Research Assessment 2017-2022

Institute of Biology Leiden

15 January 2024

Contents

1. Introduction

1.1 Background

This report presents the assessment of the research conducted at the Institute of Biology Leiden (IBL) in the Netherlands in the period 2017-2022. The assessment was performed by an external review committee using the Strategy Evaluation Protocol 2021-2027 (SEP). The SEP was drawn up and adopted by the Association of Universities in the Netherlands (VSNU), Royal Netherlands Academy of Arts and Sciences (KNAW), and the Netherlands Organisation for Scientific Research (NWO). The primary aim of SEP assessments is to evaluate the research quality, societal relevance, and viability of a research unit considering its own aims and strategy, and to suggest improvements where necessary. All research conducted at Dutch universities, university medical centres, and NWO or KNAW institutes is assessed once every six years in accordance with the SEP.

Target groups that are served by this assessment include:

- IBL researchers and group leaders, who want to know how the quality of the IBL research, its societal relevance, and its viability and strategy are perceived by independent experts and how these elements can be improved, with explicit attention to the aspects of Open Science, PhD Policy and Training, academic culture, and human resources (HR) policy,
- the board of Leiden University that wants to track the impact of its research policy,
- the Dutch government that evaluates the outcomes of assessments in connection with the institution's accountability for expenditure and its own efforts to support an outstanding research system,
- society and the private sector that seek to solve a variety of problems using the knowledge that the research of the institute delivers.

1.2 Members of the assessment committee

The board of Leiden University has appointed as members of the assessment committee (in alphabetical order):

- MSc Marianne Benning, Dutch Association for Science Centers and Science Museums, the Netherlands,
- Professor Pedro Crous, Westerdijk Fungal Biodiversity Institute, the Netherlands,
- Professor Nicholas S. Foulkes, University of Heidelberg, Germany,
- Professor Lone Gram, Technical University of Denmark, Denmark,
- Professor Corné Pieterse, Utrecht University, the Netherlands (**chair**),
- MSc Marieke Warmerdam, Delft University of Technology, the Netherlands.

Dr Linda van den Berg (Washoe Life Science Communications, the Netherlands) served as the secretary to the assessment committee. The committee members have declared to have no conflicts of interest. Corné Pieterse and Lone Gram are involved in respectively a large Dutch research consortium and a European research project in which scientific director of the IBL is involved as well,

but they do not have any direct collaborations with the institute. Marianne Benning is collaborating with the head of the research group Science Communication and Society in one research project. These committee members have declared that these connections to the institute shall not lead to a biased assessment. The evaluation and recommendations in this report constitute the committee's consensus. 'Currently' refers to the time of the site visit; 'we' refers to the committee members.

1.3 Procedure

Our committee evaluated the research conducted at the IBL based on

- the institute's self-evaluation report, which described the strategic goals, development, and structure of the institute during the review period; reflected on the quality and relevance of the research, the PhD policy and training, the academic culture, and the HR and Open Science policy; and presented a SWOT analysis and strategy for the future,
- a series of interviews during a site visit in November 2023 with the IBL management team, IBL research theme leaders, and representatives of tenure trackers, postdocs, PhD candidates, and technicians, as well as tours of the facilities. The discussions were transparent and constructive. The site visit programme is included in Appendix 1.

Personal circumstances prevented one committee member from physically visiting the institute, so he joined online. The others were present at the IBL during the site visit and received a guided tour of several facilities. Our committee met online twice prior to the site visit to prepare for the interviews.

Assessment criteria

Our committee evaluated the IBL research based on three assessment criteria, all considering the IBL's own aims and strategy:

- **research quality**, i.e., the quality and scientific relevance of the IBL research in a national and international context, including contributions to the body of scientific knowledge and the academic reputation and leadership within the field,
- **relevance to society**, i.e., impact, public engagement, and uptake of the IBL research in economic, social, cultural, educational, or other terms, including the teaching-research nexus,
- **viability**, i.e., the extent to which the IBL goals for the coming six-year period are expected to remain scientifically and societally relevant; whether its aims, strategy, the foresight of its leadership, and its overall management are optimal to attain these goals; and whether the plans and resources are adequate to implement this strategy; including a reflection on the viability of the IBL in relation to the expected developments in the field and society as well as on the wider institutional context of the IBL.

In addition, the IBL specifically asked our committee to reflect on the following strategic topics:

- strategy and implementation of research themes in a matrix organization,
- the IBL profiling within the sector plan,
- strategic choices with respect to the scientific staff members that have been hired,
- the IBL's new PhD monitoring system.

Aspects

In line with the SEP and in relation to the aims and strategy of the IBL, our assessment committee incorporated four specific aspects in the assessment, because these help to shape the quality of a research unit:

- **Open science**
  - availability of the IBL research output,
  - reuse of data,
  - involvement of societal stakeholders in the IBL research.
- **PhD policy and training**
  - institutional context of the PhD programme, including position of the PhD training in the IBL research; programme content and structure; selection and admission procedures for PhD candidates,
  - supervision of PhD candidates and functioning of the quality assurance system, effectiveness of the training and supervision plans; duration, success rate, exit numbers; guidance of PhD candidates to the job market and career prospects.
- **Academic culture**
  - openness, (social) safety and inclusivity of the research environment, reflecting on the culture in terms of appreciating the multiplicity of perspectives and identities in the workplace; measures that are taken to ensure openness, safety, and inclusivity; how responsibility is taken by leaders to contribute to such an academic culture,
  - the IBL policy on research integrity and the way the institute facilitates the relevant actions and requirements, reflecting on data integrity; the extent to which an independent and critical pursuit of science is made possible; the degree of attention given to integrity and ethics; the prevailing research culture and mode of interaction; relevant dilemmas (e.g., authorship, ethical considerations regarding privacy or collaborations with stakeholders) that have arisen and how the IBL has dealt with them.
- **Human resources (HR) policy**
  - extent to which diversity (gender, age, ethnic & cultural background, disciplines) is a concern at present, reflecting on how the IBL guarantees diversity-promoting HR practices such as inclusive selection and appraisal procedures and its actions and plans,
  - the IBL policies on talent selection and development, i.e., the IBL recruitment policies; opportunities for training and development; coaching and mentoring; career perspectives for researchers and research support staff; selection, training, promotion, and retention policy; the way that the IBL offer opportunities for diverse career paths and ensures that researchers are properly evaluated, rewarded, and incentivised.

1.4 Research unit under assessment: the Institute of Biology Leiden

Mission and leading principle

Building on a history of more than four hundred years of research in the field of biology at Leiden University, the current Institute of Biology Leiden is an internationally oriented institute for research and education in the fields of biology and biological chemistry. The institute is embedded in the Faculty of Science at Leiden University. Research at the IBL covers the study of life from the molecular and cellular levels to the organismal and population levels. The IBL mission is to contribute

to solutions for major societal and industrial challenges via high quality innovative and curiosity-driven research and via education of next generations of scientists. The IBL has phrased this mission as '*Harnessing Biodiversity for Health*'.

Matrix structure

At present, the IBL is organized in a matrix structure consisting of three clusters (Animal Sciences, Microbial Sciences, and Plant Sciences) and four research themes (Bioactive Molecules, Development & Disease, Evolution & Biodiversity, and Host-Microbe Interactions). The clusters facilitate managing the institute, mentoring the junior scientists, managing the facilities, and organizing the institute's teaching responsibilities. The research themes have been created to promote scientific interaction within the institute and to highlight the current interdisciplinary research focus areas of the IBL. In addition to the research groups that focus on biology and biochemistry, the IBL is home to a research group that focuses on science communication and society (SCS). The IBL is responsible for the BSc and MSc education programmes in biology of Leiden University, and teaching and research are interwoven at the institute. The SCS group runs a Science Communication and Society specialisation, which can be followed by MSc students at Leiden University's Faculty of Science and Biomedical Sciences students at the Leiden University Medical Center (LUMC).

Research facilities

The IBL research facilities include a bioacoustics facility, microbial fermentation units, mass spectrometry, natural product facilities, microbiology labs, a microscopy facility, molecular biology laboratories, and plant and animal breeding facilities. In addition, the IBL plays a key role in the management of several local and national research facilities:

- The NeCEN is a national multi-user cryo-EM facility that is embedded in the IBL. It welcomes users from more than ten different countries.
- The Cell Observatory of Leiden University's Faculty of Science facilitates research at the cellular level including high-throughput and high-content imaging equipment. The IBL plays a major role in its management. The IBL imaging facility is connected to both the Cell Observatory and the NeCEN.
- The central zebrafish facility of Leiden University's Faculty of Science is run by the IBL.
- The metabolomics facility has recently been established and will be housed in the Sylvius Building.
- The institute also provides support for work in the field of bioinformatics.

Management and support

The IBL is supervised by an IBL board, which is composed of a scientific director, vice-scientific director, institute manager, and two education directors. This IBL board is responsible for making formal and strategic decisions. Strategic scientific decisions are taken by the management team (MT), which consists of the IBL board, the three cluster leaders, the leader of the SCS group, the research manager, and a representative of the institute's assistant professors. The MT receives advice from

- a scientific council, which consists of all assistant, associate, and full professors,
- an institute council, which consists of elected representatives from students, researchers, and support staff,
- an external scientific advisory board, which consists of prominent Dutch scientists and a member from industry.

Support is provided by the IBL Office, the Research Support Office (which includes a Grant & IP Office and collaborates with the rest of the Faculty of Science), and an Education Office.

Staff and funding

In 2022, the IBL research staff (including the SCS group) represented 96,9 full-time equivalents (FTE), consisting of 2.3 FTE research support staff (i.e. Grant & IP Office), 47.9 FTE PhD candidates, 24.4 FTE post-docs, and 22.3 FTE senior staff members (i.e., assistant professors, associate professors, and full professors). Further details about the IBL staff are provided in Tables 1 and 2 of Appendix 2.

The budget of the IBL has increased substantially during the review period as a result of a growth in the numbers of BSc and MSc students (from 642 in 2017 to 1042 in 2022) and a significant increase in the acquisition of external funding. Personnel costs accounted for approximately 75% of the IBL expenditure in 2022. Funding sources were direct funding from the Dutch government (~58%), research grants (~20%), and contract research (22%). Further details about the IBL funding and expenditure are provided in Table 3 of Appendix 2.

Strategic collaborations

The IBL strategically collaborates with several Leiden-based institutions:

- In the Leiden Biodiversity Network, the IBL collaborates with the Centre for Environmental Sciences (CML), the Hortus Botanicus Leiden, Naturalis Biodiversity Centre. These institutions also jointly teach BSc and MSc students in Leiden.
- In the Leiden Early Drug Discovery and Development (LED3) programme, the IBL collaborates with the Leiden Academic Centre for Drug Research (LACDR), Leiden Institute for Advanced Computer Sciences (LIACS), the Leiden Institute of Chemistry (LIC).
- The LED3 cluster collaborates with the LUMC in the field of academic pharma, and they participate in the national growth fund consortium PharmaNL.
- The SCS group collaborates with Naturalis Biodiversity Center and Hortus Botanicus Leiden. Joint positions with the Institute of Physics (LION) and the astronomical institute of the Faculty of Science (Leiden Observatory) have been established to facilitate joint science communication research.
- The IBL has a variety of project-based collaborations with the LUMC, the other institutes of the Faculty of Science, the Faculty of Humanities, and several companies based at the Leiden Bio Science Park.

In addition to these local collaborations, the IBL is embedded in a variety of regional, national, and international research networks, such as the League of European Research Universities (LERU) and Una Europa, and the IBL researchers collaborate with numerous other research groups in Europe and beyond.

2. Evaluation of the Institute of Biology Leiden

2.1 IBL strategy and aims during the review period

Strategy and implementation of research themes in a matrix organization

During the review period, the IBL has made the strategic decision to focus on four research themes: Bioactive Molecules, Development & Disease, Evolution & Biodiversity, and Host-Microbe Interactions. In combination with the three pre-existing organizational clusters (Animal Sciences, Microbial Sciences, and Plant Sciences), the themes produce a twelve-grid matrix organizational structure. With the formulation of the four research themes, the institute aimed to promote internal collaboration and strengthen its external visibility by showcasing the focus areas of its research programme. The research themes were chosen in a co-creation setup with the scientific staff of the IBL. The themes constitute research interests that cross the borders of the three clusters, and they correspond to research areas in which the IBL either already had a strong critical mass, or in which it wanted to expand in the future. The chosen themes also served as the future framework for the Sector Plan for the Beta II sector (Earth and Environmental Sciences, Astronomy, Biology, Pharmaceutical Sciences and Computer Sciences), hereafter: sector plan.[1]

We consider the introduction of the research themes a positive development. While the clusters in the animal, microbe, and plant domain facilitate the smooth running of organizational and administrative matters (e.g., managing the facilities and technicians), the cluster-spanning themes have successfully promoted internal collaboration, scientific community building, and collaboration with neighbouring institutes. Examples of collaborative activities within the themes are joint grant applications and Spotlight presentations with international speakers. In the period 2023-2028, the IBL aims to intensify its multidisciplinary collaborative research at all levels and strengthen and integrate the research themes within the institute. We support this ambition. We have several recommendations regarding the research themes; these will be discussed in section 2.4 (on viability).

IBL profiling within sector plan

The sector plan investments will create seven new positions at the IBL. The IBL will use these to strategically strengthen the four research themes. We consider this a sensible approach because with 38 senior members, the current IBL staff has a modest size considering the broad range of topics that are studied at the institute. Aligning the themes with the sector plan will allow the institute to create critical mass in the themes according to a clear vision, which is positive. We do think that the bioinformatics expertise (including the broader multivariate statistics) at the IBL could be strengthened. We acknowledge that a new BSc programme in bioinformatics has been developed in collaboration with the LIACS, and that Bioinformatics Facility has recently been established. However,

[1] Through the sector plans, the Dutch government is structurally investing 200 million euros per year to strengthen academic education and research in the Netherlands. These investments should encourage cooperation between and within the Dutch universities and university medical centres and enable them to mutually raise their profiles and develop distinct identities in the Netherlands and abroad. It allows for new and permanent job positions to be created. In addition, these investments aim to decrease the workload for lecturers and researchers.

the Bioinformatics Facility seems to be based on one or a small number of people and does not seem to be a full-fledged facility with associated infrastructure that is able to cater future data-driven science at the IBL. More in-house bioinformatics expertise and structural organization of associated personnel and infrastructure will be essential for the future, so it may have been better to dedicate one of the sector plan positions to this.

Strategic hiring choices and other strategic actions

The IBL has strategically recruited talented young scientists during the evaluation period to strengthen the research themes and the interactions across the clusters. These hiring choices are sensible and strategically placed along the new matrix structure. We are happy to see that the hiring choices have led to significant rejuvenation of the institute, with competitive talent and potential for future leadership roles. The IBL has also strategically invested in its research facilities, collaborations with the other institutes at the Faculty of Science of Leiden University (leading to enhanced visibility of the themes), and its earning power.

According to the self-assessment report, the earning power increased during the review period as a result of the recruitment of new staff, a stronger focus on large personal and national and international team-effort grants, an improved ratio of PhD candidates on regular contracts versus those on scholarships, and the start of a dedicated Grant & IP office in 2018. The latter serves as a centre of expertise for grant proposals, and it advises on the quality and competitiveness of these proposals. This has clearly paid off because the institute's funding acquisition increased impressively during the review period: from an average of 4.3 M€ in 2014-2018 to an average of 7.3 M€ in 2019-2022. The improved earning power (as well as an increase in student numbers) has enabled the institute to grow substantially during the review period. We congratulate the IBL, and particularly the Grant & IP office, on this achievement.

2.2 IBL research quality

In line with its strategic aims, the IBL has produced valuable new scientific insights in the fields of Bioactive Molecules, Development & Disease, Evolution & Biodiversity, and Host-Microbe Interactions during the review period. The high quality of the IBL research programme is demonstrated by its successes in competitive national and international funding schemes and impactful scientific publications with above average citations. The success of the IBL researchers within the ERC funding schemes in particular highlights the level of its science and scientists, as ERC grants are some of the most competitive grants available. We applaud the SCS group for its accomplishments in the field of science communication and society, in which they operate at the national forefront. The leader of this group recently won the Iris Medal for Excellent Science Communication.

The IBL has strategically invested in its earning power. As a result, the funding acquisition strongly increased during the review period, with a record of almost 12 M€ in 2022. Prestigious personal grants were acquired by IBL scientists, including two ERC PoC, three ERC Starter, one ERC Consolidator, one ERC Advanced, three NWO Veni, and four NWO Vici grants. Large collaborative research grants were also acquired, including three NWO XL, two NWA, three NWO Perspectief, two NACTAR, two NWO OTP, one Moore foundation, two Novo Nordisk Foundation, and a European

Horizon 2020 grant. (The latter project is called 'MARBLES' and is managed by the IBL.) The ability of the IBL to attract such prestigious research grants is a testimony to its national and international academic reputation. Especially given the small number of senior scientific staff members, the IBL should be considered a highly successful and productive institute that is conducting high-quality science.

During the review period, the institute has strategically invested in its research facilities, which are impressive and well-managed. The facilities are maintained by dedicated facility managers, who supervise the equipment and train young scientists. The facility managers that we met during the site visit were visibly proud of their jobs. The IBL's advanced research facilities support the institute's own researchers as well as visiting scientists from other institutes in the Netherlands and abroad. In this way, they contribute to the body of scientific knowledge directly and indirectly.

2.3 IBL societal relevance

Driven by curiosity, the IBL aims to produce new scientific insights that contribute to solutions for the grand challenges that society is currently facing. Several of the IBL research results that were produced during the review period contribute to sustainable development goals of the United Nations. Appealing examples of 'blue sky research' and research results with high societal relevance were presented in case studies in the IBL self-assessment report, e.g., the IBL work on the discovery of novel bioactive molecules including antibiotics, harnessing microbiome functions for sustainable crop protection, and the ecological effects of wind farming on the North Sea. The SCS group is providing insight into factors that contribute to impactful science communication, for instance with the IMPACTLAB project (a collaboration between Leiden University, Utrecht University, and the Dutch Research Agenda). In addition, the SCS group plays a key role in a recently established national centre for science communication.

Fundamental research rightfully is a hallmark of the IBL research, even if it is not of direct societal relevance. In addition, the IBL is producing a next generation of high-end knowledge workers that are trained and educated in a state-of-the-art environment, at the cutting edge of science. This in itself is of the highest societal relevance because these professionals are highly wanted in industry or at governmental bodies. The teaching activities of the IBL researchers are intertwined with their daily research work. BSc and MSc courses are integrated in the IBL research activities and BSc and MSc students perform their research projects under supervision of the IBL staff. The IBL distinguishes itself from other biology institutes in the Netherlands in that it organizes a relatively long compulsory research internship in the BSc phase, consisting of 24 European Credits (EC). MSc students at the IBL spend at least 60 EC on their research internships. We consider training knowledge workers a very important contribution to society. We noticed that the IBL researchers (ranging from PhD candidates to full professors) have a very positive attitude towards teaching, even though it may consume a substantial amount of time. This is to be applauded and showcases the collegial academic atmosphere within the institute. IBL students under supervision of the IBL staff have also competed in the iGEM (Internal Genetically Engineered Machine) competition, as part of the team from Leiden University, and this team has been awarded many prizes and awards.

The choice of research themes creates plenty of opportunities to connect with industry. Indeed, the IBL researchers have engaged in a substantial number of large public-private partnerships during the review period, teaming up with companies located at the Leiden Bio Science Park (e.g., Baseclear, Batavia, Dupont, Galapagos, and Janssen), and elsewhere (e.g. BEJO, Corbion, DSM, ENZA, Friesland Campina, Koppert, Pfizer, and Rijk Zwaan). Many patents have been filed during the review period, although these were driven by only a small number of researchers. In addition, a spin-out company was launched (Cantoni Therapeutics).

Many IBL researchers are keenly aware of opportunities for outreach and collaboration with institutions such as Naturalis Biodiversity Center. The institute also makes use of the extensive network of the SCS group, which has connections with all faculties of Leiden University and with a variety of Dutch museums. As a result, the IBL has engaged in a variety of outreach activities during the review period. We encourage the IBL to enhance the interaction with the SCS group because this could strengthen the science communication activities of the institute; this will be discussed further in section 2.4.

2.4 IBL viability

In general, the committee is highly positive about the viability of the IBL. The institute has grown substantially during the review period and is financially healthy. With its renewed vision with clearly defined overarching, interdisciplinary research themes, the IBL is well-embedded in Leiden Bio Science Park. Two of the IBL research themes correspond with the six research foci of Leiden University's Faculty of Science (Biodiversity and Drug discovery). The current scientific director and interim institute manager intend to step down in 2024. They will leave behind a well-functioning organization with appealing opportunities for the successive leadership. Both the promising new generation of young scientists and the proactive Grant & IP Office have demonstrated their ability to acquire prestigious research grants. Having said that, several topics will require attention in the future: the further development of the research themes, the position of the SCS group, the building, and the research facilities. We will discuss these topics below.

Research themes

Our committee is very positive about the strategic decision to implement the overarching, interdisciplinary research themes in a matrix organization, and supports the IBL in its ambition to strengthen these themes in the future. We noticed that PhD candidates and postdoctoral researchers are less aware of the themes than the group leaders and institute management. We realize that embedding a new organizational structure takes time, but it will be important that the structure will be internalized by all layers of the organization. This can be facilitated by organizing theme events such as symposia and seminars, and by providing incentives like rewarding interdisciplinary activities. The IBL may also consider installing an international scientific advisory board for each theme, perhaps including an industry representative. This will accelerate maturation of the research themes and it will maximize national and international visibility.

It is our impression that the IBL has not fully exploited the research themes in its marketing and communication with the outside world yet. The themes could be used for storytelling purposes. The IBL covers a broad range of topics, so the institute may consider selecting a number of very visible

‘flagships’ within the matrix to better profile its thematic research areas, i.e., areas in which the institute is internationally at the forefront, and which can be representative of the themes. Selecting flagships could help to sharpen the profile and visibility of the institute and its chosen research themes.

We also observed that the groups in the matrix are of variable size and the degree of interaction varies between the cells in the matrix. Three themes have a clear focus and identity, but the Evolution & Biodiversity theme seems highly diverse, with unclear focus. This theme may wish to investigate how to improve this by showcasing how the theme is more than the sum of its parts. In addition, this theme appears to be connected to many different elements in the greater Leiden Biodiversity Network, but the role of this theme (and the rest of the IBL), and how the IBL benefits from this network, is not completely clear to our committee.

Taken together, to further capitalize on the research themes in the future, we recommend (1) using the themes to present the IBL to the outside world (communication, marketing, storytelling) and for strategy development to position the IBL in for instance the sector plan and other local, national, and international research networks, (2) installing an international scientific advisory board for each theme, (3) selecting a number of ‘flagships’ within the matrix to sharpen the profile and visibility of the institute.

Position of the SCS group

We learned that practising science communication is *not* the core activity of the SCS group. Instead, it is a research group that investigates the interaction between science and society. Although this group is embedded in the IBL, it does not exclusively focus on biology because it is the SCS group of Leiden University as a whole. The SCS group and the IBL jointly organize three-week student projects. In addition, one of the novel job positions that will be created with the sector plan investments will be dedicated to science communication & society (in the field of urban ecology). Other than that, we have the impression that there currently is relatively little scientific interaction between the SCS group and the rest of the IBL. The SCS group appears to be a friend of the family rather than a family member. As a result, the mutual benefits of embedding the SCS group within the IBL are poorly visible. We consider this a missed opportunity.

We recommend enhancing the scientific interaction between the SCS group and the rest of the IBL, because there are many potential mutual benefits and goals. The SCS group may share its knowledge and tools on impactful science communication, helping the IBL researchers with their science communication activities, especially on societal challenges such as biodiversity loss, climate change, and drug discovery. This may in turn promote research on biology-related science communication topics (like citizen science projects) in the future.

Building

In its SWOT analysis, the IBL mentioned the present housing situation as one of the threats. The IBL is currently located in an outdated and energy-inefficient building, outside the unilocation of the Faculty of Science in the new Gorlaeus building. This poses substantial challenges regarding adequate laboratory and working space. A new building is required not only because the current building is deteriorating and business continuity in the long run cannot be guaranteed, but first and foremost

because world-class science in the biosciences calls for an excellent building that maximizes interactions between disciplines. Biosciences is one of Leiden University's signature research domains, and it should hence be a priority for the Leiden Bio Science Park to house a representative academic biology building. We recommend developing a strong and integrated vision that articulates the urgent need for a new building and how this can strengthen the position of both the IBL and the university. This new building should support the institute's strategy, i.e., it should promote internal collaboration and boost the four research themes in connection with the outside world. Strong ambassadors and communicators are needed to constantly bring this urgent topic under the attention of the right persons at the university.

Research facilities

The IBL houses a number of state-of-the-art research facilities that are essential to perform its world-class research and provide the fundamental knowledge basis on which the Leiden Bio Science Park thrives. The facilities are very well managed by dedicated personnel. However, several of the advanced research facilities at the IBL require attention. The financing of the CryoEM facility of the NeCEN is in jeopardy. This high-end national facility needs an upgrade to remain active at the forefront of the science field. We recommend actively pursuing funding to be able to continue the CryoEM as a funded national and international resource. The metabolomics facility is positioned between the IBL scientists (which is very good) but remote from the faculty's central metabolomics facility. In order to cater the increasing demands, extra technical support is needed. The same holds true for the plant growth facility. The institute is aware of this issue and is in the process of recruiting extra personnel. The need for greenhouse facilities was repeatedly expressed during the site visit. This is because the institute's research is gradually shifting from model plant species to crop species. The IBL plant research needs greenhouse facilities to accommodate research projects on crop plants to remain competitive nationally and internationally.

2.5 IBL Open Science

Open access and stakeholder involvement

In the review period, 84 percent of the IBL publications were open access, facilitating the uptake of the IBL research results by peer scientists and other stakeholders. The IBL shares its research data with the research community as soon as possible. Stakeholders are involved in several IBL research projects. For instance, the partners of the Leiden Biodiversity Network collaborate with the municipality of Leiden. Research of the SCS group is driven by questions from societal partners and conducted and published in collaboration with these partners. The SCS group strategically publishes its results in ways that allow society to benefit, e.g., reports or websites. The IBL researchers are involved in (coordinating) the development of open-source software and databases for the analysis of genome and metabolome data, such as antiSMASH and MIBiG. They share these resources through workshops such as the eScience NPLinker project and through the IBL Bioinformatics Atelier.

Research data management

An IBL research data management policy has been drawn up in close collaboration with a data steward and privacy officers from the Faculty of Science. PhD candidates at the IBL are trained in research data management and the FAIR Data Principles. The institute has been exploring options for

safe data storage and uses electronic lab journals. Microscopy data are stored using the open-source storage tool OMERO, allowing microscopy data from different vendors to be uploaded in a central database. Taken together, Open Science is well on the agenda at the IBL. With the increasing volume and complexity of biological data generated within the IBL and the limitations of storing them, a continuous dialogue about FAIR Data Principles will be important in the future. In addition, we encourage the IBL to actively put issues related to the opportunities and threats of new artificial intelligence possibilities for research and education on the agenda.

2.6 IBL PhD policy and training

Institutional context

In 2022, the IBL was home to 66 PhD candidates (including those of the SCS group and scholarship PhD students). The IBL PhD community is diverse and the PhD candidates that we met during the site visit seemed happy. The IBL PhD programme is embedded in Leiden University's Graduate School of Science, which oversees the admission, registration, and performance of the PhD candidates. The scientific director and vice-director of the IBL jointly oversee all steps in the PhD trajectory. The IBL PhD and Postdoc Association (IPPA) offers support, organizes social and networking events, and is in direct contact with the IBL management and the institute council. The PhD events such as the PhD bootcamp and the annual PhD & Supervisors event are well-visited.

As research and teaching are interwoven at the IBL, all PhD candidates participate in the daily supervision of BSc and/or MSc students, and most PhD candidates also contribute to BSc or MSc courses (e.g., assisting in practicals). The PhD candidates' teaching activities are supervised by a staff member and typically do not consume more than ten percent of the PhD candidates' time. Some PhD candidates at the IBL have a five-to-six-year combined PhD-teaching position. This special position allows the candidates to obtain a basic teaching qualification by following a 1–2-year education programme in combination with their PhD research.

Selection and admission procedure

The Graduate School of Science and the IBL scientific director screen the admissions of all PhD candidates. New PhD candidates are initially appointed for one year, with the possibility of a three-year extension if the first year is satisfactory. An open selection procedure is usually applied to recruit PhD candidates on employment contracts. About one quarter of the IBL's PhD candidates are supported by a personal scholarship from countries such as China and Indonesia. The institute has set up a specific selection procedure to ensure that the academic level of these PhD candidates on scholarships is sufficient. We will discuss the onboarding of PhD candidates and other scientists from abroad in the section about talent management (in 2.8).

Supervision and training

We learned that all PhD candidates at the IBL have at least two supervisors. Usually, one of these is appointed as the primary supervisor. Most PhD candidates meet their primary supervisor weekly and their second supervisor monthly. New staff members are encouraged to follow a course on PhD supervision. An education & supervision plan is created at the beginning of each PhD project, describing the research objectives, expected output, supervision arrangements, contribution of the PhD candidate to teaching of BSc and MSc students, and the training plan for the PhD candidate. The

education & supervision plan is co-created by PhD candidates and their primary supervisors, and it is used to evaluate the PhD candidates' progress in research and training on a yearly basis.

In addition to training-through-research, the PhD candidates at the IBL are offered an individual training programme consisting of courses in academic or transferrable skills, tailored to their personal career development goals. From January 2024, following 140 hours of courses in scientific skills and 140 hours in transferrable skills will become mandatory. The PhD candidates that we interviewed had mixed feelings about that, with some appreciating the courses and others finding the number of hours a burden. Overall, we feel that that the PhD candidates are offered a very good training and supervision system and a diverse pallet of soft skills and specialized courses that sufficiently caters for their needs.

New PhD monitoring system

The IBL has implemented changes in the monitoring system for its PhD candidates, amongst other things to prevent extremely long PhD trajectories. In 2016, a monitoring procedure was established to facilitate timely detection of potential problems. In 2022, the institute increased the frequency of monitoring meetings, and involved external experts in the monitoring process. Each PhD candidate is now assigned a monitoring committee in addition to the 'regular' supervisors. This committee monitors the progress and development of the PhD candidate and the quality of the supervision. The monitoring committee includes both an internal (IBL/ Faculty of Science) and an external member (a specialist in the field of the PhD research). The monitoring committee is chaired by the scientific director or vice-director of the IBL.

The new monitoring system appears to facilitate early detection of problems, but it is too early to judge if it is effective because it was only installed in 2022. It still needs to be internalized. It remains to be seen if the monitoring committee has sufficient influence if problems occur. As is the case at any research institute, the quality of supervision and training will depend on the interaction between PhD candidate and supervisor, and there will always be variability across supervisors in terms of expertise and interaction with PhD candidates.

Duration and success rate

Overall, the success rate of PhD trajectories was more than ninety percent during the review period. The IBL aims for PhD theses to be submitted within four years. During the review period, the average PhD duration was 5.1 years. A significant proportion of PhD candidates required substantially more time to graduate. Therefore, the institute has implemented more strict monitoring in 2022, as we discussed above. One of the strategic goals of the IBL for the period 2023-2028 is '*promoting optimal PhD trajectories, including time management, effective training opportunities, and a healthy supervision culture',* according to the self-assessment report.

In our interview with IBL PhD candidates, we noticed that there still are supervisors who communicate from the start that they expect the PhD track to take longer than four years. Apparently, there is a discrepancy between the atmosphere that is experienced by the PhD candidates (i.e., the PhD track can take longer, and extensions will be provided) and the message that the institute management wants to convey (i.e., the manuscript of the thesis should be finished after four years). Supervisors still need to be aligned regarding the anticipated PhD duration of four

years, so we recommend working on this. In principle, the monitoring system should be sufficient to ensure a four-year duration. The IBL has successfully decreased the time to defence during the review period, so the institute clearly is on the right track.

Guidance to the job market and career prospects

Career path orientation is a mandatory aspect of the progress monitoring report in the third year of the PhD track. Leiden University Career Counselling provides support through personal coaching, an online career platform, and workshops. The career prospects of the IBL graduates are good, with around 75 percent finding a job in academia and the rest in companies (biotech, pharma or agricultural) or other types of organizations (governmental, education or ICT). Taken together, we think that the IBL is sufficiently active in guiding PhD candidates to the job market. We recommend inviting alumni to PhD and postdoc events to present non-academic career perspectives, so that PhD candidates can get acquainted with diverse career possibilities outside of academia.

2.7 IBL academic culture

Openness, (social) safety and inclusivity

During the site visit, we observed a vibrant and dynamic research community that seemed to have coped very well with the challenges of the intense COVID-19 period. Many interviewees spontaneously mentioned that they liked the atmosphere at the IBL. The IBL leaders actively take the responsibility to contribute to this positive academic culture. For instance, they improved the internal communication in the institute (focusing on empowerment) when this came up as a point of concern in dialogues about employee wellbeing. An active bystander training is mandatory at the IBL, employees are aware of the option to approach a confidential advisor, and they know how to find this person. We conclude that the checks and balances to ensure social safety are in place at the IBL.

The development of four research themes has promoted interaction between the clusters, and between senior and junior researchers, although the PhD candidates and postdocs relate, as yet, less well to the themes. Community building is facilitated by organizing scientific meetings, retreats, and social events. The IBL has a personnel association (BioSpirits) and a PhD student and postdoc association (IPPA). A recent personnel monitor showed that the IBL employees appreciate the degree of social inclusion and autonomy at the institute, but that they are experiencing high work pressure. In the self-evaluation report, the IBL mentions the high student/staff ratio and the competition for external funding as causes of this pressure. However, we noticed that the IBL researchers (ranging from PhD candidates to full professors) have a very positive attitude towards teaching, even though it may consume a substantial amount of time. This is to be applauded. The IBL devotes special attention to the wellbeing of its PhD candidates. The institute has partnered up with a professional training and coaching agency that organizes an annual event for PhD candidates and supervisors and offers facultative courses on teamwork and problem-solving. These appear to be well-received. Moreover, the recently developed ‘Golden Rules for PhD supervision’ are a good tool to communicate mutual expectations between PhD candidates and supervisors and help to secure social safety in a demanding, high-performing academic environment.

Research integrity

A scientific integrity course is mandatory for first-year PhD candidates, but not for postdocs. Depending on the background and awareness level of the scientists involved, we recommend offering a scientific integrity course to postdocs and other staff members as well. The institute carefully considers the risk for conflicts of interest in its collaborations with industry and is supported by the Knowledge Exchange Office of Leiden University (LURIS) to evaluate such matters. Data integrity is checked by multiple researchers, promoting compliance with the Netherlands Code of Conduct for Research Integrity. A data steward that is present at the IBL for one day a week supports the IBL scientists in writing data management plans to further promote data integrity.

Taken together, we observed that the institute leaders are aware of what can be done to ensure social safety and research integrity. We encourage the institute to continue along this line because there is room for improvement (as is the case in any institution).

2.8 IBL human resources policy

Diversity

Diversity is a topic that needs attention on a daily basis in any research institute. The IBL has tried to increase the diversity of its scientific staff during the review period, for instance by following a structured protocol in selection processes and by offering a talent programme for female principal investigators. At present, 42 percent of the assistant, associate, and full professors are female. The average age of the staff decreased significantly during the review period. Staff diversity in terms of nationalities has increased as a result of several international recruits. The institute now has staff members from 15 different countries of origin including 8 non-Western countries.

In our opinion, the IBL staff currently is reasonably diverse in terms of gender, age, and cultural or ethnic backgrounds, given the composition of the recruitment base. However, we noticed that the current IBL management mainly consists of people of Dutch origin. In addition, we would like to point out that diversity also pertains to aspects such as LGBTQ+ and disability. During the interviews, we were informed that the Faculty of Science sometimes needs to be made aware of this point, but that these aspects of diversity are taken seriously, and problems are immediately acted upon. We encourage the institute to continue striving for a balanced representation of minorities among its staff.

We heard mixed stories about the onboarding process for scientists from abroad. The availability of assistance in for instance finding accommodation and completing the visa procedure appears to depend on the efforts made by the supervisor or contact person. We understood that there is a guidebook to assist foreign scientists in finding their way at Leiden University, but we recommend installing a go-to person that can be approached for assistance. We were informed that such a person (or a buddy system) existed before the corona pandemic and that there is a plan to reinstall such a person or organize a buddy system. We support this plan. More in general, we recommend installing a structured procedure to support the onboarding process.

Talent management

During the review period, the IBL has strategically hired talented new staff members via searches on broad research topics to attract a diverse range of talents aligning with the newly installed research themes. The young scientists that we interviewed represent a very promising new generation. New staff members are offered courses in leadership skills, funding acquisition, and university teaching qualifications, depending on their personal ambitions. In addition, they are coached in various ways (e.g., peer review of grant applications and mock interviews). We learned that the IBL offers training and opportunities for personal development at all levels, ranging from PhD candidates to senior scientists, which we applaud. The training and coaching opportunities for postdocs may be a bit less extensive than those for other groups, as is the case in most research institutes. We encourage the IBL to ensure that postdocs are not forgotten.

We noticed that the current scientific director of the IBL is closely involved in many aspects of people management, ranging from PhD training and mentoring to tenure track recommendations. We applaud the director's engagement in the management of the IBL personnel and acknowledge that this is done with all the right intentions, but we would advise to formalize these roles more specifically and delegate them more to dedicated committees to safeguard that (1) responsibility about decisions is broadly covered, and (2) procedures are well-incorporated in the organization in case of changes in the management.

In the self-assessment report, one of the strategic goals for the period 2023-2028 was formulated as '*Continuing to implement the recognition and rewards strategy, aimed at optimising employee satisfaction and wellbeing in an inclusive working environment.* In line with the Recognition and Rewards[2] development in the Netherlands, Leiden University is gradually creating opportunities to pursue diverse career paths (e.g., teaching, outreach) but this has not fully been formalized yet. The IBL has installed assistant professor positions with a stronger focus on teaching, while granting sufficient time for research and the possibility to be promoted to associate or full professor. As discussed in 2.6, there are combined teaching-PhD positions for PhD candidates as well. Research support staff members may grow into the function of facility manager. We encourage the institute to continue developing well-articulated instruments with clear examples of career path options that deviate from the standard research and teaching oriented profiles for employees to live up to the goals of the recognition and rewards programme.

Tenure track system

We learned that the tenure track system has recently been ended because of new national HR rules. Newly hired mid-career scientists are offered a permanent position after one year if their performance is satisfactory. At that point, they become assistant professors. They may opt for promotion to associate and full professors later, depending on their performance and development. Mid-career scientists that are still on the old tenure track system are offered a permanent position after five years, and then they immediately become associate professors. We observed a justifiable frustration among the mid-career scientists about this inequality.

[2] The Recognition and rewards programme advocates a modernization of the system of recognition and rewards at Dutch universities. This should improve the quality of the key areas education, research, impact, leadership, and (for UMCs) patient care. The programme has been developed in cooperation with all universities, UMCs, reputable research institutes, and research funders.

The requirements for promotions to associate and full professorships are based on guidelines of the Faculty of Science. The mid-career scientists in the old and new system that we interviewed felt that these guidelines leave a lot of room for interpretation, thus creating uncertainty and frustration. Although we acknowledge that it is not possible to work with fixed criteria, better expectation management is wanted. We recommend (1) installing a clear, uniform career development system for new- and old-system mid-career scientists, with clear guidelines, different career path examples, and a good mentoring system, (2) ensuring that all mid-career scientists are treated equally (i.e., permanent position after one year also for the tenure trackers in the old system), (3) installing a career track committee that develops clear guidelines and oversees monitoring and evaluation of the candidates and provides advice about promotion to the IBL management team. Now this seems to be done solely by the IBL scientific director.

3. Summary and recommendations

3.1 Summary of observations and conclusions

During the review period, the IBL has successfully reorganized its structure in a matrix structure with clear interdisciplinary research themes. The themes clearly showcase the overarching research foci of the institute, are well-embedded in the strategic themes of the university and provide enhanced visibility to both science and society. In line with its strategic aims, the IBL has produced valuable new scientific insights in the fields of Bioactive Molecules, Development & Disease, Evolution & Biodiversity, and Host-Microbe Interactions, often contributing to solutions for the grand challenges that society is currently facing. The high quality of the IBL research programme is demonstrated by its remarkable success in national and international funding schemes (in particular the highly competitive ERC schemes) and impactful scientific publications with above world average citations. We also applaud the SCS group for its accomplishments in the field of science communication and society, in which it operates at the national forefront.

The institute adheres to the principles of Open Science to promote the uptake of its research results by peers and stakeholders. In addition, the institute engages with societal stakeholders to increase the impact of its research. The IBL invests heavily in teaching activities in Leiden University's BSc and MSc programmes. We consider training knowledge workers a very important contribution to society. The IBL researchers have engaged in a substantial number of large public-private partnerships during the review period, teaming up with companies located at the Leiden Bio Science Park. Many IBL researchers are keenly aware of opportunities for outreach. Enhancing the interaction with the SCS group could strengthen the science communication activities of the IBL.

The IBL PhD programme is embedded in Leiden University's Graduate School of Science. All PhD candidates at the IBL have at least two supervisors. An education & supervision plan is used to evaluate the PhD candidates' progress in research and training on a yearly basis. Supervisors still need to be aligned regarding the anticipated PhD duration of four years, so we recommend working on this. Overall, we feel that that the PhD candidates are offered a very good training and supervision system and a diverse pallet of soft skills and specialized courses that sufficiently caters for their needs. The IBL actively guides its PhD candidates to the job market and the career prospects of the IBL graduates are good.

We observed a vibrant and dynamic atmosphere at the IBL. The implementation of the four research themes has promoted interaction between the clusters, and between senior and junior researchers. The leaders actively take the responsibility to contribute to a positive academic culture and to ensure social safety and research integrity. The IBL has strategically invested in its research facilities, local collaborations, and its earning power. As a result, the institute has grown substantially during the review period, and it is now well-embedded in Leiden Bio Science Park. The research themes that the institute studies will be of high and growing societal relevance in the years to come. In conclusion, our committee is highly positive about the viability of the IBL.

To ensure that the institute will continue to thrive, our main recommendations are to (1) further capitalize on the research themes by installing scientific advisory boards per theme and creating 'flagships' that showcase the themes to the outside world, (2) enhance the scientific interaction between the SCS group and the rest of the IBL, (3) develop a strong and integrated vision that articulates the urgent need for a new building and how this can strengthen the position of both the IBL and the university, (4) ensure that there is sufficient funding and support to continue operating the IBL's advanced research facilities such as the CryoEM, metabolomics and plant facilities, (5) installing a clear, uniform career development system for new mid-career scientists, with clear guidelines, different career path examples, a good mentoring system, and a supervising committee, ensuring that all mid-career scientists are treated equally. A complete list of recommendations and suggestions is provided in section 3.3.

3.2 Additional questions posed in the Terms of Reference

Implementation of research themes in a matrix organization

During the review period, the IBL has made the strategic decision to focus on four research themes: Bioactive Molecules, Development & Disease, Evolution & Biodiversity, and Host-Microbe Interactions. In combination with the three pre-existing organizational clusters (Plant, Animal and Microbial Sciences), the themes produce a twelve-grid matrix organizational structure. While the clusters in the animal, microbe, and plant domain facilitate the smooth running of organizational and administrative matters, the cluster-spanning themes have successfully promoted internal collaboration, scientific community building, and collaboration with neighbouring institutes. The themes have been aligned with the sector plan, allowing the institute to create critical mass in the themes. We are highly positive about this strategic decision. We support the IBL in its ambition to strengthen the themes in the future, and we provide several recommendations and suggestions on how to achieve this in this report.

IBL profiling within sector plan

The sector plan investments by the Dutch government will create six or seven new positions at the IBL. The IBL will use these to strategically strengthen the four research themes. We consider this a sensible approach because the current IBL staff has a modest size considering the broad range of topics that are studied at the institute. Aligning the themes with the sector plan will allow the institute to create critical mass in the themes, which is positive. With the ever-increasing demand on big data analysis in the IBL's field of science, we feel that the institute should invest more in a structural bioinformatics, big data, and artificial intelligence expertise centre to cater the future needs.

Strategic hiring choices

The IBL has strategically recruited talented young scientists during the evaluation period to strengthen the research themes and the interactions across the clusters. These hiring choices are sensible and strategically placed along the new matrix structure. The hires are scientists with strong track-records and contribute to the diversity in the institute. The talents also represent good potential for future IBL leadership roles.

New PhD monitoring system

The IBL has installed a monitoring system for its PhD candidates, amongst other things to prevent extremely long PhD trajectories. Each PhD candidate is now assigned a monitoring committee in addition to the 'regular' supervisors. The new monitoring system appears to facilitate early detection of problems, but it is too early for us to judge if it is effective. However, as the IBL has successfully decreased the time to defence during the review period, the institute clearly is on the right track.

3.3 Complete list of recommendations and suggestions mentioned in the report

In order of appearance in Chapter 2, our committee has the following recommendations and suggestions for the IBL:

1. Create more in-house bioinformatics expertise and structural organization of associated personnel and infrastructure (section 2.1).
2. Install an international scientific advisory board for each research theme (2.4).
3. Use the research themes to present the IBL to the outside world (communication, marketing, storytelling) and for strategy development (2.4).
4. Select a number of 'flagships' within the matrix to sharpen the profile and visibility of the institute (2.4).
5. For the Evolution & Biodiversity theme: investigate how to improve your focus and showcase how the theme is more than the sum of its parts. In addition, your role in the greater Leiden Biodiversity Network could be communicated more clearly (2.4).
6. Enhance the interaction between the SCS group and the rest of the IBL. SCS should be more involved in outreach and science communication at the IBL (2.4).
7. Develop a strong and integrated vision that articulates the need for a new building, especially because the IBL provides the fundamental knowledge basis for the university's eminent biosciences profile (2.4).
8. Ensure that there is sufficient funding and support to continue operating the IBL's advanced research facilities such as the CryoEM, metabolomics, and plant facilities (2.4).
9. Ensure that the IBL plant research groups obtain greenhouse facilities to accommodate research projects on crop plants (2.4).
10. Foster a continuous dialogue about the FAIR Data Principles (2.5).
11. Actively put issues related to the opportunities and threats of new artificial intelligence possibilities for research and education on the agenda (2.5).
12. Ensure that PhD supervisors are aligned regarding the anticipated four-year duration of PhD tracks (2.6).
13. Invite alumni to PhD and postdoc events to present non-academic career perspectives (2.6).
14. Offer a scientific integrity course to postdocs and other staff members depending on the background and awareness level of the scientists involved (2.7).
15. Continue striving for a balanced representation of minorities among the staff (2.8).
16. Install a structured procedure to facilitate the onboarding of scientists from abroad (2.8).
17. Develop a better structured/guided career path for postdocs, including training and coaching opportunities (2.8).
18. Delegate advice about promotion of staff members to dedicated committees so that decisions of the director and the MT about these important topics are broadly covered (2.8).

19. Continue developing well-articulated instruments for employees to live up to the goals of the recognition and rewards programme (2.8).
20. Install a clear and uniform career development system for mid-career scientists (formerly tenure trackers) with clear guidelines, different career path examples, and a good mentoring system (2.8).
21. Ensure that all mid-career scientists are treated equally with regards to their career paths and potential promotion to become permanent members of the IBL staff (2.8).
22. Install a committee that develops the guidelines and oversees monitoring and evaluation of the mid-career scientists and provides advice about their promotion to the IBL management team (2.8).

Appendix 1. Site visit programme

9 November 2023

Day 1	What and goal	Who involved	Where
12:30 – 13:30	Lunch and welcome by the dean of the Faculty of Science	Panel, MT and Jasper Knoester	Gorlaeus BS1.17
13:30 – 14:00	Preparatory meeting	Panel	Gorlaeus BS1.17
14.00-15.00	Interview panelists with IBL MT, including cluster leaders and head of IBL graduate school - 10min Presentation Scientific director on the self-assessment - Key questions of the panel to be clarified during the site visit	Panel and MT	Gorlaeus BS1.17
15:00-15:15	Break		Gorlaeus BS1.17
15:15-16:30	Consultation meetings with Research themes leaders	Panel, IBL Research themes leaders	Gorlaeus BS1.17
16:30-17:00	Visit NeCEN and zebrafish facility and discussions with responsible PIs	Panel, Ariane Briegel, Guus van der Velden (facility manager), and MT	NeCEN, Gorlaeus
17:00-18:00	Reflection on the day	Panel	Gorlaeus BS1.17
19:00	Dinner	Panel, MT	Restaurant in Leiden

10 November 2023

Day 2	Institute Review Scheme	Who involved of IBL	Where
8:30-9:00	Taxi to Sylvius Building	Panel	
9:00-9:30	Preparation of the day	Panel	IBL Boardroom, Sylvius
9:30 – 10:30	Meeting with Tenure trackers	Sandra Irmisch, Pingtao Ding, Ben Wielstra, Lennart Schada, Julia Cramer	IBL Boardroom
10:30 – 11:30	Meeting with PhD students and postdocs	Panel, PhD students, postdocs	IBL Boardroom
11:30– 12:00	Discussion time Panel (free to fill in by the panel)	Panel	IBL Boardroom
12:00 – 13:00	Lunch and reflection on morning session	Panel	IBL Boardroom
13:00 – 14:00	Visit research facilities and discussions with technicians and scientific staff	Joost Willemse (facility manager Microscopy), Somayah Elsayed (Metabolomics), Michelle Spierings (birds), Sofia Gomes (Plant facility)	Sylvius
14:00 – 15:00	Consultation meeting about academic culture, human resources, and PhD policy	Panel, scientific director, head of PhD graduate school, Institute manager, HR manager, Research manager	IBL Boardroom
15:00 – 15:30	Break		

15:30-16:00	Final meeting with Institute Management: questions, clarifications and feedback	Panel, MT	
16:00-17:30	Formulation preliminary assessment and conclusions [Evaluators only]	Panel	IBL Boardroom
17:30-18:00	Presentation of preliminary findings	Panel, MT	

Appendix 2. Quantitative data on the composition and funding of the IBL

Table 1: IBL research staff in the period 2017-2022 expressed in full-time equivalents (FTE)

Number of fte dedicated to research			Year					
Institute	**SEP Category**	**Position**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Biologie	Total		66,7	67,2	69,6	69,0	81,0	91,5
	1. Scientific staff (60% research, 30% education, 10% management)	Total scientific staff	15,5	16,3	18,4	18,5	19,1	20,6
		Assistant professor	5,5	5,8	6,7	6,7	7,8	8,8
		Associate professor	4,2	3,9	4,0	4,1	3,6	3,9
		Full professor	5,8	6,7	7,7	7,7	7,7	7,9
	2. Postdocs (100% research)	Postdocs	18,0	15,1	11,9	15,3	21,1	22,5
	3. PhD candidates (100% research)	PhD candidates	33,1	35,2	38,4	34,2	39,4	46,0
	4. Research Support staff (100% research)	Support staff	0,0	0,6	0,9	0,9	1,4	2,3
IBL SCS	Total		2,6	5,2	3,9	4,8	6,3	5,5
	1. Scientific staff (60% research, 30% education, 10% management)	Total scientific staff	1,3	1,3	1,4	1,4	2,1	1,7
		Assistant professor	0,8	0,8	0,8	0,8	1,1	1,1
		Associate professor		0,1	0,1	0,1	0,1	0,0
		Full professor	0,5	0,5	0,5	0,5	0,5	0,6
	2. Postdocs (100% research)	Postdocs	0,4	1,8	1,5	1,6	1,9	1,9
	3. PhD candidates (100% research)	PhD candidates	0,9	2,0	1,0	1,8	2,7	1,9
Total Result			**69,3**	**71,9**	**73,7**	**73,6**	**86,8**	**96,0**

Table 2: IBL research staff in the period 2017-2022 expressed in number of persons

Staff			Year					
Institute	**SEP category**	**Position**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Biologie	Total		**111**	**113**	**117**	**119**	**137**	**152**
	1. Scientific staff	Total scientific staff	30	33	35	37	40	44
		Assistant professor	12	12	13	16	19	22
		Associate professor	7	7	7	6	6	7
		Full professor	11	14	15	15	15	15
	2. Postdocs	Postdocs	38	32	28	33	44	43
	3. PhD candidates	PhD candidates	43	47	53	47	51	62
	4. Research Support staff*	Research support staff	0	1	1	2	2	3
	5. Technicians**	Technicians	39	40	42	39	44	35
IBL SCS	Total		**5**	**9**	**8**	**8**	**11**	**11**
	1. Scientific staff	Total scientific staff	3	4	4	4	5	5
		Assistant professor	2	2	2	2	3	3
		Associate professor		1	1	1	1	1
		Full professor	1	1	1	1	1	1
	2. Postdocs	Postdocs	1	3	3	2	2	2
	3. PhD candidates	PhD candidates	1	2	1	2	4	4
Total			**116**	**122**	**125**	**127**	**148**	**163**

*Research support staff: research support professionals who help with advice and administration of the externally funded projects (grant/strategy advisor, project managers).
** Technicians are not included in the totals in this table.

Table 3: IBL funding and expenditure in the period 2017-2022 as presented in the IBL self-assessment report

	Realised		Realised		Realised		Realised		Realised		Estimated	
	2017		2018		2019		2020		2021		2022	
	fte	%	fte	%	fte	%	fte	%	fte	%	fte	%
Funding												
Direct funding	73,30	60,2%	72,80	59,4%	74,20	58,8%	75,10	58,2%	83,20	56,1%	92,40	57,9%
Research grants	31,30	25,7%	30,20	24,7%	22,50	17,8%	23,30	18,1%	32,00	21,6%	32,50	20,4%
Contract research	17,20	14,1%	19,50	15,9%	29,40	23,3%	30,60	23,7%	33,20	22,4%	34,60	21,7%
Other												
Total funding	**121,80**	**100,0%**	**122,50**	**100,0%**	**126,10**	**100,0%**	**129,00**	**100,0%**	**148,40**	**100,0%**	**159,50**	**100,0%**
Expenditure												
Personnel costs	€ 8.806.000	75,4%	€ 8.717.000	71,6%	€ 9.514.000	75,0%	€ 10.615.000	74,8%	€ 12.217.000	74,2%	€ 13.711.000	75,4%
Material costs	€ 2.871.000	24,6%	€ 3.456.000	28,4%	€ 3.173.000	25,0%	€ 3.572.000	25,2%	€ 4.244.000	25,8%	€ 4.485.000	24,6%
Other costs												
Total expenditure	**€ 11.677.000**	**100,0%**	**€ 12.173.000**	**100,0%**	**€ 12.687.000**	**100,0%**	**€ 14.187.000**	**100,0%**	**€ 16.461.000**	**100,0%**	**€ 18.196.000**	**100,0%**