

Students-Professors Joint Committee

2021 Annual Report

(Reference Academic Year: 2019/2020)

This document is the **Annual Report** of the Students-Professors Joint Committee (CPAD), in compliance with SISSA's Quality Policy Guidelines.

Composition of the Students-Professors Joint Committee

The Committee, regulated by Art. 13 of the Statute of the School, is composed by prof. *Matteo Bertolini*, of the Physics Area – Coordinator; by prof. *Domenica Bueti*, of the Neuroscience Area; prof. *Andrei Agrachev*, of the Mathematics Area; by Ms. *Mara De Rosa*, Neuroscience Area students' representative; by Mr. *Emanuele Caputo*, Mathematics Area students' representative. Ms. *Amanda Colombo* acts as administrative support. It should be noted that the students' representative for the Physics Area – replacing Mr. *Francesco Sgarlata*, who obtained his PhD and left SISSA in Autumn 2020 – has not been elected for this part of the year. The new CPAD, which is scheduled to take office at the end of April, will hopefully be complete.

Table of Contents

The CPAD's primary task is to draw up a comprehensive annual report for each PhD course, taking into consideration the overall educational offer, with particular reference to the results of the survey on students' opinions, highlighting any specific problems of individual PhD courses. At the same time, the CPAD is also called upon, if necessary, to express an opinion and make proposals for improvement on the completeness and effectiveness of the annual monitoring and

CPAD

cyclical review, as well as on the management and use of the Student Questionnaire.

In light of the above, this Report is divided into the following sections:

- A. General considerations on the Quality assurance process.
- B. Assessment, divided by Areas and PhD courses, of the overall educational offer.
- C. Proposals for the improvement of existing evaluation tools.

A. GENERAL CONSIDERATIONS ON THE QUALITY ASSURANCE PROCESS

In recent years, the Administration has implemented a process for the development and fine-tuning of the Quality Assurance System, whose primary purpose is to ensure continuous improvement in the areas of teaching, scientific research, technology transfer, third stream activities and relevant supporting services. As already highlighted in the 2020 Report, the CPAD believes that this work has led to a concrete improvement in the supervision of control processes and information flow between the various bodies and functions in charge, thus allowing effective rationalisation, coordination and support between the various players involved in the process.

During the past academic year, 2019/20, the *Covid-19* pandemic has affected the life of the School in many ways, and this has brought out several criticalities. The issues related to the functioning of the PhD courses will be discussed in the next section. On the other hand, as regards the frequent interactions between the CPAD and the other reference bodies or departments within the framework of the Quality Assurance System (Evaluation Committee, Quality Assurance Unit and Strategies and Systems Office), the use of IT tools was able to largely compensate for the impossibility of having face-to-face meetings.

CPAD

B. EVALUATION. BY AREA AND PHD COURSE. OF THE OVERALL EDUCATIONAL OFFER

The evaluation of the overall educational offer was mostly based on the analysis of the results of the ***Student Questionnaire*** submitted for the academic year 2019/2020, and on its comparison with the results from previous years.

In this regard, it should be noted that, starting from last year, the Questionnaire has undergone significant changes compared to the 2017/18 and preceding versions and this was therefore the first occasion in which the CPAD was able to compare the results appropriately between one year and the next (ay 2018/19 - 2019/20).

The most significant changes concerned a review of questions, in form and number, aimed at quantifying two of the three reference indicators (*Supervisor Effectiveness* and *Effectiveness of the PhD program for training as a scientist*). In particular:

- As regards the indicator ***Supervisor Effectiveness***, the following 4 questions were identified, based on which the numerical average was calculated:
 1. *Are you satisfied with the amount of time you spend with your supervisor?*
 2. *How would you judge the availability of your supervisor in helping you on your project?*
 3. *How would you rate the amount and the quality of feedback you receive from your supervisor on your work?*
 4. *To what extent does any of the following figures support you in your research activity [Supervisor]?*
- As regards the indicator ***Effectiveness of the PhD program for training as a scientist***, the following 4 questions were identified, based on which the numerical average was calculated:

How effective was the PhD program in helping you to develop the following skills:

1. *Critical thinking, independence;*
2. *Technical skills relevant to your field of choice;*
3. *Knowledge of the relevant literature in your field of choice;*
4. *Developing a network of contacts.*

A second relevant change concerned the scale (from 1- 5 to 1-4) chosen for the evaluation students could submit with their answers. Again in this respect,

the CPAD was able to make a more sensible comparison between the results of this Questionnaire and the previous one, as they have the same structure.

In addition to, and in support of the results of the Questionnaire, the CPAD has undertaken some side initiatives that have contributed to the following. In particular, the CPAD took into consideration:

- The discussion with student representatives from the various PhD courses;
- The reports of PhD coordinators for the academic year 2019/20;
- The actions that have already been undertaken (or are being undertaken) by the Areas.

General Considerations

Student participation in the Student Questionnaire for the 2019/20 academic year was 67%, down 9% on the previous year. However, this reduction was not homogeneous among the three Areas, with the Neuroscience Area reaching around 50% of participation against much higher percentages for the two other Areas, even growing for the Mathematics Area. PhD Coordinators and Area Managers, especially those in the Neuroscience Area, are invited to implement all possible initiatives to encourage student participation in completing the Questionnaire, particularly for those PhD courses where the decline in participation was more significant.

In general, the Questionnaire shows a good level of satisfaction in all three Areas: Physics, Mathematics and Neuroscience, **Annex A**. Within this positive framework, an improvement was registered in all three parameters for the Physics Area, a slight decrease in all three parameters for the Mathematics Area (but always above the attention threshold, set at 3/4) and a more consistent decrease – below the attention threshold of 3/4 – of a parameter for the Neuroscience Area, namely the one concerning *Effectiveness of the PhD program for training as a scientist*.

A fact, which emerged last year, and which appears to be even more significant this year – see in particular Tables 5 and 6 of **Annex A** – is serious criticality, common to **all** PhDs in the School, affecting a specific parameter among those contributing to the indicator *Effectiveness of the PhD program for training as a scientist*. Specifically, this related to the question:

CPAD

How effective was the PhD program in helping you to develop the following skills: [Developing a network of contacts]?

For all PhDs in the School, the numerical average for this question was less than 3. This suggests a clear criticality in the perception of the entire student community. In light of this result, the CPAD decided to undertake several interviews with students' representatives to better understand the nature of this dissatisfaction and to collect suggestions on how to deal with the problems that emerged, regardless of the relevant PhD course. Given the general nature of the problem, it was therefore decided to create a specific section in the general discussion of this Report, thus separating this aspect from the report of each PhD, which will be analysed later.

Area Coordinators are invited to pay the utmost attention to this aspect and, together with the Coordinators of the various PhDs, to investigate this issue with students' representatives, starting from the remarks provided in the dedicated section below.

A final general information that emerges from the comparison with the previous year is the significant decrease in foreign students admitted to PhD courses for the 2019/20 a.y., with an overall average of 25%, decreasing especially for the Physics Area. The situation linked to the *Covid-19* pandemic certainly contributed to this, as it discouraged many foreign students from actually taking the entrance exam in Spring/Summer 2020. However, each PhD course should examine the causes of this decrease in a more analytical way in order to be able to undertake the appropriate measures to increase the number of foreign students admitted.

The Networking Problem

The Networking aspect has two natures. One is *internal*, linked to the possibility for students to develop interactions within the School, be it within their own PhD course and outside it, both vertically - with professors and post-docs outside their group – and horizontally – with students belonging to the same PhD as well as outside it. The *external* nature, on the other hand, is related to the

CPAD

possibility of developing interactions, scientific relations and, in general, contacts with entities outside the School, especially at an international level. This second aspect, alongside its intrinsic value in terms of student's growth, also has an impact when looking for postdoctoral positions.

Discussion with students' representatives – among others – has allowed the CPAD to identify several suggestions that are summarised below. Area and PhD Coordinators are invited to consider the following remarks, with an important disclaimer. The following ideas and observations must be interpreted differently depending on the Area and a given PhD, the type of work and needs being very different according to the specific situation. It should also be noted that several initiatives are already in place in some PhDs and some of the suggestions are borrowed from existing practices in some groups, which may be more or less relevant depending on the type of research work. Despite this diversity, it was deemed useful to collect the various ideas in this dedicated section.

- Take advantage of group meetings, both within individual research groups and between students and post-docs with the same supervisor but working on different projects. Their regularity, even more so in the current pandemic phase, is to be encouraged.
- Promote horizontal collaboration between students belonging to the same PhD, which is sometimes even discouraged by some supervisors, concerned that this may take time and space from individual research projects.
- Assess the feasibility of fruitful collaboration between different supervisors (and consequently between their students), which would greatly favour internal networking and the possibility for students to be exposed to different Principal Investigators (PI).
- Identify more informal occasions beyond the progress report during the year, in which students can present their results to other group members. In addition to providing feedback on the work carried out, this is a useful tool to develop the ability to organise, select and provide a synthesis of the results of one's research in a "protected" environment.
- Encourage students' initiatives such as Journal Clubs, without considering these activities as energy taken from the research projects but, on the

CPAD

contrary, as excellent tools for expanding scientific knowledge and, more generally, individual students' growth.

- Consider organising regular initiatives, such as weekly coffee breaks or other convivial occasions, which may not have a direct scientific value but are useful to develop mutual knowledge, create a sense of community, break down cultural and hierarchical barriers. This problem is felt in particular by foreign students and post-docs.
- On the occasion of visits by external researchers for seminars, involve students in meetings with the said researchers outside the seminar, both in scientific discussions and on convivial occasions (e.g., “dinner with the speaker”).
- The organisation of Summer Schools and/or Summer Workshops on site (even of short duration) is an opportunity to put students in contact with PIs and external students, promoting personal growth and allowing students to become acquainted with staff from other scientific institutions – both Italian and foreign –, thus favouring exchange and knowledge.
- Help students – particularly those in the 3rd and 4th year – grasp any opportunity to present their work internationally, at conferences as well as to foreign institutions. It is a fact that the current pandemic situation favours online seminars, and it is reasonable to think that this will continue (and even more so) in the future. This makes it easier for students, from both an economic and a logistical point of view, to grasp new opportunities for visibility, which is why supervisors are recommended to offer their encouragement and help in this sense. On the other hand, the absence of conferences and workshops due to the Covid-19 epidemic has cancelled all opportunities for interaction with people and entities outside the School, so telematic tools have taken on even greater importance.
- Assess the opportunity, for students in both theoretical and experimental courses, to spend an extended period abroad during their PhD. In addition to being an opportunity for growth and expansion of one's knowledge and skills, this period often turns out to be of great help for searching and obtaining postdoctoral positions at the end of the doctoral course. In this regard, we wish to remind you of the 50% PhD grant increase for stays

abroad up to 6 months and Erasmus programmes.

Considerations related to the Covid-19 pandemic

The 2019/20 academic year and the current one were heavily affected by the *Covid-19* pandemic, which obviously made it even more difficult to manage several of the aspects illustrated above, and more generally any School activity.

Students appreciated the effort that was made within the various PhDs to ensure a high level of teaching, despite the fact that this was largely offered in remote or mixed mode and despite the lack of adequate IT tools. In this regard, the CPAD urges the School to carry out a serious examination of the IT support provided, which must be improved both from a technical point of view and from that of *assistance*, enabling teachers to work adequately (e.g., webcams, fast connectivity, high quality audio-video footage). This should be a priority for a School that aims at *Excellence*. The experience of other scientific institutions, also close to SISSA, shows that investments need not be excessive for quality to be significantly improved.

Students complain that some supervisors are not fully aware of the difficulties that remote research work has entailed for many of them, and require greater involvement on the part of supervisors, which has sometimes been lacking (in all three areas, both at experimental and theoretical level). In light of the above, PhD Coordinators are invited to raise awareness among colleagues of their responsibilities and of the need for an increase (and not a reduction) in the frequency of meetings with students considering the challenges of remote working (e.g., the frequency of group meetings and individual interviews).

Finally, the CPAD emphasises how the difficulties of interaction between students/Pis/post-docs during the last year has severely affected the quality of research work, which – particularly when it comes to students – can impact the rest of their career. The School (and the *Task Force* in particular) is therefore invited to make greater efforts to allow the presence of scientific staff on site for the rest of the academic year, considering that the number of students is not as significant as in other universities and that most School staff have already been given the first dose of the vaccine (and the second will soon follow). The CPAD believes that there should be greater awareness of this critical issue on the part of the School's

CPAD

decision-making bodies, and calls for bolder choices, albeit in compliance with all the necessary safety standards.

The three Areas of the School and relevant PhDs are analysed below.

PHYSICS AREA

As can be inferred from the Student Questionnaire as well as from the Committee's interactions with students' representatives and coordinators, the situation of the Physics Area is generally very good. Moreover, as stated in the minutes of the Area meetings, as well as in the *PhD Reports* presented by the Coordinators in January 2021 (**Annex B**), several initiatives and activities are in place and/or scheduled to further improve the educational offer and, in general, various aspects of life within the Area.

As already mentioned, compared to last year, the results of this questionnaire show an improvement of all three indicators, proving the effectiveness of the various initiatives and activities implemented within the Area. The single indicators for the various PhDs are also improving and the few exceptions will be discussed in the sheets relating to the individual PhDs.

Participation in the Questionnaire was 71%, higher than the School's average (67%) but down on last year (86%). Contributing to this decrease were three PhDs, namely Astroparticle Physics, Theoretical Particle Physics and Condensed Matter Theory, all recording a significant reduction in student participation compared to the previous year. Therefore, the Coordinators of the aforementioned PhDs are invited to analyse (through discussion with students) the reasons for this reduced participation. In light of the Questionnaire's importance as an effective tool for improving the School as a whole and student life in particular, and of the attention paid to it by the School Bodies, a concrete effort is necessary to ensure that participation goes back to the levels of the past, when (last year) the Physics Area reached 90%.

- **PhD in ASTROPHYSICS AND COSMOLOGY**

Based on the aggregate results of the Student Questionnaire (**Annex A**), the situation of the PhD in Astrophysics and Cosmology appears to be good. In particular, compared to last year the *Quality of courses* indicator – the only one below the attention threshold of 3/4 – shows an increase and reaches the very threshold.

As illustrated in the 2020 Report, this negative figure was analysed by the CPAD with students and PIs. Following this debate, in the 2019/20 a.y., several actions were undertaken to try and solve the issues that emerged. The effectiveness of these measures is confirmed by this year's result, which are especially appreciated by the CPAD. The overall satisfaction expressed by students on all three parameters therefore provides a generally positive picture. However, the *Quality of courses* indicator still remains at the limit of the critical threshold and among the lowest of the PhDs of the Area; the Professors' Board is therefore invited to undertake further efforts and investigations in this respect.

The PhD Report (**Annex B**) is extremely detailed, providing a clear picture of the situation of the PhD in relation to the 2019/20 a.y., as well as a detailed description of the variations made to the educational offer. Interactions with students also revealed a certain willingness to listen, on the part of PIs, which is fundamental for the proper functioning of the PhD itself.

Entrance exams for the 2019/20 a.y. saw a significant decrease in foreign students admitted, with a percentage of 20% against an average of over 40% in previous years (and peaks of 60% for the 2018/19 a.y.). The CPAD believes that this is almost entirely due to reasons related to the *Covid-19* pandemic but invites the Professors' Board to pay attention on this point.

Student participation in the Questionnaire was 86%, confirming the high level of participation recorded in the previous survey. This confirms the success of the initiatives undertaken to raise students' awareness of the importance of taking the Questionnaire. The group is therefore invited to continue along this path.

- **PhD in ASTROPARTICLE PHYSICS**

Based on the aggregate results of the Student Questionnaire (**Annex A**),

CPAD

the situation of the PhD in Astroparticle Physics appears to be good. All indicators are above the critical threshold and one in particular, *Quality of courses* is among the highest in the entire School. The third indicator, *Effectiveness of the PhD program for training as a scientist*, which was below the critical threshold in the previous survey, saw a significant increase and is now well above this threshold. Finally, as regards the *Supervisor Effectiveness* indicator, the two sub-indicators (supervisor time and availability towards students) were below the critical threshold in the previous survey and are now completely positive. The CPAD welcomes these gratifying results and the efforts made by the Professors' Board and in particular by the PhD Coordinator.

The PhD Report (**Annex B**) is extremely comprehensive and illustrates in great detail the various actions, both in terms of teaching and other aspects of group life, which have been undertaken to improve overall research quality. Some of the most interesting initiatives are, as in previous years, the experience of the *Visiting Students Training Program* (which had to be suspended in recent months due to the pandemic) and the now established *Institute of Fundamental Physics of the Universe*, an initiative of great importance for the Trieste scientific community and beyond, uniting various institutions where there are research groups interested in aspects relating to the Fundamental Physics of the Universe.

This year, the participation of students in the Questionnaire saw a serious decline (to 57%, approximately). This result is particularly impressive when compared with that of last year, which stood at an incredible 100%. The Coordinator is invited to discuss with students in order to understand the reasons for such reduced participation compared with previous years.

▪ **PhD in PHYSICS AND CHEMISTRY OF BIOLOGICAL SYSTEMS**

Based on the aggregate results (**Annex A**), the situation of the PhD in Physics and Chemistry of Biological Systems appears to remain good, with a possible criticality in one of the three indicators, as specified below.

The first two indicators, *Quality of courses* and *Supervisor Effectiveness* are respectively positive and extremely positive (the latter obtaining one of the highest degrees of satisfaction in the School). However, the result for the third indicator, *Effectiveness of the PhD program for training as a scientist* was below

CPAD

the critical threshold, not only with regard to the sub-indicator relating to *Networking* (an issue shared by all PhDs and dealt with separately) but also in all other sub-indicators. After extensive discussion with students and with the PhD Coordinator, the CPAD has come to the conclusion that – considering the low figures – this result is strongly linked to a specific case that influences the arithmetic mean, but which does not reflect actual student satisfaction as a whole (it should be noted that only the feedback provided by third- and fourth-year students contributes to this indicator).

This said, at least two aspects emerge, to which the CPAD would like to draw the attention of the Professors' Board. One of the initiatives undertaken last year regarding the *Development of technical skills* aspect was the organisation of a mini course covering technical aspects such as the optimal use of workstations and scripting languages. This course, in which senior students ought to have been the main players and guide younger students, has apparently not been implemented, mainly due pandemic-related problems. The CPAD recommends that this initiative be resumed over the next few months or starting from the next academic year, its value in addressing the critical issues highlighted by the past survey being potentially crucial, according to both professors and students. Another issue emerging from interviews with students has to do with the choice of supervisors for students at the end of the first year. Criticalities included the seemingly rigid distribution of students to the various supervisors, scant willingness to carry out shared projects with other supervisors, and fund use methods. Given that PIs and in particular the Coordinator have proven themselves to be open to dialogue and discussion, we invite them to analyse this problem with students, clarifying every aspect and dispelling any doubts.

The PhD Report (***Annex B***), in addition to providing a clear and broad picture of the situation of the PhD in the 2019/20 a.y., shows its vitality. The various initiatives implemented to strengthen the extra-curricular training of students were particularly appreciated (i.e., outside the specific research project in which each of them is involved). This is an important element in general, but even more so for this PhD course, given its interdisciplinarity.

Again this year, the percentage of foreign students having passed the entrance exam is higher than the average figure in the past (almost 30%). The Professors' Board is invited to continue along the path taken, evaluating initiatives

CPAD

and actions to further increase this percentage.

The participation of students in the Questionnaire is 81%, far above the School average and in line with the previous survey. The CPAD welcomes this significant achievement.

▪ **PhD in STATISTICAL PHYSICS**

As widely discussed in the previous Report (2020), the 2018/2019 a.y. saw all three indicators below the attention threshold of 3/4 for the PhD in Statistical Physics. This survey saw a significant increase for the three indicators, which are now all above the critical threshold. This was the result of extensive and fruitful discussion, also encouraged by the CPAD, which took place during the last academic year between the PhD Coordinator and students, and of the various initiatives that were implemented to address the issues that had emerged. The CPAD expresses its appreciation for this work, which is a sound example of *good practice*, and proof of the PhD Coordinator's ability to listen and act in the interest of students.

In this context of general improvement, however, the CPAD points out that – in absolute terms – the numerical average of the PhD parameters is still lower than the Area average. For this reason, the Coordinator and the Professors' Board are invited to make further efforts to improve the overall quality of the PhD course. A specific criticality is highlighted with respect to a member of the Professors' Board who, due to engagements and activities not directly connected with the course in *Statistical Physics*, is little involved in teaching and – above all – in supervision, thus limiting student alternatives when choosing a supervisor.

The PhD Report (**Annex B**) describes in an exhaustive manner the activities carried out during the 2019/20 a.y. and provides all the required data, including a summary of the initiatives undertaken following the issues that emerged in the past survey.

As in last year's Report, the CPAD urges the Professors' Board to make further efforts to increase the percentage of foreign students admitted to the PhD (15% this year), which is a crucial data in an international school such as SISSA.

Student participation in the Questionnaire is a flattering 92%, in line with the excellent results of the last survey and much higher than the average for the

CPAD

Area and the School as a whole.

▪ **PhD in THEORETICAL PARTICLE PHYSICS**

Based on the aggregate results of the Student Questionnaire (**Annex A**), the situation of the PhD in Theoretical Particle Physics appears to be good. All three parameters are increasing compared to the last survey, including that concerning *Effectiveness of the PhD program for training as a scientist*, which was below the critical threshold last year and is now above it. As for the indicator *Quality of courses*, the PhD has one of the highest levels of satisfaction in the entire School, reaching a flattering 3.75/4.

No particular criticalities emerged from the discussion with students, except for those related to the difficulty of student/PI interaction during the current pandemic, an issue shared by all PhDs and dealt with separately.

The PhD Report (**Annex B**) gives a clear and positive picture of the situation of the PhD itself and its vitality. The Report also presents some adjustments in terms of course organisation and logistics. These initiatives include a structural change in the educational offer for first year students, with more attention given to the *phenomenological* aspects of high energy physics, which in recent years have been excessively neglected. This was done together with the PhD in Astroparticle Physics, in the wake of their well-tested collaboration, particularly regarding the organisation of teaching activities.

The *Visiting Students Training Program* project continues to be successful even if, due to the *Covid-19* pandemic, it has now been interrupted until in-class teaching activities resume. This initiative, launched within the Theoretical Particle Physics group, has found consensus on the part of other groups as well. The CPAD suggests examining the possibility of extending this initiative to rest of the School, possibly taking into account the differences among the various PhDs and therefore envisaging different methods of implementation.

In contrast to the past years, for the 2019/20 a.y. there was a marked decrease in the percentage of foreign students who passed the entrance exam. This is certainly due to the pandemic, which had this very effect on most of the School's PhDs. However, the decrease was particularly relevant for this PhD, which is why the CPAD urges the Professors' Board to monitor the situation in this

CPAD

and the following academic year, so as to understand if this data is ascribable to a statistical fluctuation or if there may be other causes.

The participation of students in the Questionnaire appears to be in sharp decline, settling at around 57%, against 90% in the previous survey. The Professors' Board is invited to reflect on the reasons for this low participation, undertaking all possible measures to reverse this trend, in line with past years.

▪ **PhD in THEORY AND NUMERICAL SIMULATION OF CONDENSED MATTER**

Based on aggregate results of the Student Questionnaire (*Annex A*), the situation of the PhD in Theory and Numerical Simulation of Condensed Matter appears to be good. Having said this, while two of the three indicators have increased compared to the last survey, one – namely *Quality of courses* – has dropped below the attention threshold set at 3/4. The CPAD is concerned that this decline has been constant over the last 4 years, thus suggesting the need for substantial measures to reverse this negative trend.

This result is partly surprising, considering the initiatives and efforts made by the PhD Coordinator – in agreement with students – to address and overcome the issues that have emerged in recent years. The CPAD has therefore met students' representatives to better investigate this issue. These interviews confirmed the efforts made (reorganisation and rationalisation of some courses, hands-on training, etc.), the effects of which will probably be visible in the next survey, as some of the measures concern the present academic year, 2020/21. However, some critical issues persist relating to the organisation and structuring of courses that is still not ideal, at least when compared to that of other PhDs in the Area. This appears to be due to two reasons, partly connected to each other. The first depends on a different perception, compared to other PhDs in the Physics Area, of the very role of first year courses within the overall framework of the PhD course. The second seems to be due to non-full collaboration (on the part of some professors) with the Coordinator's efforts to improve various aspects of the educational offer. Therefore, while appreciating the efforts and improvements made in recent years, the CPAD believes that the Professor's Board should address this specific problem, debating it both internally and with the students and

CPAD

sharing reasons and vision with the latter.

The PhD Report (**Annex B**) is complete and detailed and provides a clear picture of the situation in the PhD in the 2019/20 a.y. It also describes the various measures being undertaken, especially with regard to first-year teaching as specified above.

As regards entrance exams, the 2019/20 a.y. saw a sharp decline in the percentage of foreign students admitted, as compared to the previous survey. As was said for other PhDs, the CPAD believes this is mainly due to the situation created by the pandemic. However, the decrease was particularly relevant for this PhD, which is why the CPAD urges the Professors' Board to monitor the situation in this and the following academic year, so as to understand if this data is ascribable to a statistical fluctuation or if there may be other causes.

Student participation in the Questionnaire was 59%, well below the Area average and a marked decrease compared to the previous survey. The Professors' Board is therefore invited to repeat those actions to raise student awareness that have proven useful in the past years to increase the percentage of participation in the Questionnaire.

MATHEMATICS AREA

As can be inferred from the Student Questionnaire and related aggregate data (**Annex A**), the situation of the Mathematics Area is generally very good and, as testified by the PhD Reports (**Annex B**), various initiatives and activities are in place or planned to further improve the educational offer and, more generally, various aspects of life within the Area. Both PhDs are in good health, with all indicators above the attention threshold of 3/4. Compared to the previous survey, however, both PhDs showed a decrease in the indicator *Quality of courses*, which are just above the attention threshold. The Professors' Boards are invited to discuss this aspect with students.

Participation in the Questionnaire stood at 81%, well above the School average (67%), and both PhDs saw an increase compared to the previous survey. The CPAD welcomes this flattering result and the effectiveness of all the measures put in place to encourage students to complete the Questionnaire.

CPAD

- **PhD in MATHEMATICAL ANALYSIS. MODELLING AND APPLICATIONS**

Based on the aggregate result of the Student Questionnaire (**Annex A**) the situation of the PhD in Mathematical Analysis, Modelling and Applications appears to be good.

The three indicators are all above the attention threshold even if none qualifies as excellent while, as hinted in the Area presentation, there was a slight decrease in the indicator *Quality of courses*. Having discussed the data with students, however, no particular criticalities emerged (except the difficulty in student-supervisor interactions, which were deemed inadequate in the last year following the *Covid-19* emergency, as underlined in the general discussion of this Report).

The PhD Report (**Annex B**) gives a clear and positive picture of the situation of the PhD. The Report also presents various improvements made to the educational offer, as well as a number of initiatives such as the *Junior Math Days*, the activities organised on site by the SISSA SIAM group of the Society for Industrial and Applied Mathematics, as well as the *Analysis Junior Seminars*, a series of seminars held by students and young post-docs to present their research in an informal and inclusive context. The seminars, which continued in spite of the *Covid-19* emergency, also involved students from other universities and were made available on a dedicated *YouTube* channel. The CPAD considers this an extremely interesting initiative and invites the other PhDs to consider the implementation of similar actions (obviously based on the specific characteristics of each PhD).

The percentage of foreign students admitted to the first year is 25%, still below the school average but growing compared to recent years. Some initiatives implemented by the Professors' Board seem to have contributed to this increase, such as the *Junior Math Days*, an event aimed at presenting SISSA's PhDs in the Mathematics Area and attracting young talents, introducing the courses and the activities of the various research groups. Compared to past years, this initiative has acquired an international character, involving students from Italian as well as foreign universities.

CPAD

Student participation in the Questionnaire was 84%, showing a significant increase compared to the previous survey and confirming the positive effects of the initiatives promoted by the Professors' Board to raise awareness of the importance of completing the Questionnaire.

▪ **PhD in GEOMETRY AND MATHEMATICAL PHYSICS**

Based on the aggregate results of the Student Questionnaires (**Annex A**), the situation of the PhD in Geometry and Mathematical Physics appears to be good, with indicators all above the attention threshold. This said, the results show a decrease in the indicator *Quality of courses*, still above the attention threshold but considerably lower than in the 2018/19 a.y. The same applies to the indicator *Effectiveness of the PhD program for training as a scientist*, which is just above the attention threshold (regardless of the general problem of *Networking*, common to all PhDs and dealt with separately in this Report). However, although discussion with students did not highlight any critical issues giving cause for concern, the CPAD invites the Professors' Board to further discuss the topic with student representatives.

In addition to giving a clear picture of the situation of the PhD in the 2019/20 a.y., the PhD Report (**Annex B**) describes suggestions and amendments implemented to the educational offer such as, for example, a new course named *Techniques in enumerative geometry*, which was activated thanks the suggestions and proposals put forward by students.

Among the various initiatives, the one called *Junior Math Days*, organised jointly by students of this PhD and of the PhD in Mathematical Analysis, Modelling and Applications, as previously specified, is of particular interest.

Finally, the percentage of foreign students admitted to the first year (traditionally a significant rate for this PhD) was approximately 50%, placing itself among the highest in the School. The CPAD was especially happy with this data.

Student participation in the Questionnaire stands at a satisfactory 78%, in line with the percentages of the last survey and above the School average. However, further action is called for to increase this percentage in the future.

CPAD

NEUROSCIENCE AREA

As can be inferred from the aggregate results of the Student Questionnaire (**Annex A**), for the Neuroscience Area two out of three indicators (*Quality of courses* and *Supervisor Effectiveness*) are above the attention threshold of 3/4, in line with the improvement seen last year (see 2020 Report) and in contrast with previous analyses (see 2019 report). However, a slight decrease in the parameter *Effectiveness of the PhD program for training as a scientist* is recorded, which is below the attention threshold (2.7).

In particular, with the exception of the average value for critical thinking and independence, all sub-indicators highlight a series of critical issues (technical development: 2.8; knowledge of relevant literature: 2.9; development of contact networks, 2.1). Apart from the indicator *Networking*, already identified as critical throughout the School and discussed separately, issues related to the development of technical skills could be due to reduced access to lab facilities, an inevitable consequence of the pandemic. On the other hand, the indicator Knowledge of relevant literature is strongly influenced by an individual PhD in this area.

The CPAD appreciates the commitment and the initiatives promoted by the Neuroscience area to address critical issues that have emerged in the past as well as the current emergency situation and its inevitable consequences for the experimental activity characterising this Area. However, all PIs are invited to pay attention to the aspects that have been identified as critical in this survey.

Student participation in the Questionnaire was 55%, lower than the School average (67%) and showing a significant decrease compared to the previous survey. This negative data is in contrast to the general trend but common to the three PhDs, Cognitive Neuroscience, Neurobiology and Functional and Structural Genomics. The Area is invited to take further initiatives to raise awareness and ensure greater student involvement in completing the Questionnaire, particularly during the period in which it is administered, typically the month of October.

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- **PhD in COGNITIVE NEUROSCIENCE**

Based on the aggregate results (**Annex A**), all macro-indicators for the PhD in Cognitive Neuroscience are above or equal to the attention threshold of 3/4. However, in line with the situation described for the Area, two sub-indicators relating to the *Effectiveness of the PhD program for training as a scientist* are below the attention threshold. In addition to the indicator *Networking*, analysed separately in the general discussion, the one relating to the ability to develop sufficient *Technical skills* during the PhD course is also below the threshold. Although this parameter is likely to have been influenced by the reduction of laboratory activities during the pandemic, the Professors' Board is invited to further investigate this issue, understanding if other, more specific reasons are behind it.

The PhD Report (**Annex B**) takes into account the CPAD's observations on the 2019/20 a.y. and aims to address particularly the issues of *Networking* and international relations. The Report lists a series of collaborations between students and researchers outside the PhD, indicates a significant effort of improvement and offers two recommendations: (1) addressing the topic with meetings and/or communications between students and the Professors' Board, and (2) identifying a member of the teaching staff who will deal with the organisation of seminars in the interest of students, inviting high-profile foreign researchers.

The report also shows a high percentage of foreign students admitted to the PhD in recent entrance exams (around 60%), and a significant presence of female students. Both of these data are extremely positive.

Student participation in the Questionnaire was 57%, in line with 2018 (59%) and down sharply on last year (83%). The CPAD invites the Professors' Board to discuss with students the reason for this decline, considering the actions which, in the previous survey, had made it possible to reverse the trend.

- **PhD in NEUROBIOLOGY**

Based on the aggregate results (**Annex A**), the PhD in Neurobiology reveals a generally positive situation, with the alarming exception of the indicator *Effectiveness of the PhD program for training as a scientist*, which was 2.2 (the lowest in the whole School), with all sub-indicators below the critical threshold.

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It is quite natural to wonder whether the negative results relating to this indicator are somehow ascribable to the situation generated by the *Covid-19* pandemic. However, the markedly negative result of this indicator is in sharp contrast with the extremely positive data of indicator *Supervisor Effectiveness*, which – even during the pandemic – testifies to the active presence of PIs and the effective interaction between them and the students. The negative result of the indicator *Effectiveness of the PhD program for training as a scientist* calls for in-depth analysis, which is why the CPAD invites the PhD Coordinator to meet students' representatives to better understand the reasons behind this decrease.

Again this year, the PhD Report (**Annex B**) indicates a strong focus on improving the educational offer, with particular emphasis on the practical and technical aspects of laboratory activities. Particularly relevant were the observations concerning the impact of the Covid-emergency on experimental work, which will result in a substantially delayed PhD qualifications for a large number of students. Initiatives promoted during the academic year include the *laboratory rotation*, allowing students to have a more detailed knowledge of the scientific research carried out within the different research groups, helping them make a more informed and educated choice of laboratory for their next PhD project.

The percentage of foreign students admitted to the PhD in recent entrance exams is significantly lower than in the past. Given the high percentage of foreign students admitted to the PhD in recent years, the CPAD believes that – in this specific case – the decrease is attributable to no specific reason other than the pandemic, which had similarly affected many other PhDs in the School.

Student participation in the Questionnaire was 52%, confirming the downward trend observed in recent years (from 80% in 2018 to 62% in 2019) and resulting in the lowest data among all PhDs in the School. It should be remembered that participation in the Questionnaire is of great importance not only as a means to improve the quality of the educational offer but also to make the Questionnaire results more reliable. The Professors' Board and especially the Coordinator are therefore invited to consider a series of concrete actions and initiatives to try and reverse this trend, including through a meeting with students' representatives.

CPAD

▪ **PhD in FUNCTIONAL AND STRUCTURAL GENOMICS**

Based on the aggregate results (**Annex A**), the PhD in Functional and Structural Genomics is continuing (slowly but consistently) to improve, with positive data in all indicators, except for the sub-indicator *Networking*, an issue that was found to be common to all PhDs (though particularly critical in this course) and dealt with separately in this Report.

The PhD Report (**Annex B**) once again indicates the high level PIs' attention to potential critical issues within the PhD. This is witnessed by the organisation of two annual meetings in which students and PIs discuss any critical issues related to the life of the PhD. Although no particular issues were highlighted on these occasions, the Report shows a marked sensitivity to *networking* issues, with greater involvement of students in international collaborations and greater dissemination of information on the opportunities available to fund research periods in other institutions. Furthermore, the Report underlines the effort to increase the number and level of seminars involving high-profile speakers.

The percentage of foreign students admitted is high, around 60%, among the highest in the School and in contrast to the trend of the last two years, when no foreign students had been admitted to the PhD course. The initiatives taken in the previous academic year to reverse this trend therefore seem to have been successful, a result which is highly appreciated by the CPAD.

Student awareness of the importance of the Questionnaire is increasing (57%, compared to 53% last year) but is still rather low in absolute terms and compared to the School average. Also for this PhD, concrete actions and initiatives should be taken into consideration to try and reverse the trend, possibly including a specific and intensive campaign during the month of October, when the Questionnaire is administered.

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C. PROPOSALS FOR THE IMPROVEMENT OF EXISTING EVALUATION TOOLS

Student Questionnaire

The main tool used by the CPAD to draw up its Annual Report is the Student Questionnaire, which is completed anonymously and on an annual basis. The contents of the survey are compliant with law 370/99, integrating elements pertaining to the specific characteristics of the School as well as suggestions made over the years by the Evaluation Committee (NdV), the CPAD, the Quality Assurance Unit and the ISAC (*International Scientific Advisory Committee*).

In collaboration with students' representatives and in agreement with the Evaluation Committee, two years ago CPAD proposed several changes to the Questionnaire. This is therefore the second year in which the structure of the Questionnaire has remained substantially unchanged. The results of the two homogeneous surveys could therefore be compared for the first time, making the analysis more reliable. Given the small figures, however, an analysis carried out on larger time scales is certainly more significant. Alongside the analysis of data on an annual basis and their comparison with the surveys of previous years, the CPAD recommends that a periodic evaluation be carried out, calculated over a whole four-year period and therefore expiring in the 2021/22 a.y.

Further suggestions and recommendations

In the 2020 Annual Report some proposals were made, some of which have been implemented or are currently being implemented by the School.

In particular, the CPAD welcomes the special attention that has been paid on several institutional occasions to the dissemination of the CPAD's work, as requested in the previous Report. We find it particularly useful that the results of the CPAD's work are the subject of dedicated moments within Area Meetings and professors' meetings for the individual PhDs. These occasions should also be opportunities for discussion and exchange with students. This would help raise awareness of the importance of completing the Questionnaire and of the impact its results may have on improving all aspects of the School's life. Further initiatives in

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this respect are therefore encouraged within the individual PhDs.

As it did in the 2020 Report, the CPAD stresses the importance for SISSA of evaluating the quality of *individual courses* within the PhDs, which is not the subject of the Student Questionnaire. In the Physics Area, an evaluation system is already in use. It involves a telematic questionnaire, administered on a course-by-course basis, which has been of great use over the years to improve the educational offer, bringing out critical issues and suggestions. Following a recent indication of the Evaluation Committee, the CPAD once again recommends that this initiative become a common practice in all PhD courses of the School, as it does not appear to have been systematically implemented by the Mathematics and Neuroscience Areas.

This CPAD has nearly reached the end of its term. We therefore wish to end this Report with a special recommendation for the CPAD that will be in charge for the next two years. Within the framework of the new Quality Assurance System, the role of the CPAD has gradually become more important. This role is not limited to the – albeit crucial – analysis of the Student Questionnaire and drafting of the Annual Report. By its very nature, this Committee is the perfect environment for the promotion of constructive dialogue between professors and students in the School. In particular, we were able to verify how, through in-depth discussion with PhD coordinators and student representatives, the CPAD could act as a link between these two components and foster a constructive dialogue within the different PhDs. This approach has been very useful in identifying problems and looking for ways to solve them, together. We strongly believe in the critical value of this catalyst role and we hope the CPAD will continue to work in this direction.

Trieste, 25.03.2021

The Students-Professors Joint Committee

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