

# Bachelor's / Master's Thesis

## “Establishing a Multi-Column Silica-Based Affinity Chromatography for Optimized and Cost-Effective Protein Purification”

Keywords: multi-column-chromatography, process design, protein purification, protein A, monoclonal antibodies

### Project Description

Due to its high mechanical strength and easy manufacturing, silica is often used as a stationary phase in different chromatographic processes. To achieve high-purity protein purification, silica resins can be used in combination with silica-binding amino acid tags. A novel octapeptide  $(RH)_4$  tag, namely the PosH-Tag, has been developed in our group. Purifying PosH-tagged proteins using a low-cost silica resin results in an economic and efficient affinity chromatography process. In this setup, the next step is to purify industry-relevant bioactive, high-value recombinant proteins (Protein A variants, etc.), which in the industry, are currently being produced in highly complex and expensive purification processes.

After establishing the baseline parameters for an optimized purification in a batch chromatography setup, the focus will be shifted towards instituting the process in a continuous chromatography system, using the method of periodic counter-current chromatography (PCC), thus further lowering the purification costs of these valuable proteins while increasing time efficiency. As part of this thesis, you will work with a cutting-edge device, of which there are only three currently available in Germany, and you will be responsible for establishing the transition to PCC with it.

This project is highly relevant to the industry since currently, shifting from batch to PCC is one of the biggest objectives in the field of Bioprocess engineering.

### Research objectives

- Optimize the current batch chromatography process.
- Transition from batch to continuous purification PCC with a bare silica affinity system.
- Investigate the impact of the PCC method on reducing purification costs and improving time efficiency.

### Profile

- Background in Industrial Biotechnology, Bioprocess-, Chemical-, Mechanical Engineering or similar.
- Structured, independent, keen, creative.
- Nice to have: Experienced with chromatography.

### Start information

- Start date: As soon as possible / flexible.
- Location: Garching.
- Spoken languages: English, German, Spanish.

„Imagination is more important than knowledge.“ - Albert Einstein

