

# STEPUPIORS

Twinning for a European Consortium of Rectal Cancer Research Institutions through Stepping up Scientific, Technological and Innovation Excellence of IORS



Funded by  
the European Union Project number: 101079217



INSTITUT ZA ONKOLOGIJU  
I RADIOLOGIJU SRBIJE



**Work Package No: 3**

**Deliverable No: D3.2**

**Deliverable Name: Teaching materials and evaluation report for workshops and summer school**

**Type: R - Document, report**

**Dissemination Level: PU**

**Due Date: November 30, 2024**

**Final Version Date: November 30, 2024**

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The knowledge exchange between participating institutions within WP3 of the STEPUPIORS project has been achieved through **6 workshops and trainings on grant writing, the application of omics approaches and skills required for careers in academia/industry and one summer school on liquid biopsy technologies**. The STEPUPIORS trainings were organized as online, hybrid and in-person events and were attended by **297 participants**. Lecturers were recruited from academia and industry among the network of collaborators of the participating PIs. A workshop on omics approaches introduced the main principles of proteomics, transcriptomics and genomics along with computational tools for integrating omics datasets and establishing connections with clinical information. This workshop helped implement the research presented in WP2, by highlighting the statistical and bioinformatics tools available for analysis of omics and clinical data.

## 1. Teaching material

During all trainings organized by the STEPUPIORS project, Power Point presentations and other publicly available teaching material were generated and are available at the Training section of the [STEPUPIORS website](#). All training events are chronologically listed below with teaching materials provided by the lecturers.

### 1.1. Pre-award grant management training

Pre-award grant management training was held on 29.11.2022., on the second day of the STEPUPIORS project Kick-off Period in Belgrade, Serbia. It was a whole-day training focused on pre-award grant management. The lecturers were project management and research staff (Dr Işıl Tekeli, Dr Mariska Bierkens, Dr Remond Fijneman, Dr Ieronymos (Makis) Zoidakis, Dr Christos Ilioudis, Dr Sergi Castellvi-Bel) from partner institutions Institut d'Investigacions Biomèdiques August Pi I Sunyer (IDIBAPS), the Biomedical Research Foundation of the Academy of Athens (BRFAA), the Netherlands Cancer Institute (NKI AVL), while the majority of registered participants were from the Institute for Oncology and Radiology of Serbia as the host institution, and from the Institute for biological research "Siniša Stanković", Institute for Medical Research, Vinca Institute of Nuclear Sciences the University of Belgrade - Faculty of Pharmacy, University of Belgrade, Faculty of Medicine, Faculty of the Chemistry University of Belgrade. The training culminated with round table discussions and sharing experience of several principal investigators of successful EU-funded and national grants from Serbia, Prof. Dr Tatjana Simic, Dr Svetlana Jovanovic, Dr Jelena Grahovac, Dr Miljana Tanic and Dr Milena Cavic.

The training was attended by 51 participants (78% female) and the registered participants were from the Institute for Oncology and Radiology of Serbia as the host institution, and from six other research institutions. The workshop was combined with the project kick-off meeting to initiate the preparation of proposals for submission of various EU calls.

The training agenda included topics:

1. How to search for European and International grants? – Isil Tekeli
2. European Funding Ecosystem – Isil Tekeli
3. Consortium Building – Makis Zoidakis
4. Proposal Writing, Part 1 – Isil Tekeli
5. Proposal Writing, Part 2 – Isil Tekeli

6. Budget – Christos Ilioudis

7. FAIR Data Management – Remond Fijneman and Mariska Bierkens

Teaching material from Pre-award grant management training is available at the project website [Training section](#).

Other documents relevant to the training:

- [Agenda](#)
- [Attendance list](#)
- [Report](#)
- [Lecture outlines](#)

### **1.2. ELISA training**

STEPUPIORS participants, Dr Ana Vuletić and Dr Katarina Mirjačić Martinović, organized onsite two-day ELISA Training on March 22-23, 2023 for IORS project participants and other interested IORS colleagues. As a practical exercise with the help of laboratory technician Jasna Popović Basić, the level of IL-10 in the sera of healthy individuals was analyzed. During the first day, theoretical principles of the ELISA method were presented, while the second day was dedicated to a practical step-by-step approach, explaining how sandwich ELISA works.

Teaching material from ELISA training is available at the project website [Training section](#).

Other documents relevant to the training:

- [Report](#)

### **1.3. Omics data generation and integration with clinical information**

The two-day interactive workshop "Omics data generation and integration with clinical information" was held on June 01-02, 2023, in Athens, Greece. During the workshop, the main principles of proteomics, transcriptomics, metabolomics and genomics along with computational tools for integrating omics datasets and establishing connections with clinical information were introduced. This workshop also highlighted the statistical and bioinformatics tools available for the analysis of omics and clinical data.

Seventeen doctors and researchers of the Institute for Oncology and Radiology of Serbia attended the workshop. During the interactive lectures, 43 course participants from 4 partner institutions gained knowledge about the basic principles of "omics" techniques, which are an integral part of biomedical research. Given that these techniques are significantly modernized every year, it is necessary to continuously invest in training in this field so researchers can keep up with modern principles of treatment and oncological research. The course was led by 4 main researchers from the partner institutions of this project, Dr. Ieronymos Zoidakis from the Biomedical Research Foundation of the Academy of Athens (BRFAA, Greece), Dr. Sergi Castellvi-Bel from the Fundació de Recerca Clínic Barcelona-Institut d'Investigacions Biomèdiques August Pi and Sunyer (FRCB-IDIBAPS, Spain), Dr. Remond Fijneman from the Netherlands Cancer Institute Antoni van Leeuwenhoekziekenhuis (NKI-AVL, The Netherlands) and Dr. Milena Čavić from the Institute for Oncology and Radiology of Serbia.

First day 01.06.2023. was dedicated to topics related to the application of clinical proteomics - Tonia Vlahou (BRFAA), clinical transcriptomics - Soufyan Lakbir (NKI-AVL),

epigenomics – Miljana Tanić (IORS), metabolomics - Ana Đurić (IORS), clinical applications of mass spectrometry – Nikos Paschalidis (BRFAA), HAP-1 cell models - Gemma Llargués (IDIBAPS), gene editing – Xavier Dominguez-Rovira (IDIBAPS), organoids - Laia Bonjoch (IDIBAPS) and fragmentomics – Alessandro Leal (Delfi Diagnostics) in oncology research.

Second day 02.06.2023. was dedicated to topics related to the application of circulating tumor DNA in oncological diagnostics - Raymond Fyneman (NKI-AVL), the discovery of frequent and rare genetic variants in colorectal cancer - Sergi Castellví-Bel (IDIBAPS), the application of omics techniques in predicting the response to chemoradiotherapy in rectal cancer - Mladen Marinković, Aleksandra Stanojević, Milena Čavić (IORS), spatial transcriptomics - Emmanouil Athanasiadis (UniWA), metabolomics in screening - Julie Courraud (NKUA), chemoproteomics in the identification of oncological therapeutic targets - Guillaume Médard (NKUA), multiplex ELISA in validation and clinical implementation of biomarkers - Leonidas Alexopoulos (PROTAVIO), as well as the erroneous application of markers from urine - Ieronymos Zoidakis (BRFAA).

Individual reports of IORS clinicians and researchers who attended this course perfectly show the benefit of such targeted meetings. All participants were engaged and interested, actively participated in discussions and expressed great collegiality and desire to improve and apply modern methods.

The training agenda included topics:

#### Day 1

- 1.1. Clinical Proteomics – Tonia Vlahou
- 1.2. Clinical Transcriptomics – Soufyan Lakbir
- 1.3. Epigenomics in Cancer Research – Miljana Tanić
- 1.4. Metabolomics in Cancer Research – Ana Djuric
- 1.5. Mass Cytometry Clinical Applications – Nikolaos Paschalidis
- 1.6. Gene Editing – Xavier Dominguez-Rovira
- 1.7. HAP1 Cellular Model – Gemma Llargués-Sistac
- 1.8. Organoids Modeling – Laia Bonjoch

#### Day 2

- 2.1. Cancer Diagnosis Using Circulating Tumor DNA – Remond Fijneman
- 2.2. Discovery of Common and Rare Genetic Variants for Colorectal Cancer – Sergi Castellví-Bel
- 2.3.a Predicting Response to Chemoradiotherapy in Rectal Cancer Using Omics Approaches – Milena Cavic
- 2.3.b Predicting Response to Chemoradiotherapy in Rectal Cancer Using Omics Approaches – Mladen Marinkovic
- 2.3.c Predicting Response to Chemoradiotherapy in Rectal Cancer Using Omics Approaches – Aleksandra Stanojevic
- 2.4. Transcriptomics in Hematological Malignancies – Christos Kontos
- 2.5. Amyloid Typing by Mass Spectrometry – Julie Courraud
- 2.6. Chemoproteomics Approaches for the Identification of Therapeutic Targets in Cancer – Guillaume Médard
- 2.8. Biomarker Ruin in Urine – Makis Zoidakis

Teaching material from the "Omics data generation and integration with clinical information" workshop is available at the project website [Training section](#).

Other documents relevant to the workshop:

- [Agenda](#)
- Attendance list [Day 1](#), [Day 2](#)
- [Report](#)

#### **1.4. Post-award grant management training**

Post-award grant management training organized by the STEPUPIORS project as a post-congress symposium of the SDIR-6 meeting “From Collaboration to Innovation in Cancer Research” of the Serbian Association for Cancer Research was held on the 4th of October 2023 in Hotel Royal Inn in Belgrade, Serbia in the period from 11 – 18.30 CET. Lecturers were from partner institutions, Fundació de Recerca Clínic Barcelona-Institut d'Investigacions Biomèdiques August Pi i Sunyer (FRCB-IDIBAPS), the Biomedical Research Foundation of the Academy of Athens (BRFAA) and company for research, management and communication – Exelixis from Athens, Greece, and the Netherlands Cancer Institute (NKI AVL). The topics were presented by: Dr Lidia Castro (FRCB-IDIBAPS), MSc Joan Pallarés (FRCB-IDIBAPS), Dr Ieronymos Zoidakis (BRFAA), Dr Christos Ilioudis (BRFAA), MSc Dimitris Raptis (Exelixis), Dr Adrià Closa (NKI-AVL) and Dr Remond Fijneman (NKI-AVL).

Round table discussions and sharing experience of several principal investigators of successful EU-funded and national grants from Serbia, Prof. Dr Miroslav Savic, Dr Svetlana Jovanovic, Dr Milos Ciric and Dr Milena Cavic concluded the training.

The training was attended by 68 participants (72% of them were women) mostly from the Institute for Oncology and Radiology of Serbia as the host institution, and from the 12 other research institutions.

The training agenda included topics:

1. Legal Issues HE – Lidia Castro
2. Scientific Reporting and Communication with the Project Officer – Christos Ilioudis and Dimitris Raptis
3. Discussion – Makis Zoidakis
4. Personnel Cost and Equipment Depreciation – Joan Pallares
5. Data Management and Upload to cBioPortal – Adria Closa
6. Dissemination, Communication and Exploitation – Lidia Castro

Teaching material from Post-award grant management training is available at the project website [Training section](#).

Other documents relevant to the training:

- [Agenda](#)
- [Attendance list](#)
- [Report](#)
- [Lecture outlines](#)

### **1.5. Preparing future faculty for teaching**

An online webinar on Preparing Future Faculty for Teaching was organized by Professor Zoidakis on December 13, 2023. 19 researchers participated in the workshop. The workshop presented skills required for careers in academia and industry and was aimed mainly at early-stage researchers and aims to prepare them to become future leaders in their scientific fields. Representative topics covered were effective teaching methods, critical assessment of scientific papers, leadership, teamwork, work ethic, and ensuring gender equality.

Teaching material from Preparing Future Faculty for Teaching webinar is available at the project website [Training section](#).

Other documents relevant to the webinar:

- [Report](#)
- [Participant list](#)

### **1.6. Management support to the IORS team**

An online webinar on Management support was organized by Dr. Christos Ilioudis from BRFAA on January 22, 2024, for IORS project management staff.

The webinar included topics:

1. Project Summary in SyGMA
2. Critical Risks
3. Impact and impact continuation sections
4. Financial Reporting
5. Person effort in research WPs
6. Equipment depreciation

Teaching material from Management support to the IORS team webinar is available at the project website [Training section](#).

### **1.7. Colorectal cancer screening: great opportunities and new challenges**

STEPUPIORS webinar entitled "Colorectal cancer screening: great opportunities and new challenges" by Prof. Antoni Castells from Hospital Clínic de Barcelona was held on 25 April 2024, from 10:00 to 11:00 AM (CET). The webinar was organized as a joint hybrid event of the STEPUPIORS project and the Serbian Association for Cancer Research (SDIR) during the SDIR Scientific Day held at the University of Novi Sad, Serbia. The webinar was attended by around 30 online and 50 onsite Serbian and international researchers.

During the webinar, Prof. Castells talked about all the opportunities and challenges researchers and clinicians are facing in implementing colorectal cancer screening. The topics that were discussed during the webinar included: colonoscopy as the most accurate method for CRC screening, fecal immunochemical testing as an adequate approach for an organized screening program, the effectiveness of FIT- and colonoscopy-based screening in terms of CRC mortality and biomarker-based screening strategies for CRC prevention.

Teaching material from Management support to the IORS team webinar is available at the project website [Training section](#).

Other documents relevant to the webinar:

- [Report](#)

### 1.8. Summer school *Liquid biopsy technologies*

In the period from September 30 to October 4, 2024, sixteen clinicians and researchers of the Institute for Oncology and Radiology of Serbia attended the four-day summer school "Liquid Biopsy Technologies" that was held at the Analysis of Circulating Tumor Cells Laboratory (ACTC) lab, Dept. of Chemistry, National and Kapodistrian University of Athens (NKUA), Athens, Greece. The course on liquid biopsies was organized in the form of lectures that were held on the first day of the course and "hands-on" demonstrations of liquid biopsy techniques that were held in laboratory settings for the next 3 days. Participants were divided into three groups of 6 to 7 researchers. During the fifth day of the course, the participants attended lectures at the One-day Conference "LIQUID BIOPSY: Latest advances and applications in oncology" which was organized by the Hellenic Society of Liquid Biopsy. The course covered the theoretical and practical knowledge of the applications of liquid biopsies in oncology, isolation of circulating tumor DNA (ctDNA) and circulating tumor cell (CTC), characterization and enumeration of CTCs, detection of mutations in ctDNA, ctDNA methylation analyses, digital droplet PCR and preanalytical aspects and quality control in liquid biopsies. The lectures and practical part of the course were led by Prof. Evi Lianidou, Ass. Prof. Athina Markou, Dr Aliko Ntzifa, Post-Doctoral Research Associate, Stavroula Smilkou, MSc; Elena Thanou, MSc, and Elina Lagopodi, MSc, from the ACTC lab, Dept of Chemistry, NKUA, Dr Miljana Tanic, Senior Research Associate, IORS, Dr Remond Fijneman and Dr Paul Van der Leest, from NKI AVL.

The summer school included topics:

1. Liquid Biopsy: an introduction | E. Lianidou
2. Liquid biopsy: an overview in Serbia - M. Tanic
3. ctDNA applications in colorectal cancer - R. Fijneman
4. CTC: an overview of enrichment technologies - A. Markou
5. CTC: enumeration and phenotypic characterization - S. Smilkou
6. CTC: molecular characterization - A. Markou
7. ctDNA: mutation detection / PCR, NGS - A. Markou
8. ctDNA: methylation analysis /MSP, cfMeDIP - A. Ntzifa
9. The technical possibilities of droplet digital PCR analyses - P. Van der Leest
10. Pre-analytical aspects and Quality Control in liquid biopsy applications: How important is it? - A. Ntzifa

Teaching material from summer school Liquid Biopsy Technologies is available at the project website [Training section](#).

Other documents relevant to the training:

- [Agenda](#)
- [Attendance list](#)
- [Report](#)



## 2. Evaluation reports

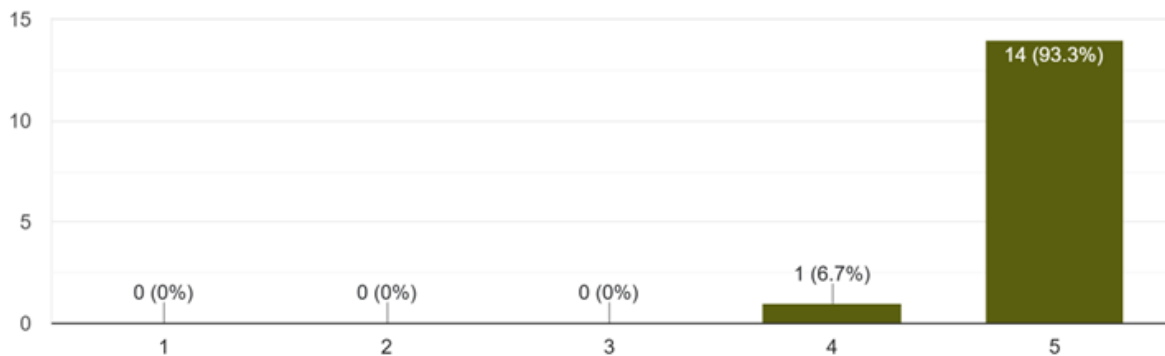
After major STEPUPIORS training events participants filled out Feedback Forms. Evaluation reports of the events and the overall satisfaction of participants are presented below.

### 2.1. Evaluation report of Pre-award grant management training

According to the responses, participants of the Pre-award grant management training expressed high satisfaction, high relevance of the training to their work, graded most of the lectures with high marks, and gave high grades to the overall logistics of the event. The responses to the [Pre-award grant management training questionnaire](#) are given in Figure 1.

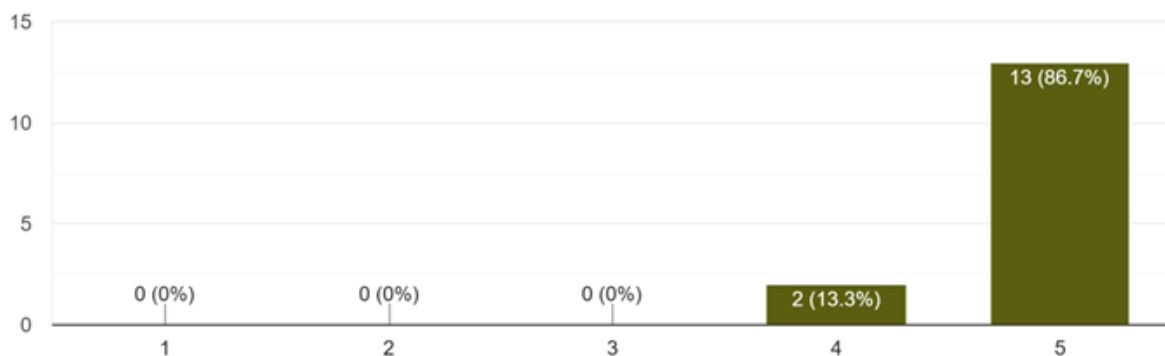
How satisfied were you with the event?

15 responses

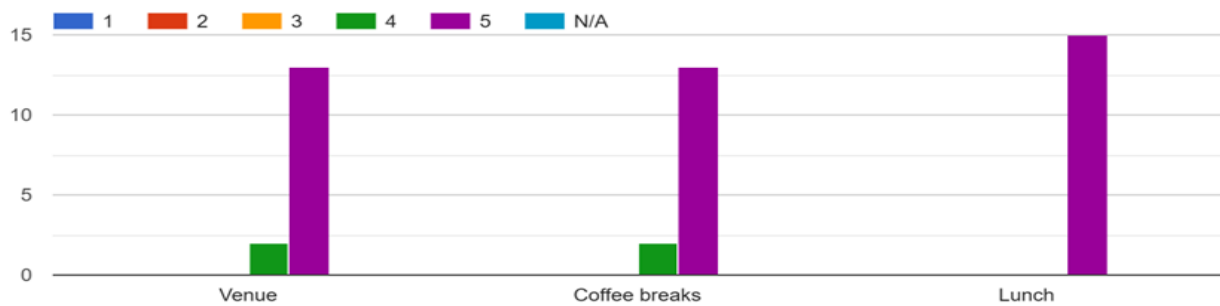


How relevant and helpful do you think it was for your grant writing skills?

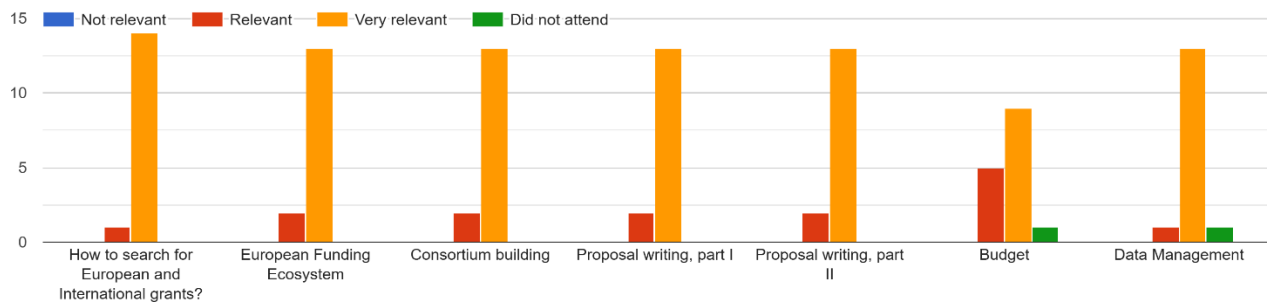
15 responses



How satisfied were you with the logistics?



Which sessions did you find most relevant?



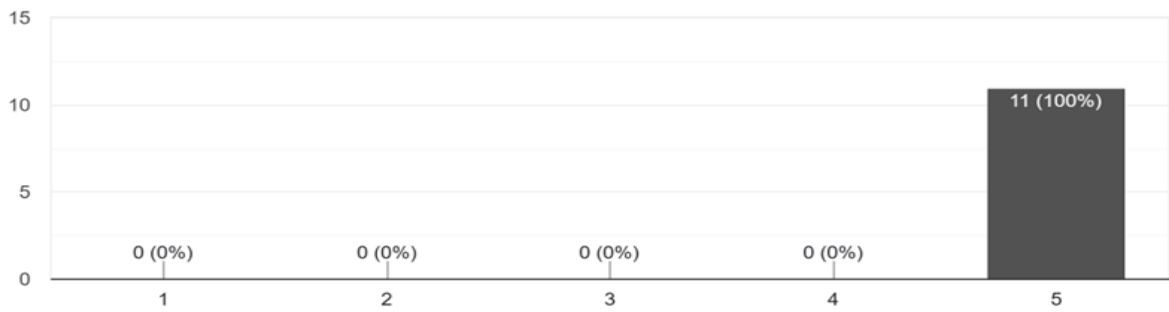
**Figure 1.** Evaluation report of Pre-award grant management training.

## 2.2. Evaluation report of Omics data generation and integration with clinical information

According to the responses to the [Omics data generation and integration with clinical information questionnaire](#), all participants gave high grades to the relevance and helpfulness of the workshop for their research. Furthermore, all participants expressed that they were highly interested in the omics and more interested in learning about them after the workshop. Participants were also delighted with the overall logistics of this workshop. Also, participants expressed that they were glad to have the opportunity to meet in person so many people working in different fields and engage in discussions and expressed a wish to meet more often. Few participants had objections to the length of the lectures. A summary of the responses collected from the evaluation forms is given in Figure 2. below:

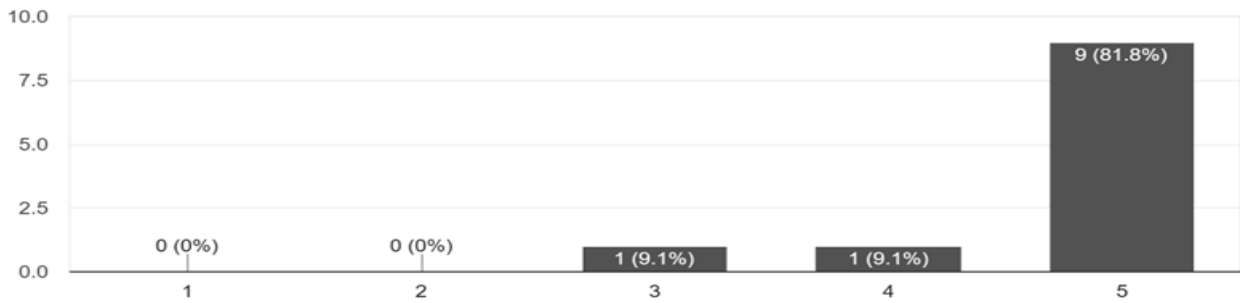
How satisfied were you with this workshop overall?

11 responses



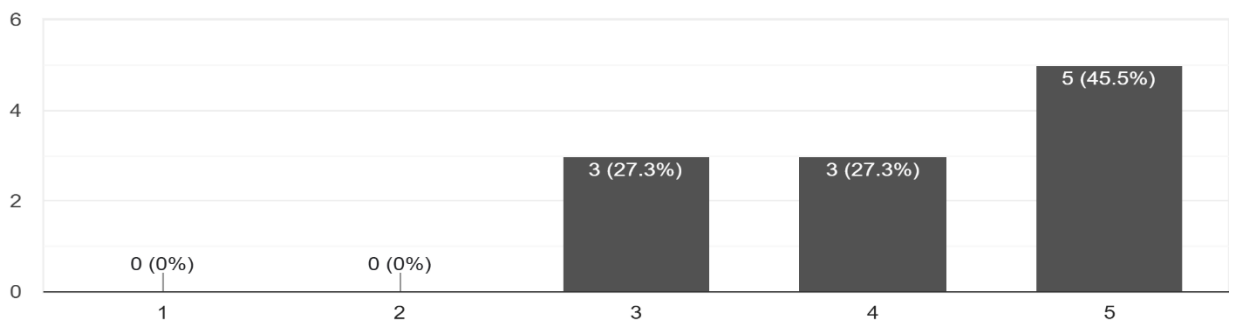
How would you rate the relevance and helpfulness of this workshop for your research?

11 responses



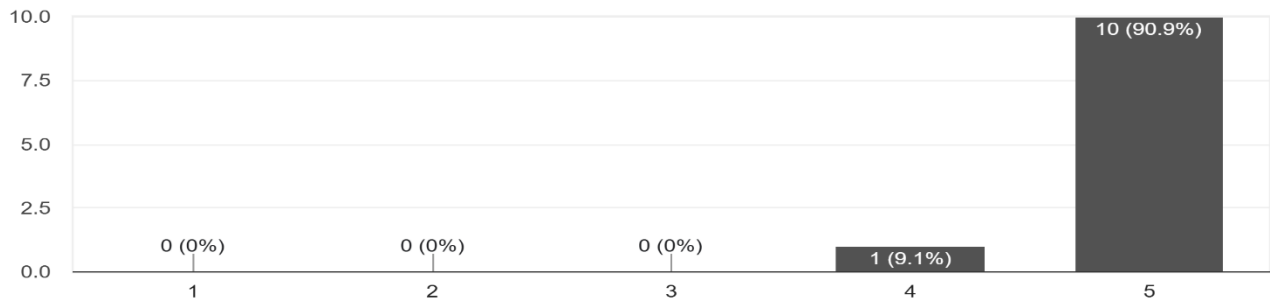
How interested were you in learning about "Omics" before attending this workshop?

11 responses



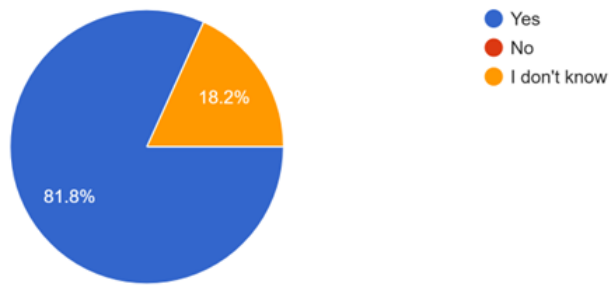
How interested are you in learning more about "Omics" after attending this workshop?

11 responses

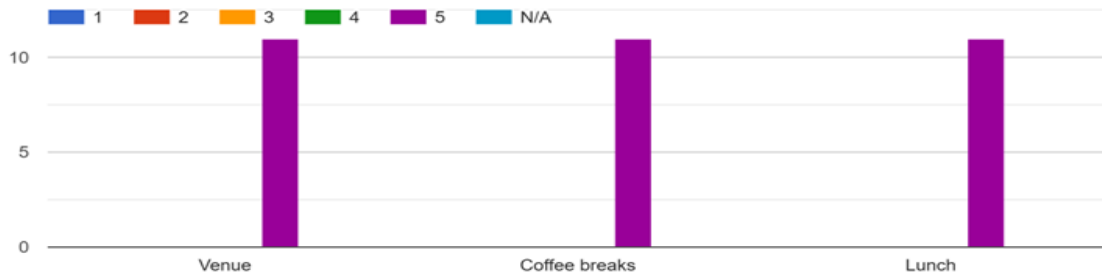


Do you plan to utilize the teaching materials provided during the workshop in the future?

11 responses



How satisfied were you with the logistics of this workshop?



What did you like about the workshop?

6 responses

1. open to discussion
2. The opportunity to meet in person so many people working in different field, and to discuss with them all the lectures we had.
3. I liked that it was oriented towards students, that the lecturers were of high quality and expertise, and that they were also very willing to discuss. I could also hear from the lecturers about their failures, from which they gained the most experience.
4. Interesting line of speakers
5. The lectures were great and there was enough time to discuss between sessions.
6. The workshop on various omics techniques was highly enlightening, as it effectively demonstrated the potential of omics and its integration into clinical practice for the benefit of oncology patients. I was particularly impressed by how the course showcased the practical applications of omics in understanding the underlying mechanisms of cancer and its personalized approach to diagnosis, treatment, and patient management.

What could be improved?

5 responses

1. length of lecture
2. How about meeting more often, having more trainings like this?
3. Maybe assignment to engage with the material
4. Seating arrangement more spaced, 3 persons per table was too crowded.
5. One potential improvement for the workshop would be to adjust the duration of the lectures. This adjustment would provide participants with more focused sessions and allow for the inclusion of interactive elements like group discussions and Q&A sessions. By giving more time for engagement and interaction, the workshop can help participants better understand the topics and share knowledge with each other.

Please share any additional comments regarding the sessions or the overall agenda of the workshop. 4 responses

1. They combined the beautiful and the useful.
2. Balanced workshop on omics topics.
3. I found the sessions to be particularly valuable and I believe this approach should become a standard practice in workshops and educational programs.
4. Great workshop, congratulations!

**Figure 2.** Evaluation report of Omics data generation and integration with clinical information.

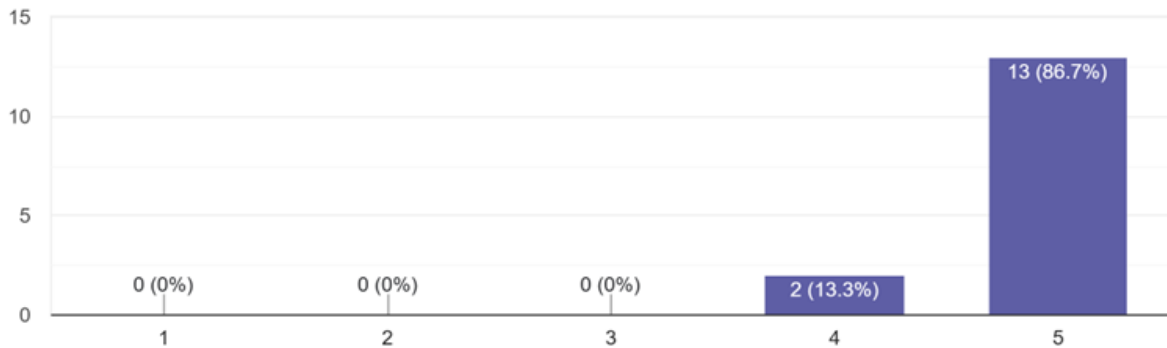
### 2.3. Evaluation report of Post-award grant management training

The majority of the participants of the Post-award management training gave the highest marks to the relevance and helpfulness of the training for their project management skills and expressed great satisfaction with the event and the overall logistics of the event.

The summary of the responses to the [Post-award grant management training questionnaire](#) is given in Figure 3. below:

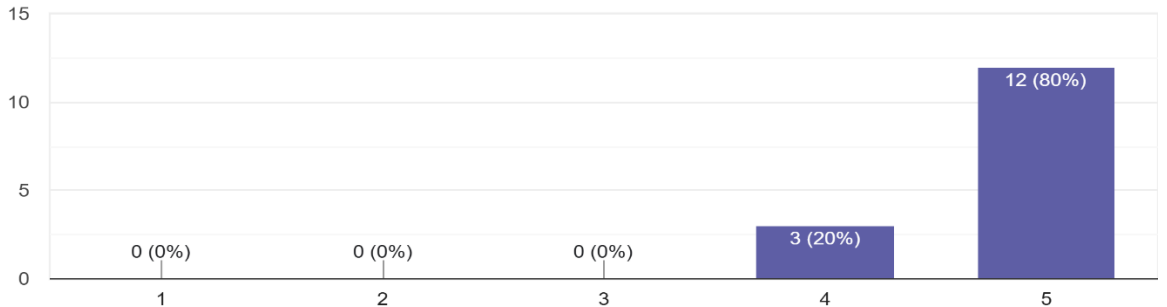
How satisfied were you with the event?

15 responses

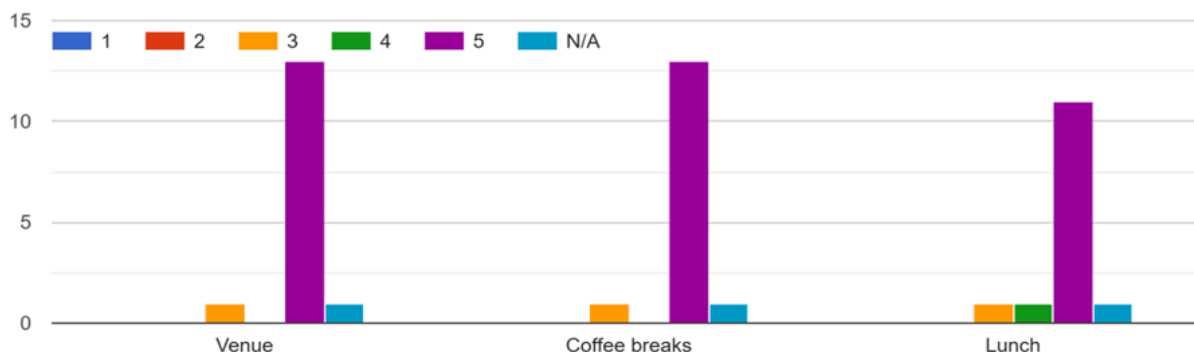


How relevant and helpful do you think it was for your grant managing skills?

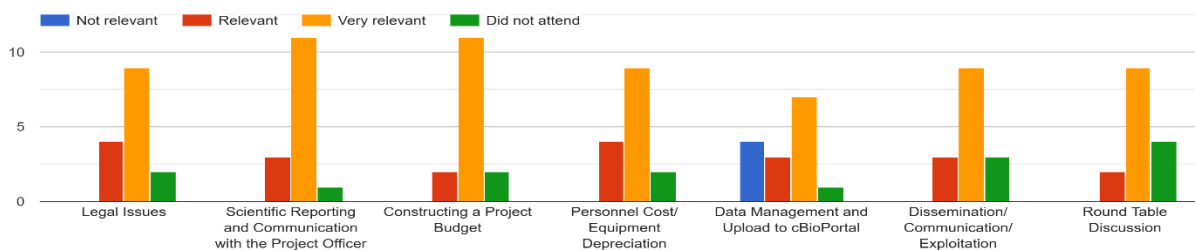
15 responses



How satisfied were you with the logistics?



Which sessions did you find most relevant?



Any additional comments regarding the sessions or overall agenda? Were there any topics that you felt were missing? 1 response

Thank you for your hospitality and great effort. However, the training took too long. Computers weren't really needed. The presentation on data management was disorganized.

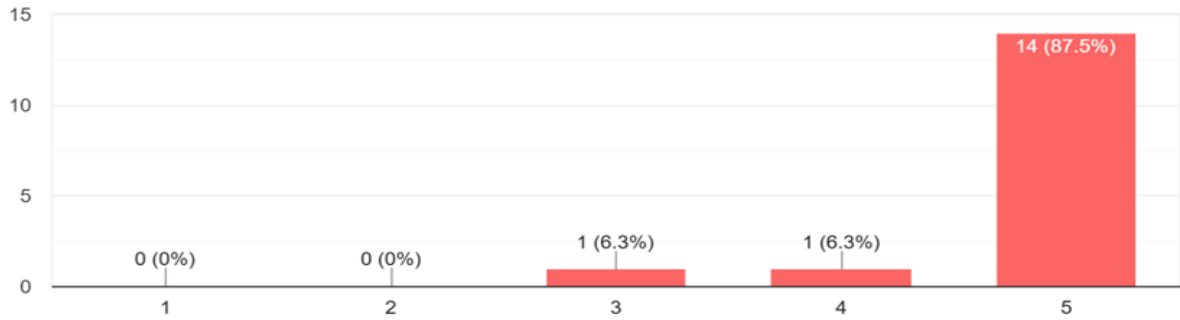
**Figure 3.** Evaluation report of Post-award grant management training.

**2.4. Evaluation report of Summer school *Liquid biopsy technologies***

According to the responses of participants, everybody was delighted and found the summer school very useful for their future research. The summary of the responses to [the Summer school Liquid biopsy technologies questionnaire](#) is given in Figure 4. below:

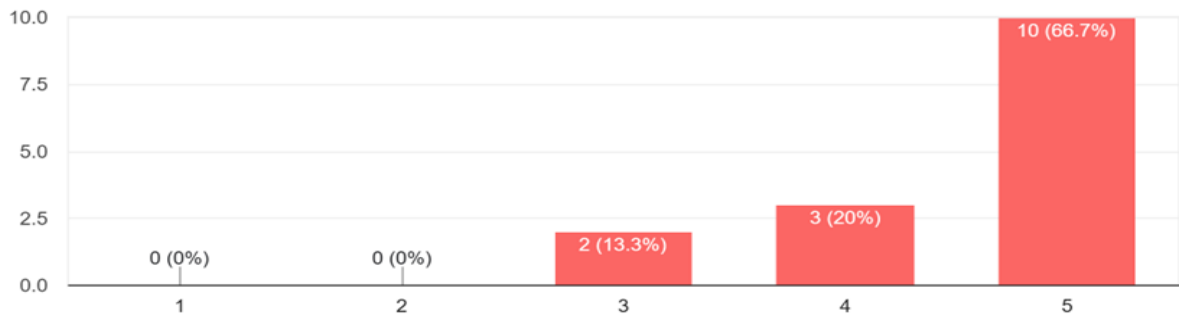
How satisfied were you with this summer school overall?

16 responses



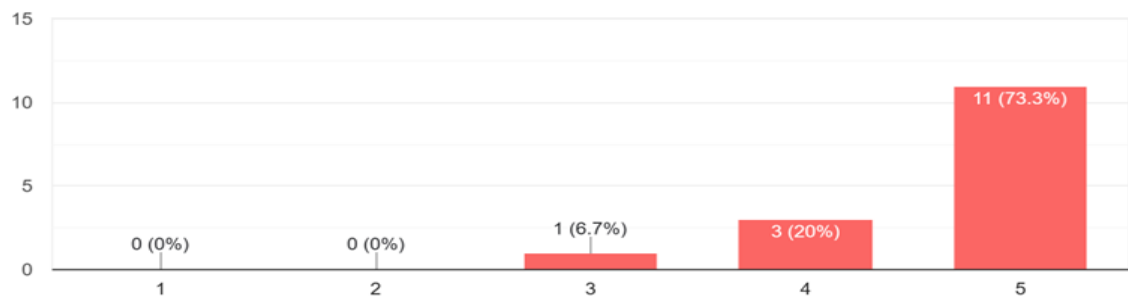
How would you rate the relevance and helpfulness of this summer school for your research?

15 responses



How interested were you in learning about liquid biopsy technologies before attending this summer school?

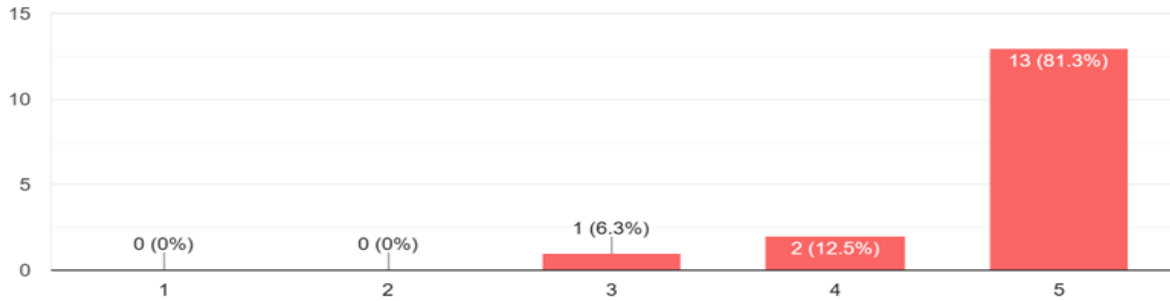
15 responses





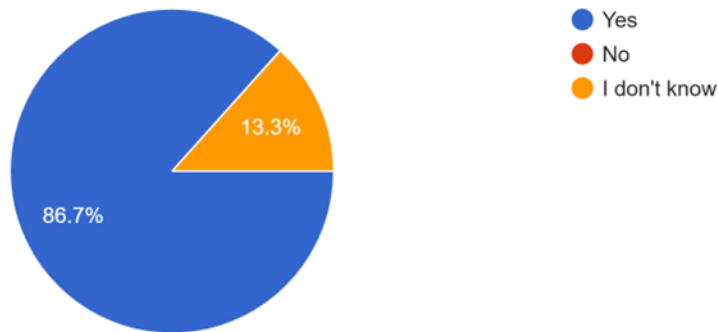
How interested are you in learning more about liquid biopsy technologies after attending this summer school?

16 responses

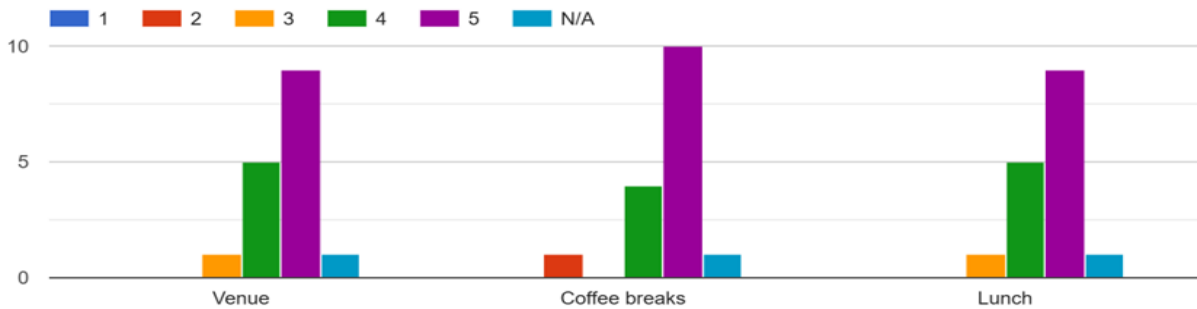


Do you plan to utilize the teaching materials provided during the summer school in the future?

15 responses



How satisfied were you with the logistics of this summer school?



What did you like about the summer school?

7 responses

1. Exchange of experiences on results and samples analyzed on digital droplet PCR
2. Comprehensive laboratory demonstration with detailed explanation of each step in the process.
3. The open approach of the host laboratory and all lecturers and organizers
4. Great organization, great people, knowledgeable scientists in the field, and useful techniques and methods.
5. I appreciated the organization and the hands-on training experience. I also enjoyed the discussions with colleagues from NKUA.
6. The opportunity to see new techniques in liquid biopsy.
7. Practical part of the training was organized great.

What could be improved?

6 responses

/

1. Microphone would improve earshot during introducing lectures.
2. Maybe to school last longer, because we had a great time as in ACTC lab as in Greece overall
3. I wish the course had lasted longer and that there had been another lecture focused on the basics of ctDNA and CTC formation.
4. Presentation of several real cases.
5. It would be good to include some kind of round table or discussion session where the real situations of the application of liquid biopsy in clinical settings in countries across Europe would be discussed.

Please share any additional comments regarding the sessions or the overall agenda of the summer school. 2 responses

1. Thank you for a very comprehensive overview of liquid biopsy approaches
2. I have no additional comments. Thank you for providing this very useful opportunity.

**Figure 4.** Evaluation report of the Summer school “Liquid biopsy technologies”.