PhD Position:

Intelligent Proteins and High-Performance Cells

How can proteins be engineered to make decisions, and how can cells be pushed beyond their natural performance limits? In the Rahi lab (LPBS), we study and design the **dynamic computations of life**. Using a combination of **optogenetics, continuous directed evolution, and AI-driven protein design**, we aim to create **intelligent proteins**, that is, molecules that integrate multiple inputs, switch states, and perform logic-like operations. At the same time, we use light-controlled evolution to sculpt **high-performance cells**, probing the physical and evolutionary limits of growth, variability, and robustness.

As a PhD student in our group, you will:

- Use **AI-based design and simulations** to generate and test candidate proteins that perform computational tasks at the molecular level.

- Develop and apply **optogenetic and light-directed evolution platforms** to re-engineer switchable proteins with novel functionalities.

- Explore how cellular physiology can be tuned and optimized through laboratory evolution, uncovering **fundamental constraints on growth and decision-making**.

- Work at the interface of **machine learning, synthetic biology, biophysics**, in an environment that bridges physics, biology, and engineering.

We are looking for **highly motivated candidates** from physics, bioengineering, and quantitative biology who are excited to combine **computation and wet-lab experiments** to solve fundamental and applied questions in synthetic biology.

Join us in building the next generation of **programmable proteins and optimized cells**, and help define what it means for biology to compute.

Contact: Prof. Sahand Rahi (sahand.rahi@epfl.ch)

Date: October 3, 2025