



Newsletter #14 December 5th 2007

SystemsX.ch

The Swiss Initiative in Systems Biology

SystemsX.ch: World Class in Systems Biology is the Aim

Switzerland wants to become a world leader in Systems Biology. About 400 million Swiss Francs will be invested into in this emerging field. SystemsX.ch is at the core of this effort and coordinates the interests of eight universities, three research institutions and industry. An investment of this magnitude into one research field is unprecedented in Switzerland. Read the press release below.



SystemsX.ch held a media conference on December 5th in Berne. Charles Kleiber, State Secretary for Education and Research, Ruedi Aebersold, Chairman of the Scientific Executive Board, and Ralph Eichler, President of the Board of Directors of SystemsX.ch presented the plans for 2008-2011.

Berne. After decoding the genomes of various plants, animals and microorganisms, Systems Biology is regarded as the next major step that will drive biological research. Current technologies allow biologists to spell all the letters in the genetic material, however, these technologies offer very little in the way of deciphering this complex code. Pharma- and biotechnology companies hope that Systems Biology will give them new tools for use in drug discovery and development.

Systems Biology is expensive, and requires the development and maintenance of elaborate technological platforms. Such platforms could not be financed by a single university or research institution individually. In addition good Systems Biology relies on the successful interaction of scientists from multiple disciplines including

Biology, Chemistry, Mathematics, Computer Science, and Engineering.

After careful consideration of all of these issues, Swiss universities and research institutes decided to pool their knowledge and resources in a single research consortium called SystemsX.ch. The Universities of Basel, Berne, Lausanne, Fribourg, Geneva, and Zurich, the Paul Scherrer Institute, Friedrich Miescher Institute, and the Swiss Institute for Bioinformatics teamed up with the two Federal Institutes of Technology in Zurich and Lausanne to support this research initiative. At a press conference in Berne, the State Secretary for Education and Research Charles Kleiber stated that «A cooperation of this magnitude among the universities is of unparalleled character, and on many levels embodies the way projects should be tackled and coordi-

nated among Swiss institutes in the future».

Financing research with federal, university, and industry funds

In its 2007 fall session, the Swiss parliament allocated 200 million Swiss Francs (CHF) for research in the area of Systems Biology from 2008-2011 (subject to yearly budget decisions). CHF 100 million will flow into Systems Biology research projects at the universities and other significant Swiss research institutions, which are partners of SystemsX.ch. However, monies will only be distributed to those partner institutions if they commit an equal amount to the research project in question. This means the federal government is requiring that an additional CHF 100 million come from the individual partners of SystemsX.ch. On top of that, parliament approved a CHF 100 million budget for the continued development of the Systems Biology relevant ETH Zurich Department for Biosystems Science and Engineering located in Basel.

Assuming universities and higher education institutions continue to apply for and obtain other grants to support their research activities (i.e. via the Swiss National Science Foundation and EU grants) and keep up their cooperation with industry partners, we can expect about CHF 400 million to flow into Systems Biology research from 2008-2011. A financial commitment of this scale for a specified research area is unprecedented in Switzerland. Concurrently, SystemsX.ch represents the largest thematically defined research initiative in recent (Swiss) history.

In the international arena, this effort is by no means unsubstantial. Since 2004 Great Britain has invested £ 88 million (CHF 214 million) into Systems Biology research. In Germany the federal government plans to spend about € 37 million per year (CHF 62 million) on Systems Biology from 2008-2011. This leaves the Swiss investment at the top of its class when spending is considered as an amount per population size.

Application deadline is end of 2007

All applications must be submitted by the end of the year. So far, the management office counts eighteen project ideas with intension of becoming research pro-

jects funded by SystemsX.ch. Projects in Zurich, Basel, and Lausanne, which are currently still being funded with monies from previous Systems Biology grants from the fusion partners of SystemsX.ch must reapply for funding under the new scheme. Ralph Eichler, Chairman of the Board of Directors for SystemX.ch and ETH Zurich president says «the scope and volume of individual projects should be in the range of CHF 1-5 million per year». In addition to these rather large 'Research Technology and Development' (RTD) projects, SystemsX.ch will fund about 40 «Interdisciplinary PhD» projects (IPhD) and 40 «Interdisciplinary Pilot Projects» (IPP). The IPPs should help seed interdisciplinary interactions among researchers from various academic backgrounds and institutions by allowing them to collaborate on an exciting and high risk project for a year.

The Swiss National Science Foundation (SNSF) has been mandated to supervise the scientific quality of SystemsX.ch projects. A special SNSF panel has been created for the evaluation, and periodical review of all the applications for RTD and IPhD projects. In addition to its six Swiss National Science Council members, this panel will contain internationally recognized experts from various disciplines crucial to Systems Biology. It is the first time the SNSF has agreed to be responsible for the quality control of a large research initiative, which it is not directly funding. This

Welcome to SystemsX.ch

Zurich. VDM. The University of Fribourg, the Paul-Scherrer-Institute (PSI), the Swiss Institute for Bioinformatics (SIB-IBS) and the Friedrich-Miescher-Institute (FMI) applied to become a SystemsX.ch partner. Based on the decision of the Board of Directors, the four institutions were invited to join the SystemsX.ch initiative. We are happy to announce that all of the applicants have since signed and submitted their partner declarations.

SystemsX.ch now incorporates 11 partner institutions: ETH Zürich, EPF Lausanne, FMI, SIB-IBS, PSI, Universities of Basel, Bern, Fribourg, Geneva, Lausanne and Zurich.

represents another important novelty being launched under the SystemsX.ch initiative.

All strategic and operational business decisions and transactions, including the administration and distribution of the SNSF-approved grants, will be left to SystemsX.ch. SystemsX.ch is operationally controlled by a Scientific Executive Board which is chaired by ETH Zurich Prof.

Ruedi Aebersold. The Board of Directors (BoD) functions as the strategic organ of the organization. The BoD is made up of all the presidents, rectors, and directors of the SystemsX.ch member institutions plus two guests to represent the interests of industry.

All the materials from media conference see [here](#).

All-SystemsX.ch-Day a Big Success

About 250 people met at EPF Lausanne for the first All-SystemsX.ch-Day. The interest among scientists from the new partner universities was high and 15 ideas for new SystemsX.ch-projects were presented.



Will produce gigantic amounts of data. Day two of the All-SystemsX.ch-day brought an excursion to CERN and a visit of the giant Atlas detector. *Photo CERN*

EPFL. thm. Switzerland goes Systems Biology. 250 scientists from various disciplines from Swiss universities as well as several industry researchers gathered at EPF Lausanne for the first All-SystemsX.ch-Day on September 17. In the morning, the running SystemsX projects were showcased in a succession of short presentations by their principal investigators. Over lunch, students presented their interdisciplinary PhD fellow-

ship projects (IPFPs), and the late afternoon brought a bouquet of ideas for new projects from new partners of SystemsX.ch as well some from the former SystemsX pilots.

The resonance on the day during the coffee breaks in the afternoon was, on the whole, very positive. The only concern formulated several times was that the «established» SystemsX people might have an advantage in the current round of applications, due to their previous years of experience in Systems Biology and their running projects. In the audience an industry representative from Merck-Serono was spotted who described SystemsX.ch as a «fantastic» initiative.

Evidently many people were eager to learn about this Swiss initiative which received CHF 100 million from the federal government for funding projects over the next four years (2008-2011). Most importantly, individuals from the SystemsX.ch universities in Berne, Lausanne and Geneva were mobilized and eager to create new contacts. This investment will lead to matching funds by the SystemsX.ch partner institutions amounting to at least another CHF 100 million. In addition, the Department of Biosystems Science and Engineering of ETH Zurich in Basel will receive CHF 100 million for the next four years, 2008-2011.

Under the new SystemsX.ch initiative the terms «Scientific Node» and «Glue Projects» will no longer be used. They will now all fall under a single project type

collectively termed «Research, Technology and Development Projects» (RTD-Projects). They «are expected to have the size of a small National Competence Center of Research (NCCR), but may also be smaller», explained Daniel Vonder Mühl, managing director of SystemsX.ch. A typical RTD shall have an overall yearly budget of up to CHF 6 million. Half of this amount would come via the matching funds from the research institutions taking part. For the present call, some CHF 45 million have been allocated for funding RTD projects. About 10 RTD projects are expected to start in spring 2008.

The large size of RTD-projects, and their relatively small number, came as a surprise to some. However, as Daniel Vonder Mühl pointed out, «SystemsX.ch is not meant to be the only channel for the funding of Systems Biology in Switzerland. For small research projects the traditional projects funded by the Swiss National Science Foundation (SNFS) can and should be used».

More information:

Call for all kinds of SystemsX.ch-Projects [here](#).

Everything on the SystemsX.ch-Day [here](#)

The Scientific Advisory Board was on Site



The Scientific Advisory Board of SystemsX in a meeting at the Department of Biosystems Science and Engineering in Basel. From left to right: Marvin Cassman, Leroy Hood, Ruedi Aebersold (not member of SAB) and Eugene Butcher. Not on the picture Hiroaki Kitano.

Photo Daniel Vonder Mühl

Zurich/Basel. VDM. Four members of the Scientific Advisory Board (SAB) of SystemsX.ch came to Zurich and Basel to review the progress of SystemsX (2004-2007) and to learn more about the structure of SystemsX.ch. They were pleased to see that most of their recommendations from their first SAB report in 2006 have been implemented.

The SAB is chaired by Marvin Cassman. He, Eugene Butcher, Hiroaki Kitano and Leroy Hood attended the second SAB meeting. Stanislas Leibler and Jasper Rine could not attend. SystemsX, a cooperation project, financially supported by the Swiss University Conference, will come to its official end on December 31, 2007. Therefore, it was the last meeting of this kind. One main task was to review the progress of the running SystemsX pro-

jects. Most Scientific Nodes and Glue Projects were presented and discussed on November 27 in Zurich and in the morning of November 28 in Basel. The PhD students of the dual-mentored interdisciplinary program (IPFP) had a round-table discussion with the SAB. In a similar form, the experts were informed about experiences with the Interdisciplinary Pilot Projects (IPP). These two project types were established following a recommendation of the first SAB report and will be maintained within SystemsX.ch.

Some of the current SAB members were invited to serve on the panel of the Swiss National Science Foundation, which will review the SystemsX.ch proposals for Research, Technology and Development Projects, others will stay in the SAB of SystemsX.ch. Therefore, they were very

interested in the structure, organization, and project types solicited by SystemsX.ch. The afternoon of the second day (Nov 28) was dedicated to the next four years. The experts were informed about the Federal State Secretariat for Education and Research but also directly by Anita Fetz, Member of the Council of States and President of the Committee for Science, Education and Culture (CSEC) of this parliament chamber.

After the official SAB meeting, Eugene Butcher (Stanford University) gave a lecture about «Cell Systems Biology: Modeling Human Disease for Drug Discovery and Development». The lecture was broadcasted to the Pharmazentrum in Basel and is available as podcast.

The SAB report with recommendations will be available in about three weeks.

Podcast of Eugene Butcher public lecture [here](#).

Strategy Paper on Systems Biology in Europe



Brussels. thm. The ERASysBio partners would like to focus your attention to the Strategy Paper «Systems Biology in the European Research Area».

It's still a draft version in which the comments of the Systems Biology community will be worked into. Check [here](#) for the paper and see if comments are still possible. The deadline was December 2nd, but might be extended again.

In the Rearview Mirror

Here we present a selection of articles, which were published recently in the lay-press on SystemsX.ch projects or topics.

Zurich. A paper from the Ruedi Aebersold Lab was published in «Molecular Systems Biology». [Here](#) is the report in «ETH life» (in English). A German version of the portrait of the SystemsX.ch-project C-MOP published in the SystemsX.ch Newsletter #13 appeared in the online magazine of the University of Zurich. Click [here](#).

Also in ETH Life, new D-BSSE professor Niko Beerenwinkel was featured [here](#)

(in English). Markus Stoffel, ETH Zurich Professor at the Institute for Molecular Systems Biology, has succeeded in elucidating the mechanism for the uptake of siRNA in combination with fatty acids in mammals together with chemists from the Alnylam Company.

The corresponding paper in «Nature Biotechnology» was featured in [ETH Life](#) (in English).

Upcoming Events

Date	Location	Topic
December 14, 2008 18.15h	Aula, University of Basel	«Controlling the Cell Cycle» Paul Nurse, PhD «Lectures of Nobel Prize Winners» Nobelpreisträger in Basel
January 4-8, 2008	Big Island, Hawaii	From Molecules to Cells to Organisms Pacific Symposium on Biocomputing conference
February 6-7, 2008	EPF Lausanne	Biology meets Engineering - Union of the Swiss Societies for Experimental Biology (USGEB 2008)
March 6-7, 2008	Cambridge UK	Advances in Synthetic Biology
March 10-14, 2008	Trento, Italy	Computational and Systems Biology Course at CoSBI
April 12-17, 2008	Sant Feliu de Guixols, Spain	ESF-UB Conference: Systems Biology

April 20-21, 2008	Seattle, USA	Systems Biology and Engineering
May 7-8, 2008	Barcelona, Spain	Lab-on-a-Chip World Congress
May 22-24, 2008	Dresden, Germany	2008 International Conference on Systems Biology of Mammalian Cells
1-2 May, 2008	Boston USA	RNAi World Congress
7-8 May, 2008	Barcelona, Spain	Lab-on-a-Chip World Congress
16-17 October, 2008	Lisbon, Portugal	Advances in Metabolic Profiling
16-17 October, 2008	Lisbon, Portugal	European Biomarkers Summit
18-19 November, 2008	Boston, USA	Epigenetics World Congress

Recent Publications from SystemsX Scientists

Publications from SystemsX Projects, which have been released since Newsletter 13.

COMPETENCE CENTER FOR SYSTEMS PHYSIOLOGY AND METABOLIC DISEASES

C. Dahinden, G. Parmigiani, M.C. Emerick, and P. Bühlmann: Penalized Likelihood for Sparse Contingency Tables with an Application to Full-Length cDNA Libraries; BMC Bioinformatics, in press

B. Bodenmiller, J. Malmstroem, B. Gerrits, D. Campbell, H. Lam, A. Schmidt, O. Rinner, L.N. Mueller, P.T. Shannon, P.G. Pedrioli, C. Panse, H. Lee, and R. Aebersold: [PhosphoPep – A Phosphoproteome Resource for Systems Biology Research in Drosophila Kc167 cells](#); Molecular Systems Biology, in press

C. Wolfrum: [Cytoplasmic Fatty Acid Binding Protein sensing fatty acids for Peroxisome proliferator Activated Receptor activation](#); Cellular and Molecular Life Sciences, in press

J. Grossmann, B. Fischer, K. Bärenfaller, J. Owiti, J.M. Buhmann, W. Gruissem, and S. Baginsky: A workflow to increase the detection rate of proteins from un-sequenced organisms in high-throughput proteomics experiments; Proteomics, in press

P.A. Gerber, V. Pavlicek, N. Demartines, R. Zuellig, T. Pfammatter, R. Wüthrich, M. Weber, G.A. Spinaz, and R. Lehmann: [Simultaneous islet-kidney vs pancreas-kidney transplantation in type 1 diabetes mellitus: a 5 year single centre follow-up](#); Diabetologia 2007, Epub ahead of print

N. Djouder, S.C. Metzler, A. Schmidt, C. Wirbelauer, M. Gstaiger, R. Aebersold, D. Hess, and W. Krek: [S6K1-Mediated Disassembly of Mitochondrial URI/PP1g Complexes Activates a Negative Feedback Program that Counters S6K1 Survival Signaling](#); Molecular Cell 28, 2007, 28-40

C. Wolfrum, S. Shi, K.N. Jayaprakash, M. Jayaraman, G. Wang, R.K. Pandey, K.G. Rajeev, T. Nakayama, K. Charrise, E.M. Ndungo, T. Zimmermann, V. Kotliansky, M. Manoharan, and M. Stoffel: [Mechanisms of in vivo delivery of lipophilic siRNAs](#); Nature Biotechnology, 2007, Epub ahead of print

F.F. Roos, R. Jacob, J. Grossmann, B. Fischer, J.M. Buhmann, W. Gruissem, S. Baginsky, and P. Widmayer: [PepSplice: Cache-Efficient Search Algorithms for](#)

[Comprehensive Identification of Tandem Mass Spectra](#); Bioinformatics, 2007, Epub ahead of print

D. Schöner, S. Barkow, St. Bleuler, A. Wille, P. Zimmermann, P. Bühlmann, W. Gruissem, and E. Zitzler: [Network Analysis of Systems Elements](#). In: S. Baginsky, A.R. Fernie (Eds.): Plant Systems Biology, Series: Experientia Supplementum, Vol. 97; Basel 2007

L.N. Mueller, O. Rinner, A. Schmidt, S. Letarte, B. Bodenmiller, M.-Y. Brusniak, O. Vitek, R. Aebersold, and M. Müller: [SuperHirn – a novel tool for high resolution LC-MS-based peptide/protein profiling](#); Proteomics, 7(19), 2007, 3470-3480

CENTER FOR MODEL ORGANISM PROTEOMES

Roos FF, Jacob R, Grossmann J, Fischer B, Buhmann JM, Gruissem W, Baginsky S, Widmayer P: [PepSplice: Cache-Efficient Search Algorithms for Comprehensive Identification of Tandem Mass Spectra](#). Bioinformatics 2007;23(22):3016-3023.

INSTITUTE OF MOLECULAR SYSTEMS BIOLOGY

Kuepfer L, Peter M, Sauer U, Stelling J. Ensemble modeling as a novel concept to analyze cell signaling dynamics. Nature Biotechnol. 2007 Sep; 25(9): 1001-1006. [Pubmed](#)

van der Werf M, Takors R, Smedsgaard J, Nielsen J, Ferenci T, Portais JC, Wittmann C, Hooks M, Tomassini A, Oldiges M, Fostel J, Sauer U. (2007) Standard reporting requirements for biological samples in metabolomics experiments: Microbial and in vitro biology experiments. Metabolomics. In press.

Fuhrer T, Chen L, Sauer U & Vitkup D. (2007) Computational prediction and experimental verification of the gene encoding the NAD⁺/NADP⁺-dependent succinate semialdehyde dehydrogenase in E. coli. J. Bacteriol. In press.

CENTER OF SYSTEMS BACTERIAL INFECTIONS

Saenz, H.L., Engel, P., Stoeckli, M.C., Lanz, C., Raddatz, G., Vayssier-Taussat, M., Birtles, R., Schuster, S.C., and Dehio, C. (2007) Genomic analysis of Bartonella identifies bacterial type IV secretion systems as host adaptability factors. Nat. Genetics 39: 1469-1476.

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