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SWEDISH FOUNDATION *for*
STRATEGIC RESEARCH

Call for Proposals, 200 MSEK:

SSF Agenda 2030 Research Centers (ARC)
on Future Advanced Technology
for Sustainability

Four research centers of 40-60 MSEK each in the following areas:

- 1. Future Nuclear Power**
- 2. Plant Biotechnology, including GMO and CRISPR/Cas9**
- 3. Hydrogen/Fuel Cells**
- 4. Next Generation of Antibiotics and/or Actions to Prevent Pandemics**

Scope

The Swedish Foundation for Strategic Research (SSF) announces SEK 200 million in a national call for Agenda 2030 Research Centers on Future Advanced Technology for Sustainability. These shall be mission-oriented with challenge-driven research that meets the highest international scientific standing and promotes innovation, i.e. span technology readiness levels 1-5. The call drives transformation with interdisciplinary research within the above listed visionary areas for substantial impact on sustainable development within our generation with a 10-15 year horizon and beyond.

The strategic research program of the SSF Foundation over its first 25 years of operation much overlaps the UN Agenda 2030 for Sustainable Development. The present program will provide sense-of-urgency research to efficiently reach the Agenda goals, in particular mitigating climate change. Each of four Centers will target one or several of the sustainable development goals for which there is a strong science case and knowledge gaps, in particular for #2, 3, 7, 9, 11, and 13. It is, for example, imperative to generate science-based understanding and develop technology to provide fossil-free fuel and energy and to fight-off pandemics.

Selected projects will be supported by grants of SEK 40 to 60 million in total for a period of five to six years (incl. overheads) to be used for salaries (senior researchers, postdocs, PhD students, etc.), expensive equipment and other research infrastructure, research tools, and running costs according to the needs of the project. Funding for the last two to three years will be contingent upon a successful midterm evaluation.

Project will be selected in competition with the intention to fund one Center in each of the following areas:

1. Future nuclear power

This area concerns primarily fourth generation nuclear reactors (both thermal and fast), including small modular reactors and/or accelerator-driven systems for power generation systems. Deployment of more nuclear power will help the world to abandon coal burning and at the same time generate the electricity needed for electric-propulsion vehicle technologies, as well as complementing the parallel expansion of wind, solar, and wave power.

2. Plant biotechnology, including GMO and CRISPR/Cas9

This involves breeding of agricultural crops and forest trees with a focus on more efficient and sustainable food and wood production. Research should be directed towards the use of modern breeding methods, like, for example, genomic selection or different genetic engineering/modification methods, including CRISPR/Cas9. Adding to this, genetic engineering of chloroplast genomes, aiming to reduce CO₂ release via decreased photorespiration, could be an interesting route. Interdisciplinary projects, where different areas in plant biology are connected to modern plant breeding, are encouraged.

3. Hydrogen/Fuel cells

This technology should be developed as an alternative to conventional battery vehicles, and to avoid likely problems in rapid upscaling in the application of batteries with potential negative impact with respect to scarce resources. Research can be directed towards, catalysts, electrolytes, hydrogen production and delivery, hydrogen storage, cell and cell components manufacturing, hydrogen system technology analysis, etc.

4. Next generation of antibiotics and/or actions to prevent pandemics

Alternative ways to prevent and treat infectious diseases are needed, now when the output of new antibiotics is slowing, the resistance against current antibiotics increasing, and new pathogens emerging. This area can be directed towards identification of new antibiotic targets, development of new antimicrobials, new vaccines and immunotherapies as well as better and faster diagnostic tools for infectious agents, in both medical and veterinary practice.

Strategic relevance

The proposed research shall aim to provide enabling technologies and medical solutions for future economically and environmentally sustainable applications, products, services, health care solutions.

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. Measured on a technology readiness level (TRL) this would correspond to TRL span of two to five.

A central part of the relevance is graduate student education and the attractiveness of the corresponding PhD:s in industry and society. This includes providing effective measures for translation and innovation. It is recommended that the PI:s involve partners that can continuously support utilisation/exploitation efforts of research results. One way to do this is to involve a university innovation office and/or holding company, already at the formulation stage of the application. Three percent of the grant will be reserved by SSF for such directed activities. In case one Center does not claim its 3 percent allowance during the first five years of operation, the other Centers may bid for the freed funds for additional exploitation activities during year six.

Eligibility

All projects must be based on a credible collaboration between recommended four to six senior Swedish applicants with different kinds of relevant complementary scientific expertise, typically not co-localised - 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 has the capacity to assume responsibility for the project during the entire grant period, which means that the person should be employed with at least 50 percent tenured/permanent position within his/her organization. The 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.

A Letter of Intent from the Head of the main applicant's department is compulsory. Support letters from collaborating industry, clinic or other external partner is optional.

While project participation from industry, public authorities or other relevant organisations is an evaluation criterion, such participants cannot be funded by the SSF grant but may participate on their own budget, in which case should be highlighted in the application.

The applicants should relate the projects to one or more of the Agenda 2030's 17 Sustainable Development Goals, and the pending 169 targets.

The proposal budget should be in the range of SEK 40 to 60 million in total during five to six years. A maximum of 25 percent 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 percent of the salary of each applicant. Junior participants (PhD students, postdocs or other junior researchers) may be funded by 100 percent of the salary. Part of the grant may also be used for expensive instrumentation, laboratories, and other research infrastructure, required for the project.

Exclusivity in applications:

- 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.
- any one person is allowed to have maximum one SSF-center grants simultaneously (with an overlap in time of up to three years) as a main 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 application portal, a clear purpose statement, 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.

The proposal must be written in English and submitted via the SSF application portal at: <http://apply.strategiska.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 January 21, 2020**. 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.

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 internationalisation and interdisciplinarity, and feasibility of the research plan.
- Strategic relevance, with clear purpose and potential impact of the proposed research to Swedish industry and/or society, including possibility for scale-up of the devised solutions.
- Qualifications of the applicants and composition of the research team, including gender balance; previous achievements (science, innovation, and entrepreneurship), international experience and networks, and leadership/management of research teams.

Timetable

- Last date for applications: January 21 2020, 14:00 CET at the latest
- Decision by the SSF Board: June 2020
- Project start: August 2020

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:

Mattias Lundberg, Scientific Secretary, tel.: +46-8-505 81 678, e-mail: mattias.lundberg@strategiska.se

Joakim Amorim, Research Programmes Manager, tel.: +46-8-505 81 665, e-mail: joakim.amorim@strategiska.se