INFOrum Scientium

Study Visit Zürich

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As part of the PhD-students career planning Forum Scientium makes study visits to research-intensive companies and to research departments at universities. During the visits, we try to meet newly hired PhDs and postdocs. The network of earlier Forum members, the so called Former Scientium, is valuable when arranging the study visits and contributes to the high quality of the visits. May 30 - June 1, 2011, the Forum Scientium members Rozalyn Simon and Abeni Wickham arranged a visit to Zürich.

Surface Science and Technology, ETH Zurich *Prof Nicholas D. Spencer*

On a nice and sunny morning we started our Zürich study visit by a visit to the Surface Science and Technology group at ETH. This large group is lead by Professor Nicholas Spencer and conducts research within different areas of material science.

We were greeted by Dr. Lucio Isa, postdoc in the group, who presented his own research, dealing mainly with nanoparticle self-assembly at liquid interfaces. For example, he had been working on a method to measure the contact angle of individual nanoparticles. The nanoparticles could also be used for 2D patterning of colloidal lithography masks. In addition, Dr. Isa talked about how he had ended up at ETH and gave some general advice about post-doc positions.

A second postdoc, Dr. Mateu Pla Roca, gave us useful advice on what to think about when looking for post-doc positions. During his career he had changed research topic, from inorganic chemistry to work on lipid bilayers and transmembrane proteins. He considered the start of a postdoc an excellent time to change the main focus of the research.

We also met two Swedish PhD students who both had studied Engineering Biology in Linköping; Maria, who had just finished her PhD and Bengt-Olof who had just begun his. Maria and Bengt-Olof gave their view of doing a PhD abroad.

At the end of the visit we went on a lab tour. The facilities included a number of instruments important in surface science, including among others QCM, ellipsometry and AFM.

/ Kristin Persson and Leif B.G Johansson

More information at:
http://www.surface.mat.ethz.ch/

Dr Lucio Isa, Dr Mateu Pla Roca, and Stefan Klintström at Surface Science and Technology, ETH.

EMPA - a Research Institute of the ETH Domain *Prof Gabor Kovacs*

At EMPA, we were greeted by Dr. Gabor Kovacs, who started by giving a presentation about EMPA. EMPA is regarded as one of the top ten research institutes in Europe, with a budget of around 150 MCF and 500 publications/year. It has around 940 employees, whereof 24 professors and 140 PhD students. The main research focus is on materials and technologies for a sustainable future, and the institute tries to act as a bridge between applied research and industry. EMPA also conducts contract research and education at both ETHZ and EPFL.

The research in Dr. Gabor Kovacs' group concerns the use of electroactive polymers (EAP) as artificial muscles. These are in principle stacks of elastic capacitors. When the capacitors are electrically charged the electrostatic interactions between the electrodes will cause contraction of the stack. EAPs can be fabricated in numerous forms, such as rolls or planar actuators. Rolled EAPs can for example be used as a robotic muscle (for arm-wrestling application). The planar type can for example be put onto the surface of an air

Some of the devices demonstrated for us during the lab tour at EMPA.

blimp to achieve a twisting motion that propels the airship.

Dr. Florian Habrand does a postdoc in development of fabrication techniques for EAPs. He presented the importance of minimising the voltage requirement for actuation and to allow for thinner elastomer layers and more compliant electrodes to make EAP more interesting for the industry. Further, he presented his work on an integrated process for manufacturing EAPs, where the dielectric and electrodes are deposited in a rool-to-rool process. He also shared his views on the differences of being a PhD and a postdoc.

After the presentation we got a tour to the lab where EAPs are manufactured and tested, there we saw several types of EAPs. Finally, we were invited to mingle over some snacks and beverages.

/ Erik Gabrielsson

More information at:
http://www.empa.ch/plugin/template/empa/1011/*/---/l=2

Laboratory of Organic Chemistry, ETH Zürich

Prof. Dr. Erick M. Carreira

Speaking to quite a mixed audience Prof. Carreira began his hour-long talk by describing the core fundamentals and potential of organic chemistry. The step-

Professor Carreira together with three of his PhD students at Organic Chemistry,

wise assembly of complex molecules, often derived from nature itself, is a concept not too familiar to most Forum members and therefore made a perfect introduction before moving on to his group's research, spanning over quite diverse fields of organic chemistry. One interesting area is that of synthesising spirocyclic amines with strong structural resemblance to morpholine but with different chemical and biological properties. They are for example more metabolically stable, making them interesting to for example the pharmaceutical industry. Another field of Prof. Carreira's research is that of cathalytical methods in organic chemistry, for instance the interesting rhodium-catalysed formation of strained substituted cyclopropene rings.

The latter part of the hour Prof. Carreira used to describe his group's research in synthesising natural products, such as lipids, containing chloride. He especially described one particular reaction initially suffering from one of the most common issues in organic chemistry, that of stereoselectivity. Prof. Carreira closed his talk by giving some advice about your postdoc period (he highly recommends doing it abroad), and all of his attending PhD students got to share their view on working in Zürich and Switzerland, the lab, their research and their own postdoc plans. When the hour was up all too early the audience had received a better understanding of the field of organic

chemistry as well as the challenges associated with it.

/ Mattias Tengdelius and Linda Åkerman

More information at:
http://www.carreira.ethz.ch/

Laboratory of Biosensors and Bioelectronics (LBB)

Prof Janos Vörös

The hot weather that Zürich offered continued on Tuesday morning when we walked up-hill to the laboratory of professor Janos Vörös. When in place in the lecture hall Prof. Vörös gave an inspiring and honest talk about his hiring strategy and also some information about his research and his group dynamics.

The field in which the research lies is widely multidisciplinary and comprises physics, chemistry, biology and material science and focuses on the nanostructured dynamic bioelectronic interfaces with applications in e.g. neuron healing and biosensor techniques for diagnostics and drug discovery.

Prof. Vörös leads a group of around 50 people and among these there are three postdocs. He presented his personal concept of hiring new people and it would in the end tell us that the criteria to get a position are very hard… First, he mentioned that he receives around 10-20 open applications every week, but he only hires staff via friends and recommendations etc. He showed us a list of the criteria which the applicant who will get a position shall fulfill, e.g. the applicant should impress him in some way, have more than one job option and good timing, and preferably also be smarter than himself. After passing an unannounced phone interview the applicant gets an invitation to Zürich and there another interview takes place. A lunch together with the group (not in presence of Prof. Vörös) is held to make sure that the person could fit in the group mentality. Prof. Vörös also explains that his group has veto right in making the decision. So, if the person makes a good impression on both Prof. Vörös and the rest of the group he or she gets a job offer.

It appeared that the crowd was inspired (or afraid?) by the very good talk because not many questions aroused afterwards. Next, we had a chance to meet the three postdocs; they gave a short presentation about themselves and didn't quite understand how they passed all the criteria to get the position they actually had. However, everyone was very pleased by working under Prof. Vörös and liked the environment which ETH had to offer.

At the end of our visit, after having coffee and a lovely croissant combined with mingle, we were divided into three groups and were introduced to the various labs. One of the postdocs was Andreas Dahlin, a Swede almost finished in Zürich and on his way back home to Chalmers and Gothenburg. He was pleased with his stay and could recommend it. Prof. Vörös was opponent at his defense and a friend of his supervisor, so that was the way in for Andreas.

The visit was very well planned and nice in general, and the members of Forum Scientium had an inspiring and insightful experience at LBB

/ Sara Nilsson and Jutta Speda

More information at:
http://www.lbb.ethz.ch/

Prof. Vörös and his postdocs Dr. Andreas Dahlin, Dr. Gemma Palazzolo and Dr. Jose Francicso Saenz Cogollo (from left to right)

Neurobiology Hoffmann-La Roche, Basel *Per-Ola Freskgård*

We hired a few cars and our excellent drivers drove us for about an hour to Basel. After a quick lunch and for some of us; a few meetings with different guards and a few missed phone calls, we finally arrived to Roche. Dr Per-Olof "PeO" Freskgård welcomed us and we got our nametags and were shown to a fancy conference room. We could definitely tell that we had arrived to a company; there were ice tea, soda, fruits, sweets, papers, pencils and laser pointers for all of us.

PeO started off with a presentation about himself. He did his PhD at Linköping University in Uno Carlsson's group working with carbonic anhydrase. After the dissertation he got an employment at Novo Nordisk. They let him do a postdoc for a year in California and then he continued working for the company for six years. PeO continued on to Maxygen for a year, started up a company called Nuevolution and worked with patents for two and a half years. After resigning he was unemployed for a couple of months before he started to work at Astra Zeneca. During that time he also became an associated professor at Linköping University, working together with Nalle Jonsson and Uno Carlsson. PeO has now worked at Roche for two years and is very happy about the employment.

Today PeO is working with diseases like AD, MS and Parkinson. Roche has clear focus on healthcare. The company was founded in 1896 in Basel and has 80,500 employees and is active in 150 countries. The sales were 47.5 billion Swiss Francs in 2010. Roche is number three in pharmaceuticals and number one in in vitro diagnostics in the world. The biggest income comes from Avastin, a drug that blocks angiogenesis, the growth of new blood vessels. The product is used for treatment of various cancers. However, the most famous product is probably Tamiflu,

Dr PeO Freskgård at Roche, Basel.

the antiviral drug that slows the spread of influenza virus.

PeO enjoys the work at Roche better than at Astra Zeneca. One reason is that Roche spend 80 % on research while Astra spend 80 % on processing.

We enjoyed the visit, not only for all the sweets but also for PeO's great presentation. PeO is a great example of that you can try many different roads in your career.

/ Klas Tybrandt and Karin Magnusson

More information at:
http://www.roche.com/r_d_sites.htm?id=3

Computational Biology, ETH in Basel *Prof. Dr. Dagmar Iber*

Three members of Forum Scientium went to Basel by car from Zürich to visit Professor Iber and her group at ETH in Basel. We were greeted by Georgios Fengos at the door who led us into the building and to the Scientific Lounge. There, we initiated an intimate discussion with professor Iber's two Ph.D students, Mr. Fengos and Mr. Federico Felizzi. Their main work involves the complete characterisation of the Integrin receptor signalling pathway. Through an ingenious experiment where a cell is stimulated to form a protrusion through a plate with a hole small enough not allow the cell nucleus to go through, the cell is trapped mid-way through the plate. The cell can then be chopped of and the protein content

Georgios Fengos and Professor Dagmar Iber

of the two parts can be analysed. By comparing the Integrin-rich protrusion part with the nucleus part the proteins potentially important for the Integrin pathway are harvested. These proteins are finally modelled in a signalling network to study the pathway and related effects. Another research topic headed by Federico Felizzi involves a method to study protein co-importance or protein-protein interaction potential. In this method proteins are optimally ordered in a sphere in space where proteins co-expressed are repelling each other. Through removing proteins from the sphere one could study the followed displacement and make predictions on the importance of the specific protein in regard to the data. Finally, we sat down with Philipp Germann who is studying embryonical cell differentiation. Through modelling different important differentiation factors he could predict and model how limbs, wings etc. are growing. Through these models he could also visualise these processes.

/ Alexandra Ahlner and Fredrik Lysholm

For more information:
http://www.bsse.ethz.ch/research/Professors/iber_cv

Division of Psychiatry Research, University of Zurich *Prof. Roger Nitsch*

On Tuesday afternoon a group of us went to the Division of Psychiatry Research and Psychogeriatric Medicine and met up with our guide for the day, Institute Manager Cornelia Marty. The visit started with a welcome speech by Prof. Roger M. Nitsch who explained the research performed at the division and also what would be presented to us during the day. The first scientific presentation was held by PhD student Jitin Bali who talked about the cell biology of Alzheimer's disease. He was followed by Dr. Uwe Konietzko who presented the role on nuclear signalling in Alzheimer's disease. Right before the coffee break, Postdoc Tobias Welt presented his work on animal models of neurodegenerative diseases. After a very nice coffee break, we were guided around the lab and given the opportunity to observe the procedure to harvest the brain of an Alzheimer knock-out mouse. During anaesthesia the mouse was perfused with PBS buffer to drain it from all blood, since this allows nice histological labelling of the brain tissues.

The study visit then continued with a walk to the Psychiatrische Universitätsklinik (PUK), where we were received by MD Mathias Laurig. He started by presenting the work that is performed at the Psychogeriatric University Hospital.

The scientific presenters of the day; Jitin Bali, Tobias Welt and Uwe Konietzko.

The clinic is capable to admit up to 30 patients with various types of neurodegenerative disorders. After evaluation and a set medical regimen, the patients are usually transferred to other geriatric facilities. The study visit was ended with a tour at the clinic where we had the opportunity to meet patients and see their rooms and social areas.

More information at:
http://www.neuroscience.ethz.ch/research/aging_disorders/nitsch

SurfaceSolutionS (SuSoS) AG *Dr Samuele Tosatti*

SuSoS is a spin-off company from Prof. Nicholas D. Spencer's Surface Science group at ETH. They focus on surface modifications in the fields of wettability and tribology. SuSoS works together with other companies to develop tailored surface modifications for their products. The work is problem-oriented without performing basic research, but they keep good contact with academia to follow developments and get consulting when needed.

The visit consisted of three parts; Ms. Mine Krasniqi gave a presentation of the company together with product demonstrations, Dr. Samuel Tosatti, CEO of the company, gave a lab tour while explaining the challenges of a small high-tech company and the importance of "rentability", Dr. Elizabeth Duncan answered questions about life in Zurich,

Maria Bolin (left) and Kristin Persson (right) listens to Dr Samuel Tosatti, Dr. Elizabeth Duncan and Ms Mine Krasniqi at SuSoS.

working in a small company and how to get a job after dissertation.

/ Linnéa Axelsson and Per Erlandsson

More information at:
http://www.susos.com/home.php

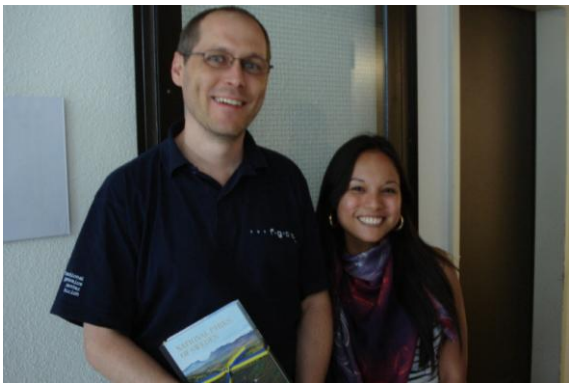
Functional Genomics Center Zurich *Prof Ralph Schlapbach*

The very last study visit took place at the Functional Genomics Center Zurich (FGCZ). Prior to this visit half of the group had already left for the airport, while the rest of us were stuffed from Indian food from a kitschy restaurant nearby the FGCZ. We also had some coffee to keep us alert. The coffee turned out to be superfluous because this visit was ambiguously well arranged and also really interesting.

To begin with Dr. Bernd Roschitzki gave a general presentation of the activities at the FGZC, which is a joint research facility of the ETH Zurich and the University of Zurich. The FGCZ functions as a competence center, offering expertise within the latest technologies in genomics, transcriptomics, proteomics, and metabolomics. Its task is to support the research community in Zurich and offer services both to academic and commercial scientists. That is, the FGCZ only performs life science research in collaborations. Their own research instead focuses on methodology development.

After the presentation we were divided in groups with only 4-5 persons in each group, meaning we really had the opportunity to ask questions.

One of the employees that guided us was Catharine Aquino, who has been working at FGZC for 7-8 years. She showed us the equipment for microarray techniques. Another employee, Dr. Åsa Wahlander showed us their mass spectrometry machine-park and explained the develop-



Dr. Bernd Roschitzki och Catharine Aquino at Functional Genomics Center Zürich

ment of the ion-trap. All the employees we met at FGCZ took good care of us and the two planned hours passed very quickly.

/ Amanda Nordigården and Elin Nyman

More information at: http://www.fgcz.ch

Blinde Koh *Restaurant in Zürich*

When presented with the challenge of helping to plan such a large trip for such a diverse group of researchers I was very intimidated. Naturally, I wanted to think of something fun where everyone could experience something new and different. When I first heard about this form of blind dining I was intrigued. I was reminded of an Indian folk tale, in which a group of blind people (or people in the dark) touch an elephant to learn what it is like. Each one feels a different part, but only one part, such as the side or the tusk. They then compare notes and learn that they are in complete disagreement. I often think of this parable when I consider communication between fields within the sciences. Physicists, Chemists, biologists, all have their own language by which we try to describe what we are observing, and often our ways of defining and describing the same exact thing differs so greatly that we cannot agree that we are looking at the same object. I thought that since one of the goals of Forum is to break down these language and research boundaries between our fields and to encourage collaboration, dining in the dark would add to that experience of communicating our exper-

The restaurant Blinde Koh where we had dinner the last night in Zürich.

iences without all of the common senses. At first, is was a bit scary and exciting, my heart was racing. Then, when we were in the dark it was disorienting and even made me a little annoyed. I began to strain to hear what others were saying, things seemed closer than they actually were or much farther than I expected. I could not read the expressions on others faces so I became unsure as to whether or not they were interested in talking, or if I had asked a question while their mouth was full of food ☺. I realized how much I rely on reading lips in noisy places to understand speech, especially Swedish! In the end I became withdrawn, exhausted and I just wanted to see again! I can't say it was what I would call pleasurable dinning but it taught me a lot about myself in relationship to others. What kind of cues I rely on for communication and for the general ability to do something as simple as eat a meal. I gained insight into the life of a blind friend of mine and I have a new sympathy for the aging process when one begins to loose sight, hearing, and mental agility. I would never do it again, (I'll wait for old age to do it for me) but I would encourage others to try it at least once!

/ Rozalyn Simon

More information at:
http://www.blindekuh.ch/blindekuh_zuerich/