

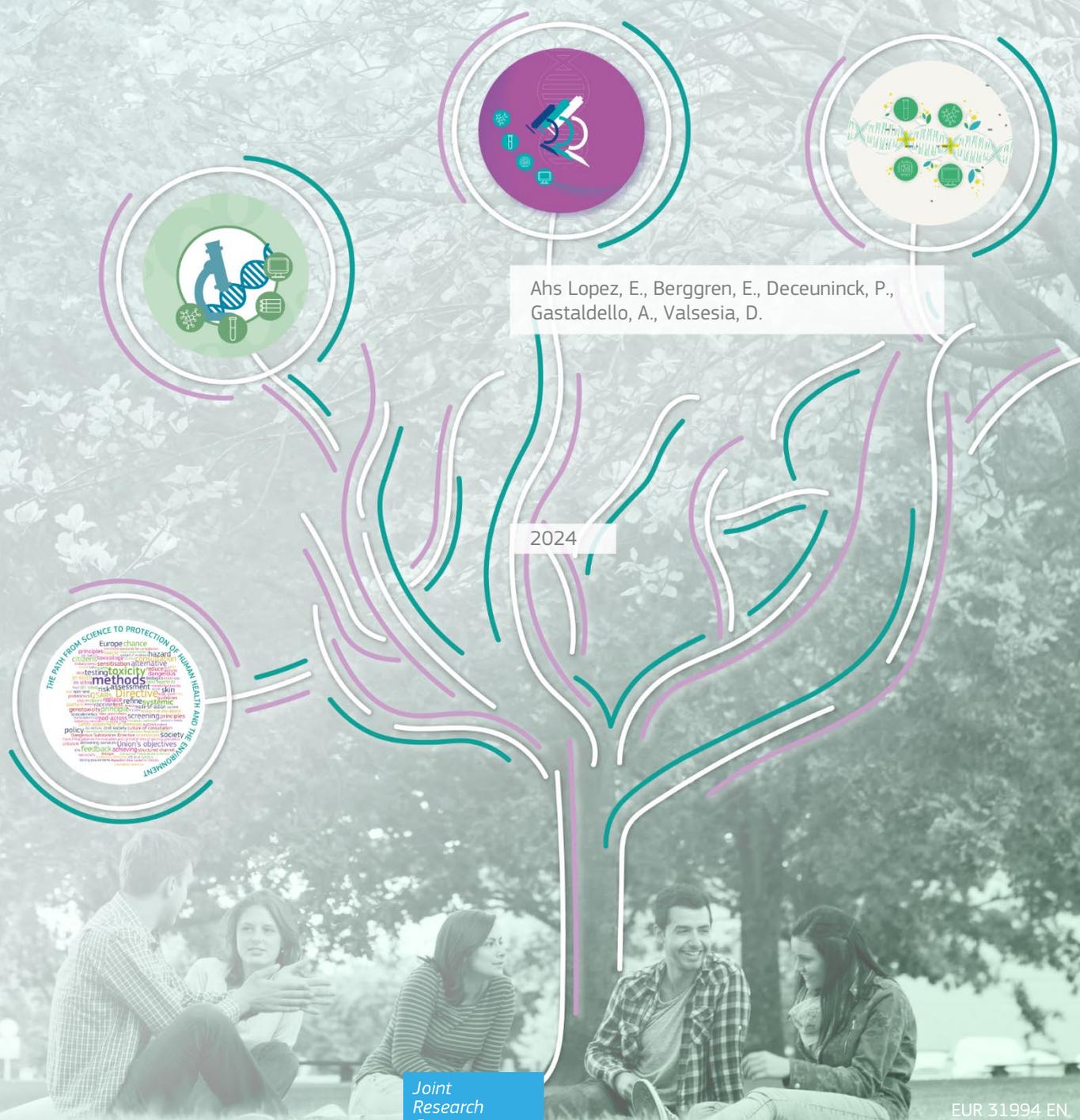


Learning from the students

The impact of the JRC Summer School

Non-animal Approaches in Science

Survey results



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Abstract

The European Commission's Joint Research Centre is hosting the European Union Reference Laboratory for alternatives to animal testing (EURL ECVAM) as mandated by Directive 2010/63 on the protection of animals used for scientific purposes. EURL ECVAM has been dedicated to advancing the Three Rs – Replacement, Reduction, and Refinement of animal experiments for over 30 years with the scope of eventual phasing out of the use of animals in research, education and regulatory testing. As part of their efforts, EURL ECVAM organises a biennial Summer School on Non-animal Approaches in Science, aimed at post-graduate students and early-career scientists.

The Summer School, initiated in 2017, focuses on sharing knowledge about non-animal methods and technologies in science. It also provides insights into the current and future roles of the Three Rs and explores career paths in non-animal approaches in science.

Since its inception, four Summer Schools have trained over 400 post-graduate students worldwide. To gauge its impact, EURL ECVAM conducted a survey among alumni.

Results show that a majority of respondents indicated that the Summer School had influenced their current research or career. A greater part of them contribute to non-animal approaches in their current professional activities by actively developing Non-Animal Methods (NAMs) and encouraging others to use NAMs.

Moreover, almost all respondents expressed a high likelihood of recommending the Summer School to young students and researchers. Many shared achievements attributed to their participation, such as increased involvement in non-animal methods research and knowledge sharing within international research communities.

The survey also provided valuable feedback for enhancing future Summer School editions.

1 Introduction

The European Commission's Joint Research Centre (JRC), which runs the [EU Reference Laboratory for alternatives to animal testing \(EURL ECVAM\)](#), organises every second year since 2017 a Summer School on Non-animal Approaches in Science, specifically tailored for post-graduate students and early-career scientists in biomedical research and regulatory toxicology/ecotoxicology and focused on non-animal methods and technologies.

For over 30 years, the JRC has been working on the Three Rs – the Replacement, Reduction and Refinement of animal experiments aiming on ultimate replacement of the use of animals. The mandate of EURL ECVAM is set out in the [EU legislation on the protection of animals used for scientific purposes](#) (EU, 2010) and one of its duties is to promote and share knowledge on the Three Rs and non-animal approaches in science.

Education and training are fundamental to boosting the uptake of alternative methods and the application of the Three Rs. EURL ECVAM has been engaged in several education and training activities aiming at increasing the awareness of the Three Rs and alternative methods or approaches among students at the levels of secondary school, university, early professional training and young scientists.

The aim of the JRC Summer School is to share knowledge and experience on the latest non-animal approaches in science and to promote their use in biomedical research, regulatory applications and drug development. This includes cutting-edge technologies such as induced pluripotent stem cells, organ-on-chip, complex in vitro methods, computational modelling, and artificial intelligence that are being exploited for world-class science which benefits our society and supports sustainable development and innovation.

In addition, the intention is to explore the current and future role of the Three Rs through discussion and debate. Time is also given to explore career paths in non-animal approaches in science.

Since the start 7 years ago, EURL ECVAM organised four Summer Schools, 2017, 2019, 2021 and 2023, and trained over 400 post-graduate students world-wide.

EURL ECVAM decided to conduct this survey to understand how the Summer School might have impacted the participants' professional career and choices. Our intention is to make young scientists more aware of the Three Rs, and when possible, choose replacement methods and progress related research. We also assume that we create a network opportunity among young scientists around the world. This survey should assist us to understand whether, and to which extent, we reached these goals. Alumni from all Summer School editions were invited to complete the online survey which consisted in a set of 10 questions tailored to measure the impact the Summer School might have had on them. 78 students replied, which is considered a good feedback (ca 20% of all students) especially taking into consideration that not all students could be reached and those participating in the early editions would be less motivated to respond to the survey.

The survey will help to assess how the Summer School contributed to shape future approaches and initiatives of non-animal methodologies in science, and provide inspiration on how to improve future editions of the Summer School and how to optimise our promotion of non-animal approaches.

2 Impact Survey: results

2.1 Question 1: What edition of the Summer School did you attend?

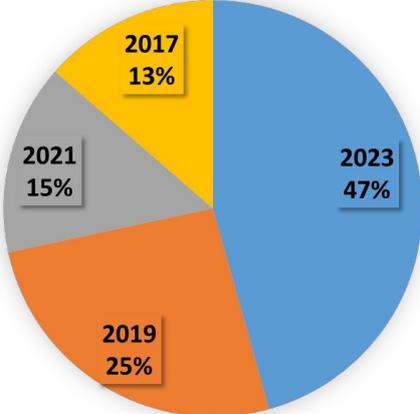


Figure 1. Answers to the first question of the survey

79 respondents in total from the four different Summer School editions.

One respondent attended both 2017 & 2019, and one three editions 2019, 2021 and 2023. These respondents were only counted for their attendance at their first Summer School, as students are not accepted a second time, so subsequently they attended in another role, e.g. lecturer.

2.2 Question 2: What was your level of education at the time you participated in the Summer School?

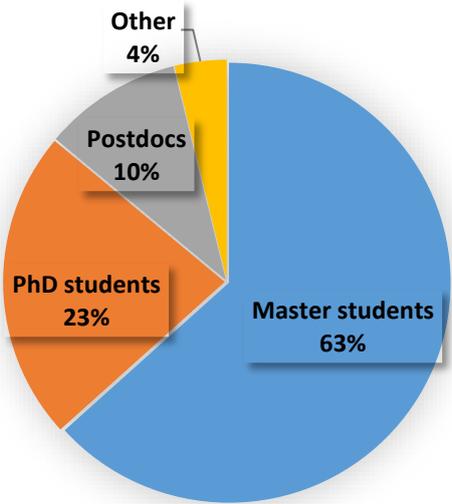


Figure 2. Answers to the second question of the survey

2.5 Question 5: Did you directly or indirectly contribute to any of the Summer School editions?

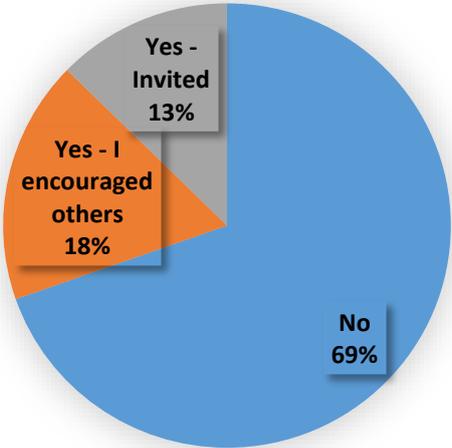


Figure 5. Answers to the fifth question of the survey

2.6 Question 6: Did the Summer School have an impact on your current research or career?

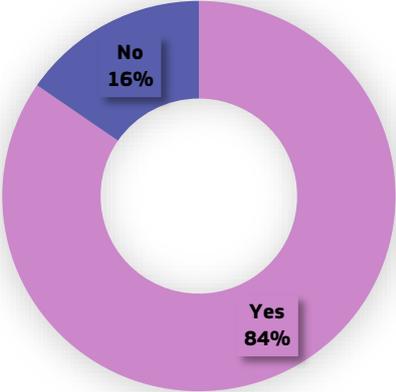


Figure 6. Answers to the sixth question of the survey

2.7 Question 7: In what way did the Summer School influence you?

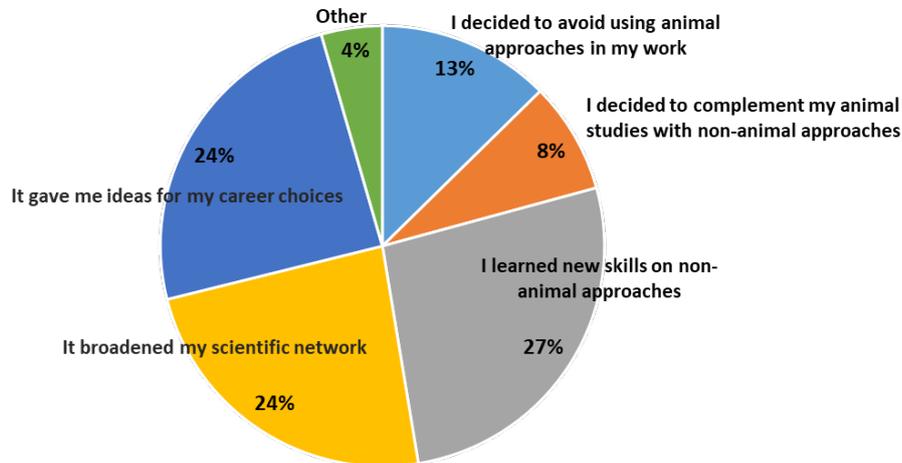


Figure 7. Answers to the seventh question of the survey

On this question, respondents could provide free text replies (collected under Other in the diagram), listed here:

- I am considering NAMs for regulatory assessment,
- I gained awareness about EURL ECVAM/JRC activities and resources.
- I improved presentation and collaboration skills.
- It broadened my scientific perspective.
- I gained general basic knowledge on the issue of NAMs and the research going on in this field.
- I received job offers.

2.8 Question 8: Do you in your current professional activity contribute to the progress of non-animal approaches?

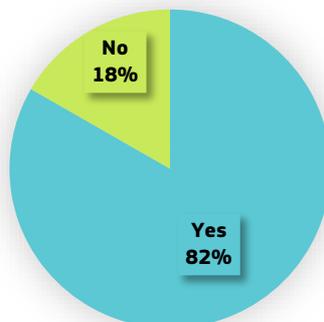


Figure 8. Answers to the eighth question of the survey

2.9 Question 9: How are you actively contributing to non-animal approaches in science?

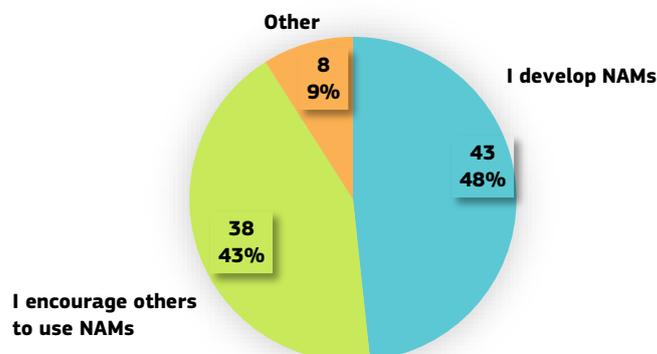


Figure 9. Answers to the ninth question of the survey

On this question, respondents could provide free text replies (collected under Other in the diagram), listed here:

- *I use non-animal approaches.*
- *I use computational tools for the assessment of chemicals.*
- *I provide information about & education on non-animal approaches.*
- *I investigate ways to develop non animal approaches.*
- *I fully work with non-animal models, since I am working in a field that is very human-specific (pregnancy) and thus there are many differences between animals and humans rendering results from animal studies unreliable.*
- *I work to pass policies to protect animals used in research and promote the use on non animal methods.*
- *I am working on Safe & Sustainable by Design developed at JRC.*
- *I was involved in the test method development, refinement, and (pre-) validation for NAMs for metabolic disruption, and currently encourage complementing regulatory in vivo tests required for product safety testing with human in vitro tests/NAMs to increase understanding of MoA and relevance towards human health safety.*

2.10 Question 10: Would you recommend young students or researchers to attend future JRC Summer Schools?

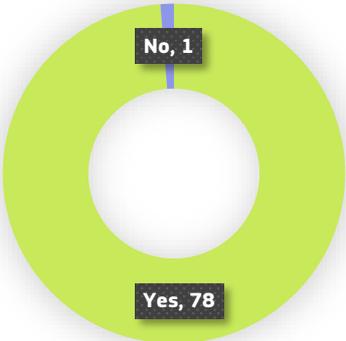


Figure 10. Answers to the tenth question of the survey

2.11 Question 11: Would you like to share any success story or achievement that can be attributed to attending the JRC Summer School(s)?



Figure 11. Answers to the eleventh question of the survey

2.12 Question 12: Is there anything you would like to add, any suggestion or comment on your mind?

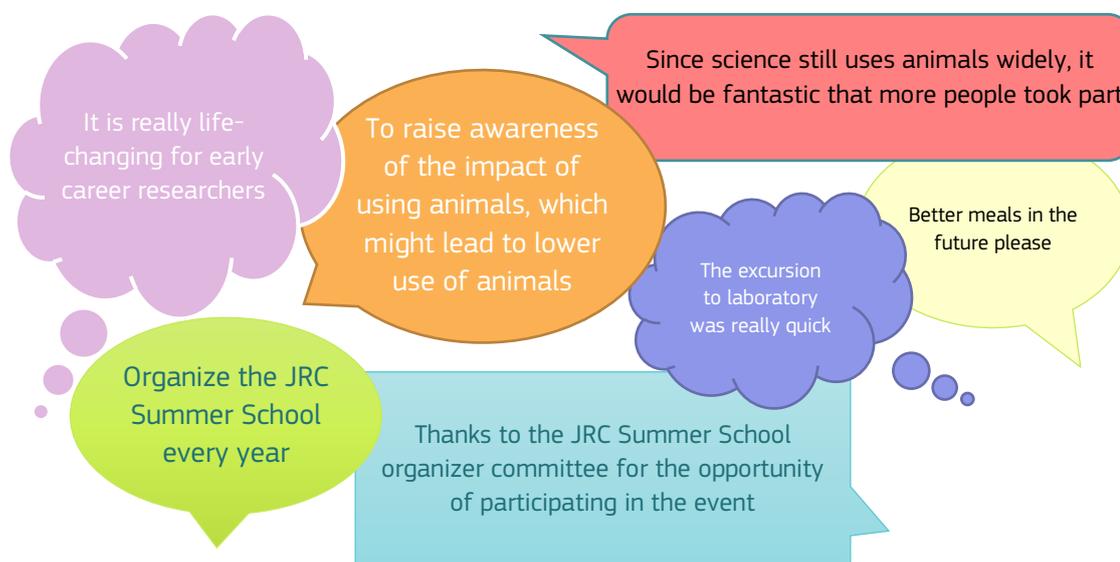


Figure 12. Answers to the twelfth question of the survey

2.13 Comments on results from the Survey

We invited 415 Summer School alumni from all editions. Among the contact details we had, around 40 email addresses were no longer active. The rate of respondents were therefore 79 out of 375 (21%), with most respondents from the latest edition of the Summer School in 2023 with 47% (**Figure 1**).

Over 60% of the 79 respondents were Master students when they participated in the Summer School. When they took part in the Survey, many of them had moved on to PhD positions or careers in the biomedical and toxicology field. Many of the respondents are now specialised in toxicology. The different specialisations such as biotechnology, computational toxicology or biomedical engineering might be expected, while it is interesting to see that there are also students that are involved in other scientific fields, such as regulatory affairs (**Figure 3**).

84% of the respondents answered that the Summer School have had an impact on their current research or career (**Figure 6**), which of course is the desired reply from our point of view. But, it might also be a larger percentage among responders in the survey with this opinion, than if you would consider all students, including also non- responders.

On the question in what way the Summer School influenced them, 24% responded that it gave them ideas for future careers and 13% that they decided to avoid using animal approaches in their research. Several students (27 %) stated that they learned new skills on non animal approaches and that they broadened their scientific network (**Figure 7**).

82% of the responding students stated that they contribute to the progress of non-animal approaches in their current professional activity. 48% actively contribute to non-animal approaches in science by developing NAMs and 43% encourage others to use NAMs in their research (**Figure 8** and **Figure 9**).

An overwhelming majority of 78 respondents answered that they would recommend young students and researchers to attend future JRC Summer Schools. We only received one negative reply to this question, with detailed remarks and opinions about the Summer School. This reply became very useful, and also stimulated internal discussions on how to better manage expectations and how to get organised. For example, how to manage the poster presentations more effectively and efficiently, which indeed is difficult. The problem is that students dedicate much time for preparation while it is difficult to find sufficient time in the agenda to discuss each of the 120 posters presented. We still believe it is very important for the students to get the possibility to present their own work, and also for the organisers, lecturers and other students to get an insight in the broad spectrum of scientific activities represented at the summer school, and also the ignition to bilateral discussions on subjects of common interest. However, as noted below, we will further consider how to find a better suitable format for this part of the programme. Other remarks were related to our eco-friendly policy, like offering only a vegan menu. We do communicate this green approach efficiently during the promotion, as we are proud of this aspect, and are trying to improve the sustainable aspects in each edition of the Summer School. **(Figure 10)**.

Several participants in the survey shared their achievements and commitments in their current professional career that can be directly attributed to their participation in the JRC Summer School. They got more involved in non-animal methods in their current research and shared this knowledge with international research communities and networks. For example, there were students being part of the board of network of young professionals engaged with the transition to animal-free research in the Netherlands, or sharing non animal methods with their research community in India.

Some relevant food for thought and suggestions on how to improve and develop our future Summer School editions were received in response to the last question; **“Question 12: Is there anything you would like to add, any suggestion or comment on your mind?”**.

Some students wished more time for laboratory visits. While visits to the laboratory is indeed a crucial component of the Summer School program, there is unfortunately not enough time to arrange overly detailed and comprehensive experiences due to the number of students, and other important aspects of the program that need to be addressed as well.

A few students expressed a desire for additional time and improved visibility for posters. We value these comments and have taken on board some of those concern, and decided that in future Summer School editions we will explore a different poster concept.

Overall, evaluating the survey it seems that the JRC Summer School on Non-animal Approaches in Science has clearly contributed to fostering a community dedicated to advancing alternatives to animal testing and promoting ethical and innovative scientific practices.

3 Conclusions

The JRC Summer School on Non-animal Approaches in Science has made a significant impact on the careers and practices of many post-graduate students and early-career scientists.

Over the past seven years, the Summer School has trained over 400 students worldwide.

A large majority of the respondents taking part in the impact survey indicated that it has influenced their current research or career paths. Notably, they gained ideas for future career choices, and many decided to avoid using animal approaches in their research. Over 80% of the respondents contribute to the progress of non-animal approaches in their professional activities, with many actively developing Non-Animal Methods (NAMs) and encouraging their peers to adopt them.

The overwhelming majority of respondents expressed a willingness to recommend the Summer School to young students and researchers, highlighting its value in fostering a community dedicated to advancing ethical and innovative scientific practices.

The survey provided valuable feedback for improving future editions of the Summer School, ensuring its continued impact on shaping the future of non-animal methodologies in science.

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List of abbreviations and definitions

Abbreviations	Definitions
EURL ECVAM	European Union Reference Laboratory for alternatives to animal testing
JRC	Joint Research Centre
NAMs	Non Animal Methods

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Annexes

Annex 1. Survey

JRC Summer School Impact Survey

Fields marked with * are mandatory. ✕

Introduction

Dear Summer School Alumni,

Your involvement in the JRC Summer School on "Non-animal Approaches in Science" was highly appreciated and valuable to us.

We are conducting this survey to understand how the Summer School might have impacted your professional career and choices.

Your input will help us to assess how the Summer School contributed to shape future approaches and initiatives of non-animal methodologies in science and provide us with some inspiration on how to improve future editions of the Summer School and our promotion of non-animal approaches.

Thank you for spending a few minutes to complete this short survey. Your feedback is crucial to us!

This survey is anonymous. Do not provide personal details such as your name or email address in the answers.

Questions & Answers

* 1. What edition of the Summer School did you attend?

Minimum 1 selection(s)

- 2017
- 2019
- 2021
- 2023

* 2. What was your level of education at the time you participated in the Summer School?

Minimum 1 selection(s)

- Master
- PhD
- Postdoc
- Other

* 3. Please indicate your current profession or field of study.

* 4. Do you still have contact with any of the other participants that you met during the Summer School in the context of your work?

- Yes
- No

* 5. Did you directly or indirectly contribute to any of the Summer School editions?

Minimum 1 selection(s)

- Yes, I was invited as a speaker, moderator or exhibitor
- Yes, I encouraged my own students and/or networks to attend the Summer School
- Other
- No

* 6. Did the Summer School have an impact on your current research or career?

- Yes
- No

* In what way did the Summer School influence you?

Minimum 1 selection(s)

- I decided to avoid using animal approaches in my work
- I decided to complement my animal studies with non-animal approaches
- It gave me ideas for my career choices
- It broadened my scientific network
- I learned new skills on non-animal approaches
- Other

* 7. Do you in your current professional activity contribute to the progress of non-animal approaches?

- Yes
- No

How are you actively contributing to non-animal approaches in science?

Minimum 1 selection(s)

- I develop non-animal approaches
- I encourage others to use non-animal approaches
- Other

* 8. Would you recommend young students or researchers to attend future JRC Summer Schools?

- Yes
- No

9. Would you like to share any success story or achievement that can be attributed to attending the JRC Summer School(s)?

10. Is there anything you would like to add, any suggestion or comment on your mi

Thank you for taking part in this survey!

In case you would like to share your story with us (e.g. to take part in the promotion of the next Summer School or participate in an interview), please contact us at:

JRC-F3-SUMMER-SCHOOL@ec.europa.eu

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