

Research Internship

Identification of optimization potentials in a bioreactor using fluid simulation

With the patented Tissue Regenerator, a platform is being established to further advance the automation of tissue engineering [1]. The goal of this research internship is to gain an improved understanding of temperature distribution, shear forces, and mixing processes, particularly within the main chamber of the Tissue Regenerator and the tubing. To achieve this, you will set up a fluid simulation, which you will ultimately use to evaluate the initial setup and identify potential areas for improvement.



Task Description

- Evaluation of literature on reactor design
- Fluid simulation of the main chamber (including inlet, outlet, stirrer, heating element and dummy geometry representing the tissue)
- Assessment of initial design and different reactor design modifications
- Sensitivity analysis

Profile

- Interested in fluid simulation (Ansys)
- Basic knowledge of CAD (e.g. Fusion360)
- Independent working style

References

- [1] <https://www.mbt.tf.fau.de/research/research-groups/bioreactors-in-tissue-engineering/the-myoreactor-prototype/>
- [2] <https://www.validierungsfoerderung.de/validierungsprojekte/gewebe-regenerator>
- Paul, E.; Atiemo-Obeng, V.; Kresta, S. (2004). Handbook of Industrial Mixing – Science and Practice. Wiley Interscience.
- Salho, A.; Hamzah, D (2024). A Review of Stirred Tank Dynamics: Power Consumption Mixing Time and Impeller Geometry. International Journal of Heat and Technology.

If this caught your interest, please contact me at niklas.buente@fau.de.

Registration: 01.10.2025

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Examiner: Prof. Dr.-Ing. habil. Philipp Beckerle

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