



# INDUSTRIJSKI DOKTORAT NOVARTIS – UL FMF

*v okviru Skupine za fiziko mehkih in delno urejenih snovi*

Iščemo visoko motiviranega dokorskega študenta za delo na raziskavah hibridnega modeliranja kromatografskih procesov v biofarmacevtski industriji, neposredno v sodelovanju in podprto s strani podjetja Novartis (Lek). Delo bo potekalo na industrijsko-akademske preseku Novartis – UL FMF in kot član ekipe boste imeli priložnost prispevati k najsodobnejšim raziskavam in razvoju inovativnih rešitev za optimizacijo procesov biofarmacevtske proizvodnje na podlagi modelov. Raziskovalno delo bo vsebovalo razvoj t.i. hibridnih modelov in algoritmov, načrtovanje eksperimentov in analizo podatkov ter prenos raziskovalnih rezultatov v industrijsko prakso.

**Vabljeni!**

**Začetek dela: idealno 1. 10. 2023 oziroma po dogovoru.**

**Kontakt:**

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# **Ph.D. Student - Hybrid Modeling of Downstream Processes (Chromatography)**

## **Job Description**

We are seeking a highly motivated Ph.D. student to join our downstream development research team with a topic of hybrid modeling of downstream processes, specifically chromatography, in the biopharmaceutical industry. As a member of our team, you will have the opportunity to contribute to cutting-edge research and develop innovative solutions for model-based optimization of biopharmaceutical manufacturing processes.

## **Responsibilities**

1. Conduct in-depth research: You will conduct extensive research and literature reviews to gain a comprehensive understanding of downstream processes, with a specific focus on chromatography. This will involve studying scientific papers, industry reports, and staying up-to-date with the latest advancements in the field.
2. Hybrid modeling development: You will be responsible for developing and implementing hybrid modeling techniques by integrating machine learning algorithms with traditional process modeling approaches. The goal is to enhance the efficiency and effectiveness of chromatographic separations by leveraging the power of machine learning.
3. Experimental design and data analysis: You will design and perform experiments to collect relevant data for validating and refining the hybrid models. This will involve setting up experiments, acquiring data using different instruments, and applying statistical analysis techniques to interpret the results.
4. Collaboration and translation: You will collaborate closely with interdisciplinary teams, including scientists, engineers, and biopharmaceutical experts, to understand process requirements and translate them into modeling objectives. Effective communication skills will be crucial in conveying technical concepts to team members from diverse backgrounds.
5. Continuous learning: You will need to continuously learn and stay up-to-date with the latest advancements in machine learning, process modeling, and chromatographic technologies. This will involve attending relevant workshops, conferences, and seminars to exchange knowledge and collaborate with the wider research community.
6. Methodology and algorithm development: You will contribute to the development of new methodologies, tools, and algorithms to enhance the accuracy and robustness of the hybrid models. This may involve proposing novel approaches, implementing them in software, and conducting rigorous evaluations to ensure their effectiveness.
7. Presentation and publication: You will be responsible for presenting research findings through oral presentations, written reports, and scientific publications. This will involve effectively communicating your research methodology, results, and conclusions to both technical and non-technical audiences.
10. Safety and compliance: You will be expected to comply with laboratory safety protocols and maintain a clean and organized work environment to ensure the highest standards of safety and efficiency in the research activities.

### **Minimum requirements**

1. A completed Master's degree until September 2023 in a relevant field as physical sciences, (bio)-chemical engineering, bioprocess technology, bio-informatics or a related discipline.
2. Strong knowledge and experience in and/or willingness to learn machine learning techniques, including supervised and unsupervised learning, regression, classification, and feature engineering.
3. Prior basic understanding of downstream biopharmaceutical processes, particularly chromatography would be advantageous.
4. Programming skills in languages such as Python, R, or MATLAB, with some experience in applying machine learning algorithms.
5. Excellent analytical and problem-solving abilities to tackle complex modeling challenges and optimize chromatographic separations.
6. Strong written and verbal communication skills, with the ability to effectively convey complex concepts to both technical and non-technical audiences.
7. Demonstrated ability to work independently as well as collaboratively in a team environment.
8. Eagerness to learn and adapt to new technologies, methodologies, and research areas.
9. Prior experience in process optimization, data analysis, or computational modeling would be advantageous.
10. Familiarity with statistical analysis tools and software packages is a plus (e.g., JMP, Minitab)
11. Proficiency in oral and written English