

Interview with Sciex Home Mentor Prof Dr Talis Juhna – July 2014

Project title: BioWater: Assessment of biological stability in drinking water distribution networks with chlorine residuals.

Duration: 12 months

Call: 7th Call, no. 12.265

Duration: 1st of September 2013 - 31st of August 2014

Host institution: Swiss Federal Institute of Aquatic Science and Technology (Eawag), Dübendorf, Switzerland

Home Institution: Department of Environmental Microbiology, Riga Technical University RTU, Riga, Latvia

Fellow: PhD student Alina Neščerecka

Host Mentor: Senior researcher Dr Frederik Hammes

Home Mentor: Prof Dr Talis Juhna

“The weight of our co-operation helps in negotiations with water suppliers”

Talis Juhna is a professor at the Department of Water Engineering and Technology of Riga Technical University (RTU). In 2012, he was appointed Vice-rector for Research of RTU. As a Sciex Home Mentor, he supervises PhD student Alina Neščerecka who is currently working on her doctoral thesis as a Sciex Fellow at Eawag in Switzerland. In 2013, the Latvian news magazine ‘IR’ listed Talis Juhna among the top ten Latvian researchers of the year. His research interests include drinking water treatment, bacterial growth in water distribution networks and rapid methods for pathogen identification in drinking water.

Sciex: Prof. Juhna, you have been acting as a Vice-rector for Research at RTU since 2012. Do you think that Sciex differs from other funding opportunities by expecting a stronger commitment from the Home Mentor and the Home Institution?

T.J.: Our major programmes are related to EU programmes like FP7 or Horizon 2020. In terms of money, structural funds have a large share. The Sciex Programme is not the most common way we cooperate with other institutions or researchers from outside Latvia. It differs by focussing on visiting researchers and their projects. This requires careful planning and submitting of a project proposal. I think Sciex accepted our proposal because we also had a previous cooperation with Eawag. We had a very good contact and it was clear what we were going to do during this Sciex project, what the research plan was going to be. I think this was a bonus.

Our researchers are very grateful for the opportunity to participate in such a programme. I wish there would be more such initiatives in every country.

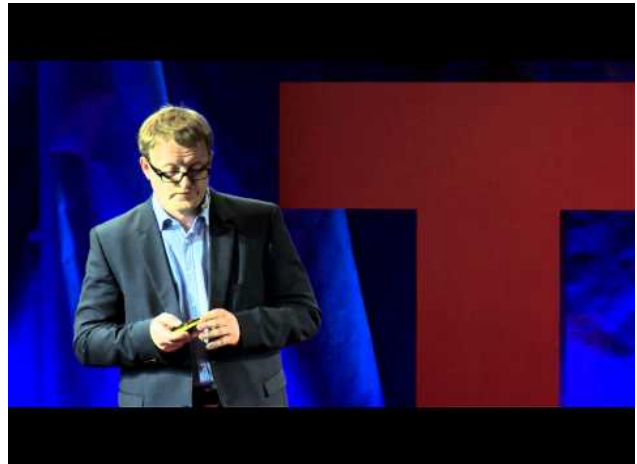
You graduated in Stockholm, obtained a joint PhD in Lulea and Riga and then started an academic career at RTU. Is international experience nowadays a requirement for a successful academic career in Latvia?

Mobility is of utmost importance. Apart from being a valuable experience, I would say that it is almost a requirement. It provides a lot of incentives for students to become more

independent, to widen their horizon, to meet scientist and researchers with different experience and thinking. As for my Fellow Alina, I can only say that after half a year in Switzerland, you can already see that you are dealing with a completely new person.

Is international experience a selection criterion for candidates applying for a professorship in Latvia?

It is one of them. Besides scientific excellence and experience in teaching, you need international experience. If you find yourself in a selection process, international experience is definitely taken into account. I wish that criterion had an even stronger weight.



Prof Dr Talis Juhna, RTU holding a lecture at TEDxRiga 2013

A recurring issue with the Sciex Programme is the concern of brain drain. What do you think about this concern?

If you send someone to a country with better income, you have to face the risk that he or she will find a job and stay there. Of course you could make some kind of contract that this person should return. But this limits the freedom of movement. One way we can diminish risks is to go for programmes like Horizon 2020. If we have projects with sufficient funding, and that's a development we can already see, then students and researchers come back to Latvia.

You are pointing to Horizon 2020 's goal of a balanced development within the ERA through “teaming and twinning” of partners from different countries in research?

We have of course already started “twinning activities” for Horizon 2020 by looking for partners and we will certainly go for these excellence centres as mobility destinations for young scientists.

You see, for young people, it is not just about leaving the country. They want to gain experience abroad and then return. I have had lots of students telling me they would like to come home if they found an opportunity here. The most efficient way is to offer strong support (also financial) to young people going abroad and coming back. To offer them opportunities to do their research here. This is the path we should take rather than putting constraints on mobility.

The European Commission has, in consequence of the outcome of the Swiss popular vote on immigration restriction of 9.2.14, frozen negotiations about Switzer-

land's participation in Horizon 2020 and Erasmus. What impact does this have on your collaboration with Eawag?

I think it is a pity. We are talking about highly trained students and researchers moving across borders and making a contribution. Look at our case: Eawag gains something, as we provide the best students. I don't really feel at ease criticising the vote of the Swiss people, but from our point of view, such limitations are detrimental to mobility. Scientific mobility should be totally free regardless of the country you are coming from.

According to your Fellow, safety of drinking water is a pending matter in Latvia. Your team has been developing new methods connected with drinking water biological risks, but the use of flow cytometry in case of drinking water is only rarely used today. What kind of knowledge transfer and technical spillover is to be expected from this Sciex partnership?

Alina's host mentor, my friend Frederik Hammes, and I spent a lot of time on this topic. The project Alina developed is a contribution from both sides. A few years ago, Frederik was in Riga for two weeks to test the technology and we showed that if you managed to collect large samples, you would be able to forecast changes in water quality, something we could not do before. This gives us the possibility to show how quality alters within a distribution network. Take for example Legionella or micro-bacterial problems in networks. If we don't know how the system actually works, it is very difficult to develop a cure or some kind of action against these diseases. By means of the flow cytometry technology, we increase the quality of water in its daily use, but also protect the water supply network from deliberate contamination, caused for instance in a bio-terrorist attack. I think that the network is a kind of weak point in the water supply chain. By applying this technology, and as you know in Switzerland water companies have already started to do this, you can increase water safety and people will start to use tap water for everyday consumption.

Where do things stand with tap water right now in Riga?

Well, let me explain. I talked about this when addressing water companies in Riga and surroundings. Drinking water is meant to be drunk, as the expression says. So its quality has to be suitable for consumption and not just for flushing toilets or showering. The water quality we provide at the treatment plant is good. However, we have troubles maintaining water quality in the network. And technologies like the one Alina is working on allow us to deal with quality changes in networks. It is up to companies and municipalities to take the message more seriously that we expect Riga water supply to be available and people willing to drink from the tap. If you ask people right now in the streets, not even one in three will drink from the tap – this can be changed!

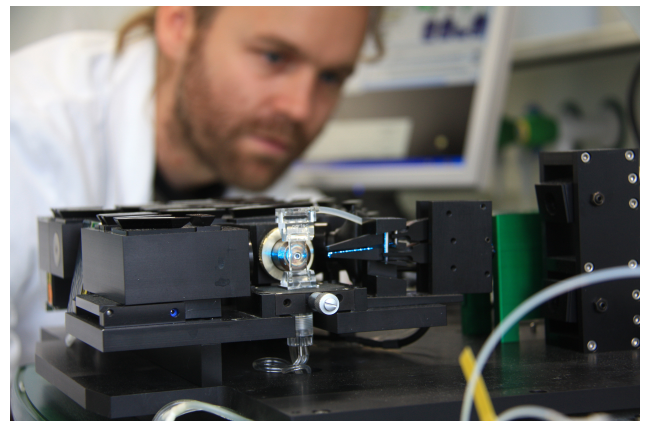
Alina will come back with a toolkit she wants to apply to the water supply system in Riga. We are talking about 700'000 out of 2 Million Latvians living in the greater Riga area. This is a large water supply system. What is the biggest challenge for applying Alina's research outcome in the field?

I think it is not about money, but about attitude. It is the challenge of convincing municipalities that the investment

is worthwhile. To persuade them that investment in a better control of water quality, even if drinking water standards do not require this, not only brings about safety but also confidence and trust in water suppliers. If customers know that tap water is fine, you change customer relations and they will start drinking it and be willing to pay for its quality assurance and the maintenance of the network. This change should be done. We'll try to talk to the companies. We already have some contracts but we'll try to make it more visible in public.

Does it help to have an international research network behind you?

As the saying goes: A prophet is without honour in his own country. Most likely people will rather believe in a 'Swiss prophet' (laughs). Of course, the weight of our co-operation helps in negotiations.



Laser scanning of water samples in a flow cytometer at Eawag in Dübendorf (© Eawag)

The director of the Swiss Development Agency stated at the World Economic Forum 2014 that 4.8 billion people will be exposed to severe water scarcity by 2050, if no changes to management of water resources are made. In what way does your project contribute to a turnaround?

I think that one of the reasons for the water crisis is water safety, not just scarcity. The technology we are developing with Eawag can provide a backup for decision-makers to decide for instance what source they want to use. I hope that we will be able to make the technology smaller and to measure quality in situ in future. If, for example, you go to African countries, you could, relying on flow cytometry, decide very rapidly if a source can be used or not. This is something we cannot do now. If we can spread this idea and focus not only on water network but on treatment, this could facilitate decisions regarding the use of water and then this would obviously contribute to a better monitoring and decision-making in water consumption.

You have some experience in this domain from your consultancy in the EU 'Developing India Call'.

Yes, I spent some time in India, as we had to develop a Call for India and investigate into what the major problems are. The idea was that European partners should help solving problems related to water quality and quantity in India. I learnt a lot over there, as their problems are very different from ours here in Europe. And there is definitely a potential for using these technologies. They are not that expensive and probably, with the development of laser

technologies, flow cytometry will become even cheaper. This will undoubtedly facilitate its application in these contexts.

Your co-operation with Eawag, on which Alina Neščerecka's project is built, started within research networks like Technau in FP6 and SecurEAU in FP7. Do you think the prospects for continuing this co-operation are good?

I certainly hope so. I went to Eawag on a Sciex Short-term Visit in April to see my Fellow, Frederik and other friends in order to draw up a proposal for Horizon 2020. I hope we will succeed.

During this Sciex Fellowship at Eawag, your task is to monitor Alina's progress from Riga. What are the challenges of this long-distance tutoring?

We communicate by e-mail and Alina came back to Riga for discussions. Of course, one could say that the distance entails some disadvantages, as I don't have complete control (laughs). But on the other hand, you gain a student that becomes more independent. Students cannot run home to their supervisors every minute; they have to take their own small decisions instead. Important decisions are of course still coordinated with me and I dare say we have been quite successful until now.

Professor Juhna, thank you for your time and good luck with your project!

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