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

ECI

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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 in1984 and 1988) and its outstanding network. Joachim Klein, director of Geselschaft für Biotechnology 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).

Conference Sponsors

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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 Wuu, 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**

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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)

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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 bioproccess 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*

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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**

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

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 micrornas**
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 lnc-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. Gerdtzen, University of Chile, Chile

134 **Next-gen glycoengineering: Combining cellular and metabolic engineering to fine-tune β1,4-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 amion 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

153 **Investigating cell culture process parameters and galactosylation using media buffering experiment and digital twin modeling**
Woo Suk Ahn, Sanofi, USA

154 **Cell culture oxygen utilization as orthogonal measure of biomass for feed control**
Christopher Jackman, Biogen, USA

155 **Transcriptional and metabolic response of CHO cells to different carbon dioxide concentrations**
Jorge Campano, Instituto de Biotecnología, Universidad Nacional Autónoma de México, Mexico

156 **Tracking amino acid metabolism in CHO cell cultures using stable isotope labeling assisted metabolomics**
Maciek Antoniewicz, University of Michigan, USA

157 **Developing methodologies to optimise production of recombinant antibodies at specific phases of Chinese Hamster Ovary (CHO) cell culture**
Ellie Hawke, University of Manchester, United Kingdom

158 **Model-based scale-up of CHO cell culture process**
Emmanuel Anane, FUJIFILM Diosynth Biotechnologies, Denmark

159 **Understanding the effect of oxidative and ER stress on CHO cell culture and product quality through multivariate analysis**
Leran Mao, Carnegie Mellon University, USA

160 **Lifecycle management of a commercial platform monoclonal antibody process: The promise of ICHQ12**
Cillian McCabe, Eli Lilly & Co., Ireland

161 **Combined effect of ammonia stress and cell line age on CHO cell derived VRC01 monoclonal antibody glycosylation**
Nicholas Sandoval, Tulane University, USA

162 **DNA sequence to a million doses of COVID-19 therapeutic antibody in 9 months – Making the seemingly impossible, possible**
Matthew D. Osborne, Eli Lilly, Ireland

163 **Characterization of cellular viability drop during media and platform development**
Vince Price, Janssen R&D, USA

164 **Expression of stress proteins during fed batch and perfusion cultures**
Claudia Berdugo, Catalent Biologics, USA

165 **Real-time bioprocess and automated feed control with in-line Raman sensor**
Ching-Jen Yang, Development Center for Biotechnology, Taiwan

166 **Measuring Golgi's redox potential in CHO cells and its response to hypoxic conditions**
Stfanny Wendy Meza Soto, Universidad Nacional Autónoma de México, Instituto de Biotecnología, Mexico

167 **Mixing and mass transfer in shake flasks and their relationship with antibodies productivity of CHO cells**
Mauricio Trujillo-Roldan, Universidad Nacional Autónoma de México, Mexico

168 **Generation and characterization of a process-specific HCP reagent using stably transfected Null Cell Pools**
Sven Loebrich, Alkermes, USA

169 **High density culture of human induced pluripotent stem cells in stirred tank bioreactors for regenerative therapies**
Jorge Escobar, Eppendorf SE, Germany

170 **From product microheterogeneity to homogeneity using integrated modeling methodology and new cell culture component**
Bassem Ben Yahia, UCB Pharma S.A., Belgium

171 **Transient expression of CHIKV VLP in large stirred tank bioreactors**
Peifeng Chen, NIH, USA

172 **Automation of an N-1 perfusion process using BioCapacitance**
Abbey Weith, Janssen R&D, USA

173 **Multifunctional surface modifications to capture and expand flowing endothelial colony-forming cells**
Corinne A. Hoesli, McGill University, Canada

174 **Design and in vitro validation of smart microcarriers for next generation cell culture**
Hugo Level, Mcgill University, Canada

175 **Proof-of-concept of a novel scalable magnetic bead-based cell separation technology**
Nils Brechmann, KTH, Sweden

176 **Immunocompetent human 3D brain cell cultures to advance ATMP development**
Catarina Brito, iBET, ITQB-NOVA, Portugal

177 **Novel vertical-wheel bioreactors for the scalable, robust and efficient production of shear-sensitive cell therapy products – human pluripotent stem cells (aggregate culture) and mesenchymal stromal cells (microcarrier culture)**
Matthew Croughan, Tahoe Biotechnology LLC, USA

178 **Encapsulation of mesenchymal stem cells and MCF-7 cancer cells in aqueous two-phase systems droplets for 3D culture applications**
Marco Rito-Palomares, Tecnologico de Monterrey, Mexico

179 **Integration of pancreatic aggregates into BioSilk network to treat diabetes**
Kelly Blust, The Royal Institute of Technology, Sweden

180 **Development of a dynamic SH-SY5Y 3D culture model for biological evaluation of Alzheimer-induced pathology**
Macarena Fernandez, Pontificia Universidad Catolica de Vaparaiso, Chile

181 **Novel cell engineering platform for improving production of AAV for gene therapy applications**
Kathy Ngo, CHO Plus, Inc., USA

182 **Environmental footprint of adherent cell culture viral vector drug substance manufacturing process**
Morgan Soukup, Takeda Pharmaceutical Company, USA

183 **Advancing large-scale production of MSC-derived extracellular vesicles through cellular pre-conditioning and enhanced process control**
Margarida Serra, IBET, Portugal

184 **A scalable and flexible solution for robust T cell expansion**
Jeffrey Mulkin, Thermo Fisher Scientific, USA

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186 **Simple and convenient method for adipose-derived mesenchymal stem cells serum-free medium development**
Joon-Chul Lee, Korea Institute of Industrial Technology, South Korea

187 **Novel impeller design for stem cell bioprocessing and its application in hMSC stirred-tank bioreactor cultures**
Tom Adam Wyrobnik, University College London, United Kingdom

188 **Towards the design of a feeder-free system for natural killer cell expansion**
Janani Narayan, University of Minnesota, USA

189 **Ex vivo expansion and differentiation of erythroblasts: From culture dishes to stirred tank reactors for the production of red blood cells**
George Barringer, Getinge Life Sciences, USA

190 **Cell therapy process development with a 2 mL perfusion bioreactor**
Ryan Trocki, Millipore Sigma, USA

191 **Utilisation of capacitance measurement (dielectric spectroscopy) to monitor, control and improve viral vector and virus-based vaccine production**
Aditya Bhat, Aber Instruments Inc, USA

192 **The role of extracellular vesicles in the modulation of the cell density effect**
Jesús Lavado García, UAB, Spain

193 **Continuous harvesting of retroviral murine leukemia viral vector particles in a high cell density perfusion cultivation**
Marc Dominique Hein, Max Planck Institute for Dynamics of Complex Technical Systems, Germany

194 **Influenza A virus OP7 defective interfering particles: Cell culture-based production and antiviral efficacy in vivo**
Lars Pelz, Max-Planck Institute Magdeburg, Germany

195 **Scaleable transient transfection of intensified rAAV production processes**
Kathryn Olson, Pfizer, USA

196 **A hot new bioprocess strategy to improve small EV production**
Christoph Keysberg, University of Applied Sciences Biberach, Germany

197 **Towards large-scale production of human-induced pluripotent stem cell-derived extracellular vesicles in stirred-tank bioreactors**
Ana Meliciano, iBET, ITQB, Portugal

198 **Simplifying manufacturing and control of dual vector AAV therapies**
Peter Slade, Decibel Therapeutics, USA

199 **Expression of anti-apoptotic genes to enhance rAAV production**
David Catalán-Tatjer, Technical University of Denmark, Denmark

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201 **On the AAVenue to success: Advances in technologies for AAV production**
Sandra Klausing, Sartorius Xell GmbH, Germany

202 **Exploring alternative oncogene-free mammalian hosts for adeno-associated virus production**
Seongkyu Yoon, University of Massachusetts Lowell, USA

203 **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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205 **Process improvements for AAV production by transient transfection of HEK293 cells**
Stephanie Doong, Vertex Pharmaceuticals Inc, USA

206 **Hybrid liposome-extracellular vesciles for targeted delivery of CRISPR/Cas9**
Jessica Belliveau, University of Delaware, USA

207 **High cell density perfusion process for rAAV9 production based on transient transfection of HEK293 cells**
Brian Ladd, KTH, Sweden

208 **Accelerating the Vero vaccine production platform through the generation of high-density cell banks and direct thaw into microcarrier bioreactor cultures**
Samantha Marrone, Merck & Co, Inc., USA

209 **The effect of cell density on the plasmid utilization for the production of adeno-associated virus via the triple-transfection method**
Brian Ladd, KTH, Sweden

210 **Suspension like scalability of rAAV9 production in adherent cells**
Brian Ladd, KTH, Sweden

211 **Intensified virus production in suspension HEK293SF cells using high inoculum fed-batch or low-perfusion rate cultures with continuous harvest**
Cristina Silva, Polytechnique Montréal, Canada

212 **Scalable iPSC-based platform to produce tissue-specific Extracellular Vesicles**
Rachel Moen, Vanderbilt University, USA

213 **Scale up of Sf9/BEVS-based AAV production process for GMP-manufacturing of cardiovascular gene therapies**
Tae Won Chung, Tenaya Therapeutics, USA

214 **Medium- and high-cell-density production of Adeno-Associated virus serotype 6 and the mitigation of cell density effect via medium supplementation**
Pablo Diego Moco, McGill University, Canada

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216 **Conditioned medium derived from murine BM-MSCs cultured as spheroids exhibit in vitro immunomodulatory capacity**
Claudia Altamirano, Pontificia Universidad Católica de Valparaíso, Chile

217 **Process development and scaleup comparisons for transient production of AAV**
Michael Gillmeister, REGENXBIO, USA

218 **Developing rAAV production platform with enhanced productivity, scalability and biosafety**
LiYing Yang, PackGene Biotech, USA

219 **Improved production of viru like particles of Cowpea Chlorotic Mottle virus using the baculovirus expression system**
Anayeli Martínez, Instituto de Biotecnología, Universidad Nacional Autónoma de México, Mexico

220 **HSC70/HSP40 overexpression in viral vector-producing Sf9 cells impacts AAV productivity and product quality**
Juan Aponte-Ubillus, BioMarin Pharmaceutical Inc., USA

221 **Large scale production and purification of a lentiviral vector reference material**
Otto-Wilhelm Merten, Miltenyi Biotec SAS, France

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223 **Improving recombinant Adeno-Associated Virus production through plasmid design and host cell line optimization**
Jenny Shupe, Biogen, USA

224 **Integrated semi-continuous manufacturing of lentiviral vectors**
Michelle Yen Tran, McGill University, Canada

225 **On demand, in-situ media and buffer preparation in continuous integrated biomanufacturing to reduce water consumption and CO2 footprint**
Alois Jungbauer, University of Natural Resources and Life Sciences Vienna, Austria

226 **Leucine and Isoleucine derivatives as bioavailable alternatives for canonical amino acids in cell culture media to enable next generation bioprocesses**
Tim Hofmann, Merck, Germany

227 **Implementation of N-1 process intensification in bioprocess development and production**
Jochen Schaub, Boehringer Ingelheim Pharma GmbH & Co. KG, Germany

228 **Enabling commercial-scale perfusion manufacturing using single-use bioreactors and tangential flow filtration**
Nicholas Guros, AstraZeneca, USA

229 **A scalable single-use perfusion system: Are single-use bioreactors suitable & scalable?**
Quang Long Pham, MilliporeSigma, USA

230 **Scale-up of cell culture processes using Digital Twins**
Mehran Rafigh, Yokogawa Insilico Biotechnology Pte. Ltd., Singapore

231 **Toolbox for efficient development of high cell density perfusion process, integrated with continuous DSP**
Nils Arnold Brechmann, KTH, Sweden

232 **Improving AAV manufacturing by integrated and continuous processing**
Antonio Roldao, iBET, Portugal

233 **Insect cell-based production processes intensified via high cell density perfusion and continuous culture**
Antonio Roldao, iBET, Portugal

234 **Raman spectroscopy for on-line monitoring of amino acid concentrations and antibody N-glycosylation in high cell density perfusion process**
Veronique Chotteau, KTH, Sweden

235 **WITHDRAWN**

236 **Development and application of an advanced PAT strategy to an integrated continuous drug substance manufacturing process**
Chao-Hsiang Wu, Amgen Inc., USA

237 **WITHDRAWN**

238 **Development and scale-up of perfusion cell culture process for higer productivity**
Hirokatsu Makitsubo, Chugai pharmaceutical co., ltd., Japan

239 **Study of the magnetic properties of glioblastoma cancer stem-like cells and non-stem tumor cells using magnetophoresis for label-less separation**
James Kim, University of Washington, USA

240 **Fully automated on demand cell culture media preparation for perfusion**
Lisa Wolowczyk, Merck KGaA, Germany

241 **Development of Scale-down system for perfusion precesses**
Bjarne Rask Poulsen, Novo Nordisk A/S, Denmark

242 **Marching toward implementation of an ultra-high density dynamic perfusion process**
Dominique Monteil, Boehringer Ingelheim, USA

243 **Oxygen transfer rate model for cell-free and predictive D.O. control in intensified bioreactor processes**
Samantha Whitney, Merck KGaA, USA

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245 **Process design of a fully integrated continuous biopharmaceutical process using economic and ecological impact assessment**
Chaoying Ding, University of Delaware, USA

246 **Economic and ecological analysis of plastic-degrading enzyme production**
Tommaso De Santis, Austrian Centre of Industrial Biotechnology, Austria

247 **Use of Ambr15 as a high throughput model to speed up perfusion bioprocess development**
Xiaoxia Jin, Sanofi, USA

248 **Scalability of CO2 stripping efficiency from bench (3 L) to pilot scale (200 L) for supporting intensified bioprocesses**
Samantha Whitney, Merck KGaA, USA

249 **Strategies for small-scale perfusion cultures in ambr®250 HT bioreactor system**
Srikanth Rapala, Clemson University, USA

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251 **Operational enhancements to improve applicability for challenging cell lines in the Sanofi Intensified Perfusion Platform (IPeP)**
William N. Napoli, Sanofi R&D, USA

252 **Advancements on process development and transfer for Integrated Continuous Biomanufacturing**
David Garcia, Novartis, Switzerland