SystemsX.ch
The Swiss Initiative in Systems Biology

11th Call for Proposals for SystemsX.ch Projects

The Federal Council has proposed to provide funds to the SystemsX.ch initiative to foster systems biology research in Switzerland in its *Messages on Education, Research and Innovation for 2008-2011, 2012, and 2013-2016*, which was approved by the Swiss Parliament. This is the eleventh call for proposals within the Swiss Initiative in Systems Biology.

Index

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** arising 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 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 collected data. 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, SystemsX.ch has approved more than 160 projects involving more than 300 research groups and more than 1'000 scientists since 2008. The main part of the efforts have gone into 14 large integrated research projects (RTD) and SyBIT, the SystemsX.ch IT backbone. In addition, the SystemsX.ch community encompasses all students, technicians and scientists working in the Medical Research and Development (MRD) Projects, Transfer Projects (TF), Transition Postdoc Fellowships (TPdF), Interdisciplinary PhD (IPhD) Projects, as well as the former Interdisciplinary Pilot Projects (IPP) and Bridge 2 Industry Projects (BIP).

The systems biology panel of the Swiss National Science Foundation (SNSF) regularly reviews the progress of SystemsX.ch as a whole.
For the evaluation of the TPdF and IPhD proposals, the SNSF has established a particular Expert Group with European leading scientists.

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 to:

- gather scientific competences on a national level to establish Switzerland at the forefront of systems biology research;
- set up and develop the cutting-edge technology required for systems biology research;
- implement a truly interdisciplinary research culture by assembling complementary disciplines to stimulate mutual benefits;
- establish collaborations with private industry and SMEs in flexible forms of public-private partnership;
- educate PhD students, postdocs and young researchers for the future.

2.2 Scope of the 11th Call

SystemsX.ch supports projects that comply with the above definition of systems biology. The present call for proposals focuses on promoting young scientists, and is part of the second phase of SystemsX.ch, aiming to consolidate the achievements of the first phase.

This call encourages the submission of proposals for

1. **Transition Postdoc Fellowships** (TPdF, for details see section 3.1): Ambitious and motivated young researchers formulate their own interdisciplinary research project for two years. They choose one research group working in a **discipline complementary to the one of their doctoral thesis** at a SystemsX.ch partner institution. The research groups will host the Transition Postdoc Fellow and their project, allowing the postdoc to get to know their new discipline. Proposals from promising TPdF candidates will be commented upon by the SystemsX.ch Scientific Executive Board (SEB) and evaluated by the Swiss National Science Foundation (SNSF).

2. **Interdisciplinary PhD** student projects (IPhDs, for details see section 3.2): IPhD Projects aim to contribute to educate the next generation of systems biology scientists. To this aim, IPhD students are **guided by two supervisors** from **different** and **complementary disciplines**. The main applicant must be a faculty member of a SystemsX.ch partner institution. The IPhD proposals will be commented upon by SystemsX.ch Scientific Executive Board (SEB) and evaluated by the Swiss National Science Foundation (SNSF).

3 Types of Proposals

3.1 SystemsX.ch Transition Postdoc Fellowships (TPdF)

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 push forward exploration in new research directions. With the TPdF projects, the disciplinary background of the young scientist will be widened.

SystemsX.ch TPdF projects aim to promote scientists who completed their doctoral thesis **not more than 5 years ago**. The interdisciplinary research project must contain substantial quantitative and modeling or simulation work. As a SystemsX.ch Transition Postdoc Fellow, the successful applicant will be responsible for their project including management, equipment and consumables. The fellow can use the infrastructure of the hosting research group, which will provide an inspiring environment. It is the applicant's task to find the research group or laboratory best suited to supporting the research. The applicant will be employed by the SystemsX.ch partner institution where the hosting research group is located. The research group must be new to him/her; he/she may not have been employed for longer than 12 months in the hosting group at the time of the application deadline (**April 30, 2015**).

SystemsX.ch funds the TPdF salary (maximum excluding social charges 1st year CHF 85'750; 2nd year CHF 90'050) and, on request, consumables for up to CHF 10'000 per year.
It is recommended that the TPdF project is complemented by additional resources for personnel, equipment and consumables, for example from

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

TPdF projects are limited in time to two years. Allocated funds have to be used by December 2018 (**SystemsX.ch funds cannot be used after 2018**), unused allocated funds must be returned. SystemsX.ch expects to fund up to 8 TPdFs within this call.

3.1.1 Who May Apply for a SystemsX.ch TPdF?

Scientists who can find a hosting research group at a public Swiss university or research institution which is a SystemsX.ch partner, and who fulfill the requirement stated in chapter 3.1, are eligible to apply.
The applicant must have received their doctoral degree within the last 5 years. The applicant must provide a letter of commitment from a faculty member of the hosting SystemsX.ch partner institution, including the commitment to be hosted and employed at the institute, should the proposal be accepted.
This project type should also offer a career opportunity for former (I)PhD-students of SystemsX.ch. However, these candidates must find a new host group (i.e. not those of the PhD supervisors).

3.1.2 Letter of Commitment

With the letter of commitment, the research group leader hosting the successful candidate guarantees that the Transition Postdoc Fellow can conduct their research project in a self-contained manner and that he/she is supported, in particular in the new disciplinary research field. Further, the following items must be addressed in the letter:

- relation of the proposed research project to the work of the group
- expected support measures for the Transition Postdoc Fellow (e.g. equipment, consumables, personnel, travel, etc.)

3.1.3 Information to be Submitted

The TPdF proposals are to be submitted using the official forms, which are available on the SNSF web platform *mySNF* (www.mysnf.ch) and which consist of three parts:

Part 1: General Information

Part 2: Scientific Information

1. Summary (1 page)
2. International standing of the applicant in their field of research (1 page)
3. Why was this hosting research group chosen; international standing of the research group (leader); explanation of the complementarity of the disciplines (1 page)
4. Research plan: state of the art, questions, methods and milestones (10 pages)
5. Justification of the systems biology approach, significance of the planned research for the scientific community (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.

Part 3: Budget

3.1.4 Submission Deadline

The Transition Postdoc Fellowship proposals are to be submitted by **April 30, 2015** 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 at the latest five working days before the deadline (from abroad: 2 weeks before the deadline). It is the applicant's responsibility to ensure timely delivery of the proposal. SystemsX.ch will not accept any responsibility for electronic / e-mail or any other problems.

3.1.5 Selection Procedure for TPdFs

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

Since 2013, an organization and procedure between the SNSF and SystemsX.ch has been set up. An **Expert Group (EG)** covers the whole range of required disciplinary know-how to review systems biology proposals. It is composed of around 10 members, mainly experts from Switzerland and Europe, plus one representative without voting rights from each SNSF and SystemsX.ch, respectively.

The selection procedure consists of the three major steps:

1. The SEB members will assess the accordance with the systems biology criteria (cf. chapter 1) and comment on each proposal;
2. Scientific assessment (see 3.1.6) and decision by the Expert Group (EG);
3. The decisions must be ratified by the SNSF Presidium.

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)

The Expert Group will evaluate the proposals according to the following criteria:

- 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?
- Does the leader of the hosting research group have an excellent international track record?
- Is the chosen research group suitable for hosting the candidate?
- Can the hosting research group adequately support the candidate?

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 the quality of the candidate and scientific criteria, and on the project's potential added value to systems biology.

Note: With the TPdF, the postdoc is supposed to enter into a discipline that is complementary to the one of their PhD thesis. Consequently, the potential of the merged fields will be assessed.

3.1.7 Scientific and Financial Reporting

The annual scientific progress as well as financial reports of each TPdF project are to be submitted to the SystemsX.ch Management Office. The reports will be consolidated and passed to the SNSF.
Financial reporting, including own contributions from the institutions, second and third parties will be expected, 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. Two scientists from two different disciplines such as computer science, engineering, nanotechnology, physics, mathematics, chemistry, biology or medicine will jointly supervise the student. For IPhD students, attendance at the two annual SystemsX.ch events, i.e. the PhD retreat and the All SystemsX.ch Day or international conference (depending on the year), is mandatory. The role and tasks of the PhD student in the project as well as an overview of the training program have to be stated in the proposal.
Only one (1) PhD student can be employed per project. IPhD Projects are limited to three (3) years as a rule and may be extended until December 2018 at the latest (**SystemsX.ch funds cannot be used after 2018**). SystemsX.ch plans to fund up to 10 IPhD students with this call.

SystemsX.ch will grant the following to each IPhD Project: salary and social charges of the PhD student as set forth in the SNSF rules, on request 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 in 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 must be a faculty member of a SystemsX.ch institution. 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 which are available on the SNSF web platform *mySNF* (www.mysnf.ch). The forms consist of the following parts:

Part 1: General Information
Part 2: Scientific Information

1. Abstract (1 page)
2. International standing of both applicants in their field of research (1 page)
3. Research plan: state of the art, questions, methods and milestones (6-8 pages)
4. Description of the tasks the PhD student will carry out during the project (1/2 page)
5. Overview of the training program that the PhD student will complete (taking into account the environment in which he/she will be working and the interdisciplinary character of the project) (1/2 page)
6. Justification of the systems biology approach (1 page)

Annex:

- CV and publication list for the past 5 years of the two supervisors

Part 3: Budget

3.2.3 Submission Deadline

The IPhD proposals are to be submitted by **April 30, 2015** 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 at the latest five working days before the deadline (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 applicant and co-applicants

Since 2013, an new organization and procedure between the SNSF and SystemsX.ch has been set up. An **Expert Group (EG)** covers the whole range of required disciplinary know-how to review systems biology proposals. It is composed of around 10 members, mainly ex-

perts from Switzerland and Europe, plus one representative without voting rights from each SNSF and SystemsX.ch, respectively.

The selection procedure consists of three major steps:

1. The SEB members will assess the accordance with the systems biology criteria (cf. chapter 1) and comment on each proposal;
2. Scientific assessment (see 3.1.6) and decision by the Expert Group (EG);
3. The decisions must be ratified by the SNSF Presidium.

3.2.5 Selection Criteria

The EG will evaluate 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 criteria, the standard scientific criteria will applied in accordance with the SNSF Rules of Procedure (Reglement über Gesuche SystemsX.ch, 3. July 2007):

a) Scientific relevance 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 decision will be based on scientific criteria, primarily on (1) added value to systems biology and (2) scientific quality.

3.2.6 Annual Scientific and Financial Reporting

The annual scientific progress, as well as financial reports of each IPhD Project, are to be submitted to the SystemsX.ch Management Office. The reports will be consolidated and passed to the SNSF.

Financial reporting, including own contributions from the institutions and third parties will be expected according to defined directives (cf. Partnership Agreement Article 35 and Article 37, No. 4).

4 Appendix: Abbreviations

SEB	Scientific Executive Board (scientists from different systems biology fields & partner institutions)
EG	Expert Group of the SNSF
MO	SystemsX.ch Management Office
IPhD	Interdisciplinary PhD Project
TPdF	Transition Postdoc Fellowship
SNSF	Swiss National Science Foundation
SUK/CUS	Swiss University Conference