



**Science  
Academy**

**Fundació  
Catalunya  
La Pedrera**

**Research Project Call  
Barcelona International  
Youth Science Challenge  
(BIYSC)**

Dear scientist,

Pursuing the path that you decided to take and choosing science as a way of living must have been, above all, challenging. In fact, throughout a scientific career, millions of challenges are encountered, and overcome. But, what if as a teenager you were immersed in a scientific environment, surrounded by like-minded people, and discovered the true meaning of science? It is impossible to travel back to high school, but we would like you to help us pose this challenge by inspiring and transmitting your passion to those who are just about to jump into the real world.

Barcelona International Youth Science Challenge (BIYSC) is a program organized by Science Academy - Catalunya La Pedrera Foundation which aims to stimulate scientific talent among young students from all over the world. It takes place every summer in the Mediterranean city of Barcelona and welcomes students aged 16-18 years old.

BIYSC has been designed to offer students a world-class experience by working in different scientific and technological challenges proposed by international research centers based in Catalonia. These institutions are involved in cutting-edge research, so it is a unique opportunity to conduct hands-on research under the mentorship of leading scientists.

BIYSC intends to create an enriching environment for science to be experienced in many ways. During the two-week program, students become immersed in scientific research while gaining an appreciation for the learning paths of their promising future. BIYSC aims at creating new value to promote excellence in education through a hands-on approach.

Facing global challenges and taking responsibility of scientific progress is stimulating as well as demanding. Future scientists' knowledge, skills, attitudes, and values will thrive and so help shape a constantly changing world. Science is a way of thinking and, encouraging students to think beyond boundaries, this will open them up to the world as better-prepared scientists, and better-prepared agents of change to promote a sustainable planet.

With the aim to inspire, engage, empower, and challenge students, we encourage you to share your passion for science by creating a science education project for BIYSC 2022. Hereafter, you will find the instructions for the research project proposals to be submitted.

Thank you for being willing to take part in the education of our world's future scientists!

Best regards,

**Lluís Farrés**  
Science Academy and BIYSC Director

**Gerard Segú**  
BIYSC Coordinator



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This document has been prepared for the exclusive use of those research centers and science professionals collaborating in BIYSC 2022.

It comprehends a description of the general features of the program, the tasks to be carried out by the team of scientists in charge of a research project, and the instructions to submit a research project proposal to be conducted on the next edition of the program, during summer 2022.



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## 1. ABOUT THE PROGRAM

Barcelona International Youth Science Challenge (BIYSC) is a program of excellence that aims to stimulate scientific talent among young students from all over the world. It is meant to encourage their enthusiasm for pursuing scientific research and careers in science. The program is an opportunity for the participants to work hands-on in a research project of their choice with researchers who are involved in cutting-edge research in the different international research centers based in Catalonia that are involved in the program.

**BIYSC 2022 will be held in Barcelona from July 4<sup>th</sup> to 15<sup>th</sup> 2022 and will welcome around 140 students aged between 16 to 18 years old.**

This year's edition will offer **10-12 research projects**, chosen from among those submitted in this call by the researchers and research institutions involved in BIYSC. A maximum of 12 students will be selected per research project. The profile of the selected students must be as follows:

- Talented students aged between 16 to 18 years old (10<sup>th</sup> to 12<sup>th</sup> grade).
- With a special motivation, curiosity, and interest for science.
- With good academic results and the will to pursue scientific research.
- Good command of English language, both written and spoken.
- Good interpersonal and communication skills.
- With enthusiasm for participating and commitment to take advantage of the opportunities offered by the program.

During the 12-day program, the students will participate in one of the projects for 8 days. On the first day of the program, all participants, researchers, and representatives of the different research centers will be invited to attend the Opening Ceremony. Likewise, the last day of the program, the participants will do an oral presentation of their project to the rest of the groups, their families and guests attending the Closing Ceremony.

Science Academy - Catalunya La Pedrera Foundation runs BIYSC as part of its vision in developing and collaborating with projects that promote excellence in education, offering young students opportunities and supporting those at risk of social exclusion. BIYSC was created based on the knowledge of projects that the Foundation has been running for several years in Catalonia and through the experience of our students who have attended similar international programs around the world. Catalunya La Pedrera Foundation had a clear vision of wanting to offer more opportunities with an international scope, inspiring young scientific students from around the world to meet in Barcelona during summer to work on research projects of their choice, thus bringing new ideas into the scientific panorama.

More information at:  
**[www.biysc.org](http://www.biysc.org)**

Note: All information highlighted in grey is provisional. We will confirm it as soon as possible.



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## 2. RESEARCH TEAM FUNCTIONS

The tasks to be carried out by the team of scientists in charge of the research project submitted to this call are:

### DEVELOPMENT OF THE RESEARCH PROJECT

BIYSC 2022 will offer to its participants **10-12** research projects in the area of theoretical and the experimental sciences: physics, chemistry, biology, mathematics, technology, biomedicine, biochemistry, genetics, neuroscience, robotics, nanotechnology, astrophysics, biotechnology, engineering, medicine, engineering, etc. Projects should be challenging for students and should enhance their enjoyment for scientific research.

The projects should be adapted to talented students aged between 16 to 18 years old (10<sup>th</sup> to 12<sup>th</sup> grade) and the language of the projects must be English. The project proposal must have a research structure with start and end, so that the students experience all the stages of the scientific method process; from the collection of information, formulation of hypothesis, design of the methodology and development of the experimental part, obtaining and discussing the results, etc. The level of the projects must be high, since the program is demanding. Moreover, as the name of the program suggests, the contents of the project should be structured in challenges that students will have to face to solve specific problems within the research.

Groups will be of approximately 12 students per project, which will be led by a team of scientists of 2-3 people. At least one of the members of the scientific team should have a PhD. The scientists will be in charge of the development and well-functioning of the project and will be responsible for guiding the students through their research activities. Their mission is to provide students with the necessary skills to conduct their research with success; giving them the autonomy to learn how to gather information, draw hypothesis and solve problems by themselves, to be critical with the results they obtain, etc. Ultimately, teach them how to think like scientists do.

Through the project, participants are expected to pose questions, design and develop experiments, critically interpret the results, propose new hypothesis, etc. The project has to be attractive, challenging and motivating, and also has to leave a margin for students' creativity and curiosity. Likewise, the scientists leading the project should meet the program's expectations: to be able to transmit their passion for science and encourage, engage, and stimulate the participants' scientific interest and abilities. Their role in captivating their interest and challenging them to achieve is critical and essential for the program to succeed.

The students will work with the scientists in the research centers for about 6-7 hours a day in their projects, except on Saturday afternoon and Sunday, which are devoted to leisure time, and on Wednesday July 13<sup>th</sup> afternoon, when the project must be already concluded (see



schedule below). The last day of the program, participants will present their project to the rest of the groups, their families, and guests attending the Closing Ceremony of the program.

	Mon. July 4th	Tue. July 5th	Wed. July 6th	Thu. July 7th	Fri. July 8th	Sat. July 9th	Sun. July 10th
8:00-9:30	Arrivals	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
9:30-13:00		Project	Project	Project	Project	Project	Leisure/Free
13:30-15:00		Lunch	Lunch	Lunch	Lunch	Lunch	Lunch
15:00-17:30		Project	Project	Project	Project	Leisure/Free	Leisure/Free
17:30-20:00		Opening	Leisure/Free	Leisure/Free	Leisure/Free		
20:00-21:30	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner
21:30-23:00	Leisure/Free	Leisure/Free	Leisure/Free	Leisure/Free	Leisure/Free	Leisure/Free	Leisure/Free

	Mon. July 11th	Tue. July 12th	Wed. July 13th	Thu. July 14th	Fri. July 15th
8:00-9:30	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
9:30-13:00	Project	Project	Project	Workshops	Presentations
13:30-15:00	Lunch	Lunch	Lunch	Lunch	Closing
15:00-17:30	Project	Project	Leisure/Free	Workshops	Cocktail
17:30-20:00	Leisure/Free	Leisure/Free		Leisure/Free	Leisure/Free
20:00-21:30	Dinner	Dinner	Dinner	Dinner	Dinner
21:30-23:00	Leisure/Free	Leisure/Free	Leisure/Free	Leisure/Free	Leisure/Free

Besides the research activities, there will be also shared activities, such as conferences and workshops given by invited scientists; as well as leisure activities, such as touristic visits, excursions, out-door games, cinema, etc. The staff team of the program will lead most of these activities. Finally, the Opening and the Closing Ceremonies will take place at the start and at the end of the program, respectively, and all the researchers involved in the projects in this call will be invited to attend.

## SELECTION OF CANDIDATES

To be a participant of BIYSC, students must pass through a selection process. Every year the program receives around 300 applications from secondary schools (both public and private) from all over the world. So far, the program has already welcomed students from 38 different countries across the 5 continents.

The researchers behind the projects of BIYSC 2022 will be in charge of the selection process for the admission of students to the program.



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The first step is the PRESELECTION. All applications received in a project will be individually evaluated by the researchers in charge of its coordination. The preselection of candidates will require the evaluation of the information and documentation provided by each student during the application process, which include: the science teacher or tutor recommendation, the student's motivation letter and academic results. Based on these, those candidates that fit the selection criteria will be called for a personal interview through Skype.

The personal interview through Skype is the last step of the SELECTION process. Again, the researchers in charge of the project will interview the final candidates and select the 12 participants that will enter their course.

#### **FOLLOW UP OF THE SCIENTIFIC PROJECTS**

Once the program is concluded, students are entrusted to write a **scientific project** inspired or based on the project developed at BIYSC as a requirement to obtain the official certificate of participation in the program. Students start working on their scientific project by September and this has to be finally delivered on mid-January.

Researchers in charge of the project must oversee and do the follow up of the students' scientific projects, acting as mentors. The task can be done through email. Once all reports are submitted and assessed, participants can be considered for the BIYSC Award that provides the two winners with the opportunity to participate in an international science program the year after their participation in BIYSC.



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### 3. INSTRUCTIONS TO SUBMIT A RESEARCH PROJECT PROPOSAL

The research project proposal should include:

- 1. NAME OF THE RESEARCH CENTER**
  - . Description of the research center (100 words max.)
  - . 5 pictures of the research center (both indoor and outdoor)<sup>1</sup>
  - . HQ logo of the research center (in PNG format, preferably)
- 2. EXCELLENCE AND RECOGNITION AWARDS**

e.g., 2010 – “Severo Ochoa Center of Excellence Seal” by the Ministry of Research, Development and Innovation of Spain.
- 3. RANKING POSITIONING**

e.g., 2010 – 10<sup>th</sup> position in the SCIMAGO Worldwide Ranking of Universities and Research Institutes, according to Q1 – Ratio of Publications indicator.
- 4. NAME OF THE DIRECTOR OF THE RESEARCH CENTER**
  - . CV summarized in max. 5 bullet points of 20 words each (100 words max.)
  - . Profile picture<sup>1</sup> of the director of the center.
  - . Inspiring and motivational quote of the director for our students on pursuing scientific research and careers in science.
- 5. NAME OF AN INTERNATIONALLY RENOWNED RESEARCHER<sup>2</sup> OF THE RESEARCH CENTER**
  - . CV summarized in max. 5 bullet points of 20 words each (100 words max.)
  - . Profile picture<sup>1</sup> of the renowned researcher of the center.
  - . Inspiring and motivational quote of the renowned researcher for our students on pursuing scientific research and careers in science.
- 6. NAME OF THE RESEARCHER/S IN CHARGE OF THE PROJECT<sup>3</sup>**
  - . CV summarized in max. 5 bullet points of 20 words each (100 words max.)
  - . Profile picture<sup>1</sup> of the researcher/s in charge of the project.
  - . Email of the researcher/s in charge of the project.
- 7. NAME OF THE RESEARCH INTERN/S COLLABORATING IN THE PROJECT<sup>4</sup>**
  - . CV summarized in max. 5 bullet points of 20 words each (100 words max.)
  - . Profile picture<sup>1</sup> of the research intern/s collaborating in the project.
  - . Email of the research intern/s collaborating in the project.
- 8. TITLE OF THE PROJECT (15 words max.)**

The title that will be published on the website to encourage students to apply, so it must inspire them to choose your project above any other in the program.
- 9. SUMMARY OF THE PROJECT (50-70 words)**

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<sup>1</sup> All pictures (jpg 300 dpi) must be attached to the same email as the project proposal submission.

<sup>2</sup> The renowned researcher cannot be the same person as the director of the center.

<sup>3</sup> We suggest not having more than 2-3 researchers in the team in charge of the project.

<sup>4</sup> We suggest not having more than 1-2 research interns collaborating the project.





The summary must be sufficiently clear and describe the project, as it will be the basis for the publications of the diffusion campaign. We suggest starting this section with an inviting question, followed by some of the different challenges that students will encounter during the project.

**10. DESCRIPTION OF THE PROJECT (500 words max.)**

A more extensive summary where the contents that will be covered and the aptitudes that the participants will develop should be explained (e.g., contents related to biology, chemistry, engineering... the project will be developed using laboratory techniques, field study, computer programming...). We suggest you structure it using the following questions:

- . **What?** Explain what the students are going to research about.
- . **Why?** Which is the reason for investigating it; what is the problem you are trying to solve.
- . **How?** Which are the methods and materials used to carry the project out.

It also has to include the challenges that students will have to face to solve the problems that arise from the research process, what type of activities students will develop while working in the lab, and what is the knowledge that students will learn from this experience. This summary will be used in the diffusion campaign through the website of the program. A clear explanation of the project facilitates the project selection by the students and remember that this is the first source of information they receive when it comes to applying to your project above any other in the program.

**11. LEARNING OBJECTIVES OF THE PROJECT**

Goals and objectives of the project summarized in a maximum of 3 bullet points.

**12. PROJECT SCHEME**

Include a scheme or diagram of the project structure to facilitate comprehension of the students and to highlight its main characteristics.

**13. BUDGET<sup>5</sup> (ONLY material and infrastructures, NOT researchers' remuneration)**

List the material you plan to acquire for the execution of the project and its cost, the infrastructures required to carry it out and its cost (in case these are not available for free in your research center) and other expenses resulting from the project development. Do not include remuneration of the researchers within this budget!

**14. MATCHING PROFILES**

List the students' profiles that would match with the topic of the project (e.g., students that are interest in astrophysics, biochemistry, biology, biotechnology, chemistry, ecology, engineering, environmental sciences, evolutionary biology, genetics, marine biology, mathematics, nanotechnology, neurosciences, pharmacology, physics, robotics, technology, etc.).

**15. REQUIRED MATERIALS TO BE BROUGHT BY THE STUDENTS DURING THE COURSE**

e.g., laptop, lab coat, etc.

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<sup>5</sup> The budget for the acquisition of the required material is 1,500€ max. per project.





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#### **4. BUDGET AND REMUNERATION**

##### **BUDGET FOR MATERIAL, INFRASTRUCTURES AND OTHER EXPENSES OF THE PROJECT**

Budget of 1,500€ to cover the expenses resulting from the research project development, such as materials or infrastructures.

##### **SELECTION OF CANDIDATES AND DEVELOPMENT OF THE RESEARCH PROJECT**

Remuneration of 2,500€ gross to distribute among all team members in proportion to the hours worked, and with the condition of not exceeding the number of 2 researchers per course activity/time slot.

- Selection of candidates: from January to April 2022 (approx.)
- Development of the research project: from July 4<sup>th</sup> to 15<sup>th</sup> of 2022

##### **FOLLOW UP OF THE SCIENTIFIC PROJECTS**

Remuneration of 50€ gross per project supervised. Each scientific project should be overview by only one researcher. From September 2022 to January 2023 (approx.).

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#### **5. SUBMISSION DEADLINE**

All research project proposals should be received by **October 31<sup>st</sup>, 2021**, to the following email address: [contact@biy-sc.org](mailto:contact@biy-sc.org) filling out the following research project proposal document.

All proposals will be analyzed and evaluated in accordance with the needs and nature of the program, and the variety of disciplines to be included in the different projects will also be considered. Catalunya La Pedrera Foundation reserves the right to request further information about the project proposal if necessary.