



# Creating model-driven algal cultures in autonomously experimenting appliances Simon Schliesky<sup>1</sup>, Philipp Norf<sup>1</sup>, Rainer Machné<sup>2</sup>, Oliver Ebenhöh<sup>1</sup>

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## Motivation

Off-the-shelf photobioreactors are suitable for answering a defined set of research questions. Thus, finding a solution that is easily adaptdable to a broad range of experiments was not possible.

Designing a customisable, modular photobioreactor appliance includes mandatory development of control software. Therefore, we evaluate the possibilities of ex-



periment automation.





# Example workflow

Maintenance Provides all functions that are independent of actual sensory output, e.g. cleaning routines



→ Store results

#### Data-driven models:

- simulate parameter shifts
- simulate knockout effects
- find bottlenecks
- understand mechanistics

#### complementing

## Model-driven cultures:

- systematic parameter testing
- bottom-up approaches (mutagenesis, constraint driven evolution)
- idempotent state of cultures
- inverse methods to automatically build models through machine learning

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Run experiment

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