



Report

D4.1 OLISSIPO Early Stage Researchers training programme

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Executive Summary

One of the main aims of the OLISSIPO project is to sharpen the research profile of INESC-ID. In line with this and taking advantage of the expertise of the Twinning partners and staff exchange visits, the project will provide training to Early Stage Researchers (ESR) and support their participation in external courses, workshops, national and international conferences and meetings.

Moreover, this plan complements the management training, whose programme was submitted in June 2021 (Deliverable 5.2), since training in fields such as project management, communication, proposal writing, human resources, data management plan and research ethics will also be provided to ESR.

In summary, this deliverable outlines the main planned ESR training, which will be regularly reviewed and updated during the entire project.

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1. Introduction

The OLISSIPO project aims to provide training to staff and Early Stage Researchers (ESR) to build critical mass at the interface of computer science and health research.

The consortium was designed to provide outstanding and complementary expertise in Strategic Areas of Computational Biology. Profiting from the existing staff exchange programme (WP1), ESRs will be invited to visit the other Twinning partners for 1-3 weeks.

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

Furthermore, short-term staff exchanges will promote and strengthen collaborations between the Twinning partners, which may also become attractive for young scientists that want to pursue a research career or improve their knowledge transfer skills in these areas.

1.1 Deliverable objective

This report describes the main planned ESR training programme, profiting from staff exchange between the Twinning partners. Due to the highly dynamic situation of the coronavirus pandemic, it is essential to note that this deliverable will be regularly reviewed and updated during the entire project.

2. OLISSIPO Early Stage Researchers training programme

During the exchange programme and OLISSIPO meetings, half-day or 1-day short courses for ESRs will be organized, covering a wide range of topics and expertise. The programme for this training is described below and will be updated periodically. The dates indicated may be subject to small individual changes depending on the participants restrictions (e.g., departing and returning days), but the periods are planned to have a comprehensive agenda and overall availability of the Twinning Partners. More local participants can be further invited to some of the sessions.

The exchange program is aligned with the Computational Biology topics and strategic areas identified, which include:

- A1) Single-cell analysis, modeling and simulation;
- A2) Mathematical modeling of inter-cell and communities' interactions;
- A3) Computational phylogenetics of cells and communities;
- A4) Translational bioinformatics, data management and software development.

2.1. INESC-ID - EMBL exchange

INESC-ID to EMBL	Date	Target	Name	Action
2022	8 - 11 Nov	Senior Staff	Susana Vinga	Visit and get to know EMBL, Workshop with talks, teamwork and presentation of the collaboration.
			Emanuel Gonçalves	
			Rui Henriques	
		Management	Sara Tanqueiro	
			Pedro Ferreira	
		ESR	Ana Rita Baião	
			André Patrício	
			Carolina Peixoto	
			José Basílio	
			Mónica Silva	
EMBL to INESC-ID	Date	Target	Name	Action
2022	4 - 7 Apr	Senior Staff	Wolfgang Huber	Visit and get to know INESC-ID, Workshop with talks, teamwork, presentation of the cooperation.
		Management	Simone Bell	
		ESR	Julia / Alex	
			Tümay	
			Donnacha	
			Constantin	

Overall, EMBL will provide state-of-the-art methods for the analysis of single-cell RNA-Seq and multi-omics (A1), for the analysis of genotype-phenotype relationships, in particular, to analyse

drug response in patient data (A2), for patient and disease stratification (A3) and in scientific computing (R and Bioconductor) - open-source, tutorials, teaching materials, training (A4).

2.2. INESC-ID - Inria exchange

INESC-ID to Inria	Date	Target	Name	Action
2022	17-24 Mar	Senior staff	Susana Vinga	Visit and get to know Inria, Workshop with talks, teamwork and presentation of the collaboration.
			Emanuel Gonçalves	
			Pedro Monteiro	
			Rui Henriques	
		Management	Sara Tanqueiro	
		ESR	Ana Rita Baião	
			André Patrício	
			José Basílio	
			Carolina Peixoto	
Mónica Silva				
Inria to INESC-ID	Date	Target	Name	Action
2022	25 Apr - 10 May	Senior staff	Marie France Sagot	Visit and get to know INESC-ID, Workshop with talks, teamwork, presentation of the collaboration.
			Marie France Sagot	
	11-26 Jul	Senior staff	Mariana Ferrarini	
			Blerina Sinaimeri	
	29 Ago - 11 Sep	Senior staff	Marie France Sagot	
			Ariel Silber	
		ESR	Gabriela	

Inria will provide teaching and support in the areas of Motif inference, small RNAs, (s)RNA-Seq analysis (A1), will provide education and support in algorithms for identification of small non-coding RNAs and their targets, and combinatorial/optimization algorithms for the analysis of metabolic networks of microbial consortia (A2), will provide teaching and support in combinatorial structures and algorithms as well as Bayesian approaches to infer the dynamics of the interactions between hosts and their symbionts (A3) and will support software implementation (A4).

2.3. INESC-ID - ETH exchange

INESC-ID to ETH	Date	Target	Name	Action
2022	27-29 Apr	Senior staff	Susana Vinga	Visit and get to know ETH, Workshop with talks by ETH and INESC-ID, teamwork and presentation of the collaboration
			Alexandre Francisco	
			Rui Henriques	
		Management	Sara Tanqueiro	
		ESR	André Patrício	
			Carolina Peixoto	
			José Basílio	
Mónica Silva				
ETH to INESC-ID	Date	Target	Name	Action
2022	1-3 Jun	Senior staff	Niko Beerenwinkel	Visit and get to know INESC-ID, Workshop with talks by ETH and INESC-ID, teamwork, presentation of the collaboration
		ESR	Pedro Ferreira	
			Xiang Ge Luo	
			Aashil Batavia	

ETH will bring expertise on cross-cutting methods for mutation calling (A1), on statistical methods for analysing inter- and intra-cellular networks from high-throughput experimental data (A2), on Bayesian modeling of evolutionary cell lineage trees (A3) and on Computational oncology (A4).

We will also implement activities to invite researchers from Portuguese speaking countries, e.g. Brazil, to visit INESC-ID following strict gender balance issues during the selection of the candidates. This aims to expand the OLISSIPO network to South America, impacting the visibility and attractiveness of INESC-ID and further expanding and strengthen collaborations outside Europe, reinforcing Lisbon as a key hub between Europe and non-EU countries.

Note: The dates and names of staff allocated for each visit might change since we are currently facing a new wave of coronavirus infections in Europe. Staff exchange for 2023 will be planned during 2022.

2.4. Thesis co-supervisions

The success of this project will enhance the capability of INESC-ID and IST/ULisboa in the areas of Computational Biology, with a focus on ESRs that will have the opportunity to benefit from the collaboration between Twinning partners and their expertise. Besides staff exchanges, OLISSIPO will also support thesis co-supervision between the participating institutions. Thus,

each partner will host an MSc student for 1-2 months and supervise their thesis together with INESC-ID. This can also include the SAB members who were interested.

INESC-ID will be responsible for recruiting 3 Master students for this action, from programmes at IST such as MSc Biomedical Engineering, MSc Computer Science and Engineering, MSc in Electrical and Computer Engineering, and MSc Applied Mathematics and Computation. A proposal of the joint supervisions will be drawn during the first semester of 2022 to be started in the Fall 2022.

2.5. Training courses

We will explore, as much as possible, the complementarities and synergies between the Management training of INESC-ID staff and PI (Deliverable 5.2) and the Training Activities for ESRs. Benefiting from the effective staff exchange between the Twinning partners to optimise the travelling budget, training will be provided on different topics:

- Project Management - Planning the work effectively towards successful projects;
- Communication - Increase the impact of research activities and raise general public awareness of science and technology importance;
- Proposal Writing - Increase the success rate of project submissions and improve writing skills; Scientific writing and communication (Teams INRIA, ETH and INESC-ID, supported by the IST/ULisboa Public Relations and Media Office - GCRP), to increase the impact of research activities and to raise general public awareness of the importance of science and technology;
- Human Resources - Managing teams and support researchers and staff;
- Data Management Plan - Learn best practices in data management during and after a research project;
- Research Ethics - Learn how to manage and evaluate a research project from an ethical standpoint;
- Open-source software (Teams INESC-ID, ETH, and EMBL) - Improve technical knowledge towards a more accessible and reproducible science;
- Soft-skills and career development for ESRs (Academic Development Office from IST, Teams EMBL and ETH) - Support ESR in career management and planning;
- Intellectual property (Team INESC-ID, supported by the IST/ULisboa's Technology Transfer Office)- Provide ESRs with adequate tools to deal with IP management in their future careers.

Whenever possible, all the material will be made available for future Virtual Training of new students.

2.6. Other training courses, workshops, conferences and meetings

OLISSIPO will continue to support ESRs participation in external workshops, courses and international conferences and meetings to leverage the scientific excellence of INESC-ID and also IST/ULisboa.

OLISSIPO had already supported the participation of INESC-ID ESR on one course in Computational Data Analysis (UMinho, 20-28 May 2021) and conferences such as the ISMB/ECCB'2021 virtual meeting (25-30 July 2021) and Cancer Genomics (EMBL, 22-24 November 2021).

The Computational Data Analysis Course was a 7-day hands-on advanced course intended for students and researchers of biological/biomedical fields who may have basic knowledge of statistics and data analysis but want to learn the basics of fundamental advanced computational techniques to analyze large complex data sets.

Cancer Genomics conference provided an opportunity to learn about and keep up to date with the rapidly progressing area of cancer genomics. It covered presentations from cancer genome projects, the areas of cancer functional genomics, systems biology, cancer immunogenomics and epigenomics, cancer mouse models and the translation and clinical impact of obtained scientific results.

The annual international conference on Intelligent Systems for Molecular Biology (ISMB) and the European Conference on Computational Biology (ECCB), organised by the International Society for Computational Biology (ISCB) are the world's largest bioinformatics and computational biology conferences. ISMB/ECCB'2021 provided an intense multidisciplinary forum for disseminating the latest developments in bioinformatics and computational biology. The conference fostered fresh dialogues, collaboration and learning opportunities.

Additionally, OLISSIPO will continue to support the participation of students in workshops and conferences such as the [Ascona Workshop](#) (27 March 2022 - 1 April 2022), [CSAMA 2022](#) (19-24 June 2022) and [Bioconductor Conference](#) (14-16 September 2022).

The Ascona Workshop 2022 will be focused on "Biological systems: from first principles to data-driven modelling and back". This workshop will explore recent advances and open problems in mathematical modeling of biological systems comprising both approaches based on first principles and on large high-dimensional data sets, identify opportunities and challenges for these two approaches to benefit from each other or even to converge, and facilitate

meaningful interactions between engineering, biomedical, and quantitative researchers of both camps.

CSAMA 2022 is a one-week intensive course Statistical Data Analysis for Genome-Scale Biology teaches statistical and computational data analysis of multi-omics studies in biology and biomedicine. It comprises lectures covering underlying theory and state of the art, and practical hands-on exercises based on the R / Bioconductor environment. The course is intended for researchers who have basic familiarity with the experimental technologies and their applications in biology and are interested in making the step from a user of bioinformatics software towards adapting or developing their own analysis workflows.

Bioconductor Conference, which will be held on 14-16 September 2022, is an event organised in the context of the Bioconductor project. The main aim of this project is to develop, support, and disseminate free open source software that facilitates rigorous and reproducible analysis of data from current and emerging biological assays.

2.7. Joint Lab retreats

Besides the exchange programme between INESC-ID and the Twinning partners, the consortium will gather every 12 months for lab retreats, which will take place in Lisbon during 3-4 days. These will include all the members of the teams. Also, ESR will be invited to participate. Due to the pandemic situation and restrains in travelling, the first annual meeting was held virtually on 13 January 2022 and the lab retreat was postponed to July 2022 and will ideally be co-located with an OLISSIPO School or Workshop (Deliverable 2.1 - OLISSIPO Schools, Workshops, and Invited lecture series programme).

3. Conclusions

The present planned activities will be revised and updated during the duration of the entire project in order to cope with the main goal of OLISSIPO, which is to enhance the competences in Computational Biology at INESC-ID.

A report evaluating the impact and forecast of these measures will be submitted in June 2022 (Deliverable 4.2 - Mid-term report on activities targeted for Early Stage Researchers).