EXCHANGE REPORT	Name	Year and term for exchange
	Juan Pablo ROMERO BERMUDEZ	2018 Autumn Semester

Exchange university

EPFL

Degree programme

Medical Engineering (TMLEM)

A Great Escape

Before departure

I applied to EPFL for my exchange because I want to focus my career on developing neural interfaces and their department of life sciences offers a minor in neuroprosthetics consisting on some courses that are related to my interests and which are not taught in KTH like 'Sensorimotor Neuroprosthetics', 'Biomedical Electronics and Medical Microelectronics' and 'Flexible Bioelectronics'. My expectations were mainly being exposed to state-of-the-art research on subjects such as brain-machine-interfaces, bio-amplifiers, neural implants, etc and, of course, expand my academic network. Since EPFL is located in Switzerland, I did not need vaccinations, nor visa. I speak French so I didn't need extra language courses. It is important to mention that EPFL offers French courses for exchange students.

Upon arrival

The semester started on September 18th. However, a 'Welcome' talk was given on September 14th. I arrived one day before that talk. During the talk, Agepoly (an equivalent of THS) was introduced. Several student clubs exist at EPFL (see here).

Financials

I got a scholarship from the swiss government: an equivalent of the Erasmus scholarship. Switzerland is more expensive than Sweden. The groceries cost almost the same, but the rent is higher. There are not mandatory fees to pay at EPFL.

Accommodation

EPFL helps students finding accommodation in corridor rooms and shared flats in student residences. However, those options are limited. I got accommodation through social media. I lived kind of far from the campus (30 minutes using public transportation). I rented a room in a flat shared with two other persons. We had a dog.

University and studies

I have the impression that EPFL's campus is bigger than KTH's one but not by much. I like KTH's campus better than EPFL's since it's greener. Moreover, the main building at EPFL, the CO, is kind of oppressing. I really hated being there. As for the studies, EPFL is more stressful. The courses typically are 3 to 4 ECTS; 30 ECTS require more than 7 courses. In addition to this, the semester is not divided in periods, which means that all the >7 courses are taken at the same time. At the end, I had 7 exams in 10 days. Almost all the courses are taught in English but, although they claim to be the most international campus in Europe, one can notice some clustering: 1/3 of the students are French, 1/3 are Italian, the other third is half-swiss and half from other countries. If one does not speak French/Italian is kind of hard to feel integrated.

Courses

The following is a list of the courses that I took at EPFL. As I already mentioned, I want to focus my career on developing neural interfaces. This means that I would like to work with neural implants for brain-machine interfaces or neural stimulators. For that I need background in implantable bioelectronics and machine learning.

BIOENG-486 / Sensorimotor Neuroprosthetics
This course is about neural prostheses. The lectures focus on neural disorders which affect upper- and lower-limbs. However, 50% of the grade corresponds to a group project which purpose present a proof-of-concept of a neural prosthesis beyond the limbs. This year's projects included: active prosthetic tongue with soft actuators, drug delivery and brain signal recording for epileptic seizure control, vagal nerve stimulator for controlling appetite in obese people.

EE-516 / Data Analysis and Model Classification
This course is machine learning for biomedical applications. We explored topics such clustering, classification, regression and hidden Markov models. 40% of the grade corresponds to projects based on using MATLAB to analyse datasets taken from brain recordings on monkeys operating brain-machine interfaces and robotic arms.

EE-519 / *Bioelectronics* and Medical Microelectronics
This course is about electrodes and analogue front-ends (filters and bio-amplifiers) for neural implants. Principles of neurophysiology are presented. A review of classic microelectronics is done; different topologies are tackled. The classic model of an electrode/electrolyte is presented. Patterns of electrical stimulation are discussed. 33% of the grade corresponds to a presentation of a topic; this year's subjects include: brain-machine interfaces, neuromorphic circuits, regulatory framework for implantable wireless electronics.

EE-423 / Low Power Electronics
This course is about electronic analysis and design of electronic circuits biased in strong inversion and whose amplifiers operate in weak inversion, so the power consumption is reduced. Strategies to make the circuits robust to noise and supply inconstancy are tackled. 100% of the grade corresponds to the exam. Although the course is part of the first semester of the master's program in electrical engineering, I don't recommend it to students who don't have a solid background in electronics. I am doing my master's in medical engineering, but I have a bachelor in electronics.

MICRO-514 / Flexible Bioelectronics
This course is about microfabrication and design of electronic circuits on flexible substrates. The core of the course is the study of the mechanical properties of the materials used to build transistors and transducers. The course is very broad but requires solid knowledge about electronics. 50% of the grade corresponds to a group project. This year's projects included: active multi-electrode array for electrocorticography, facial mask for speech-detection, conductive fibers for smart textiles, etc.

MICRO-568 / Seminar in Physiology and Instrumentation
This course is about the use of technology in medicine. Each lecture was divided in two parts. First, a medical doctor presented a subject (such as respiration, immunology, dementia, etc). Then, 3 students presented one topic (gamma knife, photodynamic therapy, retinal implants) each. The idea was to realize the extent at which technology could be beneficial for medical purposes.

City and country

I have lived in 4 countries and visited about 15 more. Based on my experience, Switzerland is not the more fun place to live. Supermarkets close really early and Lausanne, in particular, is too small. I lived in France for 7 years so I would say that I don't find swiss culture too different from what I know. They have good cheese which means that I enjoyed the holidays. I did not have enough time nor money to enjoy what seems to be the best of Switzerland: the mountains. Swiss people, as suedes, are reserved so, no big change there. I don't recall any culture shock: the only 'shocking' thing is that at EPFL we need to recharge the EPFL card with money in order to get the student discount at the school restaurants; paying with a normal card means 2 extra francs on the receipt.

Leisure and social activities

I did not have much spare time. I was busy studying and finding a master's thesis. I know that there are several leisure activities promoted by the school through associations, but I did not enrol any of them. I played football a couple of times. I made acquaintances when working in groups, then I made them become friends by going to SAT (the school bar) or to The Great Escape (one of the most popular bars in town). I made friends from France, Switzerland, Iran, Turkey, Italy and Venezuela.

Other recommendations and observations

If you go to EPFL during the Autumn semester, try to enjoy the first month as much as possible: go to the mountains and to the small cities around the 'Lac Leman'. If you don't do that at the beginning of the semester when the weather is good and the workload is low, you might regret it.