

## Miniaturized High Throughput Screening for Continuous Chromatography

**PhD candidate:** Tiago Picanço Castanheira da Silva  
Tel: +351 932 889 639 || +31 (0) 627842096  
Email: T.PicancoCastanheiraDaSilva@tudelft.nl

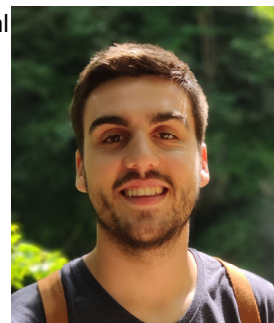
**Supervisor/ Promotor:** Marcel Ottens

**Co-Promotor:** Michel Eppink

**Institute:** Delft University of Technology,  
Department of Biotechnology,  
Bioprocess Engineering section

**Project term:** May 2019 – April 2023

**Financed by:** CODOBIO



### Project Description

The biopharmaceutical industry is evolving and is pushing for continuous processes and manufacturing strategies [1]. Innovations in processing technologies are needed to shift to a continuous operation mode.

Monoclonal antibodies (mAbs) are therapeutic proteins that can be used to treat a wide variety of diseases, ranging from autoimmune diseases to different types of cancers. The production of such therapeutics is very costly, with the downstream processing representing a large portion of the costs [2].

For downstream processing, specifically in the biopharmaceutical area, adsorption or chromatography is used to purify products. In order to design these processes well - in batch and continuous mode - accurate knowledge of the fundamental behavior of adsorption is needed.

High-Throughput Screening (HTS) for process optimization may accelerate the proper implementation of continuous processing by providing more insight on the process [3]. Microfluidics and liquid-handling stations allow for low sample and adsorbent consumption, automation and fast data generation, essential for the screening and evaluation of different adsorbents. The goal of this project is to develop a high-throughput device for the study of chromatographic separations that is easy to handle and versatile. With the collected data a continuous chromatographic unit operation will be modelled and designed, and the process will be tested in an industrial environment.

### References

[1] - Croughan, Matthew S., Konstantin B. Konstantinov, and Charles Cooney. "The future of industrial bioprocessing: Batch or continuous?." *Biotechnology and bioengineering* 112.4 (2015): 648-651.

[2] - Yang, O., Prabhu, S., & Ierapetritou, M. (2019). Comparison between Batch and Continuous Monoclonal Antibody Production and Economic Analysis. *Industrial & Engineering Chemistry Research*, 58(15), 5851-5863.

[3] - Nfor, B. K., Noverraz, M., Chilamkurthi, S., Verhaert, P. D., van der Wielen, L. A., & Ottens, M. (2010). High-throughput isotherm determination and thermodynamic modeling of protein adsorption on mixed mode adsorbents. *Journal of Chromatography A*, 1217(44), 6829-6850.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 812909 CODOBIO, within the Marie Skłodowska-Curie European Training Networks framework.