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Swedish Foundation for Strategic Research

The Swedish Foundation for Strategic Research (SSF) announces

Framework Grants for research in

Biological Production Systems

The Swedish Foundation for Strategic Research announces a total of SEK 225 million in a national call for proposals for problem- or application-driven research projects of the highest international scientific standards. The call aims to stimulate collaborative interdisciplinary research within the area of Biological production systems, of relevance to present or future Swedish-based industry and to Swedish society.

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

Importance of the area

Biological production systems are envisaged to be instrumental in the future transition to a sustainable bio-based economy, as highlighted by, e.g., the Commission of the European Union, in its Horizon 2020 vision for Europe as a smart, sustainable and inclusive society and in the EU Strategy for Bioeconomy, 2012. Essential to this transition is the development of industrial processes that are fed with renewable raw materials, and where the outputs are products with a high content of cutting-edge knowledge, and hence with a high added commercial value.

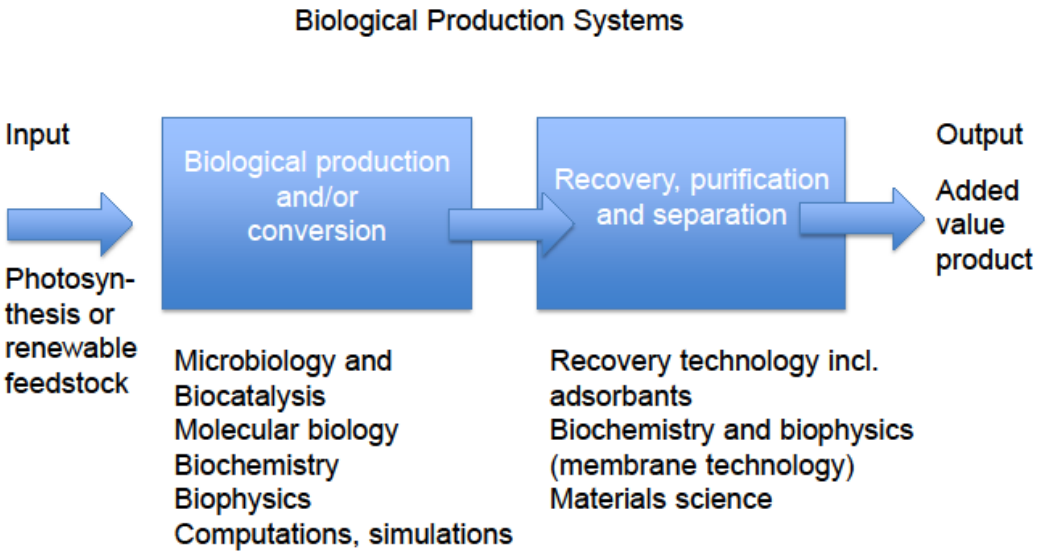
The strategic importance of investing in research in this area is further emphasized by the fact that Sweden, and indeed Europe as a whole, is at risk of losing out in terms of competence in the area. Thus, researchers in highly relevant fields such as biotechnology and breeding in plants and forest trees witness that funding has been cut down both nationally and EU-wide. As a corollary, it has become increasingly difficult to attract students and young researchers to the relevant research fields.

P.O. Box 70483, SE-107 26 Stockholm, Sweden Visiting address: Kungsbron 1, G7
phone: +46 8 505 816 00 fax: +46 8 505 816 10 e-mail: found@stratresearch.se www.stratresearch.se

Hence, strengthening this research area in Sweden will likely mitigate the loss of expertise in the country, increase our attractiveness to foreign researchers, and possibly also generate a competitive edge compared to many other EU countries. It is realised that key competences might be lacking in Sweden. Thus, applicants are encouraged to consider recruiting expertise from abroad, or to extend mutually value-adding international collaboration.

Scope of the present call

The aim of this call is to stimulate and strengthen collaborative and innovative research with the objective of developing novel, or improving existing, systems for biological production. Emphasis should be on input of renewable feed stock, innovative, smart and efficient processing, and output of high value products of societal and industrial relevance. The overall concept is depicted in the figure below:



In the figure above the output arrow signifies high value products, e.g., fine and/or specialty chemicals, biologically-based materials or food and feed ingredients of high commercial value. The downstream box represents the technologies and processes needed to generate the high value output, e.g., purification and separation of compounds.

The upstream box could be primary production of plant material in agriculture, forestry or aquaculture, in which case the input arrow simply signifies carbon dioxide, nutrients and water, i.e. the basic requirements for photosynthesis. In this case, the upstream box depicts a vision of a future photosynthesis-driven chemical factory, where cutting-edge biological knowledge and technologies are employed to direct metabolic pathways in plants in some new desired directions.

Alternatively, the upstream box is fed with bio-waste or crop residues that otherwise would have been either lost or used for low value output. In this case, the upstream box is a bio-refinery, rather than a photosynthesis-driven factory, which, however, shares the feature of employing cutting-edge knowledge to enable that the feed stock be sequestered into a novel value chain.

In either case, upstream optimization is required, which allows for increased resource efficiency in downstream processing, and for building new value chains from harvests, residues or waste materials. Such optimization can also involve breeding for improved feed stock, e.g., for better straw or wood quality.

Research areas that are covered by this call include the development of microorganisms, forest trees or crops (including e.g., straw) that are optimized with respect to production of, e.g., pharmacologically active substances, proteins, lipid or starch qualities of high commercial interest, or defined structural/chemical changes in cellulose, hemicellulose or lignin for production of polymers. Open cultivation systems of algae or aquatic plants for the production of high value compounds, or for feed stock to bio-refineries, are also relevant, as are bio-refineries in which new processes and added value from conversion of bio-waste and crop residues are achieved by development of new high value products. It is also envisaged that the rapidly expanding field of contained production in transgenic bacteria, fungi or microalgae of proteins or low molecular weight compounds of high commercial interest will attract applicants.

In terms of the figure above, research projects could address specific issues pertaining to a limited part of an overall production process (e.g., plant breeding, biocatalysis, metabolomics, or process optimization), or it could cover the full process “from farm to fork”. In the former case it is required, however, that the issue how the project fits into an existing or future production system be clearly addressed. Provided that this latter condition is fulfilled, also rather basic research projects are eligible.

As exemplified in the figure, it is envisaged that feasible research problems can derive from a multitude of disciplines, such as molecular biology, plant breeding, process engineering or computational/simulation sciences. There is no *a priori* restriction on which research areas are eligible, as long as the relevance of the research project(s) to the biological production system in question is clear. However, it should be stressed that this call is not intended for research projects addressing prevailing bulk production of, e.g., pharmacologically active substances, agricultural or forest commodities.

Projects should aim at achieving “proof-of-concept” at mid-term and plan the last 2 years to provide evidence for positive impact on the (existing or envisaged) overall value chain. The importance to the Swedish society of using the biological production system studied should be specified. If applicable, the applicants should describe the potential importance of the system for the Swedish industrial sector. The importance for society and industry should preferably be described in terms of tangible goals and milestones.

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) - not necessarily co-localised. 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 should be a prominent researcher prepared to assume the scientific responsibility for the project during the entire grant period. All co-applicants should be senior scientists (i.e. not postdocs or PhD students). All applicants 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 must not be funded by the SSF grant but will have to participate on their own budget. The same goes for international scientists working outside Sweden unless the project plan itself includes, e.g., visits by foreign-based scientists to an applicant working in Sweden.

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.

The proposal budget should be in the interval of SEK 4 to 7 million per year for five years. An approved SSF grant may be used for co-funding in projects funded by the European Union provided the cores in the two projects overlap.

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 expected strategic significance of the research, presenting a vision of utilisation/exploitation of the results in Sweden during the project's lifetime and/or up to 15 years after completion of the project.

Each proposal shall clearly describe the state of the art within the area 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 main applicants Head of department is obligatory.

The application is to be 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 respond 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.

Evaluation

Applications will be assessed by an evaluation committee including scientists from industry and academia. In a first selection the applications will be judged primarily with regard to scope (as described above) and relevance. 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 expert review. The results of the expert review will be taken into account by the evaluation committee in order to produce a final recommendation on which the board of 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 to Swedish industry and/or society and importance of the proposed research
- Qualifications of the applicants, previous scientific achievements, international experience, networks, and leadership/management of research teams.

Tentative timetable

- Last date for applications: May 6, 14:00 CET at the latest
- Decision by the SSF Board: late autumn 2014
- Project start: early 2015

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.

Contact persons at SSF:

Jan Fahleson, Scientific secretary, Life Sciences
jan.fahleson@stratresearch.se, 08-505 816 72

Joakim Amorim, Research programmes manager
joakim.amorim@stratresearch.se, 08-505 816 65