



ZETA

ZETA specializes in customized process system solutions for sterile and aseptic applications. We are partners in design, engineering, production and optimisation of integrated system solutions for the biotechnology and pharmaceutical sectors as well as the food industry.

## Master Thesis @ TU Graz:

Institute IPPT

Supervisor Assoc.Prof. Stefan Radl

### Scaling of Bioreactors on their performance indicator $k_L a$

This thesis focuses on the characterization of stirred tank reactors (STR) for mammalian cell cultivation. Bioreactors for mammalian cell cultures are optimized with regard to equal gas transfer rates ( $O_2$ ,  $CO_2$ ) and mixing time at cell-preserving process conditions. The scalability of the performance indicators, mass transfer coefficient ( $k_L a$ ) and mixing time, will be evaluated and modeled from laboratory to commercial scale. The idea is to create a scalable prediction model based on the isotropic turbulence theory. The developed procedure will be integrated into ZETA's Bioreactor design process.

#### Task

Literature study  
Experimental planning & execution  
Scale down of bioreactor designs  
Model development

#### Duration

6-8 month

#### Remuneration

1100€/month (30h/week)

#### Study

Process/Chemical Engineering  
Biotechnology

#### Contact

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#### Requirements

Language: German or English  
Experience in fluid dynamics  
DoE Basic Knowledge  
3D CAD drawing Basic Knowledge