



Stockholms  
universitet

14  
BIL  
NATURVETEN-  
SKAPEN  
FÖR OMÅRÅDET  
den 27.3.2019

1 (8)

2019-03-27

SU FV-1.2.2.-0983-19

Beslut  
ON 2019-03-27

## Stockholm University's strategies for SciLifeLab, 2019-2022

### Introduction

Research within the Biosciences is strongly technology-driven. New techniques enable studies of biological processes and interactions within and between organisms, from a deep structural and mechanistic level to a holistic ecosystem point-of-view, regardless of if it concerns the human gut microbiota or the natural geo- and biosphere. Most of the high-throughput technologies within the biosciences, the so-called 'omics', provide data that in themselves are primarily descriptive but with a genetic, visual and structural resolution that is remarkable. Importantly however, the use of such 'omics' data as read-outs of variable conditions, either natural or experimentally induced, enable scientists to address and answer fundamental questions about life on earth.

The Science for Life Laboratory (SciLifeLab) was initiated in 2010 as a strategic collaboration in molecular biosciences to benefit knowledge advancement in "health and environment". The founder universities were Karolinska Institutet (KI), the Royal Institute of Technology (KTH), Stockholm University (SU) and Uppsala University (UU). Funding was applied for and provided by the so-called strategic research area (SFO) funds. In 2013, the government provided additional funding and since then, SciLifeLab is active as a national resource, with the aim of providing Swedish academic and other users with technical support, analyses and knowledge. The SciLifeLab Board, which includes representatives from non-host universities and industry, governs the funding to the national infrastructures, while the host universities govern the research at SciLifeLab, financed by the SFO-funding and by other host university funding.

SciLifeLab is not only a national infrastructure for high-throughput molecular analyses, but also a unique research environment where scientists collaborate to address complex research questions using multidisciplinary approaches. In this respect, Campus Solna stands out, as it hosts a mixture of research groups from KI, KTH and SU in the same building, enabling cross-disciplinary and cross-university collaborations in close proximity to the infrastructure facilities. This scientific environment supports reciprocal interactions between research-driven technology development and technology-driven research efforts. The combination of

### Områdesnämnden för naturvetenskap

Stockholms universitet  
106 91 Stockholm

Besöksadress:  
Universitetsvägen 12  
www.su.se

Telefon: 08-16 20 00  
Telefax:  
E-post:



technology-driven fundamental research and development of spin-off applications is of great benefit to society, ranging from knowledge-based education, healthcare and industrial developments to a better understanding of natural eco-systems and human pressure on present environments.

**An additional background description of the role of SciLifeLab for Stockholm University, and SU's key contributions to SciLifeLab since the start are presented in Appendix 1.**

### **Stockholm University's visions for SciLifeLab**

- The continued development of SciLifeLab as an integrated infrastructure and research center is of fundamental importance for science and education in molecular life and environmental sciences in Sweden.
- The national infrastructures of SciLifeLab should support excellent research at Swedish universities by providing access to the advanced instrumentation and infrastructure services.
- SciLifeLab/Campus Solna should be developed into a world-class joint research environment.
- SciLifeLab should promote the utilization and implementation of knowledge, technologies and research discoveries in education, industry, health care and environmental sciences.

### **Stockholm University's strategies for SciLifeLab 2019-2022**

- Foster and develop research and technologies at SciLifeLab, which reflect SU's strengths and breadth in molecular biosciences and in environmental sciences. This includes strengthening current strong fundamental research areas (e.g. structural biology, bioinformatics and ancient DNA sequencing) as well as promoting the growth of new strong research areas.
- Support high-quality research and stimulate cross-disciplinary collaborations that benefit from the state-of-the-art technologies present at SciLifeLab.
- Act to increase the knowledge about SciLifeLab and its possibilities among SU researchers, who are not yet familiar with its infrastructure and research.
- Support collaborative education programs that link to the technologies and research programs present at SciLifeLab and its host universities.

- Act to further strengthen the research environment at Campus Solna by attracting and recruiting excellent researchers at junior (SciLifeLab Fellows) and senior levels, who are dedicated to SciLifeLab and its research environment.
- Act together with the other host universities to build an interactive and stimulating research community within SciLifeLab as a whole. This means in particular to increase the visibility of Campus Solna as a unique research and education center that provides excellent laboratory facilities and working conditions for an interactive and stimulating research community, and world-class training.
- Act to further develop the environmental research profile of SciLifeLab in areas linking environmental contaminants and human health.
- Stimulate further development of environmental research that benefits from the technologies present at SciLifeLab, and that is of relevance for areas such as archaeology, biodiversity, geosciences and climate research.
- Use the ongoing strategic investments in structural biology, neuroscience, biological imaging and brain research, [including the Cryo-EM facility, the intravital microscopy facility (IVMSU) and the non-clinical brain-imaging center (SUBIC)] to reinforce links to SciLifeLab activities within computational biology, theoretical physics, artificial intelligence and deep learning.

### **Action plans for 2019-2020**

- Continue to recruit young, promising scientists as SciLifeLab Fellows/Assistant Professors and provide them with solid economic support and favorable conditions to enable high-profile research, and to promote their development to strong academic leaders.
- Use the recruitment of SciLifeLab Fellows to strengthen existing or new research areas at Stockholm University that are important from a strategic point of view.
- Use the proximity to SciLifeLab and its research facilities as a means to recruit excellent senior researchers (lecturers, professors) to Stockholm University.
- Support strategic relocations of SU research groups to SciLifeLab Campus Solna.
- Act to increase the space allocated for SU at Campus Solna, to allow for increasing the number of research groups, including SciLifeLab Fellows, hosted by SU.
- As part of strengthening the “Environmental research profile” of SciLifeLab, act to promote the use of the DDD platform for environmental toxicology and exposomics research.

- Act to bridge and transfer knowledge and experience between research groups and technology platforms within the SciLifeLab community and SU Faculty.
- Encourage and stimulate Stockholm University faculty to use the technologies and services provided by SciLifeLab facilities.
- Act to develop and rationalize the organizational and legal cooperation with the other host universities.
- Follow the actions to create a common career plan for facility staff at SciLifeLab, and strive to implement them in a wise and logic manner in SU's recruitment and employment rules.
- Create programs/activities that stimulate development of new technologies and/or implementation of technologies that can become part of the national infrastructure facilities/platforms.
- Run postdoc program(s) to support cross-disciplinary collaborations and collaborations between PIs working at SciLifeLab and PIs located at other parts of SU's campus.
- Encourage SU research groups to take active part in, and to initiate new Research Community Programs (RCPs) connected to SciLifeLab.

## Appendix 1

### Role of SciLifeLab for Stockholm University

#### *Importance of the national infrastructure*

SciLifeLab creates unique possibilities for SU scientists to use cutting-edge technologies in a user-friendly and cost-effective manner. Access to a broad range of technology platforms and facilities is especially valuable for small to middle-sized research groups. In addition, support by specially trained technical personnel in planning, execution and analyses of the data, including bioinformatics and data storage, is of great importance.

#### *Importance of SciLifeLab/Solna Campus as a research center*

SciLifeLab provides excellent possibilities for collaborations between research groups belonging to different host universities/departments. It is especially important that it can offer an arena where scientists from different disciplines meet, formulate and address challenging research questions from different angles.

#### *Importance of SciLifeLab for recruitment of new faculty*

One of the essential actions has been the recruitment of SciLifeLab Fellows. This successful program enables SU to recruit young, talented scientists, who become crucial members of the SciLifeLab research community and of the Faculty of Science at SU. The SciLifeLab Fellows contribute in building a dynamic and creative research environment at SciLifeLab. Since they also belong to a host department at SU they participate in developing new research themes and provide the local research and education programs with strong links to SciLifeLab.

#### *Activities at SciLifelab (as of Dec 2018)*

##### *SU users of the national facilities*

- Users are spread out over all four sections and in 10 out of 15 departments within the Faculty of Science (except for Astronomy, Physics, MISU, MND and BIG). In addition, there are users from at least one department within the Faculty of Humanities.
- More than 80 PIs /research groups belonging to SU were users of one or more of the national facilities during 2017-2018. The largest number of users are within DBB, MBW and DEEP with around 20 unique PIs/research groups from each department.

##### *National infrastructure facilities headed/operated by SU:*

- Within the bioinformatics platform, the Long-term support (WABI) is jointly headed by SU and UU. In addition some other support divisions have coordinators employed by SU.
- Within the bioimaging platform, the Cryo-EM facility is headed and operated by SU.

- Within the Drug, Delivery and Development platform, the Biochemical and Cellular Assays Facility and the Medicinal Chemistry/Hit2Lead Facility are operated by SU.
- Within the Genomics platform: The Ancient DNA facility is headed by UU and SU together. The National Genomics Infrastructure (NGI) in Stockholm is headed by KTH, but also operated by staff from SU. In addition, the Microbial Single Cell Genomics (MSCG), which is headed by UU, is partly operated by SU staff.

*Research groups and facility staff at Campus Solna*

- PIs, Fellows and PhD students are spread out over many SU departments, primarily within the Chemistry and Biology sections, but also within the Geo/Environment section and in the Mathematics department. The majority of the facility staff is employed at DBB.
- In total 12 PIs including five SciLifeLab Fellows (+two ongoing recruitments).
- In total about 90 SU employees, including 45 infrastructure staff.

*SU SciLifeLab committee*

The Board of the Faculty of Science decides on recruitments of Fellows and senior PIs to SciLifeLab and on the budget for the SFO funding linked to SciLifeLab. The Faculty of Science Board's Working Committee (Arbetsutskott) is the "SciLifeLab committee"; it prepares the decisions for the board, discusses SciLifeLab strategic issues and takes other decisions on delegation from the board. The Working Committee consists of the Dean and Vice Dean, the four Section Deans, the chair for the Committee for Undergraduate Education and a student representative. The Vice Dean also acts as SciLifeLab Integration Director. The Working Committee meets about four times per semester and SciLifeLab issues are included in the agenda for each meeting. The SciLifeLab Scientific Director is often present when SciLifeLab matters are discussed. Having the Working Committee of the Faculty Board as SciLifeLab committee ensures that SciLifeLab issues are well anchored within the leadership of Stockholm University and that staff on all levels is well informed.

## **SU's key contributions to SciLifeLab - since the start**

*Infrastructure*

- SU has been a major founder and developer of computing science and bioinformatics linked both to facilities and research.
- In Structural Biology, SU has built the very successful Cryo-EM facility with funding from KAW and SU.
- Scientists from SU actively develop new diagnostic tools and assays. This is reflected both in several of the Drug, Discovery and Development Platform

(DDD) facilities and in the initiation of a new “*in situ*-sequencing service” within the Eukaryotic Single Cell Genomics facility, co-funded by KAW.

#### *Research and Research Environment*

- Using the Cryo-EM facility, several breakthroughs have been made by SU scientists on the structure and function of ribosomes from bacteria, eukaryotic cells and mitochondria, and in the development of software for high-throughput image analysis and structure determination.
- A new laboratory for environmental contaminant toxicology has recently been established at SciLifeLab to enable measurements of new chemical contaminants in air, water, tissues and biofluids. Future collaboration with the SciLifeLab research community will advance the understanding of how exposures to these contaminants impact human and wildlife health.
- By using SciLifeLab and through the National Sequencing projects, SU groups have carried out whole genome sequencing of many non-model organisms. Subsequent extensive transcriptome and epigenetic analyses have promoted important discoveries of evolutionary mechanisms and of ecological biodiversity at many levels.
- Several milestones have been reached in archaeogenetics, describing prehistorical migrations based on ancient DNA sequencing. The discovery of a female Viking warrior in a grave in the town of Birka rendered huge interest also among the general public. The archaeologists at SU are “super-users” of the DNA sequencing facilities at SciLifeLab.
- Metagenomic analyses of ancient sediments and SciLifeLab supported bioinformatics provided novel insights into past plant communities and climatic changes.

#### *SciLifeLab Faculty*

The establishment and continued development of Campus Solna as a world-class joint research environment relies both on relocation of faculty members from all three Stockholm host universities, as well as recruitment of new faculty. Relocations and recruitments to Campus Solna are strategically important, and the PIs are expected to contribute to the development of the research environment and/or to technology development. PIs can apply to relocate the whole or part of their research group to Campus Solna. If supported by their departments, by the Science Faculty and by the SciLifeLab/Campus Solna committee, space will be negotiated and tried to be arranged in due time. In general, the PIs will rotate back to their home department after a fixed time.



### *SciLifeLab Fellows*

The SciLifeLab Fellows program has been one of the corner stones to create a vibrant and flexible research environment at Campus Solna. The program is of benefit for the research and technology development at SciLifeLab and strengthens the research and education at SU as a whole. At the same time, SU has a responsibility to provide the fellows with optimal conditions for their research, and to support their career and development to independent scientists and teachers.

SciLifeLab Fellows are employed as Assistant Professors on a tenure track basis. They have the right to apply for promotion to become Associate Professors after 6 years (new law) or 4 years (old law). During these six years, their main work place will be at Campus Solna, and thereafter the Fellows are expected to relocate to their home departments.

SciLifeLab fellows have been/are being recruited in the following research areas (host department):

RNA Biology, 2014, (MBW)  
 Ecological Genomics, 2014, (DEEP)  
 Cryo-Electron Microscopy, 2015, (DBB)  
 Gene-Environment Interactions, 2016, (MBW)  
 Eco-Toxicogenomics, 2018, (ACES)  
 Computational Biology, 2019, (Mathematics)  
 Environmental Genomics, 2019, (either DEEP, NG or Zoology)  
 Planned: Neurochemistry/Neuroscience, 2019, (DBB)

### *Education*

Since 2014, KI, KTH and SU together run the international master program "Molecular Techniques in Life Sciences", which is linked to SciLifeLab. This successful program has had a very strong up-ward trend with increasing number of applicants, high percentage of students that pass with good grades, and increasingly positive evaluations from the graduating students.

SU is also heading the national research school in medical bioinformatics, funded by VR. It is not formally linked to SciLifeLab, but most of the leaders of the school are located at SciLifeLab and it is generally considered as a SciLifeLab activity.