



## Towards Autonomous Operation of Biologics and Botanicals

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submissions:

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### Message from the Guest Editors

This Special Issue on “Towards Autonomous Operation of Biologics and Botanicals Manufacturing” intends to curate novel advances in the development and application of model-based tools, process analytical technology, and advanced process control applications to address the ever-present challenges related to traditional pharmaceutical manufacturing practices. Topics of interest include, but are not limited to

- Advanced process control concepts and studies;
- Process analytical technology concepts and studies;
- Validation of digital twins with the development of new modeling concepts for biologics manufacturing at different steps of the workflow (phenomena, unit operation, and plant-wide);
- Design and optimization of biological processes through the derived models based on the QbD-approach;
- Process intensification, robustification, and flexibilization of multipurpose manufacturing as well as dedicated continuous bioprocessing CBP;
- Hybrid modeling combining classical first-principles models with (big) data-driven concepts;
- Process control, monitoring, and fault detection in the biologics industry.





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## Message from the Editor-in-Chief

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