SystemsX.ch
The Swiss Initiative in Systems Biology

5th Call for Proposals for SystemsX.ch Projects

In its *Messages on Education, Research and Innovation for 2008-2011 and 2012,* the Federal Council has proposed to provide funds to the SystemsX.ch initiative. This is the fifth Call for Proposals within the Swiss Initiative in Systems Biology.

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1 What is Systems Biology?

The primary objective of Systems Biology is to achieve an integral and **comprehensive understanding of the quantitative behavior of biological systems** that arises from the dynamic interplay of its components. It is expected that Systems Biology research projects will culminate in a model (e.g. mathematical) that simulates *in silico* the system's properties **and predicts its quantitative response to internal or external perturbations**. Frequently, biological systems are represented as networks of interacting elements, whereby the structure and the dynamic behavior of the network determine its phenotypic traits. The study of biological systems in this framework requires interdisciplinary cooperation and a division of labor between biologists, medical scientists, mathematicians, physicists, computer scientists, chemists and engineers. The present Call for Proposals is based on this definition of Systems Biology.

2 What is SystemsX.ch?

SystemsX.ch is a "simple partnership" which enables institutes, competence centers, and scientific research groups to interact and cooperate by establishing common technological platforms and sharing the data collected. The members of the partnership, i.e. the partner institutions, intend to position Switzerland among the world leaders in Systems Biology. SystemsX.ch will enhance and extend interdisciplinary research and education at the highest level in this field. It will develop and use the knowledge and tools necessary to expand our understanding of and ability to teach biology as an integrated quantitative science. It will foster the ongoing design, development, and application of advanced technology and the training of scientists and engineers in the special skills required to understand biological systems. To achieve its goals, SystemsX.ch relies on the creative talents of its scientific and professional staff and its ability to initiate and nurture partnerships between the projects associated with the program and with other academic institutions, private industry, and society.
As a result of the first phase of SystemsX.ch a total of about 100 SystemsX.ch projects were approved, involving more than 300 research groups and more than 1'000 scientists.

The Systems Biology panel of the Swiss National Science Foundation (SNSF) have reviewed the progress of SystemsX.ch in October 2010. It concluded that SystemsX.ch must continue for a second phase and recommended to

- increase efforts in quantitative modeling, data mining and physical interpretations,
- develop new theoretical tools,
- encourage non-biologists to act as an RTD-PI,
- increase the collaboration with the private sector,
- initiate projects to develop the theoretical framework conditions

You will find more information on the SystemsX.ch website www.systemsx.ch.

2.1 Goals of SystemsX.ch

SystemsX.ch, the Swiss Initiative in Systems Biology, aims at:

- gathering scientific competences on a national level to establish Switzerland at the forefront of the Systems Biology research;
- setting up and developing the cutting-edge technology required for Systems Biology research;
- implementing a truly interdisciplinary research culture by assembling complementary disciplines to stimulate mutual benefits;
- establishing collaborations with the private industry and SMEs in flexible forms of public private partnership;
- educating PhD students and young researchers for the future accordingly.

2.2 Scope of 5th Call

SystemsX.ch supports projects that comply with above definition of Systems Biology. In the first phase from 2008-2011, SystemsX.ch has supported almost 100 projects. The main part of the efforts went into the 14 large integrated research projects (RTDs) and SyBIT, the SystemsX.ch IT backbone. In addition the SystemsX.ch community encloses all students, technicians and scientists of the IPhD projects, the pilot projects (IPPs), and the Bridge-to-Industry projects (BIP).
The present call for proposals is an intermediate between the first SystemsX.ch phase (2008-2011, initiation) and the second phase (2013-2016, consolidation). The strategic multiannual plan for a second phase was submitted to the State Secretariat for Education and Research. It is up to the national parliament to approve an extension allowing for further calls for proposals within the Message *on Education, Research and Innovation for 2013-2016*, which will be discussed in summer 2012.

This call encourages to submit proposals for

1. **Transition Post-doc Fellowships** (details see section 3.1): Ambitious and motivated young researcher formulate their own interdisciplinary research project as a principal investigator for two years, with the option of a third year. They choose one research group of a discipline complementary to the one of their doctoral thesis at a SystemsX.ch partner institution. The research groups will host the Transition Post-doc Fellow and his/her project, allowing the post-doc to unfold and flourish. Promising Transition Post-doc Fellowship candidates will be invited for an interview with SystemsX.ch SEB members and Board members of the SNSF Systems Biology panel. With these Fellowships, SystemsX.ch wants to promote in particular the life science modelling.

2. **Interdisciplinary PhD** student projects (IPhDs, details see section 3.2): To educate the next generation of systems biology scientists, IPhD students are **supervised by two mentors** from **different** and **complementary disciplines**. IPhD proposals will be commented by the SystemsX.ch Scientific Executive Board (SEB) and evaluated by the Swiss National Science Foundation (SNSF).

3 Types of Proposals SystemsX.ch is Calling For

3.1 SystemsX.ch Transition Post-doc Fellowships

As an emerging field of research, Systems Biology critically depends on new innovative impulses, many of which are expected to come from the interfaces of traditional science disciplines. SystemsX.ch wants to foster and support young scientists with new ideas and pushing forward the exploration of new research directions. With the Transition Post-doc Fellow project, the disciplinary background of the young scientist will be widened.

The SystemsX.ch Transition Post-doc Fellowships aim at promoting scientists who terminated their doctoral thesis **not more than 5 years ago**. The interdisciplinary research project must contain substantial quantitative and modeling/simulation parts. The Transition Post-doc Fellow is the principal investigator, managing the project including equipment and consumables. The successful applicant will be responsible for his/her project, and can use the infrastructure of the hosting research group, which provides an inspiring environment. It is up to the applicant to find this research group / laboratory which will support the Transition Post-doc Fellow. The applicant shall be employed by the SystemsX.ch partner institution at which the hosting research group is located. The applicant must find a research group that is new to him/her (i.e. no longer than 6 months employed), and explain why the research group was chosen.

SystemsX.ch funds the Transition Post-doc's salary according rules of the hosting SystemsX.ch institution and consumables up to CHF 10'000 per year.
It is recommended, that the Transition Post-doc Fellow project is complemented by additional resources for personnel, equipment and consumables from:

- the hosting research group and/or institution (Own Contributions)
- competitive research foundations (SNSF, CTI, EU, etc; 2nd Party Funds)
- the private sector (industry, SMEs; 3rd Party Funds)

Transition Post-doc Fellowship projects are limited in time, two years; successful projects can apply for additional funding for maximal 12 months. SystemsX.ch envisages funding up to 10 Transition Post-doc Fellowships.

3.1.1 Who May Apply for SystemsX.ch Transition Post-doc Fellowships?

Scientists being citizen of Switzerland or a foreign country working in Switzerland or abroad, who find a hosting research group at a public Swiss university or research institution.
Scientists who received their doctoral degree not more than 5 years ago. The applicant must provide a letter of commitment of a faculty member of a SystemsX.ch partner institutions including the commitment to be hosted and employed at the institute, if the proposal is funded.
This project type also shall open a career opportunity for former (I)PhD-students of SystemsX.ch. However, these candidates must find another than one of the mentor's group as a host.

3.1.2 Letter of commitment

With the letter of commitment, the research group leader hosting the successful candidate guarantees that the Transition Post-doc Fellow can conduct his/her research project in a self-contained manner. Further, the following items must be covered:

- Relation of the proposed research project to the topics of the group
- Expected support measures for the Transition Post-doc Fellow (e.g. equipment, consumables, personnel, travel, etc)

3.1.3 Information to be Submitted

The Transition Post-doc Fellowship proposals are to be submitted using the official form (cf. Transition Post-doc Fellowship Proposal, Budget Form). General information, budget overview and budget details) that consists of two parts:

Part 1: General Information

Part 2: Scientific Information

1. Summary (1 page)
2. International standing of the applicant in her/his field of research (1 page)
3. Why was chosen this hosting research group; international standing of the research group (leader); explanation to the complementary of the disciplines (1 page)
4. Research plan: state of the art, questions, methods, milestones (10 pages)
5. Expected impact and contribution to the Systems Biology research in Switzerland by this project / Fellowship (1 page)
6. Justification of the Systems Biology approach, significance of the planned research for the scientific community and eventual users (private industry, economy, medicine, etc.) (1 page)

Annexes:

A. CV and publication list of the applicant
B. Letter of commitment from a faculty member of a SystemsX.ch partner institution including the explicit commitment to be hosted in case the proposal is accepted.

3.1.4 Submission Deadline

The Transition Post-Doc Fellowship proposals are to be submitted by **31 January 2012** using the SNSF web platform *mySNF* (www.mysnf.ch). After the completion of the submission on the web platform, the thereby compiled PDF-file must also be sent to admin@systemsx.ch.

Please note: for the Swiss National Science Foundation (SNSF) to be able to guarantee *mySNF* access, new user accounts must be requested five working days before a deadline at the latest (from abroad: 2 weeks before the deadline). It is the applicants' responsibility to ensure timely delivery of the proposal. SystemsX.ch rejects any responsibility for electronic / e-mail problems or any other problems.

3.1.5 Selection Procedure for Transition Post-doc Fellowships

The selection of the proposals will be preceded by a formal check by the SNSF administration. Proposals which fail to comply with the formal requirements will not be admitted to the next stage of the selection procedure and will be rejected if the defect cannot be easily remedied. The following formal requirements must be met:

- Compliance with the electronic submission deadline
- Use of the official forms and completeness of the proposal written in English
- Eligibility of the applicant

The selection procedure consists of the four steps:

1. Scientific assessment by external experts
2. Identification of possible candidates by the SNSF for interviewing (shortlist)
3. Interview of the shortlist candidates by SystemsX.ch SEB members and Board members of the SNSF Systems Biology panel
4. Final decision by the SNSF

Based on written assessments of the external experts, the Board of the Systems Biology Panel composed of the six members of the National Research Council will identify the most promising candidates applying the criteria specified below also taking into account the recommendations of the SystemsX.ch SEB. The shortlist candidates are invited to meet with SystemsX.ch SEB members and Board members of the SNSF Systems Biology panel.
The decisions after the interview must be approved by the National Research Council. Same is true for additional funding for a third year of the project.

3.1.6 Selection Criteria

The SNSF will evaluate the proposals according to the following criteria:

- Formal criteria (deadline, completeness of the proposal, eligibility of the applicants)
- Focus on clearly defined biological systems and questions
- Does the proposal describe an integrated, interdisciplinary and quantitative project including a modeling part?
- Does the proposal generate new data and knowledge that could not be obtained by traditionally structured projects – what is the added value?
- What are the respective contributions of the different disciplines?
- What is the standing of the applicant in the respective fields?
- Does the project have a realistic budget and a clear structure?
- Has the leader of the hosting research group an excellent international track record?
- Is the chosen research group suitable to host the candidate?
- Is the candidate adequately supported by the hosting research group?

In addition, the standard scientific criteria will apply:

a) Scientific relevance and actuality of the proposal
b) Originality of the goals
c) Adequacy of the methodology
d) Scientific track record of the applicant
e) Expertise of the applicant concerning the proposal
f) Feasibility of the proposal.

The decision will be primarily based on quality of the candidate and scientific criteria, primarily on added value to Systems Biology.

3.1.7 Scientific and Financial Reporting

The annual scientific progress as well as financial reports of each Transition Post-doc Fellowship Project is to be submitted to the SystemsX.ch Management Office. The reports will be consolidated and passed onto the SNSF where they will be reviewed by the SNSF Panel for Systems Biology.
Financial reporting including own contributions from the institutions, second and third parties will be according to defined directives (cf. Partnership Agreement Article 38, No. 4).

3.2 Interdisciplinary PhD Projects (IPhD)

To support interdisciplinary research and education and to promote the future generation of systems biologists, SystemsX.ch will finance PhD positions for students pursuing research projects that integrate at least two disciplines relevant to Systems Biology. The students will be jointly mentored by investigators from two different disciplines such as computer science, engineering, nanotechnology, physics, mathematics, chemistry, biology, medicine, etc. For IPhD students, attendance at the two annual events, the SystemsX.ch PhD-retreat and the SystemsX.ch Conference, is mandatory.
Only one (1) PhD student can be employed per project. IPhD Projects are limited in time, to three (3) years as a rule and may be extended for one (1) additional year. SystemsX.ch envisages funding up to 10 IPhD students out of this call.

SystemsX.ch will grant to each IPhD-Project: salary and social charges of the PhD student as set forth in the SNSF rules, a yearly amount for consumables (up to CHF 10'000) and a one-time amount of up to CHF 2'000 to cover the costs of participating to an international conference.

3.2.1 Who May Apply for IPhD-Projects?

Faculty members and senior researchers of SystemsX.ch institutions are eligible as main applicants and co-applicants. The main applicant's home institution must be a member of SystemsX.ch. Only institutions represented in the Swiss University Conference (SUK/CUS) and the ETH-domain are eligible to receive SystemsX.ch funding.

3.2.2 Documentation to be Submitted

The IPhD proposals are to be submitted using the official forms consisting of the following parts:

Part 1: General Information

Part 2: Scientific Information

1. Abstract (1 page)
2. International standing of both applicants in her/his field of research (1 page)
3. Research plan: state of the art, questions, methods, milestones (6-8 pages)
4. Expected impact on capacity building in Systems Biology (1 page)
5. Justification of the Systems Biology approach, significance of the planned research for SystemsX.ch and eventual users (industry, economy, medicine, etc.) (1-2 pages)

Annex:

- CV and publication list over the past 5 years of the two mentors

3.2.3 Submission Deadline

The IPhD proposals are to be submitted by **31 January 2012** using the SNSF web platform *mySNF* (www.mysnf.ch). After the completion of the submission on the web platform, the thereby compiled PDF-file must also be sent to admin@systemsx.ch.

Please note: for the Swiss National Science Foundation (SNSF) to be able to guarantee *mySNF* access, new user accounts must be requested five working days before a deadline at the latest (from abroad: 2 weeks before the deadline).

It is the applicants' responsibility to ensure timely delivery of their proposal. SNSF and SystemsX.ch do not assume any responsibility for electronic / e-mail or any other submission problems.

3.2.4 SNSF Selection Procedure for IPhD Proposals

The selection of the proposals will be preceded by a formal check by the SNSF administration. Proposals which fail to comply with the formal requirements will not be admitted to the next stage of the selection procedure and will be rejected if the defect cannot be easily remedied. The following formal requirements must be met:

- Compliance with the electronic submission deadline
- Use of the official forms and completeness of the proposal written in English
- Eligibility of the main and co-applicant

IPhD proposals will be selected by the Board of the Systems Biology Panel composed of the six members of the National Research Council.

- The Board will assess the proposals against the criteria specified below while taking into account the recommendations of the SEB.
- The SEB will assess the contributions of the submitted proposals to the strategic goals of the SystemsX.ch initiative and forward its recommendation to the SNSF.
- The decisions must be approved by the National Research Council.

- Note that this project is geared towards educating a next generation of Systems Biology scientists. It is, therefore, a personal grant to the PhD student chosen for this particular project. Only this student may be financed with these funds. For additional information please refer to the SNSF guidelines for PhD students.
- SystemsX.ch reserves the right to decide on whether a second student has enough time to finish an ongoing project.

3.2.5 Selection Criteria

The Board of the Systems Biology Panel will select the IPhD proposals according to the following criteria:

I. Contribution to the progress of Systems Biology and integration into the overall SystemsX.ch initiative;
II. Added scientific value due to the interdisciplinarity of the proposal.

In addition to the above mentioned, the standard scientific criteria set forth in the SNSF Rules of Procedure (Reglement über Gesuche SystemsX.ch, 3. July 2007) will apply:

a) Scientific relevance and topicality of the proposal
b) Originality of the questions
c) Adequacy of the methodology
d) Scientific track record of the applicants
e) Expertise of the applicants concerning the proposal
f) Feasibility of the proposal.

The Board of the Systems Biology Panel will solicit written external reviews.
The decision will be based on scientific criteria, primarily on (1) added value to Systems Biology and (2) scientific quality.

3.2.6 Annual Scientific, Financial Reporting and Own Contributions

The annual scientific progress as well as financial reports of each IPhD Project is to be submitted to the SystemsX.ch Management Office. The reports will be consolidated and passed onto the SNSF where they will be reviewed by the SNSF Panel for Systems Biology.
Financial reporting including own contributions from the institutions, third parties will be according to defined directives (cf. Partnership Agreement Article 38, No. 4).

4 Appendix: Abbreviations

BoD	Board of Directors (all Presidents and Rectors of SystemsX.ch partner institutions)
SEB	Scientific Executive Board (scientists of different Systems Biology fields & partner institutions)
MO	SystemsX.ch Management Office
IPhD	Interdisciplinary PhD Project
SNSF	Swiss National Science Foundation
SER	State Secretary for Education and Research
SUK/CUS	Swiss University Conference