

BIOENGINEERING

SEMINAR SERIES

Niall Peters

Scientist II

Just-Evotec Biologics

April 18th, 2024

12:30 – 1:00 PM Coffee/Pastry Mixer

1:00 – 1:50 PM, Foege N130

live stream: <https://washington.zoom.us/j/92391823761>



“Turning Connected into Continuous – Designing Automation and Process Control to Get the Most from Pilot and Bench Scales”

ABSTRACT: As the biologics industry matures, biologics manufacturing is moving from batch to continuous processing utilizing process intensification. Bench-scale equipment that integrates multiple unit operations is ultimately key to the adoption of continuous modalities. While digital twins and residence time distribution models are informative tools to explore continuous processing, access to a physical scale-down model is expected to remain a core element of biologics manufacturing process design. Furthermore, the availability of an automated scale down continuous train can be an important means of producing representative mass deliverables for pre-clinical evaluation. Viral inactivation is a common step in biologics platforms. It typically consists of titration to a low pH, an incubation period, and neutralization to a higher pH. While simple for a single cycle, a more sophisticated strategy is needed for continuous feed streams. Several possible technologies are available but continuous alternating batch VI offers advantages of a straight-forward and easily scalable design. In its most elegant application, this step is coupled to the outlet of a highly intensified continuous multi-column chromatography (MCC) step. Taken together, MCC with continuous VI at the bench-scale avoids several labor-intensive bottlenecks. An automated alternating batch VI system has been designed to produce pre-clinical material from perfusion bioreactors up to 50 L scale. This system addresses a hardware gap at the bench-scale where there is a lack of off-the-shelf solutions amenable to the low flows and process volumes typical of continuous processing. Specifically, this project integrated an FPLC, stirred tanks, pH sensors, programmable logic controllers (PLCs), and ancillary support hardware with a supervisory control and data acquisition (SCADA) system to provide a user-configurable platform for continuous chromatography and VI. This system provides robust control of the viral inactivation step and is capable of processing over 1 kg of feed material with a moderate equipment footprint.

BIO: Niall Peters holds a B.S. in Chemical Engineering and a minor in Computer Science from Northeastern University. Following work in AAV vectors at Ultragenyx and cell therapy at SQZ Biotechnologies, he joined the Product and Process Design group at Just-Evotec Biologics, Inc. and has led the development of purification processes and transfer to clinical manufacturing for several biologics, including work for the Bill & Melinda Gates Foundation and the Department of Defense. As a downstream scientist with expertise in computer science, he is passionate about developing integrated automation and engineering solutions, streamlining data workflows, and efficiently developing robust downstream processes.