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International Relations at Universities of Applied Sciences

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Abstract: An overview of international relations at the Universities of Applied Sciences in Switzerland is presented.

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Introduction

In a global market with worldwide competition, international orientation towards industry and academia is essential to meet the demands of the future. Therefore, from the very beginning the chemistry and life science departments at the Universities of Applied Sciences in Switzerland consistently fostered international industrial collaborations and partnerships with Universities and research facilities outside of Switzerland. For young graduates, this offers a unique possibility to build up their own networks, but also to win recognition in a new, unknown and demanding environment. In addition, exploring and experiencing a foreign country and culture during a Bachelor or Master Thesis is a lifetime experience and important for their résumé. Amongst the many contacts and collaborations that have been established during the last couple of years, only a small selection can be discussed in this article.

HES-SO – Haute école d'ingénierie et d'architecture de Fribourg

During its 40 years of existence, the Chemistry Department at the School of Engineering and Architecture of Fribourg has created a large network encompassing universities and engineering schools both at national and international level. With core education in applied chemistry and a unique range of equipment in industrial chemistry, the Department and the associated Institute of Chemical Technology (ChemTech) are an attractive partner for foreign students and researchers, offering them an opportunity to gain hands-on experience, for example with state-of-the-art reactors and distillation columns.

The Chemistry Department maintains a regular student mobility program at the Bachelor level with Germany (TU Dortmund University and Westfälische Hochschule), France (University of Burgundy), Italy (University of Bologna), Romania

(Babeş-Bolyai University) and Canada (Laval University). For Bachelor students, it is a great opportunity to visit research labs in foreign universities and get their first international professional experience.

At the Master's level, contacts have been established with the Dublin City University (Ireland) in the field of Process Analytical Technology, University of Guelph (Canada) in macromolecular chemistry and the University of Santiago de Compostela (Spain) in chemical engineering. Collaborations at the Master's level create a natural bridge between academics and research and contribute to a greater international visibility of our School abroad.

The Institute of Chemical Technology fosters international cooperation in applied research and development as well as in further education. For example, a three-month in-house course on chemical process development and scale-up was organized in 2015 for a group of seven researchers from the Federal University of Pernambuco (Brazil). In the field of research, the Institute collaborates with academic partners in countries such as India (Indian Institute of Technology), Senegal (University of Dakar) or Burkina Faso (University of Ouagadougou), as well as with industrial partners like BASF (Germany).

HES-SO Valais-Wallis

The University of Applied Sciences and Arts Western Switzerland Valais (HES-SO Valais) has been encouraging student mobility for over 20 years and works closely with other universities and universities of applied sciences across the world.

In the past six years, 65 students of Life Technologies from the HES-SO Valais wrote their Diploma theses abroad and 75 international students spent a semester or more in Sion.

Most exchanges are organized with Dublin City University (Ireland) and Università degli Studi di Palermo (Italy). For more than 15 years, we have been regularly exchanging students between the National Green Tea Institute of Zhejiang University in Hangzhou, China. The students study the effect of tea with western foods such as milk in digestion with techniques such as cell culture, and work on the effect of polyphenols on blood. In 2016, a new partnership agreement was signed with Hokkaido University (Japan), which welcomed the first Swiss student this year. HES-SO Valais students also have the option to participate in exchanges with Germany, Holland, Austria, France, Belgium and Canada. They take advantage of this opportunity to acquire new experiences, get to know new cultures and improve their work prospects.

FHNW Muttenz

For more than 10 years the Universities of Linköping and Palermo have been homebases for many exchange activities. In addition to joint research projects, each year there is a lively exchange of Bachelor and Master students performing their thesis or studies in the respective institution. There is also a regular exchange of teachers giving courses at the partner institution. Recently a very interesting contact and collaboration with the ENFSI the Swedish National Forensic Centre in Linköping could

be established and the first Bachelor and Master thesis in analytical sciences started this year.

In addition within Europe many exchange programs with a variety of internationally renowned universities are fostered, like institutes in Barcelona (Universitat Pompeu Fabra, Catalan Institute of Nanoscience and Nanotechnology, Universitat Autònoma de Barcelona). In Germany very close collaborations have been established with the Universities of Freiburg, TU-Berlin, TU-Munich and RTW-Aachen.

The first joint PhD was started with the University of Rostock in 2014 and the PhD student is expected to receive her PhD degree at the beginning of 2017. This collaboration is only one example of offering the very best graduates from FHNW the chance to continue their studies with a PhD thesis, which is at present not directly possible within the Swiss Universities.

Besides the lively and active exchange programs within Europe the School of Life Sciences holds also collaborations and exchange programs with Universities and research facilities in overseas. Harvard University, Cambridge Mass. regularly hosts bachelor theses for HLS students and has proved to be an excellent place for visiting professors. Most recently research staff (visiting professors) and student exchange was established with the Universidad de Sonora (Mexico) as well as joint research activities in the area of nanomedicine. Furthermore active exchange with several Universities in Australia like Monash University, Melbourne University and most importantly Deakin University could be established. Several students have already taken the opportunity to perform their Master thesis in Australia or continued with their PhD (University of Tasmania in Hobart). Recently the HLS has been invited to participate in an international research program of the Deakin University called the 'Future Fibre Industrial Transformation Research Hub'. This will further strengthen the already close collaboration and will enable joint research activities and PhD exchange.

In summary the HLS is very well internationally connected and linked with its many activities which open up a multitude of opportunities for research and education and is a very attractive asset for the students to perform their studies at the HLS. A clear visible international orientation is also very important to meet the demands of the future and to persist in the competitive global educational market.

ZHAW Wädenswil

Whereas applied chemistry has a long tradition in the canton of Zurich, going back to 1875 with the chemistry program taught at the so called 'Technikum' in Winterthur, the succeeding Bachelor's Degree Program in Chemistry in Wädenswil was only initiated in 2006 within the context of the European Bologna Reform.^[1] This brief description focuses on the international

activities of chemistry students of the past 10 years during the Wädenswil era. Starting up the chemistry program in Wädenswil, it was clear right from the beginning that student exchange should be reactivated. In order to build sustainable relationships with foreign universities and considering the language skills of the chemistry students, it became evident that first activities should focus on English-speaking countries.

Due to a Memorandum of Understanding between the ZHAW and the Worcester Polytechnic Institute WPI in Massachusetts/USA the opportunity arose to hold a joint International Summer Workshop 'Start-up your own chemical company' in 2012 and to initiate student exchange in the same year with three Swiss chemistry students studying at WPI. Since then the exchange between the two institutions has developed well with students being exchanged in both directions, typically 2 to 5 students per year, and several visits of staff. For outgoing ZHAW students the fifth semester at WPI integrates well into the chemistry curriculum in Wädenswil, allowing them to seamlessly complete their Bachelor's Program with the sixth semester at home. Incoming students from Worcester enroll for an advanced lab course working on applied projects in the different R&D groups. This cooperation between both institutions is especially interesting since WPI, which was founded in Worcester in 1865 and thus is one of the United States' first engineering and technology universities, has an applied sciences approach very similar to that of ZHAW.

Recently, cooperation with the University College Cork (UCC) in Ireland, another English speaking university, could be formalized in the context of the Erasmus/Swiss-European Mobility Program (SEMP).^[2] The first student has already stayed there for a semester last year and two ZHAW students will study in Cork this fall. Ireland as well as Switzerland are rather small countries, both playing important international roles with their chemical-pharmaceutical industry.

Apart from bilateral cooperation with these universities, students participated at international Summer Schools such as the Summer Schools on Advanced Biotechnology supported by Biotechnet Switzerland,^[3] which is organized this year by the University of Palermo. Furthermore, outgoing ZHAW students prepared their bachelor thesis abroad, for example at Princeton University or WPI (all USA) and accomplished traineeships offered by IAESTE^[4] in various countries from South Korea and Australia to Norway and Austria. Incoming Erasmus students studying in Wädenswil originated from Jena (GER), Graz (A) or Krakow (POL).

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[1] A. Ecker, U. Frey, D. Gygax, O. Naef, *Chimia* **2010**, *64*, 617.

[2] <https://www.ch-go.ch/en/meta/programme-overview/europe/erasmus/sempr/>

[3] <http://www.biotechnet.ch>

[4] www.iaeste.org