

An abstract graphic on the left side of the slide, consisting of a dense web of thin, light gray lines connecting various sized circular nodes. Some nodes are solid dark gray, while others are solid light green. The network is most concentrated on the left and fades out towards the right.

A HUB FOR LIFE SCIENCE
IN SWEDEN

SciLifeLab



WELCOME TO SCILIFELAB

Molecular life science research is evolving rapidly. As an increasingly crossdisciplinary and collaborative endeavour, it requires combining expertise in fundamental biology with computer science, engineering, chemistry, and physics. Moreover, life science depends on advanced, often costly instruments and complex methods that are frequently beyond the capacity of an individual laboratory, or even a university.

SciLifeLab was launched in 2010 with a mission to meet these research demands through a joint initiative by four universities—KTH Royal Institute of Technology, Karolinska Institutet, Stockholm University, and Uppsala University. Today, SciLifeLab supports research activities at all major Swedish universities.

By combining research resources and talent across Sweden, developing new technologies, offering education and training, recruiting excellent international researchers, and coordinating national research programs, SciLifeLab is strengthening Sweden's international competitiveness as a life science leader. Our vision is to further develop SciLifeLab as a national hub for molecular life science, for the benefit of researchers across disciplines and sectors.

This booklet gives a brief overview of how SciLifeLab contributes to the national and international research community. Regardless of where in the life science ecosystem you work, we hope that you will take the opportunity to learn more and take advantage of this unique resource!

Carl-Henrik Heldin, Chairman of the Board of SciLifeLab

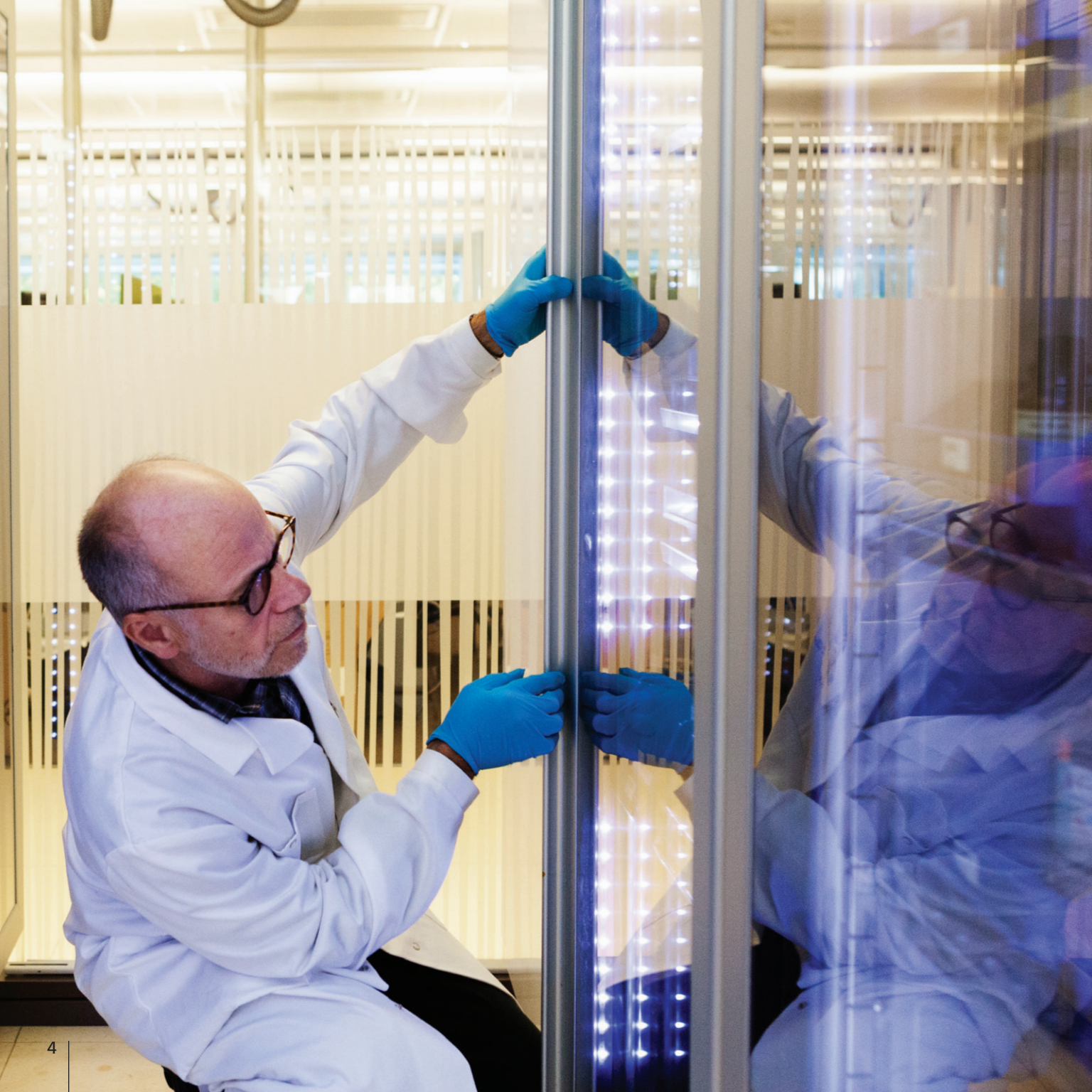


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WHO WE ARE

SciLifeLab (Science for Life Laboratory) is an institution for the advancement of molecular biosciences in Sweden. We are funded as a national research infrastructure by the Swedish government. Our organisation leverages the unique strengths of individual universities across Sweden into a focused resource for our life science community. We provide access for thousands of researchers to the cutting-edge instrumentation and deep scientific expertise necessary to be internationally competitive in bioscience research. The SciLifeLab infrastructure is supported and developed by our research community, including internationally recognized experts in life science and technology. Our facilities and expertise create a unique environment for carrying out health and environmental research at the highest level.

OUR MISSION

SciLifeLab's vision to be a national hub for life science research in Sweden is guided by the three principle mission statements that define its operations:

1

To provide unique and enabling infrastructure for high-impact molecular life science research

2

To facilitate internationally recognized collaborative research driven by a community of excellent scientists

3

To promote the translation of biomolecular research findings into lasting societal benefits.

IMPORTANT MILESTONES IN OUR STORY

2010

- SciLifeLab established by founding Director Mathias Uhlén and Co-Director Kerstin Lindblad-Toh

2013

- SciLifeLab awarded status as an official national infrastructure for molecular biosciences
- Premises in Stockholm completed: 14000 sqm housing 1000 persons from three universities
- Science & SciLifeLab Prize for Young Scientists inaugurated
- Initiation of the SciLifeLab Fellows Program

2014

- Clinical sequencing established in Swedish health care system

2015

- Olli Kallioniemi recruited as the new Director of SciLifeLab

2016

- Facilities offering electron cryomicroscopy and mass cytometry added to infrastructure

2017

- More than 20 SciLifeLab Fellows recruited
- Genomic Medicine Sweden network launched by the Diagnostics Development Platform
- International evaluation of infrastructure; integration of Uppsala and Stockholm operations
- Research proposition by the Swedish government: SciLifeLab is one of three major national infrastructures in science, along with MAX IV and ESS
- Academic SciLifeLab users from outside of Stockholm and Uppsala reach 40%; 3rd, 4th and 5th biggest users are non-host universities
- SciLifeLab users from industry and health care grow to 15%
- More than 165 groups associated with the center

2018

- Launch of the first seven Research Community Programs (RCPs) and 16 Technology Development Projects (TDPs)

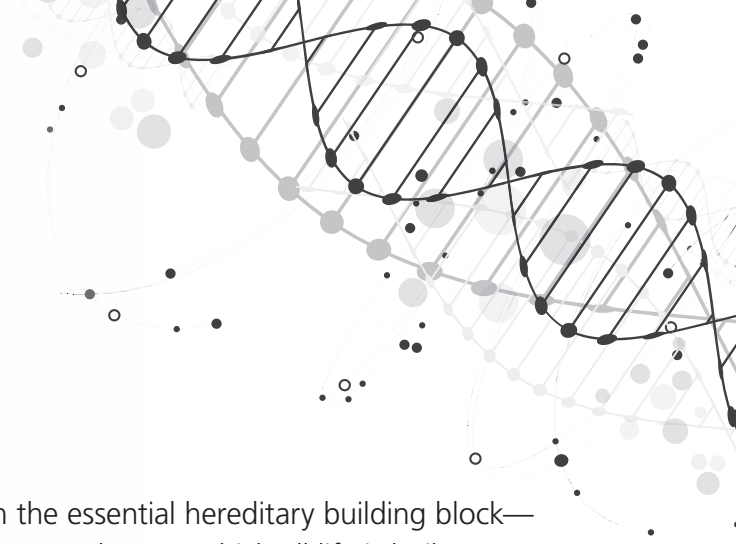
INFRASTRUCTURE SERVICES

Life science research is becoming increasingly multidisciplinary and complex. Gaining fundamental insights into ecosystems and the environment or unravelling the molecular intricacies of human biology or disease requires a broad array of complementary technologies generating vast amounts of data. Sustaining this level of frontline technology and transforming data into knowledge requires capacities beyond that of single research groups or individual universities. This is where research infrastructure plays a key role.

At SciLifeLab, we provide access to a range of pioneering technologies in molecular biosciences. Together, our facilities enable the scientific endeavours of thousands of users from academia, industry, and health care. Dedicated staff scientists offer collaborative support throughout the experimental process—from study design to data handling.

Our many resources can be categorized under the broad, overlapping research areas listed in the pages following. As our work is dynamic and evolves with the needs of the life science community, consider this list to be just a sample of our capabilities.

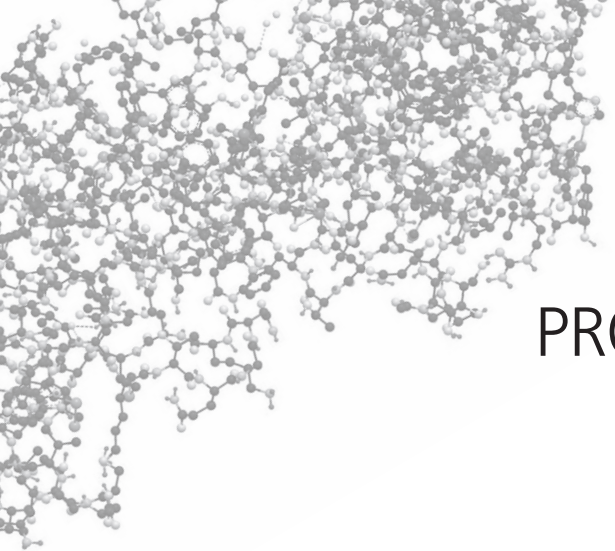




GENES

Biology begins with the essential hereditary building block—DNA—that creates a template on which all life is built. From the elucidation of DNA structure in the 1950s, through the first draft of the human genome in the 1990s, to the rise of next-generation sequencing in the 21st century, technologies to study DNA and RNA have evolved rapidly and at times dramatically. As a cornerstone of SciLifeLab's infrastructure, sequencing genomes, exomes, and transcriptomes remains an essential, powerful tool for interrogating the fundamental aspects of biology.

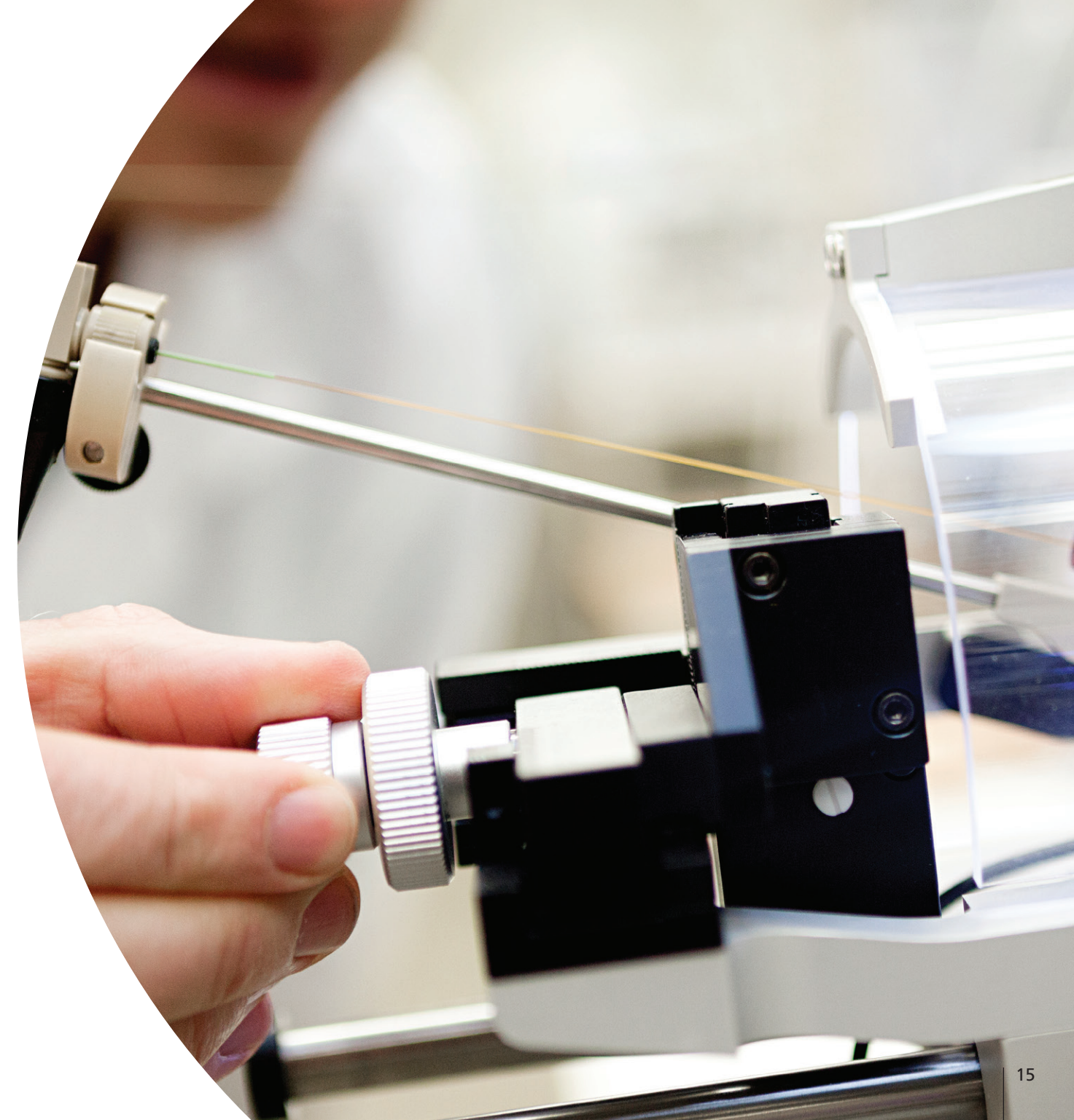
SciLifeLab provides access to the latest technologies for massively parallel/next-generation DNA sequencing, genotyping, and RNASeq at the single-cell or cell-population scale for eukaryotes and prokaryotes. Applications for these technologies include studying human- and disease-based genomics, pharmacogenomics, metagenomics, biodiversity, and evolution.



PROTEINS

The central dogma of molecular biology describes the translation of the DNA code into the multitude of proteins that perform a wide and complex range of functions necessary to maintain life. Being the physical manifestation of the genetic blueprint, proteins define the basic development, function, and homeostasis of cells, tissues, organs, and organisms. Many disease states are due to malfunctions in protein activity.

SciLifeLab offers large-scale methods for studying proteins in isolation or in a variety of biological contexts. Our facilities allow researchers to use mass spectrometry and affinity-based methods to monitor and study the temporal expression, structure, function, activation, localization, interaction, transport, and turnover of proteins.

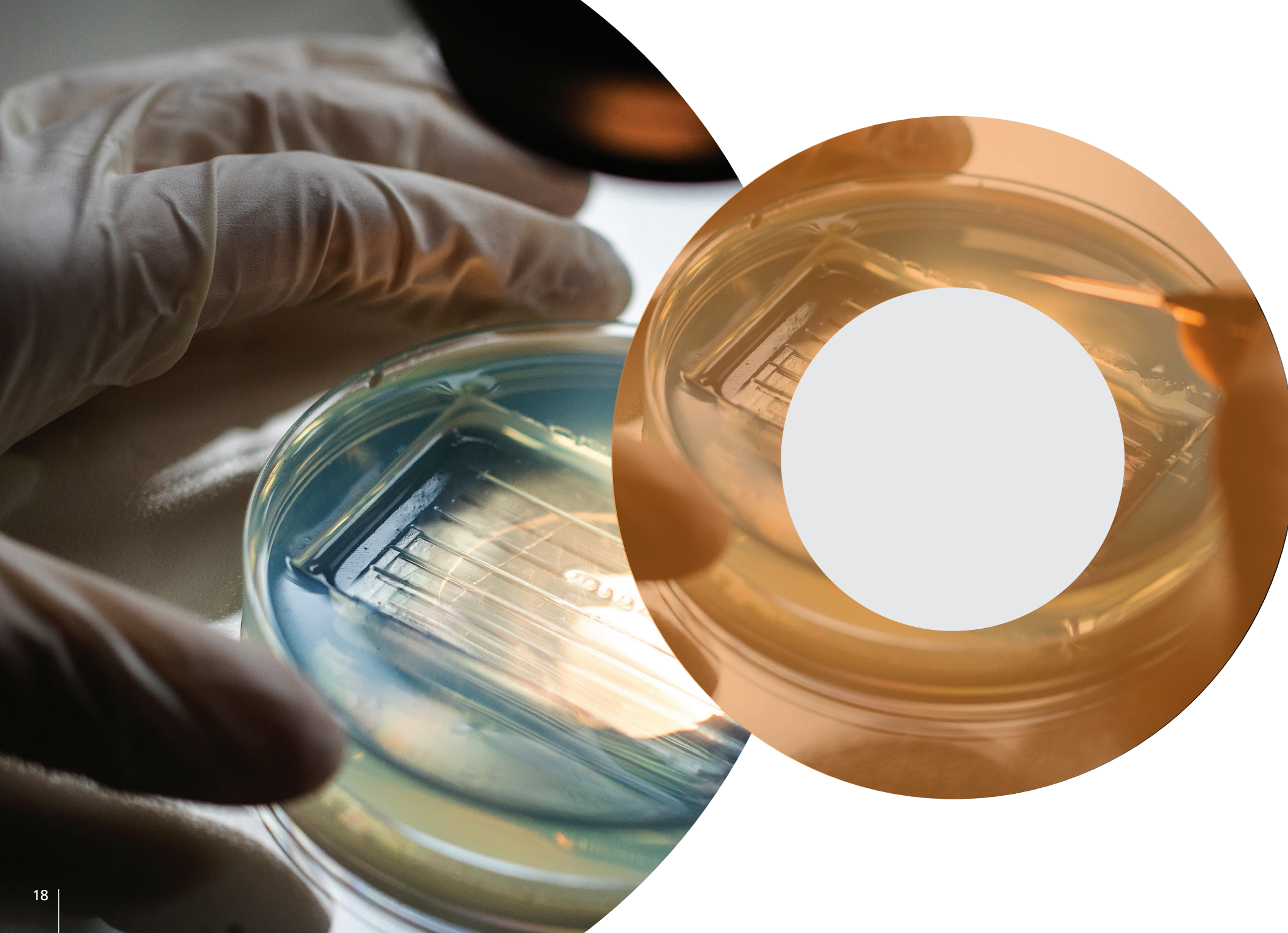




VISUALIZING LIFE

Few technologies spark our imagination and engagement as vividly as images. Advances in microscopy and other visualization methods allow us to probe deeply into biological systems, both physically and intellectually. We can now visualize biology even at the atomic level.

SciLifeLab has instruments for superresolution microscopy, cryo-electron microscopy, nuclear magnetic resonance (NMR)-based structural interpretation, and high-throughput imaging. Combined with our unique affinity reagents and bioinformatics capabilities, we offer researchers a wide repertoire of technologies for making the invisible visible.



FUNCTIONAL BIOLOGY

Life scientists alter and perturb biological systems to gain insight into their function and dysfunction in healthy and disease states, as well as their interaction with their environment.

SciLifeLab provides technologies for gene-silencing, -activating, and -editing, and also applies chemical probes and antibodies, enabling scientists to study the function of genes, proteins, cells, and tissues, and to inform new paradigms in biology. These bioengineering tools may be keys to future sustainable food and fuel production, allowing researchers to test biological hypotheses and advance new discoveries and innovations in both medicine and environmental science.

SYSTEMS BIOLOGY & BIOINFORMATICS

The complexity of living organisms makes them extraordinarily difficult to study, but also provides an intriguing challenge. Studies in the fields of genomics, epigenetics, transcriptomics, proteomics, and metabolomics, together with observations of the effects of external stimuli and cellular signalling on biological systems, are uncovering vast interwoven networks with redundancy, variability, and diversity. Unravelling this complexity requires a systems-level approach that integrates all these factors, necessitating the collection of massive amounts of data for analysis.

SciLifeLab hosts one of Europe's largest communities of bioinformatics experts, who transform the petabytes of data obtained within our facilities into actionable information and knowledge.





TRANSLATIONAL SCIENCES

One of SciLifeLab's missions is to translate biological insights into lasting societal benefits. We apply results generated by our infrastructure and research community to the diagnosis and treatment of patients with unmet medical needs. This translational research requires flexible multidisciplinary collaboration.

SciLifeLab collaborates with biobanks and health care organizations to translate large-scale research data into applications for clinical diagnostics. Our drug discovery efforts develop basic research findings from the Swedish academic community into innovative drug leads that are further developed by industry, adding new approaches to the global battle against disease.



REMAINING AT THE **FOREFRONT**

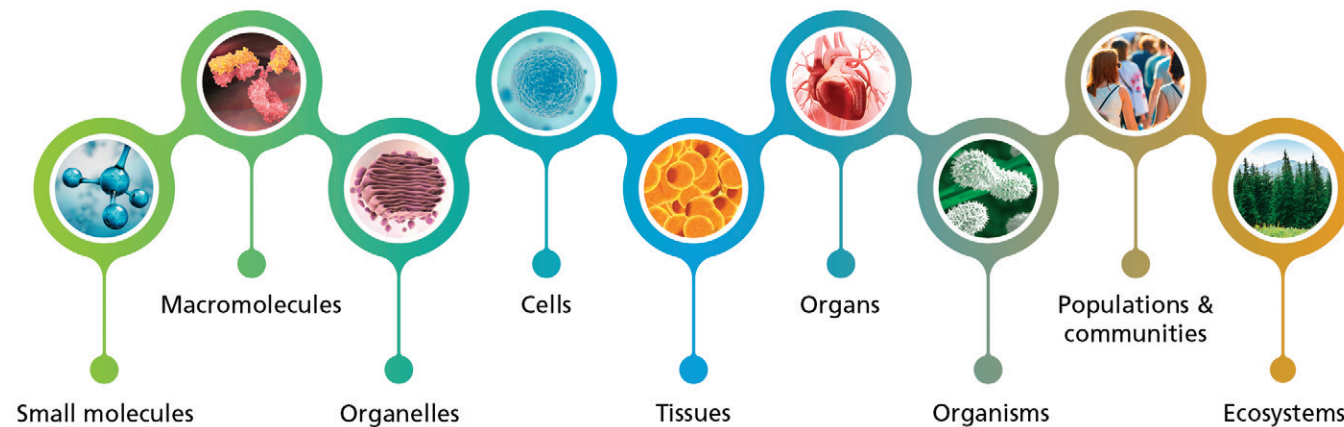
SciLifeLab's infrastructure services enable research that would otherwise not be possible in Sweden. Our technologies evolve continuously in response to the rapid global advances in molecular bioscience. Staff at our facilities collaborate closely with academic experts and industry partners, creating a unique testbed for technology development and breakthrough research.

Continuous technology scouting and rigorous evaluation by international experts ensure that we remain at the cutting edge of life science technology. Technologies that no longer fulfil the strict criteria of national SciLifeLab facilities, or that become available to the research community through alternative private or public sources, are phased out to make way for emerging capabilities.

EXPANDING RESEARCH BOUNDARIES

From molecules to ecosystems

Every day, the facilities at SciLifeLab enable researchers from all areas of life science to address their scientific questions. The research encompasses the entire continuum of biology, from the atomic level all the way to ecosystems, and everything in between. For example, our infrastructure technologies can be applied to the search for druggable molecular targets, analysis of clinical tissue samples, population-based genetic studies, and large-scale biodiversity programs.



SHARING KNOWLEDGE

Tackling today's global challenges in health and environmental research requires collective scientific effort on a global scale. SciLifeLab contributes by creating intersections between our founding universities, other research institutions and an array of life science disciplines and sectors. Through publications, training, seminars, and workshops, we disseminate knowledge and best practices about the technologies we host and develop.

By collaborating broadly with industry and health care, we promote mobility, dialogue, collaboration, and innovation. This, in turn, promotes the global competitiveness of Sweden as a strong, knowledge-based life science country.



COLLABORATIVE RESEARCH COMMUNITY

At SciLifeLab, researchers meet and collaborate. We bring scientists together across traditional university, faculty, and department boundaries, and their associated research groups represent a number of different disciplines, from biomedicine to ecology and evolution. Our scientific environment creates many opportunities for making new contacts and initiating joint projects, through both organized events and informal networking. This interaction, whether in person or virtual, sparks our community to engage and come together to tackle the life science challenges of tomorrow.

For many SciLifeLab researchers, technology development and their own scientific quest are closely intertwined—a relationship that has ignited several innovative projects and collaborations. The innovative capacity of SciLifeLab is apparent from the range of spin-off companies that have emerged from within our research community.

STRENGTHENING LIFE SCIENCE

SciLifeLab provides a proven model for how a national platform for interdisciplinary and collaborative research can benefit innovation and discovery. We play a key role as a national access point to the combined knowledge of our host universities and promote the formation of interactions with and between different players in the life science arena.

KNOWLEDGE AND TECHNOLOGY TRANSFER

SciLifeLab organizes and supports a broad range of symposia, seminars, and workshops that facilitate networking and knowledge propagation around specific topics, and which often feature presenters invited from abroad. These conferences frequently attract strong international attendance that inspires collaboration.

SciLifeLab also participates in multiple national and international networks. We work with clinical, academic, and intergovernmental partners around the world, and perform services for and collaborate with industry partners ranging from small and medium-sized enterprises (SMEs) to global corporations.

We engage industry partners on research projects and on the development of new technologies and instruments.



RESEARCH COMMUNITY PROGRAMS

Our Research Community Programs (RCPs) connect researchers and organisations across Sweden working in a variety of thematic areas within molecular life sciences. SciLifeLab funds RCPs to support scientific interaction, coordinated communication, and targeted networking within the research theme. This way, we promote the formation of national communities that advance internationally competitive collaborative research in cooperation with the SciLifeLab infrastructure.

Current SciLifeLab RCPs:

- Biology of Molecular Interactions
- The Human Protein Atlas
- Large-scale Clinical Genomics and Complex Diseases
- Human Cell Atlas and Spatial Omics Profiling
- Aquatic Microbiome Research Initiative
- Phenotypic Drug Discovery in Human Disease
- Swedish Tumor Microenvironment (STorM) Program



INVESTING IN THE **NEXT** GENERATION

SCILIFELAB **FELLOWS** PROGRAM

As a country of only approximately 10 million people, Sweden depends on an influx of new knowledge and ideas to maintain its position as one of the most innovative nations in the world. The SciLifeLab Fellows Program strengthens Swedish life science research by attracting and retaining international talent in the country's academic community. By offering a competitive start-up package, a strong interdisciplinary research environment, and proximity to facilities with front-line technologies, SciLifeLab and our host universities have combined forces, and since 2014 have recruited more than 20 young, internationally recognized group leaders to come to Sweden. New SciLifeLab Fellows are continuously being recruited.

SCIENCE & SCILIFELAB PRIZE FOR **YOUNG SCIENTISTS**

Together with our partners at the journal *Science*, published by American Association for the Advancement of Science (AAAS), we are proud to award the prestigious annual *Science* & SciLifeLab Prize for Young Scientists. Four researchers at the beginning of their careers are recognized for excellence in the fields of molecular biology, environmental research, and translational medicine. Entrants submit an essay based on their Ph.D. thesis research to be judged by a committee of noted scientists, chaired by senior *Science* editors. The winning essay is published in *Science* and the grand-prize winner is awarded a personal stipend of USD 30,000. The *Science* & SciLifeLab Prize for Young Scientists is enabled by the support of the Knut and Alice Wallenberg Foundation.



You can learn more
about SciLifeLab at
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SciLifeLab



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