**Development of advanced feeding strategies for high throughput mini-bioreactor systems**

vorgelegt von M. Sc. Annina Kemmer (ORCID: 0000-0002-5125-9093)

**List of Publications**

This thesis is based on the following publications, which either have been published in or are currently under consideration by peer-reviewed journals. They are listed in chronological order.

# denotes an equal contribution of these authors

The contributions are written according to: Brand, A., Allen, L., Altman, M., Hlava, M., & Scott, J. (2015). Beyond authorship: Attribution, contribution, collaboration, and credit. *Learned Publishing*, *28*(2), 151–155. https://doi.org/10.1087/20150211

**Paper I**

**Kemmer, A.**#, Cai, L.#, Cruz Bournazou, M. N., & Neubauer, P. (2023) High-Throughput Expression of Inclusion Bodies on an Automated Platform. In *Inclusion Bodies – Methods and Protocols* (1st ed.). Springer Protocols. <https://doi.org/10.1007/978-1-0716-2930-7>

**Author contributions:**

|  |  |
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| **Annina Kemmer**: | Conceptualization, writing – original draft, writing – review & editing, visualization |
| Linda Cai: | Writing – original draft, writing – review & editing, visualization |
| M. N. Cruz Bournazou: | Writing – review & editing, supervision, funding acquisition |
| Peter Neubauer: | Conceptualization, writing – review & editing, supervision, funding acquisition |

**Own contributions:** outlined the structure of the book chapter; wrote most of the sections materials, methods and notes; drafted and created most of the figures; responsible for revision of the publication

**Information regarding re-use of the following published manuscript in this thesis:** This is the published version of the following book chapter: Kemmer, A., Cai, L., Cruz Bournazou, M. N., & Neubauer, P. (2023). High-Throughput Expression of Inclusion Bodies on an Automated Platform. In *Inclusion Bodies—Methods and Protocols* (1st ed.). Springer Protocols; Humana New York, NY. https://doi.org/10.1007/978-1-0716-2930-7. Reproduced with permission from Springer Nature.

**Paper II**

**Kemmer, A.**#, Fischer, N.#, Wilms, T., Cai, L., Groß, S., King, R., Neubauer, P., & Cruz Bournazou, M. N. (2023) Nonlinear state estimation as tool for online monitoring and adaptive feed in high-throughput cultivations. *Biotechnology and Bioengineering*. <https://doi.org/10.1002/bit.28509>

**Author contributions:**

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| **Annina Kemmer**: | Conceptualization, methodology, software, validation, formal analysis, investigation, data curation, writing – original draft, writing – review & editing, visualization, project administration |
| Nico Fischer: | Conceptualization, methodology, software, validation, formal analysis, investigation, writing – original draft, writing – review & editing, visualization |
| Terrance Wilms: | Conceptualization, writing – review & editing, supervision |
| Linda Cai: | Investigation, writing – review & editing |
| Sebastian Groß: | Conceptualization, writing – review & editing, supervision, funding acquisition |
| Rudibert King | Conceptualization, writing – review & editing, supervision, funding acquisition |
| Peter Neubauer: | Conceptualization, resources, writing – review & editing, supervision, funding acquisition |
| M. N. Cruz Bournazou: | Conceptualization, resources, writing – review & editing, supervision |

**Own contributions:** conceived the idea for the monitoring and control concept; mainly designed and performed the mini-bioreactor experiments; prepared data for further analysis; developed the computational framework for simulation, parameter and state estimation (except module for Kalman Filter); supported in embedding the Kalman Filter module in the computational framework; developed the control concept; wrote most of the manuscript; drafted and created most of the figures; responsible for revision of the publication

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**Paper III**

**Kemmer, A.**, Cai, L., Born, S., Cruz Bournazou, M. N., & Neubauer, P. Modeling enzyme-mediated glucose release to facilitate continuous feed in miniaturized cultivations.

Submitted to Frontiers in Bioengineering and Biotechnology on 23.12.2022

**Author contributions:**

|  |  |
| --- | --- |
| **Annina Kemmer**: | Conceptualization, methodology, software, formal analysis, investigation, data curation, writing – original draft, writing – review & editing, visualization, project administration |
| Linda Cai: | Investigation, writing – review & editing, visualization,  |
| Stefan Born: | Conceptualization, methodology, formal analysis, writing – review & editing, |
| M. N. Cruz Bournazou: | Conceptualization, methodology, resources, writing – review & editing, supervision, funding acquisition |
| Peter Neubauer: | Conceptualization, resources, writing – review & editing, supervision, funding acquisition |

**Own contributions:** Designed and performed the mini-bioreactor experiments; conducted the GPC analysis; prepared data for further analysis; developed the computational framework for simulation and parameter estimation; developed the mechanistic model; wrote most of the manuscript; drafted and created most of the figures; responsible for revision of the publication