja Štor, Austrian Centre of Industrial Biotechnology, University of Natural Resources and Life Sciences, Austria
- 70 **Slowly co-fluctuating gene expression patterns are heritable and associated with stress resistance and improved productivity in CHO cell line development**
Mark Blenner, University of Delaware, USA
- 71 **Blueprint from nature: Multi-omics comparison of CHO and plasma cells unveils novel cell engineering targets to improve productivity**
Linus Weiss, University of Applied Sciences Biberach, Germany
- 72 **From observational to actionable: Rethinking omic studies in biopharmaceutical protein production**
Hooman Hefzi, Biogen, USA
- 73 **Investigation of the role of ubiquitination in ER stress mechanisms in recombinant CHO cells**
Paula Meleady, Dublin City University, Ireland
- 74 **Role of TXNIP in metabolic shift to lactate consumption in CHO cell fed-batch cultures**
Bhanu Chandra Mulukutla, Pfizer Inc, USA
- 75 **Workflow for mining process relevant knowledge from transcriptomics**
Meeri Mäkinen, KTH, Sweden
- 76 **Model-based medium optimization methodologies in high-cell density perfusion culture**
Mirko Pasquini, KTH, Division of Decision and Control Systems, Sweden

- 77 **Learning mechanistic metabolic models with small datasets**
Yen-An Lu, University of Minnesota, USA
- 78 **Leveraging single-cell and bulk transcriptomics towards improved insect cell factories for biopharmaceuticals**
Filipa Moura, iBET, Portugal
- 79 **Integrated platform for high-throughput media optimization**
Dirk Mueller, Sartorius Stedim Cellca GmbH, Germany
- 80 **Amino acid degradation pathway inhibitors trigger apoptosis in Chinese Hamster Ovary cells**
Veronica Martinez, The University of Queensland, Australia
- 81 **Improving bone morphogenetic protein production in CHO cells by understanding its maturation, signaling, and endocytosis**
Gyun Min Lee, KAIST, South Korea
- 82 **NEXT-FLUX (Neural-net EXtracellular Trained Flux Constraints)**
Benjamin Strain, Imperial College London, United Kingdom
- 83 **Targeted DNA methylation of endogenous promoters and the CMV promoter entails distinct and subsequent histone modification changes in CHO cells**
Nicolas Marx, University of Natural Resources and Life Sciences, Austria
- 84 **Comprehensive meta-analysis of the CHO coding transcriptome**
Markus Riedl, acib - Austrian Centre of Industrial Biotechnology, Austria
- 85 **Establishment and application of a multiomics systems biology approach for cell culture process development and optimization**
Chris Lowe, Takeda Pharmaceuticals, USA
- 86 **Metabolic engineering of CHO cells towards cysteine prototrophy**
Laura Greenfield, Pfizer, USA
- 87 **Screening of chemically defined basal and feed media formulations for IgM production**
Abhinav Rabindra Jain, IGM Biosciences, Inc., USA
- 88 **Enhancing CHO cell productivity through a novel dual selection system using Aspg and Gs in glutamine free medium**
Nathan Lewis, UCSD, USA
- 89 **Mechanistic insights into the metabolization of S-Sulfocysteine by CHO cells using a multi-omics approach**
Melanie Nguyen, Merck, Germany
- 90 **Genome-scale modelling of resource allocation in CHO cell metabolism**
James Morrissey, Imperial College London, United Kingdom
- 91 **Using next-generation sequencing technology, RNA-Seq, to understand the Chinese Hamster Ovary (CHO) cell transcriptome under industrially relevant conditions**
Benjamin Synoground, Clemson University, USA
- 92 **Design of experiments guided control of waste inhibitory by-products in high density CHO cell cultures**
Pranay Ladiwala, Johns Hopkins University, USA

- 93 **Intracellular factors influencing protein aggregation in CHO cell culture**
Krishnakumar Malu, Biogen Inc., USA
- 94 **A user-friendly tool using systems biology models to infer cell functions from omics**
Helen Masson, UCSD, USA
- 95 **Multi-Omics strategy for cell culture medium optimization in Fed-Bach CHO Cell Cultivation**
Chengjian Tu, Thermo Fisher Scientific, USA
- 96 **Advanced cell culture performance by rational media design based on in depth process understanding**
Jochen Schaub, Boehringer Ingelheim, Germany
- 97 **Elucidating dipeptide utilization and metabolism by CHO cells for improved cell culture performance**
Xiangchen Cai, University of Michigan, USA
- 98 **Precision editing of the CHO genome via CRISPR-based prime editing: Progress and challenges**
Nicholas Sandoval, Tulane University, USA
- 99 **Scale-down model qualification study identifies parameters to improve full-scale robustness**
Abasha Williams, MacroGenics, USA
- 100 **Feedback control of intensified fed-batch mammalian cell culture using inline raman spectroscopy**
Thaddaeus Webster, Lonza Biologics, USA
- 101 **Loss of cell viability is tracked by decreased cytoplasmic conductivity**
Michael Butler, NIBRT, Ireland
- 102 **A completely automated high inoculation density fed batch process that accommodates clonal diversity and routinely doubles space time yield as compared to low inoculation density processes**
Brandon Downey, Lonza, USA
- 103 **Development of a new control strategy based on prior knowledge that enables rapid and streamlined process characterization**
Michael Handlogten, AstraZeneca, USA
- 104 **Robust cell culture performance facilitated by comprehensive equipment characterization – the importance of hydrodynamic stress**
Thomas Wucherpfennig, Boehringer Ingelheim Pharma GmbH & Co. KG, Germany
- 105 **Getting a foot in the door: Implementing online cell growth monitoring in manufacturing for both legacy and new processes**
Alexandra Tsoras, Bristol Myers Squibb, USA
- 106 **Introducing seahorse analyzer to mammalian cell culture process development**
Mitch Raith, Teva Pharmaceuticals, USA
- 107 **Multivariate data analysis of GMP cell culture bioprocessing in Pfizer**
Guogang Dong, Pfizer, USA

- 108 **Fully-automated bioreactor process control eliminates hands-on time through closed-loop cloud software integration.**
Adam Carcella, Asimov, USA
- 109 **A scalable 3D printed bioreactor for the expansion of anchorage-dependent stem cells**
Nicholas McMahon, Southwest Research Institute, USA
- 110 **Achieving product quality targets while maintaining high titer in CHO cell culture processes**
Ryan Graham, Genentech, Inc., USA
- 111 **Improving iron tolerance and CHO cell culture performance via adaptation in high-iron chemically defined media**
Karthik Jayapal, Merck & Co. INC, USA
- 112 **Hybrid dynamic model of monoclonal antibody production using CHO cells**
Mariana Monteiro, Imperial College London, United Kingdom
- 113 **Quantitative assessment of desirability of platform cell culture media**
Kimberly Curtis, Cytiva, USA
- 114 **Integrated microfluidics for at-line culture monitoring of proteins and metabolites**
Meeri Mäkinen, KTH, Sweden
- 115 **Developing a control strategy for sequence variants**
Amy Johnson, Regeneron Pharmaceuticals, USA
- 116 **Short chain fatty acids produced by CHO cells enhance their specific productivity in fed-batch cultures**
Cameron Harrington, Pfizer, USA
- 117 **Image-based machine learning model development of cell culture attributes in bench top bioreactors**
Joseph Fantuzzo, Merck and Co., Inc., USA
- 118 **Understanding the impact of high gas entrance velocity on CHO cell culture processes to improve process scale up**
Robin Luo, Boehringer Ingelheim, USA
- 119 **NAD+ supplementation improves mAbs productivity in CHO cells via a glucose metabolic shift**
Jong Youn Baik, Inha University, South Korea
- 120 **A less-traveled path for data in bioprocess development: From dynamic experiments to dynamic process models**
Yu Luo, GSK, USA
- 121 **Explore a probabilistic network model application for biopharma manufacturing process**
Jun Luo, Roche/Genentech, USA
- 122 **The power of at-line amino acid measurements for accelerated process and media development of a mAb-expressing CHO cell line**
Graziella Piras, 908 Devices, USA

- 123 **Challenges we just couldn't IgG-nore: Case studies of process optimization for next-generation, highly engineered multispecifics**
Michael Dolan, Takeda, USA
- 124 **Modeling the effect of gradients on cell culture performance in various large scale bioreactors**
Katherine Raudenbush, University of Delaware, USA
- 125 **Modeling the effect of bioreactor pH on Chinese Hamster Ovary (CHO) cell metabolism and site-specific N-linked glycosylation of VRC01**
Jayanth Venkatarama Reddy, University of Delaware, USA
- 126 **Targeted modulation of biochemical pathways to optimize the balance between productivity and product quality in biosimilars**
Rama Bhupal Reddy Kandula, Dr. Reddy's Laboratories Limited, India
- 127 **Modulation of product quality of biosimilars using metabolic modelling to achieve robust process control**
Suman Bandyopadhyay, Dr. Reddy's Laboratories Limited, India
- 128 **Peptide-based solutions to reduce undesired cell culture media chemistry – New options for stabilized media formulations**
Martin Schilling, Evonik Operations GmbH, Germany
- 129 **Achieving desirable product quality by modulating cell culture via real time analysis**
Meena George, Boehringer Ingelheim Fremont Inc, USA
- 130 **Achieving product quality comparability while making cell culture process changes**
Eleanor Oates, Genentech, USA
- 131 **Development of real-time monitoring system and Data-driven digital twin models for forecasting multi-step ahead cell culture performance**
Seo-Young Park, Sungkyunkwan University, South Korea
- 132 **Upstream Process Development approach to selectively reduce one or more unpaired cysteines of a monoclonal antibody**
Coralie Borrossi, Fresenius-kabi SwissBioSim, Switzerland
- 133 **Validation of the model-based cell culture media design platform "CELIA" for biomass and product optimization in a bioreactor setting**
Ziomara P. Gerdzen, University of Chile, Chile
- 134 **Next-gen glycoengineering: Combining cellular and metabolic engineering to fine-tune β 1,4-Galactosylation**
Apostolos Tsopanoglou, University College Dublin, Ireland
- 135 **Lectin-aided flow cytometry reveals a close correlation between cell surface and mAb glycosylation- aided flow cytometry reveals a close correlation between cell surface and mAb glycosylation**
Apostolos Tsopanoglou, University College Dublin, Ireland
- 136 **CHO stable pool fed-batch process development of SARS-CoV-2 spike protein production**
Juan Sebastian Reyes Davila, Polytechnique Montreal, Canada
- 137 **WITHDRAWN**

- 138 **WITHDRAWN**
- 139 **Synthetic cell lines for recombinant AAV production**
Min Lu, University of Minnesota, USA
- 140 **Small scale cell culture based assay for predicting antibody reduction susceptibility**
Antonio Barberio, Sanofi, USA
- 141 **Quantitation of amino acids in diverse mammalian cell culture media types with the REBEL at-line analyzer**
Kenion Blakeman, 908 Devices Inc., USA
- 142 **Characterization of cell cycle and apoptosis using flow cytometry for bioprocess monitoring**
Xiaodan Ji, GSK, USA
- 143 **Achieving high titer in a non-platform CHO cell culture process when converting to an internal medium platform**
Tom Hayes, Sanofi, USA
- 144 **Real time monitoring of commercial manufacturing and quality control for enhanced process and method reliability**
Neeraj J. Agrawal, Amgen, USA
- 145 **Amino acid analysis to support a genome-scale nutrient minimization forecast algorithm for controlling essential amino acid levels in CHO cell cultures**
Ji Young L. Anderson, 908 Devices Inc., USA
- 146 **Closing the loop on cell culture analyzer variability**
Paul Steve, Regeneron Pharmaceuticals, Inc., USA
- 147 **Dynamic pH profiles drive higher cell specific and volumetric productivity**
Sarah Harcum, Clemson University, USA
- 148 **Accelerating attribute-focused cell culture process development through the deployment of an automatic assay preparation platform**
Chao-Hsiang Wu, Amgen Inc., USA
- 149 **Computer simulations of the shear stress/energy dissipation in peristaltic pumps**
Jeffrey Chalmers, The Ohio State University, USA
- 150 **Development of a high-throughput workflow for upstream process control**
Michael Skoumal, Takeda Pharmaceutical Company, USA
- 151 **Controlling pCO₂ in high density perfusion cultures**
Colin Jaques, Lonza Biologics, United Kingdom
- 152 **At-line investigation of capacitance for assessing biomass of mammalian cell culture and fixed cell calibration standard**
An Zhang, Biogen, USA
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