SciLifeLab

Reseach Community Program Biology of Molecular Interactions

Mid-term review 2020

SciLifeLab

career in science DEVELOPMENT communication Support opportunities postdocs support COMMUNITY research bonding students expertise exchange BREEDING GROUND training

RESEARCH COMMUNITY PROGRAM:

BIOLOGY OF MOLECULAR INTERACTIONS

Review 2018-2020

The past two years have seen an increase in the complementary scientific events and research support that SciLifeLab is able to offer to the academic community. The Research Community Program Biology of Molecular Interactions has contributed to this development by facilitating scientific exchange and building up the research community

Overall, the Program has funded 52 seminars and 2 symposiums, coordinated the organization of a graduate student symposium, set up events for student/postdoc career development and arranged talks for non-scientific personnel. Together, it helped to form better cooperation that has been evident with six new collaborative grants. This includes projects for cross-infrastructure techniques and instrumentation. The total additional research funding obtained by the PIs from the program during two years is 150.9 MSEK, excluding individual grants.

The increase in funding and scientific output naturally requires development of more advanced capabilities. Therefore, Protein Production BSL2 facility was established that has been particularly useful in addressing the spike in demand for COVID-19-related research.

> We will continue to strengthen the research community and act as a catalyst for the activities to support SciLifeLab as a world-leading site for scientific discovery.

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BACKGROUND

SciLifeLab is a joint effort with the host universities that serves as a center for large-scale molecular biosciences. It aims to facilitate cutting-edge, multi-disciplinary research and collaboration between the universities. This task involves overcoming administrative barriers between research groups to develop and maintain infrastructure and services for life science.

The effort is led by the Management Group (MG) that prepares actions for the board's consideration. The MG is supported by the Operations Office (OO) in execution of the actions for the research community and infrastructure. The Data Centre (DC) works with MG, OO and all platforms with data management and as a central support function to the infrastructure.

Together, it forms a complex structure with a heterogeneous population of managers, researchers, facilities staff, and non-scientists, all affiliated with different host universities with their distinct administrative systems, regulatory mechanisms and targets. As a result, internal barriers still affect working methods related to the organizational development, information flow and collaboration between different units at SciLifeLab. For example, the existing funding schemes for research equipment do not support its communal usage, most of the activities for PhD students and postdocs take place at the home campuses of the host universities, and minimal interactions between scientists and non-scientists constrain the cooperativity. Therefore, it might restrict a potential impact of inter-university collaborative initiatives, which is the stated hallmark of SciLifeLab as a national project.

To help reduce those barriers, better coordinate the research community, and thus further strengthen the national designation of SciLifeLab, the Research Community Program 'Biology of Molecular Interactions' has been established. The idea was formulated by the director of the Drug Discovery & Development platform **Per Arvidsson (KI)**, scientific director **Janne Lehtio (KI)**, and SciLifeLab fellow **Alexey Amunts (SU)**, who has also been appointed as the coordinator of the program. Upon funding approval, SciLifeLab fellow **Ilaria Testa (KTH)** joined as a coordinating PI, and a dedicated administrator **Vasilis Kyriakidis** was recruited.

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GOAL OF THE PROGRAM

The overall goal of the program is to establish a more collaborative research environment through bridging between the different units of SciLifeLab, including the non-scientific personnel. Therefore, the activities are aimed at the infrastructure staff, research groups, with a particular emphasis on students, postdocs and administration (Figure 1).



From the research perspective, the program is based on the existing infrastructure and expert groups across Sweden. Young PIs and SciLifeLab fellows represent almost half of the active core of the Research Community Program. In addition, MAX IV laboratory, and pharmaceutical companies AstraZeneca and Sobi are involved as external collaborators for expertise exchange. The central hub of the activity is at SciLifeLab, and the connectivity with the participating groups from 7 universities in Sweden has been developed through a series of scientific meetings, shared funding and supporting projects as described below.

Overall, the research community aims to operate as an entity with scientific bonding across university borders and facilities with the idea of providing a breeding ground for new scientific concepts and funding.

SPECIFIC AIMS

To design effective action, the overall goal of the program is broken down into

four complementary specific aims:



Towards those aims, we developed a system of accessible practical tools for the benefit of the research community. The activities include seminars, themed national and international symposiums, student symposiums, career development events, seminars for non-scientific personnel, and internal and external science communication. Below is the summary of the projects.



SEMINARS

A unified system of seminars has been introduced as a platform for formulating research focus areas. The system has been established to encourage everyone at SciLifeLab, including students, postdocs and facility staff from any university to propose a seminar speaker. The proposal is done by filling a simple half-page form on the webpage describing the proposed speaker and the research to be presented (Figure 2A).

Then the proposals are considered based on the quality of science and cross-university interest. Since the scientific value is considered regardless of the speakers' titles, it also allows students, postdocs and facility managers to be invited.



Suggestions for speakers are welcome by anyone. The criterion for SciLifeLab seminars is outstanding recent work of a cross-university interest. Once the seminar committee has given the go ahead, you will receive a step-by-step guide. The

following expenses will be covered: travel, accommodation at the Carolina hotel on the campus, seminar room booking, lunch at the faculty club, dinner. The organizational admin barriers have been removed. Only half a page motivation required, and all

the arrangements are easily pre-booked by directly invoicing the RCP Biology of Molecular Interactions.

Fig. 2A

Proposals are evaluated within 2-3 days, and upon approval a host researcher receives a practical step-by-step guide for hosting the seminar at SciLifeLab (Figure 2B). The guide includes all the information needed for the coordination of the seminar communication, room booking, travel costs, lunch and dinner, presentation, and expenses claim.

Drop a file here or click to uploa Maximum upload size 209.72MB

Hosting a seminar: step-by-step guide Invite a speaker, preferably for Thursday 09:30 and ensure date discussed are available in the Air & Fire auditorium and relayed to Vasilis vasileios.kyriakidis@scilifelab.se to avoid clashes. Vasilis will book the Air & Fire auditorium and undate seminar databases to advertise the seminar on the webpages, screens and email reminder. A letter will be sent to the speaker, confirming the date/time, and asking for title, travel and accommodation requirements We will cover up to two nights accommodation, which will generally be an executive double room at the Carolina Elite hotel on the campus. One week before the seminar, please organise the schedule for your speaker and send the draft version to Vasilis, including times for lunch/dinner and number of participants, so that it can be pre-booked. All the costs would need to be approved by Alexev Amunts as Head of the Biology of Molecular Interactions programme. On the week of the seminar, a letter will be sent to the speaker with the schedule and detailed information regarding travel a accommodation. Fig. 2B On the day of the seminar, the host has full responsibil looking after the speaker, including meetings with s researchers. Air & Fire auditorium is well equips

Organizational admin barriers have been removed, and all the travel arrangements are prebooked by the program coordinator. The program covers travel, two-night accommodation on the campus, lunch and dinner. Seminar room booking is also taken care of, as well as communication of all the administrative details to the speaker.

Therefore, no budget commitment or any bureaucratic effort is required from a seminar organizer, which allows anyone to host a seminar. Next, the **seminars are communicated** to the research community at SciLifeLab by the following means (Figure 3):

- 1) weekly email that is sent on Monday mornings to everyone;
- 2) adverts on digital screens located in the building atrium;
- **3)** reprint on the notice boards of every floor in the building.

In addition, the seminar is advertised on the day of the event by email and additional reprints. One of the purposes of the communication is to assist in bringing together researchers that are interested in meeting the speaker. Therefore, the weekly email also includes the host contact details. This has further helped to get more people involved, particularly students and postdocs, because of the increased number of seminars covering a range of topics and improved accessibility. Consequently, it led to a more proactive approach in organizing seminars, also by students and postdocs.

Together, the coordinated systemic communication of the seminars has led to a more research-oriented environment with full administrative support for researchers organizing the seminars. The effectiveness of the system is illustrated through 52 seminars that have been organized. This represents an increase of ~150% (from 34 to 86) in the number of seminars at SciLifeLab during the monitored period.

		Seminars at SciLifeLab
	To salielos Kyriakidis veski 44 (2471 + 01/12): Upcoming Seminars @ SciLifeLab Ote: 25 November 2019 at 08:30 To: general@scilifelab.se Dear colleagues, Here is the list with this week's seminars at SciLifeLab:	March 03, 15:15 Air & Fire Auditorium Anal Methods For Analysis Of Genome And Transcript Kristoffer Sahlin, Stockholm University
Monday, Nov Title: From Co Speaker: Anthe Host: Mats Nil Tuesday, Nov Title: Brain-wi Speaker: Kan Brain Wednesday, 1 Title: Deep ma Speaker: Eas P Location: G-21 Host: Riku Tur Thursday, Nov Title: Deep ma Speaker: Tan B Host: Alts Nil Thursday, Noven Thursday, Noven Thitle: Challen Speaker: Tan B Location: G-21 Host: Arta El Location: G-21 Host: Arta El Location: G-21 Host: Arta El Speaker: Tan B Location: G-21 Host: Arta El Host: Arta Host: Arta Host: Arta Host: Ar	Monday, November 25, 15:00 Title: From Connectome to Computation Speaker: Anthomy Zador, Cold Spring Harbor Laboratory Location: Biomedicum, A0315 Host: Mats Nilsson, mats.nilsson@scilifelab.se Tuesday, November 26, 15:00 Title: Brain-wide recordings reveal the distributed substrates of decision-making in mouse brain	March 04, 09:00 Air & Fire Auditorium Introduction To Lab Safety Jóna Gudjónsdóttir, Laboratory Safety Coordinator, SciLife
	Speaker: Kenneth Harris, University College London Location: Biomedicum, A0315 Host: Mats Nilsson, mats.nilsson@scilifelab.se Wednesday, November 27, 15:00 Title: Deep machine learning in individualized biomedicine Speaker: Eap Hickinen, Institute for Molecular Medicine Finland (FIMM), Helsinki Location: G-2 lunchroom Host: Riku Turkki, riku.kurkki@scilifelab.se	March 04, 14:00 Air & Fire Auditorium An Emerging Landscape Of Transcriptome Comp Piero Carninci, Deputy Director - RIKEN Center for Integrative Med
	Thursday, November 28, 10:30 Title: Deciphering molecular mechanisms of energy transduction in complex I Speaker: Ville Kaila, Stockholm University Location: A valikyway seminar room Host: Alexey Amunts, amunts@scliifelab.se Thursday, November 28, 16:00	March 05, 09:00 Air & Fire Auditorium Clinical Talks: Prenatal Diagnosis-Ethical Conside Charlotta Ingvoldstad Malmgren, Karolinska University Ho
	Tille: PhD/Postdoc Crosstalk seminar series – Plasma profiling facility Speaker: Tea Dodig-Crokovic (PhD student), Cecilia Engel Thomas (Postdoc) Location: G-2 lunchroom Host: PhD Council, phd-council@scili@slab.se Friday, November 29, 09:00 Title: Challenges to faithful classification of electron microscopy data of biological molecules - are current methods telling us what we think they are? Speaker: Björn Forsberg, Stockholm University Location: A-2 Milkyway seminar room Host: Ame Elofson, area.cel/ssocn@scilifelab.se	March 05, 15:30 Air & Fire Auditorium Chemical Biology Seminar Series Stem Cells Models Derived From Reprogrammed Pat Therapeutic Targets For Medulloblastom
	would like to include your seminar in the weekly list and the SciLifeLab Google calendar, feel free to contact me dire will Friday the week before the seminar, in the above format.	Margareta Wilhelm, Karolinska Institute resistance In Oncology: On Inhibitors And Com Nikolas Herold, Karolinska Institute

Figure 3. Examples of seminar communication. Left, weekly email addressed to everyone at SciLifeLab that includes information about the talk, location and the host's contact details. Right, weekly announcement for digital screens and notice boards.

THEMED SYMPOSIA

An important part of the program has been bringing researchers together for 2–3 day symposiums to discuss ongoing research and identify new opportunities for collaborations. In those meetings, emphasis on presentations from young scientists has been made, and about half of the speakers were selected from students and postdocs to help in progressing their scientific careers and developing useful skills.

The symposium **'The Dynamics of Life'** focused on molecular visualization and took place in Djuronaset with 120 participants (Figure 4). 7 out of 23 speakers were invited from abroad, and the national speakers represented Universities from within Stockholm (SU, KI, KTH), Uppsala, Umeå, and Gothenburg. Therefore, the symposium brought together researchers from across Sweden, offering opportunities to present their science and further discuss with the facilities staff. The interactions with the platforms were facilitated by the evening poster sessions.

The organization of the symposium was done in collaboration with the SciLifeLab Events program and the National Molecular Medicine Fellows Program. The overall evaluation of the symposium's scientific quality, organization, and location by the participants was 9.2 out of 10.



Figure 4. Poster (left) and news coverage (right) for the symposium 'The Dynamics of Life'. The meeting showcased cutting-edge research supported by SciLifeLab, covering a range of topic areas, including gene expression, membrane proteins, bioenergetics and virus replication. Advanced techniques for molecular visualization were presented by keynote speakers from abroad, as well as SciLifeLab platforms.

The symposium '**Postrevolution Cryo-EM**', focused on the developments in electron cryo-microscopy, took place in Karolinska Institute with 160 participants (Figure 5). The symposium was part of the CryoNet project funded by the Novo Nordisk Foundation and the Knut and Alice Wallenberg Foundation, and the RCP that is integrated with the organizational routines provided the logistic support and additional funding that reduced the administrative burden and helped to run the event smoothly.

The event coincided with the major initiative to upgrade the technical infrastructure and expertise in cryo-EM at SciLifeLab. Therefore, the meeting was designed to promote close collaborations between the newly established cryo-EM communities in the Nordic countries in order to catalyze shared methodology and the know-how exchange between user communities. 160 researchers participated in the meeting, 49 of them from abroad. 24 talks were given, including 3 from industry, and there were 44 poster presentations.



Figure 5. Event page with the schedule for day 1 (left), and the information page from the program booklet (right). The meeting highlighted latest discoveries in protein-nucleic acid complexes along with a view to the future of cryo-EM. Methodological advances were presented alongside presentations on biological results.



STUDENT SYMPOSIUM

This initiative for a graduate student symposium was created to facilitate ongoing involvement among students by providing a forum for science communication, professional networking, development of leadership skills, and to make their own views known. The meeting will have a title of the Swedish National Graduate Student Symposium that has been designed as a distinctive educational and networking event. It would encourage exchange between disciplines and bringing students from around the country together.

The meeting is organized by students themselves for their peers. The added value of the initiative is to assist in forming an active core of graduate students, which aims to create an atmosphere of fellowship and collaboration. It further seeks to increase awareness of students and their particular needs, so that they can act as a unified voice in discussions with the SciLifeLab leadership. Student volunteers run the symposium preparation work closely with the SciLifeLab research coordinator Disa Hammarlöf. To further improve the links between the host universities, the symposium is organized as a joint venture, and currently planned for 2021 (Figure 6). The organizational inter-institute setup is designed to provide an exciting opportunity to share experiences common to students in all graduate school communities. The event further gives the organizers (students) a valuable experience in event management, communication skills and teamwork.

The student organizers have a budget to invite speakers to talk on a variety of topics. The 2021 event is planned as a 3-day symposium that is expected to feature ~20 invited speakers and ~30 student speakers, poster presentations and panel discussions. As the first graduate-focused National Symposium in Sweden that is broadly themed, it will also provide an opportunity for ~200 graduate students to interact with academic leaders. Hence, there will be a number of invited speakers from distinguished academic leaders, for example Bertil Andersson, retired President of Nanyang Technological University and Carl-Henrik Heldin, the chairman of the Nobel Foundation, to discuss leadership and careers in science.

Figure 6. Event page for the National Student Symposium expected to take place in 2021 (postponed due to CoV19 outbreak).

The program brings together distinguished scientists from a range of fields with themed sessions covering Molecular Imaging, Cell and Developmental Biology, Systems Biology and Neurobiology, and includes high profile speakers. The symposium will also include leadership and career development sessions.



CAREER DEVELOPMENT AND ANNUAL LECTURE

One of the main values of the Research Community Program is to promote young scientists, and therefore a dedicated event for career development was established. This event is unique in the current landscape of the academic environment because it is outside the realm of the typical funding calls. The activities can be seen in the pictures below, and it is planned in collaboration with the existing scheme SciLifeLab Events with additional support from Karolinska Institute.

Once a year, a prominent scientist is invited to SciLifeLab to discuss with students and postdocs their research, as well as career-related issues. The three scientists that have participated in the project until now are Nobel Laureate Venki Ramakrishnan, the president of the Royal Society, Jennifer Doudna, co-developer of the CRISPR-Cas technology, and Jennifer Lippincott-Schwartz, a pioneer in photoactivation techniques and co-developer of one of the first super-resolution imaging technologies.

The event starts with a 30-minutes presentation about the speaker's own career, which is documented on video. During the presentation, the speaker is asked to include discussion on failures along the way, involved frustrations, and personal vulnerabilities. The message that we are trying to bring to our students and postdocs is that to be a great scientist does not require superpowers. Rather it is about hard work, a supportive environment and mentorship. The presentation is followed by a 20-minutes session of questions and answers. With this we aim to provide young researchers with confidence that they can make it too. The video for the entire meeting is professionally edited and uploaded on YouTube, and an example can be seen here https://www.youtube.com/watch?v=y4auqE9qx44&feature=youtu.be. The documentation of the events is useful for those who would like to watch again to refine specific points, those who could not attend, and it is also used for the institutional communication.

The event then continues with research presentations by selected students and postdocs in a group meeting setting with the invited scientist. This is followed by a long informal lunch in the faculty club. Together, through formal and informal communication, the program is designed to provide young researchers with a formative experience of receiving feedback to their work from a world-recognized expert and the possibility to expand their network.

The event ends with the main lecture on the research subject of the invited speaker. The lectures have been very popular, and the lecture hall of 207 seats was overcrowded for these events. Food and drinks are provided after the talk to continue scientific discussions and socialize. The communication is coordinated by all the host universities.



NON-SCIENTIFIC PERSONNEL

Another important aspect of the program is to act on the communication barriers between scientific and non-scientific personnel. The non-scientific personnel provide the fundamental support that is essential for a productive functioning of any research-oriented organization. This support however typically escapes statistics and is not contained in research achievement reports.

Therefore, a dedicated acknowledgement of non-scientists providing them with motivation, feeling of belonging and important contribution is the essential fuel to maintain their support of science. Informal communication is one form of such an acknowledgement, which therefore requires removing communication barriers.

This aspect is particularly important for the SciLifeLab campus Solna, because its operation is carried out as a collaboration between three institutes: SU, KI, KTH; while all the administration and supporting non-scientific staff is affiliated with KTH only. Managing and synchronizing the contributions of the SciLifeLab partners requires a high level of coordination. Therefore, the support of the non-scientific personnel from the single university defines the performance of the entire collaborative national hub and directly affects how the partners can successfully join forces for the benefit of the user community. Since this relies on good communication between scientific and non-scientific personnel, we decided to focus our efforts on providing additional support in the form of a series of popular seminars that would familiarize all employees with the ongoing research, scientific culture, as well as provide a feeling of belonging to the community.

Specifically, the series of popular seminars introduces the research being performed at SciLifeLab to non-scientific staff, as well as anyone interested. The primary objective of this project is to provide a platform for informal discussion between scientists and non-scientists in the institute. Therefore, the rules governing scientists in their talks are sufficiently liberalized, and up to an additional 30 minutes is dedicated for questions. The seminars are followed by refreshments, where attendees continue the discussions.



Science communication is an important complementary tool that allows attracting attention to the produced research results. Therefore, it facilitates networking that can substantially benefit researchers directly, as well as the institution as a whole. While host universities have their own ways to spread the news of research, our aim is to contribute to building up research identity and reputation for SciLifeLab as a science-oriented institution. The activity of the Research Community Program in regard to science communication is twofold: external and internal.

SCIENCE COMMUNICATION -external-

To contribute to the external science communication, we registered with the public information office of the American Association for the Advancement of Science for media relations. According to the provided information, published press releases get ~2.5 million views monthly, and provides a source of scientific information for press including international publishers CNN, BBC, New York Times, as well as social media. This new channel is used for communication of the SciLifeLab research news to the academic community and press. An example is shown in Figure 8, where a project from the lab of SciLifeLab fellow Simon Elsasser is described. In addition to the scientific impact, the communications also highlight the contribution of SciLifeLab facilities and its technological advances.



Figure 8. Press release by the American Association for the Advancement of Science for media relations, describing research performed at SciLifeLab. The established communication channel can now be used to highlight research results, technological advances, recruitments and related news in line with the development of the SciLifeLab.

SCIENCE COMMUNICATION -internal-

To contribute to the internal science communication, we started the project '**Visualize your research**' at SciLifeLab. The project is coordinated in cooperation with the Communication Office, and it has four aims:



Use science visualization to convey SciLifeLab vision more clearly and brand the organization for the scientific community.

2

Improve the research environment through science communication.

3

Form a cooperative project that would bridge different communities at SciLifeLab: researchers, facilities, management, communication team.

Create a bank of SciLifeLab authentic images for future communication campaigns.

First, an open call was announced for digital versions of information graphics built on a foundation of ongoing research at SciLifeLab and thematic illustrations that are inspired by the published work (Figure 9). Numerous scientific illustrations were submitted and assessed by the communication team, SciLifeLab coordinators, and professional scientific illustrators based on how it is visually interesting and informative. ~50 images were shortlisted for printing and distribution at SciLifeLab corridors break out areas and communal spaces in accordance with safety regulations. The contribution to the research environment is by highlighting the beauty of research and artistic aspects of science.



To provide an incentive for participants, five striking images are selected for awards. The awards are given in the form of funded projects with professional scientific illustrators. It is expected that such a project will further increase visibility of the research performed at SciLifeLab. For example, the involved scientific illustrators will provide publicity to the work, both formally and through social media, as well as other forms of communication.

Finally, the submitted digital versions of the authentic graphics from the first stage will provide a unique resource, as it will become a bank of images related to SciLifeLab. This can be used in the future by the communication team to explain the breadth of the ongoing research, parallels between the acquired technology and cutting-edge research. With this project we want to provide an insight into what it is like to work at SciLifeLab, whether in support services or the labs. The hope is that it will also inspire about the beauty of science and stimulate science-oriented environment.

SUMMARY AND OUTLOOK

During 2018–2020, the program has developed a series of tools that have facilitated research presentations and scientific discussions. This helped to identify focus areas and formulate new collaborative projects. Those projects included research questions, and also development of new methods, for example through the newly established Protein Production BSL2 facility.

Next, some of the proposed projects have been framed into funding applications highlighting the leverage from the synergy between the research groups and infrastructure. This effort was instrumental in obtaining six collaborative project grants. Hence, breeding opportunities have been created, and new challenging projects and concepts that would benefit from a multi-disciplinary approach are now funded. The established networks are expected to start tackling questions that were out of reach for a single research group.

It is our intention that the effort will provide students and postdocs at SciLifeLab with attractive opportunities to develop and lead to the creation of a pool of highly skilled researchers. This is expected to have a long-term impact on the development of SciLifeLab as the national science hub.

> You can learn more about SciLifeLab Research Community here: https://www.scilifelab.se/research/

ScilifeLab



Designed by Daria Chrobok from DC SciArt at <u>dcsciart.com</u>