



SWEDISH FOUNDATION *for*
STRATEGIC RESEARCH

SSF Call for Proposals: Framework Grants for Research on Systems Biology

The Swedish Foundation for Strategic Research announces SEK 300 million in a national call for proposals for problem- or application-driven research projects that meet the highest international scientific standards. The call aims to stimulate collaborative interdisciplinary research within the area of Systems Biology, of relevance to present or future Swedish-based industry and to society.

Selected projects will be supported by grants of SEK 4-7 million per year for a period of 5 years (incl. overheads) to be used for salaries (senior researchers, postdocs, PhD students, etc.), research tools, and running costs according to the needs of the project. Funding for the last two years will be contingent upon a successful midterm evaluation.

Background

Systems biology is a relatively new multidisciplinary field that ultimately aims to understand complex relationships over entire biological systems using mathematical and computational modelling. The focus is to develop a quantitative integrated understanding of how interactions within and between the components of biological systems and their environment lead to structure, function, dynamic response and regulation.

Systems biology requires collaboration between biologists, clinicians, mathematicians, computer scientists, engineers, physicists, chemists, and others, to reach an understanding of biological and biomedical questions.

Earlier approaches have used a more reductionist, qualitative or at best semi-quantitative route directed towards the understanding of single components, whether an individual gene, protein, cell, tissue, organ or organism. Recent advances in large-scale technologies for measuring biological systems, alongside the development of statistical and computational applications, including the use of mathematical models and simulations, makes a more integrative approach possible using quantitative models of complex biological systems.

The core of systems biology approaches is that quantitative data, which may be but is not necessarily derived from large-scale parallel measurements such as genomics, proteomics and metabolomics, is integrated into an analytical mathematical framework that allows robust, quantitative and testable models of complex biological systems to be constructed. Models should be validated experimentally, and new quantitative data used to iteratively improve them. Basic science systems biology approaches include analysis of signal transduction, neurotransmission, metabolism and receptor/ligand interactions using iterative, experimental data-derived modelling at the cellular, organ and physiological

level. Models may also take into account larger-scale interactions between systems and environment, including epigenetic response and gene/environment interactions, state transitions, and relationships between organisms, such as host/pathogen and host/biome.

Scope

Systems biology approaches can be applied to multiple research fields in bioscience, aiming to improve the understanding of physiological, developmental and pathological processes within complex biological systems. There is a need to bring model-driven life sciences to industry and to offer multidisciplinary training, and one aim with this call is to promote the effect of systems biology research within the Swedish life sciences industry. Long-term outcomes are expected to be new or improved medicines, treatment strategies, diagnostics, medical devices, biotechnology products and crops.

This call is directed towards strategic applications of systems biology in fields including, but not limited to those summarised below. Projects shall aim to provide measurable improvements in the understanding and application of systems biology to actual problems in these strategic areas:

- Human and veterinary medicine for understanding of disease mechanisms and for therapeutic strategies, diagnostic strategies and personalised medicine approaches in simple and complex disease, infection and cancer, as well as ageing research
- Industrial microbiology and other biotechnology applications
- Plant, forestry and agricultural applications for materials production or improved properties of crops

Since a large part of the genes and proteins in any organism still lack annotated functions, functional genomics approaches to assess the unknown functions of these are encouraged to be included in the projects.

Exclusions

The call is not directed towards projects that are primarily concerned with the development of new mathematical methods or with the development of new biobanks and data collections, though both methods development and sample collection may form part of planned projects within the context of an overall directed strategic research outcome.

Strategic relevance

The proposed projects shall aim to provide solutions to important application problems or, in other ways, enable future applications, products or services. The criterion of strategic relevance means that the proposal shall demonstrate a clear vision of utilisation/exploitation of the research results in Sweden in the medium to long term. Since 3% of the grant is withheld by SSF for utilisation/exploitation efforts of research results it is recommended that the PI:s involve a partner that can support such activities, already when the project is formulated and applied for. An example of such a partner is the Innovation office or the Holding company linked to a university or research institute. The strategic relevance and the vision for utilisation/exploitation shall be clarified in the application form and is one of the evaluation criteria.

Eligibility

All projects should be based on a credible collaboration between, typically, two to four applicants with different kinds of relevant complementary scientific expertise, from one or different research group(s) - and may be from different departments or universities for added interdisciplinary value. All applicants should take active part in the project and their activities should be at least partly financed by the project budget.

The proposal must be submitted by a main applicant who is a prominent researcher prepared to assume responsibility for the project during the entire grant period. The applicant must be employed by a Swedish university, university college, university hospital, or by a public or private non-profit research institute. At least one of the applicants must be employed by a university or university college.

Project participation from industry, public authorities or other relevant organisations will be considered a merit. However, such participants cannot be funded by the SSF grant but may participate on their own budget. Although SSF-grants may not be transferred to universities outside Sweden, they may be used for e.g. visits by foreign-based scientists to applicants working in Sweden (provided stated in the project plan).

The proposal budget should be in the interval of SEK 4 to 7 million per year for five years. A maximum of 25% of the grant may be used for salary for the main applicant and/or the co-applicants, but only to cover up to a maximum of 25% of the salary of each applicant. Junior participants (PhD students, postdocs or other junior researchers) may be funded by 100% of the salary.

Please note:

- each applicant is allowed to be represented in one application as a main applicant.
- each applicant is allowed to be represented in one application as a co-applicant.

Applications not conforming to these conditions will not be considered. It is the responsibility of the main applicant to inform all the co-applicants and to check the proposal for compliance with the rules before submission.

Proposal and submission

A complete application must contain, among other data specified in the portal, a full description of the research plan and full details of the relevant expertise of the participating groups. It should contain a clear account of the strategic significance of the research in the medium to long term, including a plan for utilisation/exploitation efforts that should commence in parallel with the research activities, already from day one in the project.

Each proposal shall clearly describe the state of the art within the area(s) addressed. It is also important for the proposal to give a clear picture of the resources available and to demonstrate that the proposed constellation of research groups will be effective in view of its objectives.

A Letter of Intent from the Head of the main applicant's department is compulsory.

The proposal must be written in English and submitted via the SSF portal at: <http://apply.stratresearch.se>. Note that in order to get a complete view of all data required for submission it is necessary to consult the portal. Please log on to the portal well in advance of the deadline. Please also submit the application in due time before the deadline. When the application is submitted, the system will reject it if some data field is

missing. As long as this is done before the application deadline it is possible to submit and re-submit as many times as necessary.

All applications must be submitted by **14:00 hours (2:00 pm CET) on October 18, 2016**. No additional material will be considered after this deadline.

Evaluation

Applications will be assessed by an evaluation committee consisting of generalists and specialists from industry, academia, and research institutes. In a first selection the applications will be judged primarily with regard to scope (as described above), relevance and potential impact. Furthermore, applications that are judged unable to compete in the final step of the evaluation, or that are considered too incomplete to be meaningfully assessed, will not pass this first step. The selected applications will be sent on international peer review. The results of this expert review will be taken into account by the evaluation committee in order to produce a recommendation on which SSF will base its decision.

The applications will be reviewed using the following criteria:

- Conformity to the scope and eligibility as outlined above
- Scientific quality; originality, strengths, weaknesses, degree of interdisciplinarity and feasibility of the research plan
- Strategic relevance and potential impact of the proposed research to Swedish industry and/or society, including utilization/exploitation plans
- Qualifications of the applicants, previous achievements, international experience, and networks, and leadership/management of research teams.

Timetable

- Last date for applications: **October 18, 2016, 14:00 hours** at the latest
- Decision by the SSF Board: June, 2017
- Project start: August, 2017

No additional material submitted after deadline will be considered.

Please note that the Foundation is subject to the Principle of Public Access to Official Records (Offentlighetsprincipen). Thus, applicants should avoid submitting material that they do not wish to be made public, e.g., information that could prevent patenting.

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