



Lab-of-Origin (Seminar/ Project / Thesis)

The Self-Organizing Systems lab is currently looking for students interested in research on the lab-of-origin problem.

The advancements in knowledge and tools in the context of systems and synthetic biology increase the applicability of biotechnology. At the same time, these advances lower the burden on the accessibility of approaches such as genome engineering and increase their user group. From the biosecurity perspective, possible misuses of this technology result in serious security threads.

Possible counter mechanisms include the so called lab-of-origin approaches. The goal of these approaches is to identify the group or lab in which a genetically engineered construct was produced. Thereby, machine learning algorithms identify relevant features within DNA sequences allowing for their attribution to specific labs. While there already exist lab-of-origin predictors, new datasets and advancements in the field of large language models feature the potential to improve this process further. The goal of this project is to develop a new lab-of-origin predictor from a newly created dataset.

Tasks arising within this project are:

- Identify existing lab-of-origin approaches
- Evaluate existing approaches
- Identify shortcomings of existing approaches
- Create own dataset
- Develop and implement a lab-of-origin approach

The following skills are beneficial for this project:

- Background on machine learning
- Background on deep learning
- Programming skills

We are always happy to hear about your own ideas on this or any other topic related to synthetic biology and machine learning. We look forward to hear from you.

For further information, please contact Erik Kubaczka.

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