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SWEDISH FOUNDATION *for*  
STRATEGIC RESEARCH

## *Announcement*

### **The Swedish Foundation for Strategic Research (SSF) announces synergy grants for research on “Post CMOS” and “More than Moore” electronics, and techniques for high data-rate communications.**

The Swedish Foundation for Strategic Research announces a total of SEK 250 million in a national call for proposals for problem- or application-driven research projects of the highest international scientific standard with the aim of stimulating strategic research within the area of “Post CMOS” and “More than Moore” electronics, and techniques for high data-rate communication, of relevance for present or future Sweden based industry.

Selected research projects will be supported by synergy grants in the range of SEK 4 - 7 million per year (incl. overhead) to be used for salaries, supplies etc. according to the needs of the projects over a period of five years. Funding during the two last years will be dependent upon a successful mid-term evaluation.

#### **Importance of the area**

The electronics and photonics industry is of fundamental significance for today's IT-dependent society. The semiconductor, materials and equipment industry generates the basic conditions for the huge global electronics industry. On top of this, the fibre optics communication industry is growing in importance.

In Sweden the ICT hardware sector has been dominated by the telecommunication company Ericsson, accounting for approximately 90 per cent of the total aggregated profit<sup>1</sup> within the area. On the SME-side there is, however, a quite large fauna of companies, exploring the many different aspects of the ICT hardware sector, for example: Micronic mydata - world leading nanoelectronic mask writer company, Axis – world leading network video solution supplier (with in-house chip system design), Silex - world recognised general purpose MEMS foundry, Transmode – global provider of packet-optical networking solutions, Nanoradio – low energy WiFi circuit design company, just to mention a few that are innovated largely within the realms of Sweden.

Sweden also harbours several research environments within the academic and institute sector with both excellent scientific quality and high relevance for Swedish society, according to an international review of the area<sup>2</sup>.

## Prioritised areas

There is a broad consensus among experts within the electronics area that a paradigm shift will occur sometime during the years 2020-2030. The paradigm shift is related to the extraordinary scaling law within electronics when it comes to miniaturisation, price, storage capability, etc. that has been going on for several decades. It is judged that this scaling, or at least some part of it, will end sometime in the time period mentioned above. This is very comprehensively "road mapped" by ITRS<sup>iii</sup> who refers to two consecutive lines of future development, "Post CMOS" technologies and "More than Moore" technologies. Post CMOS technologies are new material systems that have the potential to be the vehicle for extended scaling in speed, size and other capabilities, at a preferably much lower energy consumption than what the CMOS technique is heading towards presently. More than Moore technologies are diversified techniques, often integrating digital and no-digital functionalities, adding value beyond the computational ones. Examples of new functionalities can be interactive paper or micromechanic sensors and actuators, like micro gyroscopes, accelerometers, RF MEMS, etc. More than Moore technologies do often (or necessarily) not scale according to "Moore's Law".

This call for proposals addresses problem- or application-driven research directed towards the two areas described above, as well as research on techniques for high data-rate communication. Important for high data-rate communication is research on photonics but also research on high data-rate wireless techniques. More specifically the prioritised areas are development of new techniques, devices or systems regarding:

Post CMOS electronics:

- Nano wire electronics
- Carbon based electronics
- New digital information storage techniques

More than Moore techniques:

- MEMS
- Flexible (Organic/Paper) electronics

Future high data-rate communication techniques:

- Photonic devices
- Photonic systems
- System on Chip solutions for wireless communication

The call does not address the use of existing, above mentioned, techniques on new applications. The call does also not address development of new photonic materials, but focus on photonic devices and systems.

The grant distribution among the three main areas below is expected to be approximately 4, 3 and 3 (in the order above), although the final distribution will depend on the quality of the proposals.

The proposal must clearly describe the state of the art within the area and how the proposed technique possibly will outperform other techniques in the Post CMOS era. This should be demonstrated by supplying the prospect of future device performance factors, for instance, gain, signal/noise ratio, non-linearity, speed, power consumption, interference, reliability and resilience, integrability, manufacturability and/or other relevant performance data.

The proposal must also clearly describe the strategic relevance in terms of how this will be utilised, or what the competitive advantages are that it will help building the base for, in the Swedish society.

The grant can be used for co-funding in EU funded projects, if it has overlapping focus.

## Eligibility

The application must be submitted by a main applicant who should be an outstanding researcher associated with a Swedish university/college or research institute. If the main applicant is active at a research institute, at least one co-applicant must be working at a university. A presumptive project leader must be prepared to assume the scientific responsibility for the project during the whole period of the grant. The number of co-applicants must be in proportion to the amount applied for, preferably not exceeding three persons with relevant complementary competencies, from the same or different research groups. A maximum of 25% of the grant may be used for salary for the main applicant and/or the co-applicants (i.e. the senior scientists), but only to cover up to a maximum of 25 % of the salary of each applicant. Each applicant may be represented in no more than one application as a main applicant and no more than one application as a co-applicant.

## Application

A complete application must contain, among other data specified in the portal, a full description of the research programme and details of the relevant competence. It should contain a clear account focusing on the strategic significance of the research programme.

The application is submitted via the SSF portal at: <http://apply.stratresearch.se>. To get a complete view of all data required for submission it is necessary to consult the portal. Please log on to the portal in due time before the deadline.

## Evaluation

Applications will be assessed by an evaluation committee, including scientists from industry and academy. In a first selection the applications will be judged primarily on the strategic relevance and the scope (as described above). Furthermore, applications that the committee judges are too low in quality or too incomplete to be able to be assessed will not pass this first step. The selected applications will be judged by international experts regarding their scientific quality. The result of the scientific assessment and the strategic value of the applications will then be weighed together by the evaluation committee in order to produce a final proposal on which the SSF board will base its decision.

The applications will be reviewed using the following criteria:

- Conformity to the scope as outlined above
- Scientific quality; originality, strengths, weaknesses, interdisciplinarity, and feasibility of the research plan
- Qualification of the applicants, previous scientific accomplishments, international experience, and networks
- Strategic relevance to Swedish industry and/or society and importance of the proposed research

The proposal must demonstrate a vision of exploitation in Sweden within a time span of 5–15 years after completion of a project. It is also important that the application presents a clear picture of the resources available and shows that the proposed constellation of research group will be effective.

## Time table

- Deadline for applications: **September 19, 14.00 hours, 2013.**
- Decision by the SSF board: March/April, 2014 at the latest.

No additional material submitted after the deadline will be considered.

Note that the SSF follows the principle of public access to official records. For this reason, do not send material that may not become public at present, e.g. anything that could prevent possible patenting.

Contact person at SSF: Joakim Amorim, [joakim.amorim@stratresearch.se](mailto:joakim.amorim@stratresearch.se), 08-50581665

## References:

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<sup>i</sup> *MAPICT, Kartläggning av företag i den svenska IKT sektorn –*

*hårdvarurelaterad IKT*, Reviderad Slutrapport, 22 januari, 2007, [www.vinnova.se](http://www.vinnova.se)

<sup>ii</sup> *Swedish Research in Microelectronics,- an evaluation 2008*, Conducted by, the Swedish Foundation for Strategic Research – SSF, the Swedish Governmental Agency for Innovation Systems – VINNOVA, and the Swedish Research Council – VR, [www.stratresearch.se](http://www.stratresearch.se)

<sup>iii</sup> International technology roadmap for semiconductors, 2011 edition, [www.itrs.net](http://www.itrs.net)