



SWEDISH FOUNDATION *for*  
STRATEGIC RESEARCH

2022-04-07

SSF Call for Proposals

## **SSF Multidisciplinary Research Center in Semiconductor System Design (SeSyDe)**

The Swedish Foundation for Strategic Research (SSF) announces 60 million SEK in a national call for proposals for a Multidisciplinary Research Centre (MRC) that meets the highest international scientific standards. The call aims to stimulate truly multidisciplinary research between academia, research institutes, industry, and society.

SSF intends to approve one (1) MRC application in the field of Semiconductor System Design (SeSyDe).

The MRC will be granted up to 40+20 million SEK in total including overhead costs for a period of six years. Full funding will be contingent upon a successful midterm evaluation.

SSF supports various strategic research centers. Examples are SFC (Strategic Research Centers), IRC (Industrial Research Centers) and ARC (Agenda 2030 Research Centers). Multidisciplinary Research Centers (MRC) is a development of this mode of support. The overall SSF budget for these four center initiatives is approximately 2 billion SEK.

### **SSF Multidisciplinary Research Centers (MRC)**

Multidisciplinary research is defined here as coordinated research efforts in which several scientific competences, presumably not all from the same department or faculty, each outstanding in their field, work together to solve a major societal problem.

A Multidisciplinary Research Center (MRC) should be characterized by the added scientific value that arises from multidisciplinary research. The potential for an MRC to find new solutions through multidisciplinary and synergistic approaches is a key evaluation criterion.

The research by the MRC should be based on a clear scientific question centered on gaps in knowledge related to a significant problem and opportunity. Moreover, the MRC should have explicit plans for the implementation and/or knowledge transfer of research results into industry and society in a long-term perspective.

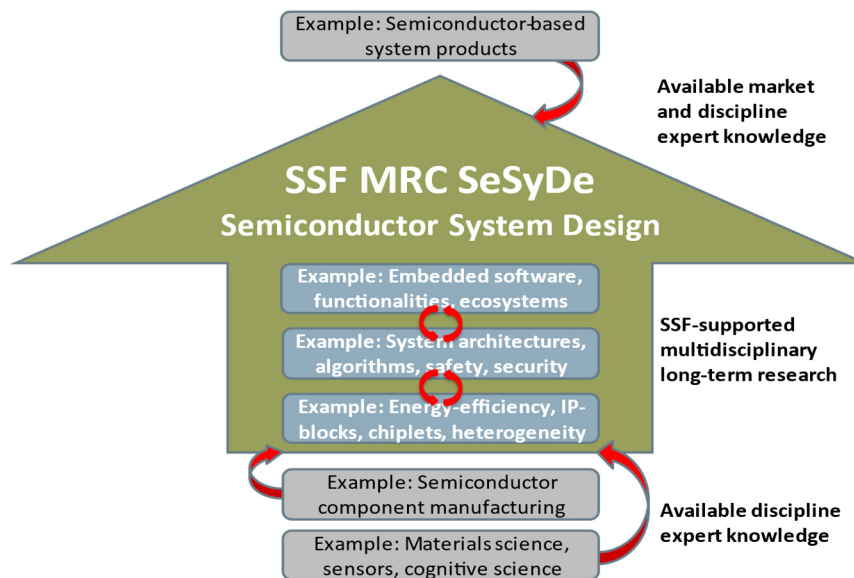
Another MRC characteristic should be its strong presence in international research initiatives (e.g., *EU Horizon Europe*), leveraging the SSF-funding with international funding for increased thrust. The potential for an MRC to constitute an internationally leading research center is a key evaluation criterion.

## Aims and Scope

This call aims to create multidisciplinary research, which should contribute to developing Sweden into a top international position in Semiconductor System Design (SeSyDe). Applications not clearly addressing this field will be evaluated as out of scope, and thus desk rejected. The supported MRC SeSyDe shall constitute an internationally leading research center in this field.

Advanced semiconductor-based products are contingent on research from many fields, spanning basic materials science to high-TRL<sup>1</sup> product design. Advancement in future chip performance can be expected from the intermediate semiconductor design stage. Here innovation, value, and product differentiation are enabled by optimally designing semiconductors to the desired product specifications. A system approach, combining multidisciplinary research, can maximize results. Sweden has no major semiconductor industry, but a strong semiconductor-based system industry. Semiconductor system design is thus important to Sweden.

The scope of this call is exemplified by a combination of semiconductor IP-blocks, chiplets, system architecture, algorithms, and embedded software design (see Figure). Ecosystems and functionalities must guarantee safety, security and energy-efficiency under constraints of heterogeneity. Examples of research fields that are peripheral are semiconductor component manufacturing, materials science, sensors, cognitive science, and high-TRL (*i.e.*, TRL $\geq$ 6) research, *e.g.*, towards semiconductor-based system products. However, expert and market knowledge from these disciplines, when applied to semiconductor system design, might be crucial for success. Note that discussed research fields are examples. Proposals might include other relevant research fields to meet the aim. SSF encourages innovative multidisciplinary approaches.



**Example of a multidisciplinary research approach to semiconductor system design**

Semiconductor chips are at the core of the digital infrastructure. Access to semiconductors is crucial for digital sovereignty, *i.e.*, the ability of a country to control and uphold its digital infrastructure. The *EU Digital Decade* initiative and the *EU Chips Act* reflect this. As ever more computations are performed, energy consumption becomes important not only at the chips level, but also at the macro level. Energy-efficiency is a

<sup>1</sup> Technology Readiness Level, spanning TRL 1 to 6 from basic principles and innovation via research and validation to technology demonstration.

cornerstone of the *EU Green Deal* initiative. This call is aligned with these EU initiatives and aims to leverage them. The supported MRC SeSyDe shall reflect this position.

This call aims to engage a comprehensive advanced semiconductor system design community in Sweden, with a significant number of senior researchers, PhD students and active industrial/societal partners. The supported MRC SeSyDe shall reflect this position.

## **Eligibility**

An MRC consists of applicants from one hosting Higher Educational Institution (HEI) and applicants from 1-3 other HEIs or research institutes (RI), supported by at least two industrial and/or societal partners.

Each of these organizations may be represented in maximum two (2) applications in this call.

The main applicant (Center Director) must have international standing as a research leader in her/his field, must be actively employed by the hosting Swedish HEI to at least 50% of full time and must be prepared to assume operative responsibility for the MRC during the entire grant period.

The co-applicants are the researchers employed to at least 50% of full time by the collaborating HEIs/RIs, including the hosting HEI. The total number of co-applicants should not exceed 7 persons, and gender equality should be considered.

Applications with industrial and/or societal partners registered in Sweden are prioritized.

International research organizations may participate only by their own means, apart from international researchers that becomes employed by the MRC through the participating Swedish HEIs/RIs.

The MRC must have a Governing Board, approved by SSF, consisting of a majority of industrial/societal representatives. The Center Director shall be part of the Board. The Board, with a chair from industry/society, shall have the mandate to recommend SSF to terminate the funding, in whole or in parts, or to change the management of the MRC. A tentative Board should be stated in the application.

The MRC must assign an international Scientific Advisory Committee (SAC), proposed in the application.

A Center Agreement signed by all partners will be required from the consortium behind the application, if and when it is selected for a hearing. The period for this contract is recommended to be at least three years, *i.e.*, until the mid-term evaluation.

Applications not conforming to the above eligibility criteria will not be considered by SSF. It is the responsibility of the main applicant to inform all co-applicants and industrial/societal partners, and to check the proposal for compliance before submission.

## **Grant**

SSF-funding is available only to Swedish universities or research institutes, where one HEI is the administrative organization for the grant. The industrial/societal partners and international partners must support the MRC by their own means.

The proposed budget from SSF shall be up to 60 million SEK in total during six years.

The budget allocation from SSF will be a decision of 40 million SEK in conjunction with the MRC's start. Up to 20 million SEK will be decided and distributed by SSF after a mid-term evaluation. Three percent (3%) of the grant will be reserved by SSF for supporting utilization/exploitation efforts of the research results.

The universities/research institutes can use the grant for salaries (senior researchers, postdocs, PhD students, *etc.*), research tools/infrastructure, and running costs according to the needs of the MRC. The application must demonstrate how the SSF grant will be adequately distributed among the HEIs/RIs, *i.e.*, with adequate budget for each organization. It must also clearly display any co-funding (in-kind, cash, lab usage, research infrastructure, *etc.*) from the industrial/societal partners.

A maximum of 25% of the overall grant may be used for salaries for the Main applicant (Center Director) and/or for the Co-applicants (*i.e.*, these individuals) taken together. However, no more than 25% of the salary of each applicant (*i.e.*, the same individuals) may be covered by the SSF grant. A maximum overhead cost of 35% is allowed.

## **Proposal and submission**

A complete application must contain, among other data specified in SSF's online application portal, a full description of the MRC research plan and details of the relevant and complementary expertise of each of the participants. The multidisciplinary approach to the research problem should be clearly described.

Each proposal must clearly describe the international state of the art within the research area(s) addressed, and present how the MRC would be competitive. In addition, the proposal should clearly state the resources available and to demonstrate that the proposed participating organizations will be effective to reach the MRC goals. The plan and potential for international cooperation and leverage should be clearly described.

The application should contain a clear account of the strategic significance of the research, including an IPR plan and a plan for utilization/exploitation of the results in Sweden during the MRC's lifetime as well as after completion of the MRC.

The MRC participants must themselves propose a concise set of long/short term Key Performance Indicators (KPI) upon which the MRC can be evaluated in the mid-term evaluation. These indicators must cover scientific, managerial, and business qualities and substance as well as strategic relevance impact. Each of the KPIs should be elaborated in the research plan and tightly connected to the MRC goals.

The following KPIs are mandatory for all MRCs:

- the volume of co-authored papers by the collaborating research groups and partners
- mobility in person-years between the collaborating research groups and partners
- international presence, *e.g.*, grants from EU and/or other international initiatives (state also the starting values of these for base line)

The application should be elaborated jointly by all the MRC participating organizations and must be submitted by the Centre Director (main applicant). All participating organizations must attach Letters of Intent (LoI) signed by the highest management level in the organizations (head of research, or equivalent). The vice-chancellor of the hosting HEI must also sign the application.

**Each participating organization may be represented in maximum two applications.**

The proposal must be written in English and submitted via the SSF online 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 fields are missing. It is possible to submit and re-submit as needed before deadline.

**Applications must be submitted by 1 November 2022, 14:00 hours CET.** No additional material will be considered after this deadline, unless explicitly asked for by SSF.

## Evaluation

Applications will be assessed by an evaluation committee and a hearing committee consisting of national and international experts from industry, academia, and research institutes as well as by international peer reviews.

The applications will be evaluated using the following criteria:

- Conformity to scope and eligibility as outlined above.
- Constituting an internationally leading research constellation.
- Scientific quality; originality, strengths, weaknesses, and feasibility of research plan.
- Added value of multidisciplinary and synergistic approaches.
- Degree of internationalization.
- Strategic relevance to Swedish industry and/or society as well as explicit long-term impact of the proposed research.
- Qualifications of the applicants and composition of the research team, including previous achievements (science, innovation, and entrepreneurship), international experience and networks, gender balance and leadership/management.
- Level of engagement from all participating organizations, including evidence of anchoring of the application to top management (including Letter of Intent, LoI).

## Timetable

**Last date for applications: 1 November 2022, 14:00 hours CET**

The applications will be evaluated in stages:

- Selection of maximum three applications for hearings. December 2022
- Hearings. January 2023
- Selection of one application for funding. Contract negotiations. February-March 2023
- Decision by the SSF Board. April 2023
- Center start. 1 June 2023.

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

Jonas Bjarne, Scientific Secretary ICT & Mathematics  
tel.: +46-8-505 81 673, e-mail: [jonas.bjarne@strategiska.se](mailto:jonas.bjarne@strategiska.se)

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