

Four Months of Protein Engineering in Lausanne

Internship Experience Report by Marina Sabbadini



As a part of my Master in Biomedical Engineering at Eindhoven University of Technology, I went to École Polytechnique Fédérale de Lausanne (Switzerland) for an internship of four months in the Protein Engineering Laboratory of Prof. Kai Johnsson. This laboratory, known for combining protein engineering and organic chemistry, has a particular interest in the development of robust methods for bioimaging and biosensing. Previously introduced technologies, including bio-orthogonal self-labelling proteins, find applications in both point-of-care diagnostics and more fundamental research to shed light on mechanisms underlying various cellular processes.

During my four-month internship in the Johnsson group, I had the opportunity to work on two distinct projects. In the first project, I used bioluminescence microscopy to test newly developed constructs, designed to red-shift the emission spectrum of the luciferase NanoLuc, in mammalian cells. The successful outcome of this project indicated that these constructs can be used for multiplexing in biological samples, where their red-shifted emission results in a reduced loss of signal. The second project consisted in the synthesis and characterization of a new tether for a semisynthetic NAD⁺ sensor. In the future, this sensor will be used to study the fluctuations of NAD⁺ in different cellular compartments, which is hypothesized to be of importance both for intracellular redox states and for the regulation of enzymes involved in DNA-repair and post-translational modifications.

In addition to participating in inspiring research and gaining new knowledge and laboratory skills, I had an amazing time on a personal level. In my opinion, this research group perfectly combines scientific enthusiasm and high-quality research with an incredibly pleasant atmosphere. The group members were really welcoming and supportive in the lab, but we also found time to relax during lunches, apéro's (similar to Dutch borrels, but with the added benefit of really nice food) and BBQ's at the lake. In my free time, I also enjoyed practicing my French and discovering Switzerland with new friends that I made in my student residence and through the Erasmus Student Network (ESN). I went to France on a ski-trip, visited Geneva (including the United Nations and CERN), Zurich, Bern, Gruyeres, Montreux and Neuchatel. I also spent a lot of time outside, either on my bike or by foot, enjoying Lausanne and the beautiful views. The city has a good cultural offer (I visited art exhibitions and participated in dance workshops) and doesn't lack bars and clubs to spend the evenings.

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