



# YOUNG PEOPLE MAKING THEIR WAY THROUGH SCIENCE

## Thoughts on Science and its role in society from a young perspective

This document is a compilation of the thoughts that arose during the third research evening of the Barcelona Biennial Ciutat i Ciència 2023. The ideas and perspectives contributed by the speakers and the audience present are therefore collected.

Thoughts were provided by Mar Alcaraz-Hurtado, Helena Arias Casals, Toni Bertólez Martínez, Lucas Bogaert, Carla Caro Villanova, Mónica Sagrera Cozar, Quim Llorens and the public present at the CSIC researchers' residence. The document has been written by Pau Sebastià Miravet and Lucas Bogaert.

We are aware that the topics discussed are much more complex than what is presented here. This document has been written with the intention of generating a space for reflection around young and future science and promoting the creation of new discussions.

### What does doing research mean?

The idea of the scientist in a white coat is outdated. Doing research goes far beyond the laboratory. A researcher needs to perform a wide variety of actions, such as communicating their work and managing research at different levels.

**Different perspectives are needed to move forward with today's world problems**, that is why a very good ability for a person who is engaged in science is to be able to socialize with other people, understand and show empathy towards their problems and questions.

Research involves many activities (project management, carrying out experiments, communication,...) that require an entire research support team, with profiles such as laboratory, administration and communication technicians. The work of this team must also be promoted and it must be emphasized that the scientific career can be done from many different points.

Research has always been seen as based on the scientific method. This consists of asking questions, formulating hypotheses (possible answers to the questions), designing experiments to check it and understanding the results obtained, formulating new questions.



Although in some disciplines, such as human and veterinary medicine, protocols are designed and very structured experiments are carried out, in many others **the process is more chaotic and the method is not strictly followed**. This is why intuition and creativity are essential in research, showing that science is one of the most creative things that exist.

Being at the base of the pyramid, **young people are an essential part of science and research**. In addition to the excitement that a new perspective brings within a research group, a young person starting his PhD is a person who already has a wide range of knowledge and previous experience in research. Therefore, their ideas and opinions should be valued.

It should be noted that the numbers for research personnel start to be counted from doctoral students, which underestimates the contribution of undergraduate and master's students in research.

**There is great pressure on the new generations who are starting their path in science.** It is very difficult to get decent PhD scholarships. Moreover, there is a culture of effort, promoted by senior research staff and constant pressure from the system, that demands excessive excellence and dedication. Mediocrity must be claimed, science can be done by being normal and ordinary.

There is a 20-30 year gap between PhD students and principal researchers, which implies a very different perspective on research. We have lost sight of the fact that **research is a job** and that you need to rest and have a full life beyond research. Young people must be the ones who must see clearly the need for changes and show intransigence towards the scientific system. This system is flawed and **we have the opportunity to make more humane and more diverse science, more compatible with life**. Young people can change things and not go through the mistakes of past generations, rejecting the practices of demand/abuse, looking for support in our own generation.

One of the points to improve in the scientific career is to break with the vision of a single path in research. To study a bachelor's degree, a master's degree, do a doctorate and continue to become a principal researcher is publicized as the only possibility. There is a certain hypocrisy in the fact that, despite the expectation that a career in research generates, the further you go down this path, the more negative and pessimistic it becomes. Meanwhile, alternative careers outside academia are not valued. **There are many ways of doing science** and it is important to solve this lack of referents in the other professions of science.



## Towards multi- and interdisciplinary research

Due to the specialization of research in increasingly specific subjects, it is also necessary to bear in mind **the need to have a wide range of knowledge**. Currently, research groups are increasingly multidisciplinary environments, favoring a diversity that helps to solve the problems that keep appearing.

Therefore, **it is necessary to change the approach in academic training to include more interdisciplinarity**. In other countries they try to do it but here it still costs. Platforms such as the #ScienceFellows Community of the Fundació Catalunya La Pedrera and the Master in Multidisciplinary Research at BIST make it possible to bring different disciplines into contact, share different perspectives and find a language that allows everyone to understand each other.

**Science is an intrinsic part of society**, and therefore must be combined with other activities, such as art (theatre, poetry,...) and sport. On the one hand, these will make it possible to maintain a healthier science, as a method of escape and rest, but they will also be influenced by the passion generated by science.

## Equality is necessary for good science

Only 17% of heads of research groups in Catalonia in science and engineering are women. This is only the visible side of the problems in gender segregation, which increases as we climb the hierarchical ladder. Although in some fields the bias is more important than in others (especially worrisome in engineering and pure science careers), the need for more actions and initiatives to reverse is evident.

One of the key points for this reversal is **to generate female referents in science**, both historical and current. On the one hand, it is necessary to recover female historical figures, with the help of historians, to find information and archives about them. Then, scientists should decipher the contribution of these figures in science. In fact, this is an example of much-needed interdisciplinary work. On the other hand, it is necessary to strengthen the visibility of female referents in science, taking the example of initiatives such as #100tifiques.

In addition to the well-known glass ceiling, the cement ceiling is one that we impose on ourselves. Without women role-models in science, it is very easy to think that you do not have a place in science or that you are not worth enough (a phenomenon known as impostor syndrome). For this reason, **it is necessary to emphasize and show that people who do research are ordinary people**.



## Bringing science closer to young people

Moving towards more egalitarian and more society inclusive science involves bringing it closer to new generations. Currently, there is a certain rejection of young people who are interested in science. Scientific interests need to be normalized, and **initiatives such as scientific communication make a closer to society science possible.**

When it comes to generating interest in science, it helps us to ask ourselves why the research we are doing is useful, in order to feel it much more tangible.

Baits must be created to engage new generations in science. For example, we need to take advantage of the fact that social networks algorithms favor that if you are curious about science, related content is suggested. It can also be extrapolated outside of virtuality, sharing science with your environment and making it available to everyone will make it possible to undo this rejection towards science and include it in the conversations of our society.

## Conclusions

It is in our hands, as young scientists, to decide what kind of science we want in the future and on what basis research should be governed. **The role of young people is essential to make science more humane, more diverse and more compatible with life.** Bringing science closer to the new generations and fostering a diverse scientific community means generating young references who capture and maintain society's attention to the science we want.