



Report

D1.2 Midterm report staff exchanges

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Executive Summary

The goal of WP1 – Short-term staff exchange is to promote the interchange of scientific knowledge and expertise between the consortium, in line with the specified Strategic Areas identified and the OLISSIPO objectives. In particular, the goal of WP1 is to implement effective staff exchange between the Twinning partners towards a more balanced scientific capacity of the teams. The planned visits also include the exchange of administrative staff, with the goal of improving project management skills at INESC-ID.

Due to the COVID-19 pandemic and restrains in travelling, alternative activities were carried out during the first year to promote the efficient exchange of ideas and information between partners. In March 2022 (M15) and following the alleviation of the pandemic restrictions that span the full first year of the project, it was possible to effectively start the staff exchanges.

This deliverable outlines the midterm report on staff exchanges, corresponding to the first 18 months of the project.

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1. Introduction

Short-term staff exchanges were planned to promote the interchange of scientific knowledge and expertise between the OLISSIPO consortium. In particular, these actions enhance INESC-ID research and innovation competence in mathematical and computational modelling of biological systems and provide training to staff and Early Stage Researchers and promote and strengthen collaborations between the Twinning partners. These visits also include the exchange of administrative staff to improve project management and administration skills at INESC-ID.

During the first year of the OLISSIPO project, the coronavirus pandemic restrained work travel, and consequently, the efficient exchange of ideas and information. In line with this, a mitigation plan was drawn at the beginning of 2021 (M02) for carrying out the project in the context of the pandemic and its associated restrictions (Deliverable 1.1).

With the high vaccination rates, travel restrictions have been alleviated for European countries in 2022 and the OLISSIPO team had the opportunity to start travelling in March 2022 (M15). The Consortium is actively following the progress of these Tasks and evaluate the impact of more than one year of delay in the full implementation of the planned activities.

1.1 Deliverable objective

This report outlines the mitigation activities carried out in 2021 to promote staff and ESR exchanges between OLISSIPO partners in the context of the COVID-19 pandemic as well as the effective staff exchanges between institutions during the first half of 2022.

2. Alternative actions in 2021

Scientific internships and exchanges were postponed to 2022. However, the interaction among OLISSIPO institutions was promoted with the organization of several alternative actions (online) to encourage institutions' interaction during 2021.

2.1. OLISSIPO Week

This activity was carried out virtually for three consecutive days, and its main goal was to facilitate the interaction among members of the four partner institutions, to share the main scientific topics addressed by each team member, and to identify novel promising routes and synergies for joint work, anchored in the OLISSIPO scientific Strategic Areas. The OLISSIPO Week had a total of 27 speakers and more than 30 participants. All partners were involved in

preparing the agenda and participated in this event. INESC-ID and EMBL were responsible for organizing all the logistics (sending the invitation emails, settling the ZOOM link and moderating the sessions).

The agenda of the meeting is in Figure 1. Each day was dedicated to one of the identified Strategic Areas (A1 - single-cell analysis, modeling and simulation; A2 - mathematical modeling of inter-cell and communities' interactions; A3 - computational phylogenetics of cells and communities; and A4 - translational bioinformatics, data management and software development) and the program was divided to ensure the participation of the PIs (Day 1), Senior Staff, and Early Stage Researchers from all the Twinning Institutions (Figure 2).



OLISSIPO Week (Virtual): 14th - 16th June 2021

Zoom Link: <https://videoconf-colibri.zoom.us/j/86771615711> (no password needed)

Agenda (CEST time, 1 hour ahead of Lisbon)

	Monday, 14 th June	Tuesday, 15 th June	Wednesday, 16 th June
CEST Time	Single-cell analysis, modeling and simulation	Single-Cell and Mathematical modeling of intercell and communities' interactions	Computational phylogenetics of cells and communities Translational bioinformatics, data management and software development
10:00	Welcome / Introduction		
10:15	PI talk <i>Susana Vinga</i>	Senior Staff / Postdoc Inria <i>Mariana Ferrarini</i>	Senior Staff / Postdoc ETH <i>Kuipers Jack</i>
20		Q&A	Q&A
25	Q&A	Senior Staff / Postdoc ETH <i>Jahn Katharina</i>	Senior Staff / Postdoc INESC-ID <i>Alexandre Francisco</i>
35		Q&A	Q&A
40	PI talk <i>Marie-France Sagot</i>	Early Stage Researcher Inria - <i>Nicolas Homberg</i>	Early Stage Researcher Inria - <i>Yishu Wang</i>
45		Q&A	Q&A
50	Q&A	Early Stage Researcher INESC-ID - <i>José Basílio</i>	Early Stage Researcher INESC-ID - <i>Daniel Gonçalves</i>
55		Q&A	Q&A
11:00	PI talk <i>Wolfgang Huber</i>	Early Stage Researcher ETH - <i>Xiang Ge Luo</i>	Early Stage Researcher EMBL - <i>Donnacha Fitzgerald</i>
5		Q&A	Q&A
10	Q&A	Early Stage Researcher Inria - <i>Antoine Villie</i>	Early Stage Researcher EMBL - <i>Tümay Capraz</i>
15		Q&A	Q&A
20	Short break (10')	Short break (15')	Short break (15')
30			
35	PI talk <i>Niko Beerenwinkel</i>	Early Stage Researcher ETH - <i>Manica Dragan</i>	Senior Staff / Postdoc EMBL <i>Katharina Imkeller</i>
40		Q&A	Q&A
45	Q&A	Early Stage Researcher EMBL - <i>Constantin Ahlmann-Eltze</i>	Q&A
50		Q&A	Senior Staff / Postdoc EMBL <i>Mike Smith</i>
55		Early Stage Researcher ETH - <i>Pedro Ferreira</i>	Q&A
12:00	Senior Staff / Postdoc EMBL <i>Junyan Lu</i>	Early Stage Researcher INESC-ID - <i>Carolina Peixoto</i>	Senior Staff / Postdoc INESC-ID <i>Rui Henriques</i>
5	Q&A	Q&A	
10	Senior Staff / Postdoc Invited by INESC-ID <i>Alexandra Carvalho</i>	Senior Staff / Postdoc Invited by INESC-ID <i>Marta Lopes (A2)</i>	Q&A
20			END
25	Q&A	Q&A	
30	END	END	
35			

Figure 1. OLISSIPO week agenda.

Presentations:

1. Susana Vinga, PI | *INESC-ID and the OLISSIPO project.*
2. Marie-France Sagot, PI | *Inria and the OLISSIPO project.*
3. Wolfgang Huber, PI | *EMBL and the OLISSIPO project.*
4. Niko Beerenwinkel, PI | *ETH Zürich and the OLISSIPO project.*
5. Junyan Lu, Researcher | *Advancing clinical cancer research through multi-omic profiling and data integration.*
6. Alexandra Carvalho, INESC-ID Alumni | *Model selection for temporal Biomedical data.*
7. Mariana Ferrarini, Researcher | *Transcriptomic analysis of host/microbe interactions.*
8. Katharina Jahn, Researcher | *Tumour mutation clustering based on single cell DNA-seq.*
9. Nicolas Homberg, ESR | *Small non coding RNAs.*
10. José Basílio, ESR | *Spatial transcriptomics of aortas from high fat diet mice.*
11. Xiang Ge Lou, ESR | *Single cell analysis of tumour mutations and Mutual Hazard Network.*
12. Antoine Villié, ESR | *Post-selection inference sequence-motifs.*
13. Monica Dragan, ESR | *Unsupervised multi-modal tumour clustering.*
14. Constantin Ahlmann-Eltze, ESR | *Single cell analysis and glmGamPoi (Bioconductor)*
15. Pedro Ferreira, ESR | *Integration from scDNA and scRNA.*
16. Carolina Peixoto, ESR | *Computational Biology for Modeling Oncological Transcriptomic Data.*
17. Marta Lopes, INESC-ID Alumni | *MONET project.*
18. Jack Kuipers, Researcher | *Single cell to reconstruct tumour heterogeneity.*
19. Alexandre Francisco, Researcher | *Algorithm development and phylogenetic trees inference.*
20. Yishu Wang, ESR | *Cophylogeny reconciliation.*
21. Daniel Gonçalves, ESR | *Integrative analysis of colon cancer samples to check for glycosylated proteins to serve as targets for immune cell clearance.*
22. Donnacha Fitzgerald, ESR | *Single cell integrative analysis, drug screening and Immunohistochemistry (codex) for spatial distribution.*
23. Tuemay Capraz, ESR | *Methods for Multiomics data integration.*
24. Katharina Imkeller, Researcher | *Functional Genomics and CRISPR screens.*
25. Mike Smith, Researcher | *Bioconductor.*
26. Rui Henriques, Researcher | *Biomedical data analysis and multiOMICS.*

All presentations were made available to all the participants.

In summary, INESC-ID had 11 participants, including 3 ESRs (José Basílio, Carolina Peixoto and Daniel Gonçalves). Inria participated with 5 researchers, 3 of them ESRs (Nicolas Humberg, Antoine Villié and Yishu Wang). 8 participants were present from EMBL, including 3 ESRs (Constantin Ahlmann-Eltze, Donnacha Fitzgerald and Tuemay Capraz). ETH had 6 participants, including 3 ESRs (Xiang Ge Luo, Monica Dragan and Pedro Ferreira).



Figure 2. Group photo in the OLISSIPO week (Day 1).

A short form was created to have feedback from the participants (Figure 3).

Figure 3. Form created after the OLISSIPO Week to have feedback from the participants.

Table 1. Feedback from OLISSIPO Week participants (1 - Not useful at all/Not at all likely, 5 - Extremely useful/Extremely likely).

How useful was the event to get to know participants from the other consortium partner institutions?	How useful was the information presented at the event?	How likely are you to attend a similar event again in the future?	Do you have any further comments or suggestions?
5	5	5	Very well done! Lots of success for the project.

5	5	5	It's hard to brainstorm virtually! I think in-person meetings will be great to allow people to interact and come up with new ideas for new projects.
4	4	5	Look forward to the future in-person event!

2.2. OLISSIPO Slack

OLISSIPO created a workspace in Slack to promote interactions between students and all the team (olissipoworkspace.slack.com). All partners were invited to share it with their researchers. At this moment, the workspace has 25 members and since we started with the staff exchanges in March 2022, the group became more active (Figure 4). INESC-ID created the workspace and is responsible for sending the link to all partner institutions and inviting them to join the space.

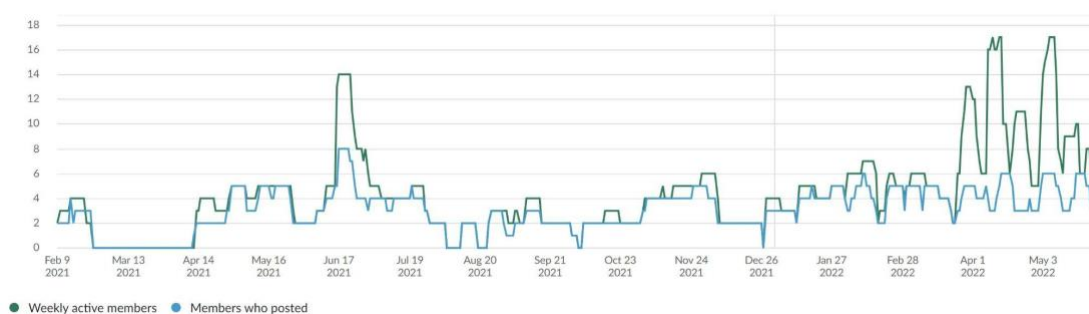


Figure 4. Slack statistics.

2.3. OLISSIPO Twin Seminars

OLISSIPO Twin Seminars (initially in-classroom teaching, under WP2, Task 2.3) were moved online during the first and a half project year. It is expected that the OLISSIPO Twin Seminars can contribute to disseminate the scientific work and expertise of INESC-ID and all the Consortium, fostering collaboration between teams and contributing to attracting new talented researchers. Due to travel restrictions in 2021, this series of seminars were planned more frequently. These seminars have been organized to include two short presentations (20-30 min/each), one from a Lecturer from the Lisbon team followed by a second presentation

from a twin international researcher working on similar topics. In the end, a discussion is opened to the public to further promote the interaction between all the participants. These lectures include experts from a specific subject related to the project Strategic Areas in Computational Biology previously identified. The seminars are open to everyone interested and further recorded and disseminated on the [OLISSIPO YouTube channel](#) (upon the agreement of all the participants). This action will be explained in more detail in *D2.3 - Midterm report on organized joint events, schools, workshops and conferences*.

3. Scientific internships and exchanges

Work travel will be reinforced in 2022 and 2023 to compensate for the forced reduction of these activities in 2021. The OLISSIPO team has already started travelling and other tentative dates to these visits occur at the second semester of 2022 were already settled (see *D4.1- OLISSIPO Early Stage Researchers training programme*). However, due to the current uncertainty, staff exchange for 2023 will be planned by the end of 2022.

3.1. INESC-ID - Inria exchange

3.1.1. Visit 1 (INESC-ID > Inria)

Three ESR (Carolina Peixoto, Mónica Silva and José Basílio), the project coordinator (Professor Susana Vinga) and the project manager (Dr. Sara Tanqueiro) visited Inria in Lyon during 6 (March 17-24, 2022) or 8 days (March 19-24, 2022), accordingly to their availability to travel.

INESC-ID team was hosted at the Université Claude Bernard Lyon 1 (Lyon) by Marie-France Sagot, one of the PIs of the OLISSIPO project and a Senior Researcher at Inria. The agenda of this first visit is in Figure 5.

Lisbon > Lyon Visit								
CET time	17	18	19	20	21	22	23	24
09:30-12:00	Arrival	Visit to Inria	Weekend: Visit Lyon		INESC-ID scientific presentations	INESC-ID and Career Paths	Inria Overview Joint discussion	Wrap up and future directions
12:00-14:00		Lunch			Lunch			
14:00-17:00		Discussion of past and future projects			Talk by INESC-ID Prof. Susana Vinga	Inria Overview Joint discussion	Joint discussion	
17:00-19:00		Free time			Free time			
19:00		Dinner			Dinner			

Figure 5. Agenda of the first visit from INESC-ID team to Inria in Lyon (March 2022).

The scientific presentations of the INESC-ID team were opened to the students and postdocs of European Research on Algorithms and Biology formal and Experimental (Erable) from Inria with 14 participants (7 ESRs).

INESC-ID team:

1. Carolina Peixoto, ESR | *Computational Biology for Modeling Oncological Transcriptomic Data*.
2. José Basílio, ESR | *Spatial transcriptomics of aortas from high fat diet mice*.
3. Mónica Silva, ESR | *Approaching Omics: From Medical Imaging to Computational Biology*.
4. Susana Vinga, Professor | *From sequences to clinical data analysis: bridging computer science and bioengineering for modeling biological systems*.

Inria team:

1. Marie-France Sagot, Researcher
2. Vincent Lacroix, Professor
3. Arnaud Mary, Professor
4. François Gindraud, Researcher
5. Laurent Jacob, Researcher
6. Audric Cologne, Researcher
7. Louis-Mael Gueguen, ESR
8. Darmon Sasha, ESR
9. Nicolas Homberg, ESR
10. Maxime Mahout, ESR
11. Luca Nesterenko, ESR
12. Antoine Villie, ESR
13. Johanna Trost, ESR
14. Sylvie Nguyen, Undergraduate

After each presentation, time was allocated for questions and discussion (Figure 6).



Figure 6. INESC-ID and Inria teams.

During the following days, free discussions between INESC-ID team members and the permanent members who are at the Laboratoire de Biométrie et Biologie Évolutive (LBBE), where Inria is physically located. The members of the INESC-ID team had the opportunity to reflect with Marie-France Sagot about their career paths and future plans for professional development. Sara Tanqueiro had also the opportunity to work together with Marie-France Sagot and Susana Vinga on the next deliverables and the upcoming events of the OLISSIPO project.



Figure 7. Photos from INESC-ID > Inria visit (March 2022).

3.1.2. Visit 2 (Inria > INESC-ID)

During two weeks, Marie-France Sagot visited INESC-ID (April 25 – May 10, 2022), together with an external visitor – Ariel Silber (April 25 – May 2, 2022) from the Department of Parasitology, Institute of Biomedical Sciences, University of São Paulo. Both researchers joined the meeting between ETH and INESC-ID teams (April 26-29, 2022 - see agenda below).

INESC-ID team had a meeting with Marie-France Sagot to discuss the challenges facing science in Portugal and how they can be addressed.

INESC-ID team:

1. Susana Vinga, Professor
2. Emanuel Gonçalves, Researcher
3. Mário Figueiredo, Researcher
4. Marta Lopes, INESC-ID Alumni
5. Sara Tanqueiro, Project Manager
6. Carolina Peixoto, ESR
7. Mónica Silva, ESR
8. José Basílio, ESR

In addition, Marie-France Sagot, Sara Tanqueiro and Susana Vinga had the chance to prepare the second edition of the Workshop Two for a Tango, the First Review Meeting, and plan the OLISSIPO Retreat.

More visits of Inria staff to INESC-ID are planned to occur in the Summer of 2022.

3.2. INESC-ID – EMBL exchange

3.2.1. Visit 1 (EMBL > INESC-ID)

Five ESR, one postdoc, one staff member and a senior project manager visited INESC-ID between April 4-7, 2022. The agenda of this first visit is in Figure 8.

EMBL > Lisbon Visit				
CEST time	4	5	6	7
08:45-09:00	Arrival	Welcome & Coffee		
09:00-10:30		EMBL presentations I	INESC-ID presentations	Joint Discussion
10:30-11:00		Coffee Break		
11:00-12:30		EMBL presentations II	Teamwork	Wrap up and future directions
12:30-14:00		Lunch (INESC-ID)	Lunch (Chiado)	Lunch (INESC-ID)
14:00-17:00		Free time	Social event	
17:00-19:00			Departure	
19:00/19:30				
	Welcome dinner (Chiado)			

Figure 8. Agenda of the first visit from EMBL team to INESC-ID in Lisbon (April 2022).

Scientific meetings with the EMBL team were opened to 20 students and researchers of INESC-ID and Instituto Superior Técnico (7 ESRs) (Figure 9). The participations from each Institution were (title of their presentations when applicable):

EMBL team:

1. Simone Bell, Project Manager
2. Julia Philipp, Researcher | *Managing omics data on different scales.*
3. Harald Vöhringer, ESR | *Delineating the tumor microenvironment in BHL.*
4. Hosna Baniadam, ESR | *Clustering single-cell RNA-seq counts.*
5. Donnacha Fitzgerald, ESR | *Probing B cell lymphomas with single-cell multi-omics.*
6. Tümay Capraz, ESR | *Statistical tools for high-throughput screening data.*
7. Constantin Ahlmann-Eltze, ESR | *Analysis of Multi-Condition Single Cell Data.*

INESC-ID team:

1. Susana Vinga, Project Coordinator
2. Sara Tanqueiro, Project Manager
3. Rui Henriques, Professor | *Learning epitranscriptomic brain patterning from peripheral tissue for neuropsychiatry.*
4. Alexandre Francisco, Professor | *On phylogenetic inference and algorithm engineering*
5. Carolina Peixoto, ESR | *Computational Biology for Modeling Oncological Transcriptomic Data.*

6. Mónica Silva, ESR | *Approaching Omics: From Medical Imaging to Computational Biology.*
7. Emanuel Gonçalves, Researcher | *Protein driven machine learning and network approaches for precision medicine.*
8. Pedro Monteiro, Researcher | *Genome-scale integrated regulatory-metabolic models: Predicting targets in yeasts.*
9. David Calhas, ESR
10. Leonardo Alexandre, ESR
11. Ana Rita Baião, ESR
12. Daniel Gonçalves, ESR
13. João Aparício, ESR
14. Roberta Colleti, Researcher
15. Alexandra Carvalho, Alumni
16. Marta Lopes, Alumni
17. Eunice Carrasquinha, Alumni
18. Filipa Borrego, Innovation Management Coordinator
19. Pedro Ferreira, Science Communication and Outreach Postdoctoral Coordinator
20. Ilda Ribeiro, European Projects Manager
21. Jorge Oliveira, PhD, BioData / ELIXIR



Figure 9. INESC-ID and EMBL teams during presentations.

Teamwork between INESC-ID and EMBL teams took place after all presentations. All participants were divided into three main groups and the results of the teamwork allow ESRs to find synergies between the work developed between INESC-ID and EMBL teams, design possible collaboration plans to potentiate the identified synergies and identify in which institution the work can be carried out. Based on the information collected, it was possible to identify the following key topics: 1) single-cell analysis, 2) biomarkers identification in metastasis and validation strategies, 3) Data normalization, management and augmentation, 4) survival analysis, 5) Multi-omics data integration, 6) Differential geometry in biological data.

An event of team building was also organised to increase motivation and promote cooperation (Figure 10).



Figure 10. INESC-ID and EMBL teams in the team building event.

A short form was created to have feedback from the participants about this first visit to INESC-ID. The obtained results are below (Table 2) and in the following testimonials.

OLISSIPO | Staff Exchanges | EMBL in Lisbon | 4-7 April 2022

Thank you for attending our meeting!

OLISSIPO – Fostering Computational Biology Research and Innovation in Lisbon – is an international research project funded by the European Commission within its H2020 Research and Innovation programme “Spreading Excellence and Widening Participation – Twinning”.

One of the main aims of this project is to promote the efficient exchange of knowledge and ideas and strengthen collaborations between the Twinning partners (INESC-ID, EMBL, Inria and ETH).

Between 4th and 7th of April, team members from EMBL had the opportunity to visit Lisbon and work together with INESC-ID staff.

Since the OLISSIPO project was designed to promote the efficient exchange of knowledge and ideas and strengthen collaborations between the Twinning partner, your feedback is essential for the success of the project.

Please reply until 13 April 2022.

Inicie sessão no Google para guardar o seu progresso. Saiba mais

*Obrigatório

Name *

A sua resposta

E-mail *

A sua resposta

Institution *

A sua resposta

Position *

A sua resposta

How does your work align with the OLISSIPO project? *
Briefly describe your research topics.

A sua resposta

How did this visit contribute to your work? *

A sua resposta

Did your interactions result in planning collaborative future work/ideas? *

A sua resposta

Overall, how do you rate this staff exchange? *

1 2 3 4 5

Not useful at all Extremely useful

Do you have any further comments or suggestions to improve future events? *

A sua resposta

Figure 11. Form created after the EMBL visit to Lisbon to have feedback from the participants.

Table 2. Feedback from EMBL > INESC-ID staff exchange participants.

Position	How does your work align with the OLISSIPO project?	Did your interactions result in planning collaborative future work/ideas?
Postdoc	I work in collaboration with Susana within the MONET project. Between the research topics there are the integration of multiomic data, glioma subtype classification and identification of biomarker as potential therapy targets.	Maybe.
ESR	I work on the analysis of Dynamic and temporal network analysis applied to several different domains. The techniques I use and develop may be applied to the domain of interest of the OLISSIPO project.	Yes.
Assistant professor	Biomedical data analysis (multi-omic My research focuses on using single-cell multi-omics to understand the intratumor heterogeneity of B cell lymphoma tumors, and identify patterns and biomarkers indicative of drug response. Primary research topics s, EHRs).	Yes, high potential.
ESR	My research focuses on using single-cell multi-omics to understand the intratumor heterogeneity of B cell lymphoma tumors, and identify patterns and biomarkers indicative of drug response. Primary research topics.	Yes.

Senior Project Manager	I'm involved in the project management tasks and communication and outreach activities.	We will continue working on the project aims and refine the management and outreach strategy.
ESR	single-cell multiomics analysis and method development.	Yes, at least an outline of a collaborative work.
ESR	Multi-omics data analysis.	Potential collaboration on creating methods to combine image data (MRI) with omics data.
ESR	Cancer precision medicine; biomarker selection; regularization.	Maybe yes, regarding single-cell transcriptomics.
ESR	Multi-omics integration for precision medicine in glioma disease.	For now, mostly ideas that, if feasible, may result in actual collaborations in the future.

Testimonials

How did this visit contribute to your work?

"I had some interesting interactions with the OLISSIPO members. I found very useful the group discussions, which allowed me to receive feedback and suggestions about my last research progresses."

"It was an experience that allowed me to better understand the research being done in the field and some of the main questions and techniques being used."

"Prospective synergies and knowledge acquisition."

"I had the chance to discuss recurring challenges I was facing in my projects, and connected with people who were also interested in addressing these challenges for future follow-up."

"It is interesting and useful to get insights from a project of the H2020 Twinning Programme."

"I got to discuss my work with people in a similar field."

"Get to know different people and their research topics."

"I got to know in detail the topics that EMBL is interested in and working on, that otherwise would be harder to understand in such a comprehensive and dynamic way. This allowed for: a) new ideas for omics data analyses to implement in the future/data integration techniques, b) establishment of a network of contacts from highly specialised people to whom I can easily reach out if needing some guidance, and/or c) better envision collaborations for the future."

Do you have any further comments or suggestions?

"All was very well organized! Thank you! I do not have any major suggestion."

"I think building a more concrete outline for future collaboration at the end of the event would be great."

"Maybe presentation slots not exclusive to an institute (e.g. the visiting one), and rather mixing it up, so each side gets to know the other as we go. This came up as an idea in a coffee break, when speaking with an EMBL visitor, that thought it was lacking some info about the host's current work (INESC-ID)."

Overall, how do you rate this staff exchange?

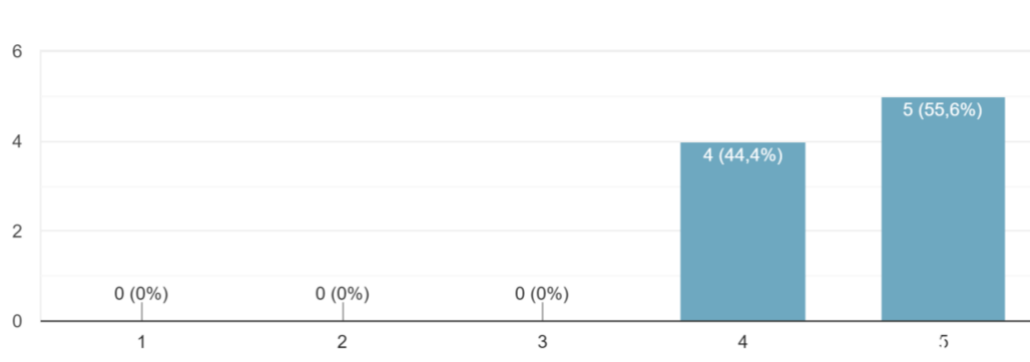


Figure 12. Participants' feedback (1 - Not useful at all, 5 – Extremely useful).

3.2.2. Visit 2 (INESC-ID > EMBL)

The visit of INESC-ID staff to EMBL is planned to occur in November 2022.

3.3. INESC-ID – ETH exchange

3.3.1. Visit 1 (ETH > INESC-ID)

Six ESRs and the PI visited INESC-ID between April 26-29, 2022. The agenda of this visit is in Figure 13.

ETH > Lisbon Visit				
WEST time	26	27	28	29
08:45-09:00	Arrival	Welcome & Coffee		
09:00-10:30		ETH presentations I	INESC-ID presentations I	Teamwork
10:30-11:00		Coffee Break		
11:00-12:00		ETH presentations II	Teamwork	Wrap up and future directions
12:30-14:30	Welcome Lunch (close to INESC-ID)	Lunch box (Picnic - Baixa)	Lunch (INESC-ID)	Lunch (Baixa)
14:30-15:30	Visit to INESC-ID/IST	Social Event (Belém)	INESC-ID presentations II	Departure
15:30-19:00	Free time		Free time (walk)	
19:00			Dinner (Baixa)	

Figure 13. Agenda of the first visit from ETH team to INESC-ID in Lisbon (April 2022).

Scientific meetings with the ETH team were opened to students and researchers of INESC-ID and Instituto Superior Técnico (Figure 14). The list of all participants who attended was (title of the presentation when applicable):

ETH team (7 participants, 6 ESRs):

1. Niko Beerenwinkel, Professor
2. David Dreifuss, ESR | *Detection and Monitoring of SARS-CoV-2 Variants by Genomic Analysis of Wastewater Samples.*
3. Lara Fuhrmann, ESR | *Characterization of intra-host viral diversity.*
4. Pedro Ferreira, ESR | *Mapping single-cell transcriptomes to copy number evolutionary trees.*
5. Johannes Gawron, ESR | *Understanding Tumor Evolution from Longitudinal Sequencing Data.*
6. Xiang Ge Luo, ESR | *Joint inference of repeated evolutionary trajectories and patterns of clonal exclusivity or co-occurrence from tumor mutation trees.*
7. Kevin Rupp, ESR | *Inferring fitness landscapes from single cell sequencing data.*

INESC-ID team (19 participants, 8 ESRs):

1. Susana Vinga, Project Coordinator
2. Sara Tanqueiro, Project Manager
3. Alexandre Francisco, Researcher | *On phylogenetic inference and algorithm engineering.*
4. Emanuel Gonçalves, Researcher | *Protein driven machine learning and network approaches for precision medicine.*
5. Carolina Peixoto, ESR | *Computational Biology for Modeling Oncological Transcriptomic Data.*
6. Mónica Silva, ESR | *Approaching Omics: From Medical Imaging to Computational Biology.*
7. José Basílio, ESR | *Spatial transcriptomics of aortas from high fat diet mice.*
8. Roberta Coletti, Researcher | *Multi-omic NETWORKS in gliomas.*
9. Rui Henriques, Researcher | *Learning epitranscriptomic brain patterning from peripheral tissue for neuropsychiatry.*
10. Francisco Santos, Researcher | *Network Science and Evolutionary Game Theory.*
11. David Calhas, ESR
12. Leonardo Alexandre, ESR
13. Daniel Gonçalves, ESR
14. Ana Rita Baião, ESR
15. Isabella Kim, ESR
16. Alexandra Carvalho, Alumni
17. Marta Lopes, Alumni
18. Eunice Carrasquinha, Alumni
19. Pedro Ferreira, Science Communication and Outreach Postdoctoral Coordinator



Figure 14. INESC-ID and ETH teams.

Scientific discussions between INESC-ID and ETH teams took place after all the presentations (Figure 15). All participants were divided into three main groups and the results of the teamwork allow ESRs to find synergies between the work developed between INESC-ID and ETH teams, design possible collaboration plans to potentiate the identified synergies and identify in which institution the work can be carried out. Based on the discussions, several topics were identified as the most promising ones to pursue the collaborations: 1) Tumor evolution and metastasis, 2) Network learning for multi-omics data integration, 3) Spatial transcriptomics, 4) Pattern identification and clustering.



Figure 15. Teamwork.

An event of team building was also organised to increase motivation and promote cooperation (Figure 16).



Figure 16. INESC-ID and ETH teams in the team building event.

A short form, similar to Figure 12, was created to have feedback from the participants about this first visit of ETH to INESC-ID. We obtained 18 replies. The results (Figure 17) and testimonials (Table 3) illustrate the positive assessment of this first staff exchange, in particular for ESRs who reported many ideas for future collaboration.

Table 3. Feedback from ETH > INESC-ID staff exchange participants.

Position	How does your work align with the OLISSIPO project?	Did your interactions result in planning collaborative future work/ideas?
ESR	Single-cell data analysis, tumor evolution, hierarchical modelling	Yes, a possible collaboration on spatial transcriptomics has been initiated.
Assistant Professor	My research activities fall under the areas of Cancer Systems Biology, Bioinformatics and Machine Learning and focus on the development of computational methods to provide data-driven hypotheses of biological phenomena and precision medicine solutions.	Yes, multiomics integration
ESR	<p>Research topics:</p> <ul style="list-style-type: none"> - Multiscale modelling of colorectal cancer (CrC) pathogenesis and progression - Inference of cancer fitness landscape - Modelling of metastasis - Optimization of early screening schedules for CrC 	Idea: Identify mutations and epistatic interactions between mutations on the genomic scale that promote the formation of metastases and verify the role of the associated gene-products in transcriptomic studies.
ESR	My work is focused on developing algorithms for analysis of network patterns and application of biclustering and triclustering. This focus can be of use in the context of pattern discovery in multi-omic data for instance.	Yes.
ESR	Integrative single-cell analysis of chronically inflamed arteries to identify unknown cellular identities and their contribution to atherosclerosis	Yes, a proposed deconvolution method for spatial transcriptomics
Professor Auxiliar	Multi-omics; Biomedical data analysis; Machine learning	Yes.
ESR	Computational Biology; Cancer; Biomarker identification; Regularization	yes, such as exchanging knowledge on different methods that could be used
ESR	My work focuses on using probabilistic graphical models to dissect mechanisms of cancer evolution from single-cell data, which aligns perfectly with OLISSIPO strategic area 1 (single-cell analysis, modeling, and simulations). In this OLISSIPO exchange, I presented my most recent work, TreeMHN, which is concerned with the joint inference of repeated evolutionary trajectories and patterns of clonal exclusivities and co-occurrences from tumor mutation trees.	A colleague (INESC-ID) and I plan to collaborate on the topic of learning Bayesian networks from multi-omics data.

ESR	My goal is to understand cancer from a genetic point of view. I apply mathematical models and computational methods to analyze and interpret data generated from sequencing experiments. More specifically I am interested in better understanding the clonal composition of a tumor in order to understand what drives tumor growth and how cancer reacts to treatment on a subclonal level. My research strongly involves working with omics data, for which there is a lot of expertise within the OLISSIPO project.	It resulted in a vague idea for a collaboration.
ESR	I am working on viral haplotype reconstruction from NGS data, as well as the analysis of time-series NGS data to understand within-host viral evolution.	Yes, I am collaborating with members of INESC-ID to use biclustering on my data.
ESR	Computational Biology, Oncology	Yes
ESR	I am developing my master's thesis in the field of bioinformatics, more specifically I am applying sparse regularization methods to drug response and CRISPR-Cas9 data.	This visit allowed me to verify that many of the researchers do research on topics such as dimensionality reduction, which is very important in my work. In addition, the topic of protein networks was also discussed in teamwork, which would be important since in my project I want to implement network regularization methods.
ESR	In my PhD I'll have to work with different types of biological data, as such I want to learn more about computational biology	Yes
Full Professor	Barely, it was my first participation and I actually found it very exciting. However, I still would need to find the path to be able to interact more with the network.	Somehow. As I am not a member of the network, and this is my first participation in an OLISSIPO meeting, ideas and connections among them must be matured.
Postdoc	I work within the MONET project in collaboration with Susana Vinga	No
ESR	Environmental genomics, epidemiology	We are planning on collaborating for our research
Professor	Multivariate-time series analysis	Not yet.

How did this visit contribute to your work?

"I had productive discussions with OLISSIPO members regarding the method I presented as well as ideas on extending it."

"Allowed me to get to know new tools and methods that I could apply in my work."

“The presentations delivered by our colleagues at INESC-ID are all highly related to my research interests. The discussions during the breaks are very constructive as well. In particular, I got the chance to talk to Monica, who mainly looks at multi-omics data integration and analysis using network-based approaches. Since I also plan to use Bayesian networks to find patterns from multi-omics data, I hope to collaborate with Monica on this topic.”

“My visit helped me to put my research into a larger context. I saw how similar problems as the ones I work with are approached differently. I made contact with other researchers in the field for possible future collaborations.”

“The visit contributed to my work as I got insights into different types of methods compared to what we work with at ETH. I learned about biclustering for pattern detection which will be useful for my projects.”

“Establishment of the most-immediate collaborative plans with ETH, identifying synergies between the two institutions. Opportunity to meet experts in the field of Computational Biology. Learn in detail the work being developed in ETH, being a reference for further ideas, with the unique possibility to further discuss it on a one-on-one basis.”

“With this visit, I got to know different projects in the area of bioinformatics and I had the opportunity to clarify doubts about the different methodologies mentioned in the presentations. Furthermore, the visit allowed me to be in contact with the world of research and to understand the main goals and obstacles.”

“It wasn't a direct contribution but it gave me a better understanding of what people in ETH have been working within the biological domain.”

“I had the possibility to present some preliminary results and discuss with people about my work”

“Made contact with researchers carrying out related work.”

“With potential points of interaction, we can follow up shortly.”

Overall, how do you rate this staff exchange?

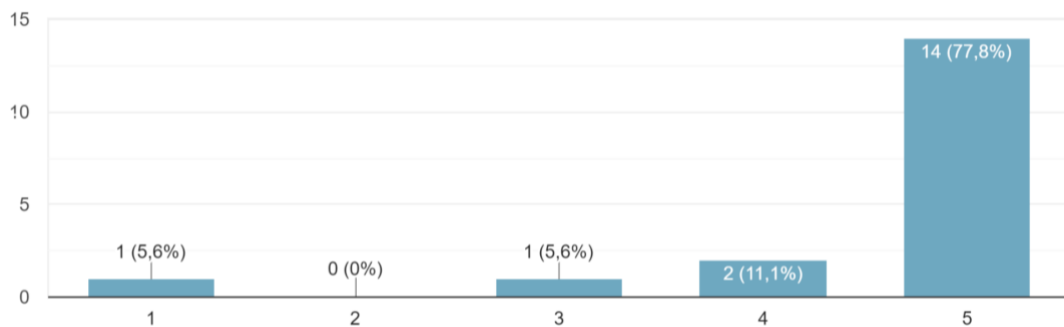


Figure 17. Participants feedback (1 - Not useful at all, 5 – Extremely useful).

Testimonials

“Thanks a lot for this organising outstanding staff exchange.”

“Have short presentations at the end of the event on the collaborative projects that have been planned.”

“The event's timeline was great.”

“It could be interesting to divide some orientation regarding application areas, in the form of reading groups or paper sharing for instance. So that the teamwork exercises happen in a more fluid way.”

“Maintain the same setting, very good as-is, very nice balance between work and leisure activities.”

“Everything was amazing!”

“I would be curious to engage in workshops in which we learn about hot topics and get to try things out in a hands-on manner.”

“This time the teams in the team working sessions are chosen by the participants who share similar interests. If time allows, it might be interesting to randomize the groups such that we can talk to people whose research might not be that closely related. Unexpected but exciting collaborations might emerge!”

3.3.2. Visit 2 (INESC-ID > ETH)

Five ESR, one researcher, the project manager and the coordinator visited ETH between June 1-3, 2022. The agenda of this first visit of INESC-ID to ETH is in Figure 18.

Lisbon -> ETH visit			
CEST	1	2	3
08:45-09:00	Welcome & Coffee		
09:15-10:30	Opening session: Intro by Niko; Projects recap	Teamwork	Jack Kuipers
10:30-11:00	Coffee Break		
11:00-12:30	Monica, Fritz	Teamwork	Teamwork
12:30-13:30	Lunch		
13:30-14:00			
14:00-15:00	Nico, Pawel	Teamwork	Teamwork
15:00-15:30			
15:30-17:00	Planning of teamwork	Team building & Dinner	Project presentations
17:00-19:00	Rheinschwimmen & Dinner		Closing session & Departure

Figure 18. Agenda of the first visit from ETH team to INESC-ID in Lisbon (June 2022).

INESC-ID team (8 participants, 5 ESRs):

1. Susana Vinga, Professor
2. Sara Tanqueiro, Project Manager
3. José Basílio, ESR
4. Carolina Peixoto, ESR
5. Mónica Silva, ESR
6. Rui Henriques, Researcher
7. Leonardo Alexandre, ESR
8. João Aparício, ESR

ETH team (11 participants, 7 ESRs):

1. Niko Beerenwinkel, Professor
2. Jack Kuipers, Researcher
3. Fritz Bayer, ESR
4. Nico Borgsmüller, ESR
5. Pawel Czyz, ESR
6. Arthur Dondi, Researcher
7. Monica Dragan, ESR
8. Johannes Gawron, ESR
9. Xiang Ge Luo, ESR
10. Kevin Rupp, ESR
11. Marco Roncador, Researcher

Teamwork between INESC-ID and ETH teams took place after all presentations (Figure 19).



Figure 19. ETH and INESC-ID teams.

All participants were divided into four main groups according to the scientific topics identified. The discussion greatly benefited from not only this visit but also from the previous staff exchange from ETH to INESC-ID (see Section XXX).

- Team 1 (Leonardo, João, Rui, Niko, Kevin and Johannes) - *Patterns in HIV time-series data.*
- Team 2 (João, Leonardo, Xiang, Monica, Rui, Niko) - *On the clustering of mutation trees.*
- Team 3 (Susana, Mónica, Fritz, Xiang, Carolina, Niko, Pedro) - *Cox-Regularized Regression and Clustering of Mutation and RNAseq data in Glioma.*
- Team 4 (Pawel, Rui, José, Pedro) - *Cross-tissue regulatory mapping system for personalized medicine.*

The results of this teamwork, presented at the end of the staff exchange visit (Figure 21), seemed very promising with the ESRs designing collaboration plans for the next months.



Figure 20. Groups presented their collaboration plans.

4. Conclusions

Staff exchanges of the second half period will be reported in D1.3 - Final report on staff exchanges.