William Smith Cell culture engineering conference report (April 27- May 2)

The Cell Culture Engineering Conference XIX, held in Arizona, USA, brought together leading experts from academia and industry to explore a wide range of topics in the field of cell culture. The event offered valuable insights into the current landscape, highlighting both the industrial perspective on large-scale biomanufacturing and the academic drive toward in-depth scientific exploration.

A recurring theme throughout the five-day conference was the increasing use of modelling and data-driven approaches within the bioprocessing sector. One standout talk was delivered by Emmanuel Anane from FUJIFILM Diosynth Biotechnologies in Denmark. He presented a compelling case for the integration of modelling into CHO cell culture processes, specifically its use to streamline scale-up and facilitate effective data transfer between different culture modes and modalities. His talk demonstrated how predictive modelling is helping to bridge the gap between lab-scale development and full-scale manufacturing, improving both efficiency and reproducibility. Another memorable presentation came from Simon Fischer at Boehringer Ingelheim. He shared the exciting discovery of novel transposases isolated from the exotic aphid *Acyrthosiphon pisum*, enabling increased stability of gene integration within CHO and HEK293 cells.

Continuous CHO cell culture also emerged as a major focus of the conference. This was particularly evident in presentations from Sartorius, Pfizer, and Novartis, as well as from academic researchers. Many of these talks highlighted how continuous processing, combined with advanced modelling techniques, is driving a shift in how biopharmaceuticals are manufactured. The alignment between academic research and industrial goals underscored the collaborative nature of innovation in this space.

My personal favourite oral presentation was given by Professor Maciek Antoniewicz from the University of Michigan. His talk, titled *"Quantifying Metabolism of CHO Cells Using Comprehensive Stable-Isotope Tracing,"* showcased the innovative use of isotope labelling for every component of CHO medium. This allowed for detailed mapping and modelling of cellular metabolism, offering new insights into nutrient utilisation and pathway fluxes.

A distinctive aspect of this conference was the inclusion of interactive workshops. These sessions fostered open discussion and collaboration between industry professionals and academics. One workshop I attended, titled *"Master the Maze: Cell Line Development and Analytical Strategies for Multi-Specific Antibodies,"* focused on tackling challenges related to bi-specific antibody aggregation. Collaborating with delegates from several companies, we identified key strategies such as the use of perfusion culture and reduced cultivation temperatures to mitigate aggregation. Participating in this collaborative problem-solving session was an enriching and unique experience.

The poster sessions were the highlight of the conference for me. I had the opportunity to present my PhD research and receive valuable feedback from peers and experts alike. With my PhD approaching completion, discussing my work and its future directions was especially valuable. I also enjoyed connecting with other early-career researchers to exchange ideas and build professional relationships.

In summary, the conference provided a comprehensive and forward-looking view of CHO cell culture. It emphasised the industry's transition toward continuous manufacturing and the vital role of modelling in improving process efficiency across the field of mammalian cell culture. The

support from ESACT-UK allowed me to attend and be a part of this great conference, providing me with significant experience and exposure to the international industrial and academic community.