SciLifeLab

Version 2024-05-20

# SciLifeLab Strategy

# Table of Contents

# Introduction

As the national research infrastructure for molecular life sciences in Sweden, SciLifeLab has a unique opportunity and mandate to promote biology-, technology- and data-driven excellence in life science and its implementation in health care, environment, industry and other sectors of society. In 2019, following a national stakeholder hearing and with input from the life science community, SciLifeLab published a roadmap for the years 2020–2030. Many of the goals originally envisioned have either been reached or are well underway. In addition, many other unforeseen developments have taken place, such as a global pandemic and an AI revolution, and SciLifeLab's role has evolved, and the strategy needs to be revised.

In the 2024 evaluation by the SciLifeLab International Evaluation Committee, the committee remarked, *"What began as a Swedish flagship project has evolved into the European benchmark for national research infrastructures in life sciences."*

Since 2019, SciLifeLab has:

- **launched SciLifeLab sites** in Lund, Gothenburg, Linköping and Umeå, creating a stronger local presence and national connection and reach.
- **launched a new model** on platform-based infrastructure organization and new service units to provide timely infrastructure offerings.
- **improved national coverage** of the infrastructure units and an expanded user base towards different stakeholders (academia, healthcare, and industry).
- **progressed in translational infrastructure** on e.g. clinical genomics and proteomics as well as in drug discovery, worked on pipelines for samples and data from the health care to the infrastructure.
- **repositioned the infrastructure** and coordinated research, technologies and data handling during the Covid-19 pandemic.
- **published** on average of 1600 publications annually, including many high-profile and highly cited publications.
- **recruited** 24 new SciLifeLab fellows and over 20 DDLS fellows into tenure-track positions. The fellows have acquired 21 ERC grants (May 2024).
- launched the thematic area, SciLifeLab capability in **Pandemic Laboratory Preparedness**
- launched the thematic area, SciLifeLab capability in **Planetary Biology** to expand on the opportunity to study life in an environmental context.
- launched the thematic area, SciLifeLab capability in **Precision Medicine** to push the paradigm shift in health with new technologies and large data.
- launched the **SciLifeLab & Wallenberg National Program for Data-Driven Life Science** to create recruitment, training, and collaborations with a new data-driven approach to life science.
- **improved life science data handling**, created prerequisites for open and FAIR data sharing and initiated new national Data Science Nodes for different research areas.
- **actively taken part in** and coordinated EU-funded projects for efficient and sustainable use of health data on national- and European-level.
- set up a comprehensive collaboration with the **European Molecular Biology (EMBL).**

SciLifeLab has proved to be able to rapidly adjust when needed and is thus well positioned to contribute to lead the Swedish life science community, health care, environmental communities and industry towards technological and data opportunities that would not otherwise exist.

This document describes the overall strategy, which is to be supplemented by specific roadmap documents from the various areas of activity, such as capabilities, data handling and training.

At the 2024 meeting, the International Advisory Board (IAB) was *"pleased to see that the implementation of the new SciLifeLab strategy is very well underway – first and foremost, now formally including four additional geographical sites, Gothenburg, Linköping, Lund, and Umeå, complementing the existing and founding sites in Stockholm and Uppsala. This is a major step forward that increases the competitiveness of Sweden within the life sciences and underscores the national mission of SciLifeLab."*

## About SciLifeLab

SciLifeLab is a national infrastructure and collaborative community for molecular and computational life science research. It stands out internationally as a unique actor, offering an attractive platform for collaboration across Swedish universities and disciplines. This strategy aims to enhance the life science ecosystem in Sweden by maximizing its capacity.

SciLifeLab was founded in 2010 as a strategic and collaborative life science research effort in Stockholm and Uppsala between the four founding universities (KTH, KI, SU and UU), supported by strategic research funding from the government (SFO). In 2014, SciLifeLab was appointed a national research infrastructure for life science by the government, with dedicated funding to make the infrastructure accessible nation-wide. In 2020, the *SciLifeLab & Wallenberg National Program for Data-Driven Life Science* (DDLS) was launched. This national 12-year research program involves 11 partner organizations, collaborators nationally and internationally, the Swedish life science community, industry, healthcare, and other stakeholders in society at large, is funded by 3.1 billion SEK through a generous donation by Knut and Alice Wallenberg Foundation.

In 2024, the SciLifeLab International Advisory Board stated in their evaluation report: *"The IAB was pleased to observe that SciLifeLab clearly is maturing but at the same time acquiring entirely new, national roles. The implementation and advancement of the SciLifeLab Wallenberg National Program for Data-Driven Life Science (DDLS) was another highlight in this respect. With the new developments in artificial intelligence, the competition for talent in this domain has become fierce and the IAB found it impressive that SciLifeLab has so successfully recruited a large number of excellent group leaders internationally. The coordinated manner in which this recruitment is carried out would be an excellent model for all SciLifeLab-related recruitments."*

## Vision and mission

The SciLifeLab vision is for *Sweden to be a world-leading nation in life science.*

The overall mission for SciLifeLab is to *enable life science research in Sweden that is beyond what is possible for an individual researcher, an individual university, or an individual research discipline.*

The SciLifeLab Code of Conduct guides responsible conduct in research infrastructure services and research. The SciLifeLab Diversity Equity and Inclusion Committee of SciLifeLab was founded by researchers at SciLifeLab Campus Solna, and the SciLifeLab Coaching in Science Initiative aims to provide tools for better mental health.

## Governance

SciLifeLab has infrastructure units at all major universities in Sweden and infrastructure users all over the country. Campus Solna and Uppsala were the initial SciLifeLab sites, but to further enhance the national assignment, SciLifeLab launched additional sites in Lund, Gothenburg and Umeå (2021) and Linköping (2022). SciLifeLab works actively to align SciLifeLab's governance to ensure proper management of the distributed collaborative infrastructure.

- SciLifeLab is governed by a national board, which represents the host universities, other universities, as well as industry. The Chair of the Board and the Industry representative are both appointed by the Government, the remaining members by the universities.
- SciLifeLab host universities manage their SFO-funded research contributions via local SciLifeLab committees.
- A National SciLifeLab Committee representing all Swedish universities and stakeholders contributes with a national perspective to the operations.
- SciLifeLab's International Advisory Board ensures that SciLifeLab evolves in accordance with international trends and developments and provides recommendations on strategies for developing SciLifeLab every other year.
- Every four years, an international evaluation of the infrastructure is organized, with additional feedback sought from all universities. This evaluation focuses on new technologies and new units to be incorporated into the infrastructure platforms
- Many SciLifeLab platforms have their own advisory boards, as do the SciLifeLab capability programs and the DDLS program.

SciLifeLab is thus stringently and systematically evaluated internationally and is a nationally well anchored research infrastructure and research community in Sweden. SciLifeLab aligns its operations with national research policy and Sweden's international competitiveness. Moreover, its research infrastructure plays a vital role in addressing the UN Global Sustainable Development Goals and other global challenges.

# Strategic objectives

Through five interrelated objectives (presented below as well as in *Fig 1*), SciLifeLab will work towards synergistic benefits for life science both in Sweden and globally. SciLifeLab's mission to maintain and advance the national research infrastructure and services is foundational to all other objectives. This infrastructure supports strong research and communities, while new discoveries and innovations enhance it in a reciprocal cycle.

As Sweden's National Infrastructure for Molecular Life Sciences, SciLifeLab aims to:

- Develop and provide excellent life science infrastructure.
- Strengthen scientific communities, capabilities, and international collaborations.
- Transform life science data into knowledge.
- Attract and foster scientific excellence and provide advanced training.
- Support innovation and bridge-building for the benefit of society.


**Fig 1.** Strategic objectives.

Photo: Mikael Wallerstedt

STRATEGIC OBJECTIVE:

# Develop and provide excellent life science infrastructure

SciLifeLab's infrastructure and expertise provide unique opportunities within a multitude of molecular technologies such as genomics, proteomics, metabolomics, imaging, structural biology, bioinformatics, single cell biology, chemical biology, and gene editing. There are dedicated infrastructure platforms for clinical diagnostics development and for academic drug discovery, promoting translation and innovation. Both the technologies and the dedicated expertise available within SciLifeLab are always available to all researchers throughout Sweden, including researchers active in the private sector, healthcare, and government entities.

As demonstrated during the pandemic, a national life science research infrastructure such as SciLifeLab, with in house technology and expertise in combination with broad networks, can be repositioned to address an acute challenge and to promote research projects, data, and collaborations. Thus, SciLifeLab is well positioned to modify its infrastructure in times of a crisis to serve the needs of a particular task, and then return to a normal infrastructure operation.

Key to SciLifeLab's success as a research infrastructure is attracting and keeping dedicated expert staff scientists. However, infrastructure scientist's career development is not aligned with traditional career paths within academic environments. In close dialogue with the universities SciLifeLab promotes establishment of career paths for infrastructure scientists.

## Ensure that infrastructure technologies and services remain cutting-edge

SciLifeLab is committed to providing access to cutting-edge technologies and multiple infrastructure services, by means of highly skilled staff scientists with technology expertise, for its broad national user community. This will empower research endeavours across universities, health care, industries, and other life science disciplines in Sweden that would not otherwise be possible. SciLifeLab will keep the national infrastructure up to date through technology development and agile adoption of new technologies as well as regular evaluations,

The process of how units and platforms are managed, launched, and operated is well established around the 4-year international review-cycle. Given the rapid developments in life science, SciLifeLab continuously develops the SciLifeLab infrastructure due to its life-cycle, from early-stage technology development, scaling-up services from local to national scale, equipment renewals and upgrades, training, strategic collaborations as well as translation and national dissemination.

## Promote Good Infrastructure Practice

SciLifeLab has guidelines and expectations for what is required to be funded as a national unit. Maintaining standards for Good Infrastructure Practice ensures quality, reproducibility, transparency and delivery in operations and the data produced. These conditions apply to all national SciLifeLab facilities, ensuring broad accessibility, quality and integrity of data.

Today, there are over 550 staff active at the SciLifeLab infrastructure units (450 FTEs), supporting about 1800 unique users and 3600 projects annually. About 60% of the users come from outside the founding universities reflecting a truly national user base, a testament to SciLifeLab's national accessibility and its successful implementation as a national research infrastructure. Indeed, SciLifeLab infrastructure users are identified world-wide.

Critical to the advancement of the SciLifeLab infrastructure is SciLifeLab's scientific community, which is tightly linked to the development of research- and data infrastructure technologies.

STRATEGIC OBJECTIVE:

# Strengthen scientific communities, capabilities, and international collaborations

About 300 SciLifeLab associated group leaders, form a vibrant and successful scientific community. SciLifeLab will continue to develop the infrastructure in the best research environments, and conversely, strong research infrastructures promote cutting-edge research.

## Strengthen scientific communities

At SciLifeLab's largest physical site, Campus Solna, over 1000 SciLifeLab-associated researchers from Karolinska Institutet, KTH and Stockholm University are co-located with the national infrastructure units. In Uppsala SciLifeLab activities are integrated within established university departments and across several campuses at Uppsala university and are connected virtually, but the physical meetingplace Navet in Uppsala works as a networking site for both national and local SciLifeLab activities. The same model of having SciLifeLab activities integrated within established university departments is also true for the most recent SciLifeLab sites at Gothenburg, Linköping, Lund and Umeå. SciLifeLab is a highly prosperous community, where engaged researchers have a good track record for international granted funding.

## Fellows

SciLifeLab hosts a successful program focusing on recruiting and hosting young tenure-track SciLifeLab fellows at KTH, KI, SU, and UU where host universities select tenure-track scientists and assume responsibility for their tenure after their fellowship is over. The aim is to engage SciLifeLab fellows in a recruitment program for young PIs to ensure that Sweden hosts future global research leaders. In addition, the DDLS program is recruiting and hosting 39 DDLS fellows that are anticipated to have a broad impact by bringing data-driven life science expertise and training to all the local research environments at the 11 partner organizations. SciLifeLab will also provide joint networking and training programs to the various national fellow communities aiming at leveraging scientific advancements from the different disciplines represented by the fellows. An example is the Program for Academic Leaders in Life Science (PALS), an official collaboration aiming to connect the fellows of SciLifeLab, DDLS, and Wallenberg Centers for Molecular Medicine (WCMM).

## Strengthen capabilities (thematic research areas)

SciLifeLab's strength is connecting the research community with the research and data infrastructure, thereby catalyzing technological advancements that drive scientific breakthroughs. To enhance this synergy, SciLifeLab has established capabilities – thematic areas dedicated to collaboratively addressing global challenges – aiming at advancing precision medicine, planetary biology, and pandemic laboratory preparedness. These capabilities integrate SciLifeLab's scientific community with the research and data infrastructures and foster connections with external stakeholders.

## Strengthen international collaborations

SciLifeLab is primarily focused on serving the national user community and promoting Swedish life science research. However, science is international, and global networks and collaborations are essential. SciLifeLab infrastructure and research communities form an attractive international partnering opportunity. SciLifeLab will continue to identify mutually beneficial partnerships with international organizations, such as SciLifeLab's partnership with EMBL. SciLifeLab will continue to promote involvement in initiatives at both international and European levels.

Photo: Mikael Wallerstedt

STRATEGIC OBJECTIVE:

# Transform life science data into knowledge

Life science is in a major transition as the data-driven research paradigm is here. As life science becomes more and more data-centric, SciLifeLab contributes to enable this data-driven research approach. SciLifeLab focuses on services toward infrastructure, data driven life science research, operations, and management as well as expertise and support. There is a need to continue harmonization of data handling across the platforms and develop a unified order and data management system that tracks samples across platforms for systems biology analyses. Also, meta-data tracking for samples submitted to SciLifeLab would be needed to help generate next-generation reusable data. SciLifeLab expects to have a major impact on research data handling practices.

## Provide and operate services and e-infrastructure for data-driven life science

SciLifeLab Data Centre will strengthen SciLifeLab platforms and develop computational capabilities and data services that are part of a national e-infrastructure, including FAIR data, bioinformatics, and AI tools. Strategies for data mining and data sharing will be developed and a simplified access to services through data-centric integration and coordination nationally through thematic Data Science Nodes will be built.

## Develop processes for safe, secure, and ethical ways of handling sensitive research data

SciLifeLab develops processes for safe, secure, and ethical handling of sensitive research data. By implementing robust protocols, SciLifeLab ensure that data are treated with the utmost confidentiality and respect for privacy. Additionally, SciLifeLab promotes research data sharing and analysis, recognizing the transformative potential of collaborative efforts in advancing research and healthcare. Through FAIR and responsible data management practices, SciLifeLab supports research while upholding ethical standards.

## Coordinate and develop The SciLifeLab & Wallenberg National Program for Data-Driven Life Science

SciLifeLab coordinates the national 12-year Data Driven Life Science program (DDLS) funded by the Knut and Alice Wallenberg Foundation. The program seeks to change how life science is practiced, energized by data- and AI-driven opportunities. This includes recruitment, training, a research school, and collaborative programs as well as promoting open, real-time data sharing and rapid data cycles. As the program is hosted by SciLifeLab it derives benefits from the links to the data-producing infrastructure.

The program focuses on how data science and computational approaches enable and energize life science, as well as applications in health, environment, and industrial research. The DDLS program has four research areas that are well aligned with the SciLifeLab capabilities to maximize synergies and output:

- Molecular and Cell Biology
- Precision Medicine and Diagnostics
- Biology and Epidemiology of Infection
- Biodiversity and Evolution

STRATEGIC OBJECTIVE:

# Attract and foster scientific excellence and provide advanced training

## Attract and foster scientific excellence

SciLifeLab works to attract and train talent and for advancing scientific research communities. The SciLifeLab scientific community is populated by excellent group leaders, some initially recruited as fellows, postdocs, PhD students and infrastructure specialists. To further this community SciLifeLab will continue to support internationally competitive recruitments. In addition, SciLifeLab will mentor young group leaders as well as provide national networking and career professional development programs for young junior/early-stage scientists. Another important task is to promote career- and competence development for infrastructure staff scientists in close dialogue with the universities. The expertise acquired while working within the SciLifeLab infrastructure supports the entire life science ecosystem through providing access to these highly qualified experts.

## Provide advanced training

SciLifeLab infrastructure organizes training events for Swedish academia, and up to 3000 people take part in such training events annually. The SciLifeLab training hub works to consolidate and coordinate the training efforts across the SciLifeLab ecosystem, giving the life science community easy access to the SciLifeLab infrastructure knowledge, skills, and expertise. The aim is to establish a culture where training is a natural component of all dimensions at SciLifeLab.

By providing an infrastructure built around both the technical platforms and their expert staff, the SciLifeLab community has all the support needed to co-create, deliver, and take part in openly available lifelong learning. This enables continuous research and technology development. Affirming that all training provided by SciLifeLab is both relevant and of the utmost quality, adhering to the principles of OPEN and FAIR. The quality and assurance of the training is achieved through providing policies, guidelines and best practices in training and learning. The training hub will provide pedagogical training to the trainers to upskill and expand the community of trainers. The vision is that SciLifeLab becomes the national go-to-place for technology- and data-driven lifelong learning.

In connection, SciLifeLab will through the DDLS program, coordinate a program on advanced training and education in technology- and data-driven life science. In addition, a national PhD and postdoc program and a research school will be launched.

Photo: Mikael Wallerstedt

Photo: Mikael Wallerstedt

STRATEGIC OBJECTIVE:

## Support innovation and bridge-building for the benefit of society

SciLifeLab's ability to meet societal challenges was demonstrated during the pandemic, and interactions with the general public, as well as with governmental bodies, are increasingly important. As a national research infrastructure, SciLifeLab offers its services to users from academia, health care, government, international and industrial organizations, but also as contributors and collaborators. Some of the SciLifeLab platforms focus primarily on translational and clinical research towards health care and industry applications.

### Support Innovation for the benefit of society

SciLifeLab contributes to innovation through initiatives within the Swedish universities, the national innovation system, as well as through private initiatives within life science innovation support. Continuous technology development is at the core of a cutting-edge infrastructure, and several key technologies within life sciences have been invented and developed at SciLifeLab. SciLifeLab Innovation – Pharma & Biotech and BRIDGE are current examples of projects put forward to leverage academic discoveries to enhance innovations within life science. With the proof-of-concept grant (funded by Knut and Alice Wallenberg Foundation and coordinated by SciLifeLab) opportunities towards expanding the pipeline of projects moving forward to benefit of society are further explored.

### Further academic discoveries to support innovations

The Drug Discovery and Development (DDD) Platform, launched in 2015, is instrumental in translating academic research into successful innovations. By screening numerous drug discovery leads, it has facilitated the licensing or venture backing of dozens of early-stage drug leads. This platform harnesses fundamental academic research to validate drug discovery targets and create lead molecules, attracting future investment opportunities. Given the trend of pharmaceutical companies relying more on academic collaborations for research and development, DDD has thrived in developing therapeutic discoveries through partnerships with academic groups nationwide, leading to licensing agreements and the establishment of new spin-off companies. DDD continues to promote academic discoveries in industrial drug discovery and engaging in joint programs with SMEs and large pharma companies. Recognizing the growing importance of biological therapies and new modalities, SciLifeLab collaborates with national research communities, exemplified by initiatives like Oligo-Nova in Gothenburg. The overarching goal is to bridge the gap between academic drug discovery and commercial development, fostering effective licensing and the transfer of early drug leads to the private sector through close collaboration among research infrastructure, academic scientists, innovation funders, healthcare, and industry stakeholders.

### Promote translation advanced diagnostics from research to healthcare

With the success of the DDD platform, planning is underway to launch a similar platform for biomarker development (or Discovery and Development for diagnostics). It will be essential to find diagnostic, and predictive biomarkers for building assays aiming to be implemented in healthcare and for industry-driven biomarker development. Biomarkers are the main drivers of precision medicine. To tailor prevention, screening, diagnostics, prognostic, or therapeutic actions to people and patients, clinical laboratory-compatible biomarkers remain the key driver and facilitator.

### Support Bridge-building for the benefit of society

SciLifeLab aims to further increase the infrastructure users and collaborators from academia, industry, and healthcare to ensure that the national research infrastructure is

utilized in a way that maximizes the benefit to society. Bridge-building efforts within SciLifeLab ensures that scientific research translates into real-world applications to contribute to the development of applications such as new diagnostic tools and biomarkers, that in the long run improve human and planetary health. Examples are the development of new diagnostic tools and biomarkers, as well as biomonitoring and studies of ecosystems, stemming from discoveries from users of the SciLifeLab infrastructure.

## Industry users and industry collaboration

A national infrastructure is an important hub in connecting various life science stakeholders. SciLifeLab infrastructure serves more than 100 projects for the industry users yearly. In addition, companies use SciLifeLab infrastructure through collaboration with academic researchers. Furthermore, companies develop technologies and methods with SciLifeLab infrastructure, for example through beta testing instruments or protocols. The SciLifeLab model, funded by the government is well suited to continue to take on the national role to leverage Sweden's life science capacity. Offering a wide range of services and expertise, SciLifeLab is well set-up for to translate knowledge into benefit for the society through close collaboration with academia, healthcare, and industry. To increase accessibility, efforts to streamline processes for industrial and healthcare accessibility will be pursued.

## Healthcare users and healthcare collaboration

Specific SciLifeLab platforms focus on translational and clinical research towards health care applications. These include clinical genomics and the clinical proteomics and immunology platforms that promote diagnostic development across the country. The Clinical Genomics platform will continue to implement new diagnostics into routine health care applications. The Clinical Genomics platform, with its national coverage, was the catalyst for the Genome Medicine Sweden (GMS) initiative where the Clinical Genomics platform still functions as the technological backbone. SciLifeLab will engage with health care system and clinical diagnostics via the precision medicine capability and pandemic laboratory preparedness capability in order to develop and mature novel methods towards clinical use.

## Coordination with other infrastructures

SciLifeLab technologies are complementary to university core facilities, other national research infrastructures and strategic research initiatives in life science. Examples include structural biology and imaging facilities (e.g. MAX-IV, ESS), healthcare infrastructures (e.g. Genome Medicine Sweden, Biobank Sweden, quality registries), environmental infrastructure initiatives (Swedish Biodiversity Infrastructure and Swedish Infrastructure for Ecosystems Science), protein production and purification centres (e.g. Testa Center, Protein Production Sweden) and initiatives within artificial intelligence (e.g. WASP, various AI initiatives). SciLifeLab will complement and collaborate with these strategic research initiatives, launch joint research efforts, promoting interdisciplinary science and thereby leverage Sweden's combined national infrastructure. The WASP-DDLS collaboration is a prominent and significant example of such initiatives.

## Public engagement and policy

SciLifeLab recognize the importance of public engagement and policy advocacy in advancing the impact of life sciences research. Through public outreach and policy initiatives, SciLifeLab strives to bridge the gap between academia and society, ensuring that knowledge and discoveries generated in our units and platforms are effectively communicated and utilized for the benefit of all. By engaging with a broad range of stakeholders, including policymakers, industry leaders, and the general public, SciLifeLab aims to foster informed decision-making and promote evidence-based policies that addresses pressing societal challenges in health, environment, and sustainability. SciLifeLab participates in the data-driven life science ecosystem through national collaborations linked to the European Health Data Space, with the goal of integrating molecular and clinical data for improved precision health, for example TEF-Health, EUCAIM, and the DIGIfor1HealthSE coordination project.

## Final remarks

SciLifeLab's strategy focuses on maximizing the impact of national life science infrastructure through collaborative research, recruitment, training, translation, innovation, and data-driven strategies. This approach yields synergistic benefits for the entire life science ecosystem, with SciLifeLab playing a pivotal role. Its expanding role aims to ensure that universities and stakeholders directly benefit from the infrastructure, making it a versatile ecosystem for technology- and data-driven life science research would otherwise not be possible. Through focused efforts, SciLifeLab has established national programs for pandemic laboratory preparedness, precision medicine, and planetary biology, as well as the development of drug candidates through the SciLifeLab Drug Discovery and Development platform.

SciLifeLab, as a strategic national research infrastructure in the molecular life sciences, is in a unique position to continue to contribute to Sweden's ability to conduct internationally competitive research and innovation with its broad repertoire of advanced technologies, technology experts, and excellent researchers.

## Acknowledgements

*This strategy was developed by the SciLifeLab Management group with input from the International Advisory Board, members of the SciLifeLab Board, Data Centre, Operations Office, host university leadership and SciLifeLab Committees, the National SciLifeLab Committee, and in dialogue with infrastructure platforms and the overall SciLifeLab community.*


SciLifeLab