Applied Science – the Step from Idea to Solution

By Flavia Schlegel, MD, MAS, Executive Director swissnex Shanghai / Vice Consul General

Searching the internet for a definition of applied science I found on Wikipedia that “applied science is the application of knowledge from one or more natural scientific fields to solve practical problems... Applied science is important for technology development.” On the free dictionary it says “Applied sciences are the disciplines dealing with the art or science of applying scientific knowledge to practical problems...” Switzerland is the world’s most competitive country according to The Global competitiveness Report 2009-2010 (www.weforum.org), the People’s Republic of China leads the BRIC countries. Looking more closely at the detailed data one can see, that both countries still have room for improvement when it comes to innovation. The speed with which a country finds an efficient market solution to a practical problem is an important factor for its innovation capacity. Competitiveness can therefore be increased by mastering well the art of applied science. Sino-Swiss cooperation can enable both countries to become even better artists.

Striving Toward a Comprehensive Partnership

By Dr. Maio Chen, SSSTC Program Coordinator in Switzerland

Bridging the cultural chasm between the East and the West has never been easy. Looking back toward the hundreds of years of contact between China and the West, there had been more conflicts than cooperation until a few decades ago. This year marks the 20th anniversary of the first scientific cooperation agreement signed between China and Switzerland. With more than 50 SSSTC projects approved and funded, we are glad to say that SSSTC, a governmental program, has contributed toward the building of a bridge in bringing the two cultures closer together than ever.

Although collaborating in cutting edge research is a sure and fruitful way in promoting understanding and cooperation between Switzerland and China, building an enduring partnership between the two countries is not all about technology transfer and commercial dealings. In its program conception, the SSSTC strives to foster trust and friendship through a broadened scope: Although there is still priority field restriction for the JRP (joint research projects), such restriction is lifted for the other instruments. We are glad to report that such measures are now proven fruitful.

In the western world as well as in China, health care has become one of the central issues in our societies. The addition of “medicinal sciences” as one of the priority research fields cannot be timelier in this regard. After one and a half years of this addition, we are now receiving applications on collaboration in clinical medicine in addition to the usual basic life science research projects. Clinical practice and translational research are areas where a joint effort can really benefit both countries. As Dr. Andreas Serra, the research team leader for the autosomal dominant polycystic kidney disease in the University Hospital Zürich (USZ), said after a 5-day visit (accompanied by Dr. Schlegel from swissnex Shanghai) to Shanghai Chang-Zhen Hospital: “I am very impressed with the enthusiasm I saw in Chang-Zhen Hospital (CZH). Their technical achievement...
Waste Water Treatment

Swiss innovation catches China’s interest

By Prof. Dr. Claudio R. Boër, Vice Director for R&D and Professional Education swissnex Shanghai / Consul

The Hydronet project has been presented by swissnex Shanghai at the Sino-Swiss Water Forum in Shanghai on 2009-06-05 with the participation of the Vice-Minister of Water Resources Mr Hu Siyi (on the right).

The main way to treat wastewater is based on sedimentation, the process to let the dirty particles slowly settle at the bottom of large tanks in form of a sludge that is collected by racks. The process is simple but has many disadvantages. It requires large surfaces; and it takes several hours. It also smells and the sedimentation wastewater treatment plants must be located far away from the urban sites and it requires a complex and long set of canalizations to bring the water from the urban sites.

Floating instead of sinking

A different process is emerging. Instead to let the dirty particle sink (to sediment) to the bottom, they are pushed to the surface by injecting air into the water. The tiny bubbles adhere to the suspended matter causing it to float to the surface of the water where it is removed by a skimming device looking like a big scoop.

A small engineering company located in Lugano, KWI, has teamed up with the University of Applied Science of Southern Switzerland (SUPSI) to innovate the floatation process and make it even more efficient, cost effective and adaptable to many different kind of waste water treatment. The Hydronet prototype is compact, odorless and fully computer controlled. The EAWAG, the world-renowned Swiss federal institute for water research is testing and certifying the new equipment. The Hydronet project is supported by the Federal Agency for Innovation (CTI). The results from the Hydronet can be summarized as follows. The dissolved air floatation process requires 1/100 of the space (and it can be even put underground) and it is 150 times faster. The final Hydronet prototype will be controlled by a computerized system under development at SUPSI using artificial intelligent algorithms.

This innovative project caught the attention of Chinese scientists and governmental officials. Recently, a cooperation agreement has been signed between the Swiss engineering company KWI and the Waste Water Treatment Plant of Zhangcun in Dongguan. First results of the installation of demonstration equipment at the Zhangcun plant will be expected in 2010.
应用科学——由构思迈向解决方案

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在网上搜索应用科学的定义时我发现维基百科里是这样写的：“应用科学是将一种或一些自然科学领域的知识应用到实际问题的解决的科学……应用科学对于技术发展至关重要。”在自由词典（the free dictionary）中是这样说的：“应用科学是解决科学知识的实用艺术和科学的学科……”在2009-2010全球竞争力报告中（www.weforum.org）瑞士是竞争力的国家，中国位居“金砖四国”之首。如果仔细研究一下这两个国家的详细数据，我们会发现在创新能力他们都还有进一步发展的空间。一个国家为某个实际问题找到有效的解决方案的途径是决定其创新能力的重要因素。因此，竞争力可以通过掌握应用科学而加以提升。中瑞合作可以帮助双方在该领域进一步发展。

努力建立全面的合作伙伴关系

Chen Maio博士，中瑞科技合作项目瑞士协调员

中德双方在文化上的差异从来都不是一件容易的事。回顾中德与西方上百家的接触与交流，总是矛盾冲突多于合作。直到近几年来，这一情况才有所改观。今年是中瑞第一项科技合作协议签署二十年，二十年来共有约50多项中瑞科技合作项目（SSSTC）通过审核并获得资金。我们很高兴的是中瑞科技合作项目这一政府项目搭建了使两国文化比任何时候都更靠近的桥梁。

尽管在前沿研究上的合作是促进瑞士与中国间相互理解的富有成效的方法，但是两国间长期稳定伙伴关系的建立不只是技术转移和商业关系。在项目理念上，中瑞科技合作项目争取在更广阔的范围内建立信任与友谊。虽然在优先合作项目上仍有有限制，但在其他方面已经取得了一些突破。我们很高兴的向大家报告目前这一方法取得了成功。

不仅在西方世界，甚至在文化中也是这样，平衡史观已成为我们社会的关键问题之一。如此看来，将“医疗科学”加入到优先研究领域中是正当其时。在过了一年半的现在，我们收到了来自来自常规基础科学研究项目之外的临床医学合作方面的申请。临床实践与早期临床研究是真正使两国合作受益的领域。正如苏黎世大学医院（USZ）的常染色体多囊肾病研究团队的主任Andreas Serra博士在对上海长征医院进行了为期五天的访问后（由上海瑞士科技中心的Schlegel博士陪同）说的：“我在中国医生所看到的人们的激情使我印象深刻，他们在（肾脏透析）透析以及血液洗涤技术上所取得的技术成果位于该领域临床实践的前沿。”Serra表示中国的医生为医疗研究和提高某些技能提供了大量的支持。中国所发展的临床手术技术将有利于USZ的临床医生培训。另一方面，Serra博士的团队具有优秀的临床研究能力。他们也将帮助长征医院的研究达到国际标准。Serra博士目前领导着两个医院间一个中国瑞士科技合作交流项目的研究。

值得一提的是，由于中方学者的努力，使得进展为这些领域的合作成为可能。如在中瑞均负有盛名的Tian Yinghua外科医生，组织了Pierre-Alain Clavien教授（USZ内脏与移植手术部主任）对中国两家医院的访问。Clavien教授对这两家中国医院印象很好，并认为如果双方合作将可以带来共赢。目前Tian博士正在为使双方合作而进行一些具体方面的联络。

Tian医生和组织Serra的上海之旅的吴先生均表示中国瑞士科技合作项目提供了一个将瑞士伙伴带到中国的平台。瑞士科学家来到中国，很容易就可以看到中国科学家/医院的素质。瑞士科技创新项目在合作项目的建立中发挥作用，并希望这种合作将是长期的，双方共赢的。
下期话题：中瑞职业教育合作

废水处理技术

瑞士创新成果赢得中国关注

作者：Claudio R. Boër博士，瑞士联邦政府科技文化中心科技研究与职业教育副院长/领事

干化处理是将基于沉淀处理，就是让具有污染性的颗粒物以污染物的方式留在容器的底部并由管架收集。这一过程很简单。但有许多副作用，如要求大的容器表面、费时长，过程中有味道，而且废水沉淀处理厂必须设有远离城市的地区。因此，需要很长很复杂的管道将废水从城市输送出去。用气浮法取代沉淀

现在又有一种新的处理方法出现，与使污染颗粒物下沉（沉淀）到底部不同的是，它是通过水中注入空气将颗粒物推向水的表面。细小的泡沫附在悬浮物上使其浮向水面，之后只需用一种看起来像大漏勺的器具将悬浮物推起即可。

位于瑞士卢加诺的一家小型工程公司KWI与瑞士南部应用科学大学（SUPSI）合作创新气浮技术以使其更有效、成本更低廉，并可用于多种不同废水的处理。Hydronet密实、无味并完全由电脑控制。世界著名的瑞士联邦水科学与技术研究所以（EAWAG）正在对这种新设备进行测试与检验，Hydronet项目由瑞士创新促进机构（CIT）赞助。Hydronet项目的研究结果可以概括，溶解性厌氧技术只要百分之一的空间（甚至可以在地下进行），但处理速度却要快上150倍。Hydronet模型将最终由电脑化系统控制，此项技术补由SUPSI使用人工智能计算进行研究。

这一创新项目吸引了中国科学家和政府部门的注意。最近，瑞士工程公司KWI与中国东南城市的废水处理厂签署了合作协议。预计2010年示范设备将在横村废水处理厂安装完成。