



nano-tera.ch

The Swiss Initiative in

Multi-scale Systems Engineering for health and security of the
human being, energy and the environment

**Call for Proposals
2013**

Call for Proposals for Projects within the Framework of *Nano-tera.ch*

1. What are the broad objectives of *nano-tera.ch* ?

Nano-tera.ch addresses **system engineering research** that leverages micro, nano, information and communication technologies. The broad objectives of the program are both to improve quality of life and security of people across different levels of education, wealth and age and to create innovative products, technologies and manufacturing methods, thus resulting in job and revenue creation.

The intrinsic value of the underlying research is to make a bridge between traditional disciplines, including electrical engineering, micro/nano-mechanical systems engineering, biomedical sciences and computer/communication sciences, with the objectives of i) deepening the understanding of enabling technologies, ii) reducing scientific concepts to practice, and iii) mastering the novel challenges of designing large-scale complex systems. In this context, the scale of the design relates to the number of variables that are handled/optimized, and can be exemplified by the number of electronic devices in a chip, the number of concurrent operating system components, the amount of data to be processed in time and space, etc..

Nano-tera.ch has been established as a “simple partnership”. This legal form enables Universities and Research Centers to meet the aforementioned synergetic objectives, by providing a neutral platform for collaboration and development. The members of the partnership, i.e. the partner institutions, as well as future joining members, intend to position Switzerland among the world leaders in these merging fields for Health, Security, Environment and Energy Systems Engineering. *Nano-tera.ch* will enhance and extend interdisciplinary research and education at the highest level to meet these challenges.

2. What are the specific goals of this call within *nano-tera.ch* ?

The *nano-tera.ch* program has several specific goals, such as pursuing excellence in collaborative scientific research, creating and expanding educational programs, constructing demonstrators of the technologies being studied and transferring the results to Swiss industry. Broad and specific objectives of *nano-tera.ch* are described in the website www.nano-tera.ch. The *nano-tera.ch* program has run successfully through a first phase with a focus on enabling technologies. The second phase, started in 2013, targets primarily multi-scale systems engineering.

The research space of the current program is shown in Figure 1. It consists of three applications areas, related to: i) *Wearable and implantable* systems, ii) *Ambient and environment* systems, and iii) *Energy* systems. These application areas intersect a set of basic engineering technologies, grouped in four columns. Namely: i) *Nano electronic devices and circuits*, ii) *Nano/Micro Electro Mechanical Systems (M/NEMS) and sensors*, iii) *Software and systems* and iv) *Communications*.

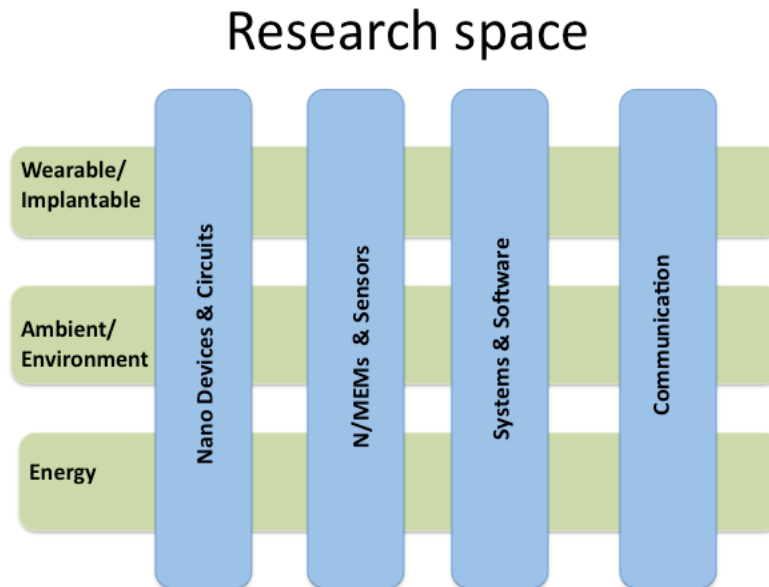


Figure 1. nano-tera.ch program structure

3. Research, Technology and Development Projects (RTD Projects)

RTD projects are integrated research projects. Major characteristics of these projects are interdisciplinarity and cooperation among research groups, preferably from different institutions, as well as the formation of doctoral students. Within one project, several research groups from complementary fields will contribute to reach the main project goals. A *nano-tera.ch* RTD project is to be proposed and led by one main applicant, the *Principal Investigator* (PI). The PI's institution is called the *hosting institution* of the RTD Project. The PI will manage the project during proposal writing, and once it is approved, he/she ensures that it is carried to completion in all its aspects including reporting.

This call addresses specifically collaborative integrated projects within the research space of Figure 1. Proposed research **must meet** the following characteristics, which embody the *nano-Tera.ch* strategic vision and which will be considered during the evaluation.

- **Multi-scale system engineering**, i.e., design of complex (large-scale) systems out of small (nano/micro) components. Objectives must include producing scientific and technological discoveries as well as a system demonstrator.
- **Synergy of various disciplines** through well-coordinated research efforts, to explore topics at the boundary of traditional scientific domains. An RTD project may match one or more boxes of Figure 1, but both breadth and depth must be demonstrated.
- **Inclusion of end-users and industrial partners.** The team proposing an RTD should include one (or more) end-user of the technology being developed, (e.g., a medical doctor for health applications). The team should also include one (or more) industrial partner active in the project, providing financial support in cash or in kind.

- **Collaborative nature and significant funding size** of the research project. The focus should be on research projects which could not be otherwise funded through usual channels (e.g. SNSF projects).
- **Social and industrial relevance**, in terms of potential benefits to health, security, energy and the environment.
- **Expected engineering impact.** The project proposal must address original research issues, but it must also show how the potential results to be achieved at the end of the project can be used to seed a prototype/product development or a tangible contribution to the application domain.

Proposals that do not match these requirements will **not** be considered for funding because they do not fit the *nano-tera.ch* strategic vision.

Proposals may be a continuation of previous RTD projects funded during Phase 1. In this case, it must be stated clearly that the proposal is a continuation, and the project description must include a concise statement on the results achieved by the previous RTD project and the expected improvements/achievements over the previous results.

3.1 Duration, Budget

The expected duration of RTD projects is **3 years**, with a typical total budget up to **4.5 MCHF** per project, including matching funds. As required by the applicable legislation, participating institutions must provide matching funds (in cash and/or in kind). Matching funds must cover at least 55% of the total project cost. Nano-Tera.ch will contribute at most 2 MCHF to each RTD project.

Three sources of funding are expected to support *nano-tera.ch* projects:

A) Funding provided by *nano-tera.ch*.

B) In-kind contributions provided by the participating institutions.

C) In-kind and/or cash contributions provided by third parties.

A) Funding provided by *nano-tera.ch*.

Financial support from *nano-tera.ch* to a given RTD (referred to as A).

B) Matching funds in the form of in-kind contributions of the institutions

1. Personnel (referred to as B1)

Direct costs related to personnel paid from the institution's own budget are eligible as in-kind contribution for that institution. The corresponding maximum applicable salary rates (full-time equivalent including social charges) are summarized below.

• Full professor	325 kCHF/year	(max. 20% involvement)
• Associate professor	290 kCHF/year	(max. 20% involvement)
• Assistant professor	255 kCHF/year	(max. 20% involvement)
• Senior researcher	215 kCHF/year	
• PostDoc	100 kCHF/year	
• Technician	125 kCHF/year	
• PhD Student	62 kCHF/year	

2. Equipment

Requests to include existing equipment or infrastructure as in-kind contributions must follow standard procedures used for SNSF grants, with commonly-applied depreciation rates.

3. Other contributions

Indirect costs linked to the project can also be considered for in-kind contributions, notably consumables and various infrastructure services provided by each institution for the performance of the project. More precisely, the official institutional overhead rate (typically 40%) on the amount listed in A and B1 can be considered as additional in-kind contribution.

C) Matching funds in the form of in-kind and cash contributions from third parties

These contributions include all support obtained from third party sources, (i.e. excluding *nano-tera.ch* and the applicants themselves) to support *nano-tera.ch* projects. They typically include industrial participation in cash or in kind.

All research Proposals for RTD projects must be submitted on the *nano-tera.ch* application forms, and satisfy the above matching funds requirements. Each proposal will present a detailed budget with both requested resources and secured matching funds. The present call covers a total amount of about 10 MCHF – subject to government approval - for funding a number of RTD projects over a period of three years, starting approximatively by the end of 2013.

3.2 Who May Apply for RTD Projects?

Faculty members of the *nano-tera.ch* partner institutions, as well as of other Swiss Universities and of institutions of the ETH-Domain not yet members of the *nano-tera.ch* partnership are eligible as Principal Investigators. After approval by the SNSF and prior to initiation of funding each qualified RTD's hosting institution must become member of the *nano-tera.ch* partnership.

Faculty members and senior researchers of Swiss Universities, of both Polytechnics, of institutions of the ETH-Domain, of Swiss Universities of applied sciences as well as of public and private research institutions outside the academia are eligible as Co-Investigators. In the case of private research institutions eligibility for *nano-tera.ch* funding is ruled by the applicable legislation.

3.3 Documentation to be Submitted

The RTD proposals are to be submitted using the official form provided at <http://www.nano-tera.ch/proposals.html>. An RTD proposal consists of two parts:

Part 1: General Information

Part 2: Scientific Information

1. Summary (1 page).
2. International standing of all applicants in their field of research (2 pages in total)
3. Research description (max 15 pages in total including references).
 - 3.1. Overall research questions, framework of the whole project, research approach and partition into tasks, task assignment to research groups, with GANTT chart showing collaboration and exchange among groups, expected added value (max 5 pages, including GANTT charts).

- 3.2. Research description for each task: state of the art, questions, methods, milestones and deliverables (max 2 pages for each task, including GANTT charts).
4. Significance of the planned research for *nano-tera.ch* and eventual users (private industry, economy, health and public sector, etc.) (max 1 page).
5. Statement on how the proposal fits the characteristics of Section 3. (max 1 page)

Appendices:

- Detailed and overview budgets using the Excel sheets provided at <http://www.nano-tera.ch/proposals.html>.
- Curriculum and list of publications of all co-applicants in the last 5 years.
- Letters of commitment of all applicants using the template provided at <http://www.nano-tera.ch/proposals.html>.
- Letters of commitment of all involved third parties.
- One (or more) offer(s) for any piece of equipment costing more than 20kCHF.

3.4 Submission Deadline

The RTD proposals are to be submitted electronically by June 17, 2013 to both:

submission@nano-tera.ch

and

<http://www.mySNF.ch>, using the mySNF submission system.

It is the applicants' responsibility to ensure timely delivery of their proposal. SNSF and *nano-tera.ch* reject any responsibility for (electronic) mail delivery problems.

3.5 Selection Procedure for RTD Proposals

The selection of the proposals will be preceded by a formal check by the SNSF administration. Proposals that 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 deficiency cannot be easily remedied. The following formal requirements must be met:

- Compliance with the submission deadline.
- Use of the official forms and completeness of the proposal written in English.
- Eligibility of the principal investigator and the co-applicant(s).
- Official commitment of the participating hosting institution, when using large facilities and/or institutional equipment.
- Official commitment for required cash/in kind contributions.

Each RTD proposal will be evaluated by a panel of experts of the SNSF according to two major principles:

- The scientific quality of the proposal.
- The strategic importance of the proposed research as a means of reaching the overall program's objective (See beginning of Section 3).

In particular, RTD proposals will be evaluated according to the criteria listed below in no particular order:

- Contribution to the state of the art in the field and impact.
- Scientific quality of the proposal.
- Originality.
- Adequacy of the methodology.
- Scientific track record of the applicants in the area of the proposal.
- Feasibility, organization and financial planning of the proposal.
- Integration into the overall *nano-tera.ch* vision.
- Relevance of the proposal toward extending the state of the art in the *nano-tera.ch* domains.
- Significant and genuine collaborative effort and synergy of the participants and corresponding budget.
- Feasibility of the project in terms of delivering realizations of the proposed results within the *nano-tera.ch* program lifespan.
- Industrial interest in the research via financial and/or technical contribution or in creating prototypes of the technology
- Differentiation of the proposed activities when compared to other funded programs.

3.6 Results of the selection procedure

The SNSF panel of experts will provide the PIs with a detailed evaluation. Projects will be selected for funding on the basis of scientific excellence and availability of funds.

3.7 Annual Reporting

The annual scientific progress report and financial report of each RTD Project is to be submitted to the *nano-tera.ch* Management Office. Each PI and Co-PI of a funded project will receive guidelines with the specific reporting requirements and notification of the reporting deadlines at least three months in advance. The financial report to the Management Office of *nano-tera.ch* should present the use of the financial resources applied to the project, including *nano-tera.ch* funds, own and other contributions “in cash” or “in kind”.

4. Nano-Tera.ch Focused projects (NTF)

NTF projects embody activities that the Executive Committee (EXCOM) deems important. The EXCOM will fund them based on a peer review procedure. These projects are small-scale focused projects to address specific scientific/technical issues and needs. Examples include, but are not limited to, activities collateral to RTDs, activities that are in-between the scope of two RTDs (glue projects) and activities that promote technology transfer. A limited percentage of the grant can be used for lab materials and supplies.

4.1 Size and duration of NTF grants

Nano-tera.ch funding is up to 150 kCHF/year. As required by the applicable legislation, participating institutions must provide matching funds (in cash and/or in kind). Matching funds must cover 55% of the total project cost, as in the case of RTD projects. (See Section 3.1 for details). Grants will be awarded subject to availability of funds.

Projects are expected to last one or two years. Deadlines for the NTF project proposal are the last day of March, June, September and December. The *nano-tera.ch* EXCOM will evaluate NTF projects directly, possibly with the help of external experts.

4.2 Who may propose NTF Projects?

Applications can be submitted by faculty members and senior scientists of Swiss Universities, of both Polytechnics and the institutions of the ETH-Domain, of Swiss Universities of applied sciences as well as of public and private research institutions outside of academia. In the case of private research institutions, eligibility for *nano-tera.ch* funding is regulated by the applicable legislation.

4.3 Information to be submitted

The NTF proposals are to be submitted to submission@nano-tera.ch using the official form provided at <http://www.nano-tera.ch/proposals.html>. An NTF proposal 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. Research plan: state of the art, questions, methods, milestones (max. 4 pages in total including references).
4. Expected impact (1 page).
5. Justification of the proposal within the context of other RTDs, significance of the planned research for the scientific community and eventual users, technology transfer plans.

Appendix:

- Curriculum and list of the 10 most relevant publications of all applicants.

4.4 Selection criteria

The EXCOM of *nano-tera.ch* will evaluate the proposals according to the following criteria:

- Formal criteria (completeness of the proposal, eligibility of the applicants).
- Focus on clearly defined scientific and technological problems.
- Does the proposal catalyze innovative interactions between groups in different fields?
- Does the proposal generate new data and knowledge that could not be obtained by RTD projects – what is the added value?
- Does the proposal support technology transfer to industry and to enhance the impact of *nano-tera.ch*?
- What is the standing of the principal scientists in their respective fields?
- Does the project have a realistic budget and a clear leadership structure?

4.5 Reporting

After completion of the NTF project, a scientific report is to be submitted to the *nano-tera.ch* Management Office. Financial reporting including own contributions, third parties will be according to defined directives.

5. Education and Dissemination activities (ED)

Education and Dissemination of results is an integral part of *nano-tera.ch*. Proposals may be submitted to support short courses, workshops, mini-conferences, as well as developing new curricula. The focus on educational activities is to fill the gap of programs that are not cur-

rently provided by Swiss Universities and Polytechnics. Proposals may address the in-depth study of a vertical technology and/or interdisciplinary horizontal activities as shown in Fig. 1.

Financial support from *nano-tera.ch* to a given ED project will require matching funds. Matching funds must cover 55% of the total project cost, as in the case of RTD projects. (See Section 3.1 for details). Grants will be awarded subject to budgetary limitations.

Deadlines for the ED project proposal are the last day of March, June, September and December. The *nano-tera.ch* EXCOM will evaluate ED projects directly, possibly with the help of external experts.

5.1 Who may apply for ED activities?

Applications can be submitted by faculty members and senior scientists of Swiss Universities, of both Polytechnics and of institutions of the ETH-Domain, of Swiss Universities of applied sciences as well as of public and private research institutions outside the academia. In the case of private research institutions eligibility for *nano-tera.ch* funding is regulated by the applicable legislation. In the case of proposals for developing new curricula, public and private research institutions are only eligible as co-applicants.

5.2 Documentation to be submitted

The ED proposals are to be submitted to submission@nano-tera.ch using the official form provided at <http://www.nano-tera.ch/proposals.html>. An ED proposal consists of two parts:

Part 1: General Information

Part 2: Scientific Information

- Summary (1 page).
- International standing of applicant in her/his field of research (1 page).
- Education plan: state of the art, added value (max. 4 pages in total).
- Expected impact (1 page).
- Curriculum and list of the 10 most relevant publications of all applicants (Annex).

5.3 Selection criteria

The EXCOM of *nano-tera.ch* will evaluate the proposals according to the following criteria:

- Formal criteria (deadline, completeness of the proposal, eligibility of the applicants).
- Focus on clearly defined scientific and technological problems in the *nano-tera.ch* scope (See Figure 1).
- Sound education and/or dissemination plan.
- Innovation and possibly uniqueness of the ED plan.
- What is the standing of the principal scientists in their respective fields?
- Does the project have a realistic budget and a clear leadership structure?

5.4 Reporting

After completion of the ED project, a scientific report is to be submitted to the *nano-tera.ch* Management Office. Financial reporting including contributions from the applicants and from third parties will be according to defined directives.

6. General Information

General information about *nano-tera.ch* is available at URL: www.nano-tera.ch . Please contact the *Nano-tera.ch* office if you have any questions.

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