

EVALUATION AND ACCREDITATION DOCUMENTS

Life Sciences doctoral program

Skoltech

Russia

March 2019

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CONTENTS

EVALUATION REPORT	pages 3-16
COMMENTS OF THE INSTITUTION	page 17
ACCREDITATION DECISION	pages 19 and following

EVALUATION REPORT

Life Sciences doctoral program

Skoltech – Russia

January 2019



Skoltech has mandated Hcéres to perform its Life Sciences doctoral program evaluation. The evaluation is based on the "External Evaluation Standards for doctorates out of France", adopted by the Hcéres Board on March 26, 2018. These standards are available on the Hcéres website (hceres.fr).

For the Hcéres¹:

Michel Cosnard, President

On behalf of the experts committee²:

Martin Teichman, President of the committee

In accordance with the decree n°2014-1365, November 14th, 2014,

¹ LThe president of Hcéres "contresigne les rapports d'évaluation établis par les comités d'experts et signés par leur président." (Article 8, alinéa 5) – « countersigns the assessment reports made by the experts'committees and signed by their president »(article8, alinéa 5)

² The evaluation reports "sont signés par le président du comité". (Article 11, alinéa 2) – « are signed by the president of the committee » (article11, alinea 2)

CONTENTS

I. National context and Institution identity sheet

General context and Higher education	2
Skolkovo Institute of Science and Technology	2
Key Figures	3
Skoltech Governance	3
Positioning, strategy and challenges.....	3

II. Evaluation procedure

Presentation of the institution's self-evaluation approach	3
Composition of the committee	4
On-site visit description	4

III. Evaluation report

Area 1 – The positioning of the Doctorate	5
Area 2 – Organization and management of the doctorate	6
Area 3 – Supervision and training for Doctoral Students	7
Area 4 – Integration of Doctors into the Job Market	9

IV. Conclusion

Past achievements	12
Today's challenges	12
Outlook to the future	12
Strength	11
Weaknesses	12
Recommendations	12

V. Comments of the institution

I. NATIONAL CONTEXT AND INSTITUTION IDENTITY SHEET

GENERAL CONTEXT AND HIGHER EDUCATION

The Russian Federation spans out over 17.125.200 square kilometers, making it the biggest country in the world. With about 145 million inhabitants, it is the 9th most populated country in the world. Its Gross Domestic Product (GDP) sums up to 4.180 trillion US \$ (6th in the world), representing 30.039 US \$ per capita (49th in the world¹).² The country is rich in resources and has a long tradition in higher education and research and figures in current rankings amongst the top countries in the world³.

766 universities cover the whole scope of hard and soft sciences, including Engineering, Life Sciences, Technology or Medical studies. Several of the Russian Universities occupied top places in the 2019 QS BRICS University Rankings (Lomonosov Moscow State University rank 6; Novosibirsk State University rank 12; Saint-Petersburg State University rank 11)⁴. The 2018 World University Ranking of Shanghai University ranked the Lomonosov Moscow State University at position 86, St Petersburg State University amongst the best 301-400 and Novosibirsk State University in the group of 401-500⁵.

Higher education in the Russian Federation is mostly provided by public universities and institutions. In recent years the offer has been extended by the advent of private higher educational Institutions⁶. In order to offer the right of issuing state-recognized degrees, they need to possess (i) a license for educational activity and (ii) a national accreditation certificate. The license for educational activity allows the institution to train specialists in fields of higher vocational education. The national accreditation certificate guarantees that you will get a state-recognized degree certificate⁷. In 2017, Skolkovo Institute of Science and Technology (Skoltech) has obtained both the "License for educational activity" as well as the "State accreditation" by the Federal Service for Supervision in Education and Science.

Since 2011, Russian universities organize their curriculum similar to what was agreed on in the Bologna treaties. A Bachelor's degree (4 years) is followed by a Master's degree (2 years). After obtaining a Master's degree, Russian students can enter postgraduate courses and obtain a Candidate of Sciences degree within 3-4 years⁸. International students have to demonstrate at least a B1 level in the Test of Russian as a Foreign Language (TORFL)⁹.

SKOLKOVO INSTITUTE OF SCIENCE AND TECHNOLOGY

Skoltech is a private research university that was established in 2011 by nine Russian universities and organizations¹⁰. For setting up research and education programs, Skoltech signed a contract with the Massachusetts Institute of Technology (MIT) and the Skolkovo Foundation. Skoltech offers programs for master and PhD studies in the following domains: Data Science & Artificial Intelligence, Life Sciences and Biomedicine, Cutting-edge Engineering & Advanced Materials, Energy Efficiency, Quantum Technology, Advanced Studies.

Research is organized in ten research centers covering the domains of biology (Life Sciences; Neurobiology and Brain Restoration), informatics (Computational and Data-Intensive Science) and integrating different domains such as mathematics, physics, chemistry and economy (Energy Science and Technology; Hydrocarbon Recovery; Design Manufacturing and Materials; Space; Advanced Studies; Photonics and Quantum Materials).

The Skoltech Center of Life Sciences (CLS) comprises twelve research groups with expertise in several branches of biology, including RNA biology, bioinformatics, genomics, bacterial immunity and genome editing. It offers a MSc program and a PhD program, where at present, 46 PhD students are enrolled.

¹ <https://en.wikipedia.org/wiki/Russia>

² <https://www.imf.org/en/Countries/RUS>

³ <https://www.master-and-more.eu/en/top-40-education-systems-in-the-world/>

⁴ <https://www.topuniversities.com/university-rankings/brics-rankings/2019>

⁵ <http://www.shanghairanking.com/ARWU2018.html>

⁶ <https://studyinrussia.ru/en/why-russia/russian-education-in-figures/>

⁷ http://www.obrnadzor.gov.ru/en/higher_education/

⁸ <https://studyinrussia.ru/en/study-in-russia/info/levels-of-education/>

⁹ <http://english.spbu.ru/torfl>

¹⁰ Moscow Institute of Physics and Technology; Tomsk Polytechnic University; Moscow School of Management Skolkovo; New Economic School; Rusnano; Russian Venture Company (RVC); Bank for Development and Foreign Economic Affairs (Vnesheconombank); Foundation for the Assistance to Small Innovative Enterprises in Science and Technology; RAS Scientific Center in Chernogolovka

KEY FIGURES

Skoltech has been conceived as a small university that will enroll 1.200 graduate students (MSc and PhD) and employ 200 faculty members by 2020. At present, Skoltech faculty comprises 100 professors as well as 160 research scientists and postdocs, 700 graduate students, amongst them 277 PhD students.

SKOLTECH GOVERNANCE

Skoltech's President heads the leadership board of Skoltech. Vice presidents have been designated for Industrial Collaboration, Development, International Business Affairs and Intellectual Property, Community Development and Communications, Finance and Operations as well as Real Estate and Facilities. Three deans of Faculty, of Research and of Education complete the leadership board. They are responsible for strategic issues of the Institute, supervising educational programs as well as research strategies.

An international board of trustees including members from academia, economy and politics supervises Skolkovo Institute of Sciences and Technology¹¹.

POSITIONING, STRATEGY AND CHALLENGES

Skolkovo Institute of Sciences and Technology has been created for becoming the leading university in the Russian Federation and one of the top institutes worldwide. Goals of Skoltech include performing cutting-edge fundamental and applied research and fostering academic excellence.

Educational and research programs have been implemented for providing the intellectual and material environment, allowing to educate the next generation of leaders in science, technology and business. Challenges include establishing successful research programs in a rapidly evolving international competition, which are predominantly dependent on optimal financial resources and access to highly qualified persons at each level of the hierarchy. The leadership of Skoltech and the association with its collaborative partner, the Skolkovo Foundation, has been organized for facing these challenges.

II. EVALUATION PROCEDURE

PRESENTATION OF THE INSTITUTION'S SELF-EVALUATION APPROACH

The PhD program of the Skoltech Center of Life Sciences has submitted a clearly organized self-evaluation report which follows the structuration into four areas of the Hcéres PhD evaluation framework:

- Area 1 – The positioning of the doctorate;
- Area 2 – Organization and management of the doctorate;
- Area 3 – Supervision and training for doctoral students;
- Area 4 – Integration of doctors into the job market.

Each of these four items has been concisely described on 30 pages that were supported by extensive appendices, providing additional information on individual points, often represented in form of tables. The self-evaluation report is accompanied by a SWOT analysis.

¹¹ <https://www.skoltech.ru/en/about/board-of-trustees/>

COMPOSITION OF THE COMMITTEE

- Mr Martin Teichmann, Professor of Genetics and Cell Biology, Director of the Doctoral School of Life Sciences and Health, Bordeaux University, France, chair of the committee,
- Ms Françoise Moneger, CNRS Research Director in molecular bases of plant development, Director of the Doctoral School Molecular Integrative and Cellular Biology, Ecole Normale Supérieure de Lyon, France,
- Ms Lilandra Boulais, PhD student in Biomechanics and Bioengineering, University of Technology of Compiègne, France,
- Mr Igor Efimov, Professor in cardiology, The George Washington University, Washington, USA.

The committee was accompanied by Prof. Pierre Sebban, science advisor at the Hcéres.

ON-SITE VISIT DESCRIPTION

The committee, together with the Hcéres representative, visited Skoltech from October 29 to 31, 2018.

On day one of the visit, president Prof. Alexander Kuleshov received the committee in the presence of provost and dean of faculty Prof. Clément Fortin, associate provost and dean of education Prof. Anna Derevnina for a general presentation of the University and to introduce the importance of the Center of Life Sciences within its institution. This meeting was followed by a more detailed presentation of the Center of Life Sciences by its program director Prof. Konstantin Severinov in the presence of all faculty members of this center. After this presentation, Prof. Severinov responded to questions of the committee.

Subsequently, the new campus and the Technopark were shown to the committee during a visit that included the presentation of the research and teaching building that was recently opened in fall 2018. Campus visit was completed by a discussion with representatives of the Skolkovo Innovation Center.

In the afternoon, the experts split into two groups that allowed interviewing representatives of the Skolkovo Innovation Center, of the Life Sciences Program Committee, of the Russian Academy of Sciences and of Russian Universities. In addition, the experts could interview the staff in charge of the "Learning Management System" and of the "Quality assessment system for the Life Sciences Doctorate".

Day one of the visit was completed by the demonstration of common infrastructure facilities, such as mass spectrometry, next generation sequencing facilities, confocal microscopy and histology facilities.

On day two (30th October 2018), the committee continued their meetings with representatives of PhD students, of alumni and of representatives of the "Individual Doctoral Committee" as well as the "PhD Defense Jury" committee. Moreover, the committee could interview Life Sciences Research supervisors and Lead Instructors, as well as representatives of the Department of Education and recently recruited junior faculty.

The whole committee had a meeting with Arkady Dvorkovich, co-chair of the Skolkovo Foundation board in the presence of Alexander Safonov and Clément Fortin.

At the end of day two, the experts were accompanied to the research laboratories of Skoltech CLS Faculty, which have hitherto been hosted by the Lomonosov Moscow State University.

On the last day of the on-site visit, the whole committee discussed with the Program Director of the Life Sciences PhD program for clarifying the points that came to its attention during the two days of interviews and campus visits.

The committee acknowledges the efficient organization of the visit by Skoltech.

III. EVALUATION REPORT

AREA 1 – THE POSITIONING OF THE DOCTORATE

Area 1-1: The doctorate's distinct features and objectives are clearly defined

Skoltech Life Sciences PhD program aims at educating the next generation of leaders in biological research and technology in Russia.

The Skoltech Life Sciences PhD Program was launched in 2013. Its objectives are defined as reaching academic excellence, performing cutting-edge basic and applied research, as well as training young international scientists to become research, technology and business leaders. The Skoltech Life Sciences doctoral program is covering Molecular Biology, Molecular Genetics, Microbiology, Cell Biology, Biochemistry, Bioinformatics, Biotechnology and Neurobiology. The ultimate goal is to become the leading Russian international research center and being recognized as such around the world. For that purpose, Skoltech is committed to providing outstanding educational environment leading to services and products, which positively impact the Russian economy. All the courses in the PhD program are taught in English as expected and required for a training program intended to be attractive for foreign students. The opportunity for each student to do international short and long term internships of 2 to 12 months is one of the doctoral program's ambitious objectives and it has already successfully been established. From 2015-2018, 34 Skoltech Life Sciences PhD program students have taken advantage of this outstanding opportunity of academic mobility. The objectives of Skoltech Life Sciences PhD program are clearly defined in the self-evaluation report and in coherence with the information provided during interviews of faculty members during the visit.

Area 1-2: The positioning of the doctorate is consistent with its environment

The Skoltech Life Sciences PhD program is well integrated into the general Skoltech strategy of scientific and intellectual excellence, but its future thematic orientations need to be more clearly defined. Sufficient laboratory space needs to be provided to current and future research groups.

The Skoltech Life Sciences PhD program is well implemented in current general strategies of Skoltech, which are directed towards fostering scientific excellence. However, the committee received conflicting information about the future development of the CLS and thus its PhD program. In particular, the establishment of a Center for Neurobiology was mentioned, but no concrete plans for the creation of accompanying infrastructures were presented. Not only such a Center for Neurobiology, but also scientific directions currently pursued at Skoltech Center of Life Sciences would require and profit from the establishment of animal facilities and ideally the association with clinical facilities. Such infrastructure decisions could furthermore be decisive for recruiting new faculty members who are international leaders in their scientific domains and who could further shape the scientific profile of Skoltech CLS and its PhD program. However, plans for such infrastructures were not explicitly presented.

Up to now, the CLS has suffered from insufficient and locally dispersed laboratory space. Most research groups are not yet located on the Skoltech campus, but rather occupy laboratory space at the Lomonosov Moscow State University. The largest CLS research team headed by Konstantin Severinov has limited laboratory space on the Skoltech campus. The wet lab of his group is not spacious enough and it has in addition to be shared twice a week with teaching classes. As a consequence, master and PhD students have limited access to their own laboratory space. This situation clearly negatively impacts on the execution of experiments. Moving to the new research building will at least in parts solve this lack of space for conducting experiments. It should, however, be recognized that moving laboratories from their current emplacement to the new research building will require strong financial support for acquiring all necessary new equipment, as well as for transporting the actual laboratory material to the new space.

All necessary efforts should be taken to clearly define the scientific orientation of the CLS, allowing to accordingly adjust its PhD Program educational development. Furthermore, it should be granted that the existing research groups will be provided sufficient laboratory space to fully develop their scientific activities. Moreover, similar plans for laboratory space should be foreseen for new research teams to be recruited within the next several years.

AREA 2 – ORGANIZATION AND MANAGEMENT OF THE DOCTORATE

Area 2-1: Effective organization and management is in place for the doctorate

Administrative support of the Life Sciences PhD program as well as its scientific organization are excellent and satisfy all standards applied at top universities around the world

The Life Sciences PhD program is associated with the Center of Life Sciences (CLS) and it is very well organized. The Department of Education (DoE) and the Doctoral Study Office, being part of the DoE, provide administrative support. The DoE covers registration and follow-up administrative assistance for students, including the implementation of decisions that were taken by diverse committees that accompany students all along their studies. The CLS administrative staff, including the Program coordinator, the Industry Project Manager, the Research and Education Program Manager, the Contract Specialist and Head of Biomedical Teaching Laboratory complete the support staff in charge of organization of the doctoral studies and their implementation on campus.

At the level of the scientific organization and of the direct supervision and assistance of doctoral students, several complementary committees have been established. These committees are run by the Center of Life Sciences faculty. At present, the "Life Sciences Doctoral Program committee (LSDPc)" is composed of six members, which corresponds to half of the research supervisors of the Center of Life Sciences. This high representation of research supervisors reflects the fact that the program has only recently been established with currently twelve CLS faculty members. According to the Strategic Action Plan, which defines Skoltech as a small university, with 1 200 graduate students (MSc and PhD) and 200 faculty set as a target for 2020, the number of faculty members is supposed to double in the next two to three years. The LSDPc decides about the development of the doctoral program in general and provides assistance to other committees associated with the CLS. "Individual Doctoral Program committees (IDPc)" are composed of three members including the thesis supervisor and experts in the respective fields of the thesis topics. Each IDPc accompanies a student throughout his doctoral studies. PhD Defense Jurys are composed of five to nine members, including two internationals.

At the level of educational program quality control, PhD students and administrative staff, as well as the research faculty are involved to efficiently develop and improve the program. The CLS is integrated into a Skoltech-wide course evaluation student survey program. In the frame of this annual program, students anonymously respond online to 10 questions that have been designed to evaluate the content and the quality of the training program. Response rates are increasing with time and accumulated to up to 70-90% within the last two years. Responses are shared with course instructors, program directors and in case of recurrent remarks with the dean of education. A self-assessment report is established and shared with the board of trustees. The results of this survey are taken into account for continuous improvement of the Life Sciences PhD program.

The quality control by students is efficiently conducted at an excellent level.

In addition to these classical bricks of organization which are also found in other high level international PhD programs, Skoltech has also installed a "Disciplinary Board". If requested, this disciplinary board decides about issues concerning 'academic integrity', 'student attendance' and 'student academic performance'. According to their decision, the monthly stipend to students can be diminished. Such a disciplinary board is not known at "western universities". It may reflect a sense of responsibility, which Skoltech assumes due to the fact that their students receive a privileged treatment compared to other students at State Universities in Russia.

In summary, the academic and administrative organization of the Skoltech Life Sciences PhD program is perfectly installed and executed at highest international standards.

Area 2-2: There is an explicit policy for recruiting and funding doctoral students, which is adapted to the PhD program

Skoltech Life Sciences PhD program recruitment procedure is well organized and is highly competitive for Russian students, but needs to be improved for the recruitment of international students. No tuition fees are

applied and generous scholarships and leave fellowships are provided to PhD students of the Life Sciences PhD program.

Skoltech has established a highly selective PhD student recruitment procedure with 1 selected PhD student per up to 10 applicants, depending on the recruitment campaign. During the first five years of the PhD program annually one to twenty students have been recruited and sum up now to 46 PhD students in total. Thereafter, maximally 15 PhD students are expected to be recruited each year. The recruitment process takes place twice a year in spring and fall periods and is divided in 2 steps. All candidates at the master level origin from other universities, since Skoltech does not provide bachelor teaching. The majority of PhD students come from master programs of Russian Universities including Skoltech. PhD program applicants first submit an online application form to which they attach previous education diplomas, including an English certificate (minimum required results are 80 on the TOEFL IBT, 450 on the TOEFL ITP or 6 on the IELTS). In addition to their CV and cover letter, they need to provide two letters of reference. The best applicants are selected by the PhD Program Committee and invited for an interview. During this second step, the applicants are supposed to present their academic and professional background followed by a research project proposal the topic of which is at their own decision. At the end of this process, the Life Sciences PhD Program Committee takes a final decision. Although all classes are taught in English, the number of international PhD students remains rather low (about 11% in 2017)¹². Nevertheless this percentage is higher than in other Russian Universities (5.5%)¹³. In particular, the fact that administrative procedures require the use of Russian language is clearly an obstacle for foreign students.

The Skolkovo Foundation provides PhD student scholarships. The amount of this scholarship is several-fold higher than those provided by State Universities and that often simply cover housing and a monthly stipend of 7700 rubles (100 Euros)¹⁴. Skoltech scholarship entry level of 75.000 rubles per month (about 1000 Euros a month) is the same for all first year PhD students. In the following years, the amount of the scholarship that each student receives can vary according to the "Annual Progress Review" results. It can increase to 85.000 (1100 Euros) or 105.000 rubles (1350 Euros) per month. Moreover, scholarships for academic mobility and for attendance at conferences are provided by the CLS (see area 3-1).

AREA 3 – SUPERVISION AND TRAINING FOR DOCTORAL STUDENTS

Area 3-1: The doctorate applies a strict doctoral student supervision and follow-up policy

The Skoltech Life Sciences PhD program applies a strict doctoral student supervision and follow-up policy at highest international level. Attractive fellowships support international leave of students for completing their training

The supervision and training at Skoltech Life Sciences PhD program is organized and managed at several levels, as was described in Area 2-1. These control mechanisms reflect the participation of three major components of Skoltech: administration, faculty and students. They include: Doctoral Study Office of the Department of Education; Life Sciences Doctoral Program committee of the Center of Life Sciences faculty (six members); Individual Doctoral Program committees (three members for each doctoral student); PhD Defense Jurys (five to nine members with at least two foreign members); Skoltech-wide course evaluation survey integrated with continuous improvement of the Life Sciences PhD program; Disciplinary Board; Student council; Alumni association, Foreign internship faculty. In addition, two requirements have to be fulfilled prior to thesis defense: i) two publications out of which one has to be signed as first author in "leading" peer-reviewed journals; ii) two presentations at reputed conferences; and a 2-12 months internship at a leading international University (in EU, Israel, China, Japan or US) is highly encouraged and was fulfilled by all students. The committee highly encourages Skoltech to establish these internships as requirements for thesis defense.

The Skoltech Life Sciences PhD Program provides continuous monitoring of doctoral students by faculty supervision and by training, including student academic performance, attendance, academic integrity, research progress, and publications. Individual Doctoral Program committees (IDPc) are composed of Life Sciences faculty members including the PhD supervisor. This structure allows doctoral students to easily access to two IDPc members who are not their supervisor, which helps resolving various issues of scientific and

¹² self-evaluation report

¹³ <https://studyinrussia.ru/en/why-russia/russian-education-in-figures/>

¹⁴ <https://studyinrussia.ru/en/study-in-russia/scholarships/>

educational programs before problems arise. Disciplinary boards are a unique instrument for student supervision at Skoltech, being helpful in resolving student grievances.

Skoltech provides strong financial support for international internships (2 to 12 months) and conference participation (program Mobility), which are particularly powerful offers for the Life Sciences PhD program students to complete their training. These academic mobilities provide additional intellectual input and external evaluation of the quality of students and their research progress. A Skype interview with five professors from leading Universities in France, Japan and the US confirmed that Skoltech Life Sciences PhD program students are of highest quality and perfectly prepared for advanced research in life sciences.

PhD students are supervised by a faculty member of Skoltech holding a PhD degree or equivalent. The supervision can be completed by a co-supervisor holding also a PhD degree or equivalent, faculty member, researcher or professional of any institutions or industries. The number of doctoral students per supervisor is not limited and, at present, an important disparity is observed from 1-2 PhD students to 9-15 PhD students per supervisor.

Each PhD student has an Individual Doctoral Committee composed of a minimum of 3 members including the supervisor, chosen by the PhD student. This committee follows regularly the student's activities during his/her 4 years of PhD and can serve as a mediator in case of conflict between the student and the supervisor. In addition to this committee, a clear and precise plan is defined along the 4 years to assess students' academic performance, attendance, academic integrity, research progress and publications. At the end of their first year, students defend their research project proposition during the Thesis Proposal Defense, which conditions the next research years. A new assessment is performed at the end of the second year: the Qualifying Exam evaluates the ability of the PhD student to conduct research. Moreover, starting with the second year, an annual progress review is performed every year by his/her Individual Doctoral Committee, which evaluates research progress, publications, courses taken and overall assessment of the student's progress.

In case of violation of any Skoltech policies, poor academic performance or any other problem, a Disciplinary board can gather to discuss about a specific student case. This committee is composed of the Dean of Education, 2 student representatives and 3 other members. The Disciplinary Board can take the decision to issue a warning, to reduce the scholarship or to expulse the student.

Area 3-2: The doctorate offers diverse teaching and organizes supplementary events

Life Sciences PhD program teaching activities are well organized and students are able to choose their personalized curriculum out of a rich disciplinary and transversal course program that is offered by Skoltech. This program could be enriched by a formal student-organized lecture series.

Most of the learning opportunities for Life Sciences students are proposed at the level of the MSc program. Doctoral students need to acquire 30 credit points (ECTS) (out of 240) from coursework. One credit formally corresponds to 27 hours of courses. The 30 ECTS are subdivided into 12 ECTS obtained from major-field courses and 18 ECTS from general doctoral courses. 80% of these courses have to be taken during the first two years of the doctorate. Advanced doctoral courses are well complementary to the research programs at Skoltech CLS and include "Molecular Biology", "Immunology", "Bioinformatics", "Biostatistics", "Mathematics in Biology" and "Evolutionary, Population and Medical Genomics". General doctoral courses are thematically broad and provide a rich offer to students to widen their horizon. These general courses also include aspects such as "Intellectual Property", "Technical Innovation" or "Industrial Applications of Biomedical Science", underscoring the importance that Skoltech Life Sciences PhD Program attributes to the translational aspect of Science. In addition, general doctoral courses also cover topics such as "Philosophy of Science" or "Thinking Disruptive for Big Future", indicating that Skoltech Life Sciences PhD program also aims at training scientists that will be able to show "out of the box thinking".

Up to now, Skoltech Life Sciences PhD program has not established a Lecture series of national and international speakers that present their work on a weekly or biweekly rhythm, but rather restricts to presentations by members of the thesis defense committees. To widen the presentations beyond Skoltech Life Sciences PhD program topics, a regular lecture series could be organized by the LSC PhD students.

Area 3-3: The doctorate is based on explicit rules for thesis duration and defense

The committee considers the rules for thesis duration and defense at Skoltech Life Sciences Program to be highly coherent and executed at an excellent level compliant with highest international standards

The expected duration for a PhD thesis is typically four years. Since 2013, all students completed their thesis in four to five years. The PhD program requirements are clearly described in Skoltech's PhD Policy. Prior to defending the PhD thesis, the student must complete his/her PhD studies, write the thesis, and co-author the required number of papers. As described in Area 3-1, the recommended Skoltech wide minimum publication and conference requirements are highly stringent and more demanding than in other Russian Universities. If after four years, all requirements are not fulfilled (for example if the papers are not yet published), it is possible for the student to obtain an extra year to finalize his/her thesis. The student's Individual Doctoral Committee and the Doctoral Program Committee determine the appropriate format of the thesis in consultation with the student, early enough during the student's research work to allow the student to invest a reasonable amount of time to prepare the thesis. The PhD thesis must contain a substantial contribution of new knowledge in the field of the project. Any form of plagiarism is not accepted. Sticking to this rule is under each student's own responsibility. In case of verified plagiarism that would be detected during the thesis final review, the candidate would be banned from the PhD defense. No cases of plagiarism have been reported so far.

The procedure to organize the thesis defense is divided into three steps:

- PhD thesis approval by the Individual Doctoral Committee
- Thesis final review occurs prior to the PhD thesis defense in order to evaluate the student's ability to successfully complete the doctoral program and its eligibility for the PhD defense.
- PhD Thesis Defense where the student is publicly presenting and defending his/her PhD thesis in front of the PhD defense jury. The jury members consist of 5-9 experts in the research area, appointed on the basis of their academic expertise, independency and reputation.

As a general conclusion, the committee considers the rules for thesis duration and defense at Skoltech Life Sciences Program to be highly coherent and executed at an excellent level compliant with highest international standards. The committee encourages Skoltech Life Sciences PhD program to pursue with the same high standards.

AREA 4 – INTEGRATION OF DOCTORS INTO THE JOB MARKET

Area 4-1: The doctorate includes mechanisms to promote the integration of doctors into the job market

The job market for Life Sciences PhD program graduates is tight in Russia. Therefore, all administrative restrictions should be levered and the students should be encouraged to complete their training by postdoctoral studies in Russia and at international institutions with the possibility to be reintegrated into Skoltech LSC after having completed their postdoctoral training. Skoltech Life Sciences PhD program supervisors and administration should cooperate with companies for finding job opportunities for their graduates. Translational research approaches may help creation of start-up companies by Skoltech graduates.

The Life Sciences PhD program prepares excellent young scientists for being integrated into the job market provided by biotechnology companies, large pharma companies or by start-up companies. At present, a problem arises from the fact that these branches are not strongly developed in the Russian Federation. As an alternative to jobs in industry, young doctors could be employed by universities. However, the experience is limited in the domain due to the very recent first graduation of PhD students (2017). It has been noted by the committee that 4 out of 5 graduated PhD from 2017 stayed at Skoltech. It must also be noted that none of these recent doctors has intended to go abroad for a postdoctoral experience.

Russian pharmaceutical and biotechnology companies prefer employing graduates that have completed their master studies at Skoltech rather than having obtained a PhD from the Skoltech Life Sciences program. This may partly be explained by the lack of equivalence of the PhD status in Russia, which is not delivered by other Russian universities. Thus, graduated students from Russian universities holding a PhD-equivalent diploma

need to make it recognize by abroad authorities prior to join international pharmaceutical companies. This limits the competitiveness on the international job market. Therefore, it is the opinion of the committee that it would be very helpful if the Skoltech Life Sciences PhD program could receive an official internationally legal recognition of its PhD degree by the Russian State. This would also be important to allow PhD graduates to move laterally within Russia and to occupy Assistant Professor Positions at other Russian Universities.

Furthermore, Skoltech could accompany students with creating their own start-up companies by providing or reinforcing programs that enable their development for instance within the Skolkovo Innovation Center. The creation of start-up companies by Skoltech students also depends on the research topics at the Center of Life Sciences, which should further reinforce translational research. This question should also be taken into consideration for hiring future faculty and for infrastructural decisions. Moreover, the Center of Life Sciences could try to establish combined Skoltech-industry PhD programs in which the student performs his research at 50% in each, academia and in a company.

In addition, PhD graduates should be encouraged to do postdoctoral studies at top international universities. Skoltech could accompany these postdoctoral programs with specific re-integration programs ensuring that these students and their additional expertise gained during the postdoc will be reintegrated into the Russian system of research in general and into general structures provided by Skoltech and the Skolkovo Foundation in particular.

Furthermore, contacts of Skoltech CLS faculty members and of the institution in general should be strengthened for placing graduates in industry.

Area 4-2: The doctorate has effective monitoring of the integration of doctors into the job market

The structures for monitoring the development of Skoltech CLS graduates are in place, but due to the recent set up of the program, it is too early to draw conclusions.

The first promotion of the Skoltech Life Sciences Program PhD graduated in 2017. Four out of five students have stayed at Skoltech University. Effective monitoring of the professional development of Skoltech alumni has not yet been a major task. Nevertheless, Skoltech has all structures in place for accomplishing such monitoring in the future. The Industry Project Manager at Skoltech's Center of Life Sciences mentioned that the job market is better for MSc students than for PhD graduates, an information that was confirmed by representatives from other universities and from biotech companies. As stated under area 4-1, these difficulties for recruiting PhD graduates from Skoltech LSC may at least in parts be due to the lack of recognition of the PhD diploma.

Area 4-3: The data collected is analyzed, communicated and used

The structures for analysis and communication of data are in place. One person is in charge of promoting the placement of CLS PhD graduates into the job market and is in close contact with both the students and the potential employers. As mentioned previously, it is too early to evaluate the results in a statistically satisfying manner

IV. CONCLUSION

PAST ACHIEVEMENTS

Skoltech Institute of Science and Technology was recently founded in 2011. The Life Sciences PhD program was created in 2013. An ambitious program was established for both the Skoltech and the PhD program. With 1200 Msc and PhD students as an objective for 2020, the currently 700 graduate students being enrolled at Skoltech indicate that this university is on a good way to achieve its goals of recruitment. A similar statement can be made for the faculty, which comprises 100 members at present and is expected to grow to 200 members in 2020. In 2018, twelve faculty members of outstanding scientific quality are associated with the Life Sciences PhD program. Their scientific excellence is documented by strong publication records in top journals, including Science, Nature Reviews in Microbiology, Molecular Cell, Journal of American Chemical Society, Nucleic Acids Research and many more, resulting in high h-indices of many faculty members and in important

international contacts. Thus, the establishment of Skoltech as a functioning university and the implementation of the CLS faculty within this Institute in a very short period of time are impressive.

The Life Sciences PhD program has grown from five students in 2013 to 46 in 2018, which likewise indicates that this program has been able to attract a sufficient number of students. The fact that the PhD program recruited only one single student in 2014 is an indicator that no compromise has been made that might negatively impact on the quality of the recruited students. An attractive complementary teaching program has been installed, allowing students not only to acquire all necessary knowledge, but also to widen their horizon beyond the central topics of their PhD theses. The administrative support meets highest international standards. Taken together, the establishment of the Skoltech Life Sciences PhD program during the first five years of its existence has resulted in convincing results with respect to the organization and management of the doctorate, as well as for the supervision and training of the doctoral students.

TODAY'S CHALLENGES

Today's development of Skoltech and of the Life Sciences PhD program will continue to face international competition for the best students. In particular, the PhD program needs to obtain a sharper international visibility that will be required to increase the percentage of students from abroad in this program. As true for all universities pretending to compete for academically excellent students, the program needs to continuously adapt to its international environment. This adaptation is only possible in agreement with local development. The committee had the impression that Skoltech and the CLS that hosts the PhD program need to take clear decisions concerning the future scientific orientation of this program. The establishment of a neurobiology program or of other scientific directions need to be taken and will have to be backed up by adequate planning for all required technical equipment and probably the creation of platforms (e.g. animal house) supporting these developments. Besides these challenges for the future, it is absolutely indispensable in the near future that the present faculty will be reunited in the new research building and be provided for optimal conditions for research, including sufficient laboratory space.

OUTLOOK TO THE FUTURE

Overall, the information provided in the self-evaluation report has been confirmed during the interviews carried out by the committee. The achievements since creating Skoltech and more specifically the CLS and its PhD program are remarkable. The current faculty will need to be completed by at least the same number of highly qualified and reputed young and / or experienced faculty. With respect to these recruitments, the committee believes that it will be important to create synergies between existing faculty and newly recruited group leaders. This could be achieved by strengthening current scientific orientations, trying to establish Skoltech CLS as one of the leading institutions in the world in these topics (for instance CRISPR/CAS; bacteria), and / or by completing the current research themes with others such as neurobiology.

In conclusion, the establishment of the Skoltech Life Sciences PhD program has been executed at highest international standards. All structures for success are in place. The faculty and the students are highly motivated and of outstanding quality. In view of the past achievements, the committee has complete confidence in the capability of Skoltech governance and of the Life Sciences PhD program to take appropriate decisions that will help to lead the PhD program at Skoltech into a very good future and will continue to make it an important actor not only in Russian higher education and research, but also on the international level.

STRENGTHS:

The Life Science PhD program is well structured and organized at the academic and administrative levels.

- The Skoltech Life Sciences PhD program faculty is conducting internationally competitive research at highest levels.
- The students are rigorously selected and highly motivated.
- The supervision of PhD students all along their thesis is very well organized.
- Skoltech offers an outstanding opportunity to PhD students to complete their training at leading international institutions.
- The technical facilities that have been established at Skoltech CLS meet highest scientific standards.

WEAKNESSES:

- The current situation with respect to laboratory space for Life Sciences Program teams is not satisfactory and represents a threat for the development of the Life Sciences PhD program.
- Future scientific orientations of the CLS are not clearly outlined, which may represent an obstacle for its goal of becoming an internationally leading institution.
- A strategy for expanding technical facilities in accordance with the development of the CLS and its PhD program has not been envisaged.
- The lack of recognition of the Skoltech Life Sciences PhD program doctoral degree impedes the international positioning of this institute and refrains the development of its graduates.
- The rate of international PhD students is low.
- Mechanisms for fostering the placement of graduates in industry have not yet shown to be efficient.

RECOMMENDATIONS:

- Skoltech Center of Life Sciences should actively develop the extension of their faculty in order to efficiently support the PhD program. This extension should be performed on the criterion of scientific excellence and could, in longer terms, lead to the development of specific thematic centers that may help to improve international visibility of Skoltech Center of Life Sciences.
- These scientific strategies need to be accorded with appropriate extensions and additions of technical facilities.
- Sufficient lab space needs to be given at the disposition of present and future faculty.
- The recruitment of international students should be increased.
- The personal contacts of professors with companies and universities should be used further to improve placement of graduates in industry and academia.
- The entrepreneurial activity of PhD students should be further encouraged.

V. COMMENTS OF THE INSTITUTION

Skoltech

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Professor François Pernot,
Directeur/Director
Département Europe et International
Europe and International Department
2 rue Albert Einstein - 75013 Paris

ref. # 221/OUT-2019 date 28.02.2019

February 27, 2019

Dear Professor Pernot,

I am writing you in appreciation of the valuable contribution of the Experts Committee and HCERES team in the evaluation process of the Skoltech Life Sciences doctoral program. Results of evaluation report will be very helpful for continuing improvement of Skoltech Life Sciences doctoral program, other PhD programs at Skoltech, and the university at large and will ensure compliance with the high Standards and Guidelines for Quality Assurance in the European Higher Education Area.

As it is mentioned in the evaluation report of the Experts Committee, “the establishment of the Skoltech Life Sciences PhD program has been executed at highest international standards.” This high praise is particularly important for Skoltech as a young international university and allows it to serve as an example to follow for other Russian institutions.

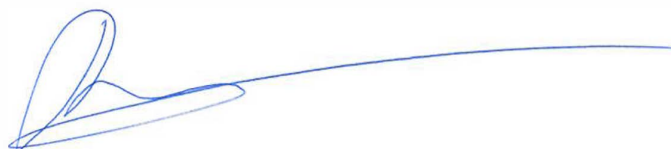
We fully agree with and are grateful for recommendations of the Experts Committee to extend the breadth and comprehensiveness of the Life Sciences doctoral program by recruiting additional faculty, adding facilities and lab space, increasing recruitment of international students, arranging placement of program graduates in companies and universities through faculty personal contacts and encouraging students entrepreneurial activities.

Let me assure you that we will be actively working along these lines in the nearest future to further strengthen the program.

Based on the evaluation report of the Expert Committee, Skoltech respectfully requests that the Council of HCERES approve the accreditation of the Skoltech Life Sciences doctoral program.

Sincerely yours,

Alexander Kuleshov
President



The evaluation reports of Hcéres
are available online : www.hceres.com

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ACCREDITATION DECISION

Life Sciences PhD program

Skoltech - Russia

March 2019

SCOPE OF THE ACCREDITATION GRANTED BY HCÉRES

Hcéres has built its evaluation process based on a set of objectives that higher education institution PhD programmes must pursue to ensure recognised quality within France and Europe. These objectives are divided up into four fields among which are the accreditation criteria.

As for the "External Evaluation Standards", the accreditation criteria have been specifically designed for foreign PhD programmes. The accreditation criteria were adopted by the Board on December 2017 and are available on the Hcéres website (hceres.fr).

The accreditation committee, meeting his accreditation decision, has wholly taken into account the final evaluation report of the PhD programme. This accreditation decision is the result of a collegial and reasoned process.

The accreditation decision issued by Hcéres shall not grant any rights whatsoever, whether in France or abroad. The decision on PhD programme accreditation confers an accreditation label and does not infer recognition of the accredited qualifications. The Hcéres accreditation process therefore has no impact on the qualifications recognition process in France.

FULFILLMENT OF THE ACCREDITATION CRITERIA

AREA 1: THE POSITIONING OF THE DOCTORATE

Accreditation criterion

The positioning, the content and the objectives of the doctorate are clearly defined. Its interactions with the stakeholders (lead institution(s), foreign partners, socio-economic environment) are formally set out and effective. Its links with the research units and the institution's scientific policy are effective.

Criterion assessment

The Life Sciences PhD Program is well defined. It is perfectly integrated into the general strategy of Skoltech Institute of Science and Technology and it participates as a part of this Institute in creating excellence in research and teaching. The distinctive features of the Life Sciences PhD program are likewise well defined and have been clearly presented to the panel of experts. Thematic and international orientations and international internship mobility program are well integrated into curricula that allow students to obtain training at the highest international level.

This PhD program is perfectly characterized and identifiable within the Skoltech Institute and more generally in the Russian Academic environment.

AREA 2: ORGANIZATION AND MANAGEMENT OF THE DOCTORATE

Accreditation criterion

The Life Sciences PhD program is part of the Center of Life Sciences (CLS) and it is very well organized with excellent administrative support from the Department of Education (DoE) and the Doctoral Study Office. Quality control is provided by integrating student feedback and internal communication of faculty and administrative offices. The recruitment of students is perfectly organized in a two-step procedure and the funding in terms of fellowships is clearly advertised and executed, including annual reviewing and adjustment of the amount of stipends according to students' achievements.

Criterion assessment

The organization of the PhD program is flawless. It is organized based on meritocratic values that are in full agreement with the institution's and PhD program's aim to become one of the leading research and teaching institutions in Russia and the world.

AREA 3: SUPERVISION AND TRAINING FOR DOCTORAL STUDENTS

Accreditation criterion

The supervision and training of PhD students is exemplary. The supervision includes the participation of three distinct Skoltech constituents: administration, faculty and students. Several committees are involved in accompanying the student during his/her thesis: Doctoral Study Office; Life Sciences Doctoral Program committee; Individual Doctoral Program committees; Disciplinary board; PhD Defense Jurys. These committees assure close guidance of the students. In addition, an extensive high quality teaching offer is presented to students from which they can compose their personalized curricula. In addition, all students are required to conduct research in a leading European or American University, under the supervision of international co-mentor. This assures adherence (compliance) to international standards of PhD training.

Criterion assessment

The supervision and training of students is conducted at highest international levels.

AREA 4: INTEGRATION OF DOCTORS INTO THE JOB MARKET

Accreditation criterion

A concluding assessment of this criterion cannot yet be provided, due to early age of the program. First PhD graduates left the Life Sciences Centre in 2017 and are for the major part employed by Skoltech Institute. However, the administrative part in charge of helping students to enter professional life after their PhD thesis is in place. Specific problems with respect to the job market have been identified and the Skoltech team works on their part to facilitate the integration of their doctors into the job market.

Criterion assessment

Four out of five Skoltech Life Sciences PhD's graduates have not yet been integrated into the Russian job market. Instead they have stayed at Skoltech. This concerns the first cohort of graduates. However, the recent establishment of an administrative infrastructure for integration into the job market could reduce the above limitation, therefore allowing more doctors to be integrated in the job market in the future.

FINAL ASSESSMENT


Considering the accreditation criteria analysis detailed above, the accreditation committee issues the following decision:

"Five-year unreserved accreditation decision"

and draws attention to the various recommendations made by the committee of experts in its evaluation report.

SIGNATURE

For Hcéres and on behalf of



Michel COSNARD,

President

Date: Paris, March 12th, 2019

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are available online : www.hceres.com

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