

FRAMEWORK PROGRAMME OF EARLY STAGE RESEARCHER TRAINING¹

1. BASIC DATA

Mentor's name and surname	Franc Janžekovič	Mentor's register number at <u>ARIS</u> (<u>SICRIS):</u>	13134
Mentor's e-mail:	Franc.janzekovic@um.si	Mentor's tel. no.:	041 512 061
Research programme (RP) leader's name and surname:	Matjaž Perc	RP leader's register number at <u>ARIS</u> (<u>SICRIS)</u> :	23428
Title of research programme:	Computationally intensive complex systems	RP's Register number at <u>ARIS</u> <u>(SICRIS):</u>	P1-0403 (A)
Research organisation (RO) of University of Maribor, where training shall be conducted:	FNM UM	RO Register number at <u>ARIS</u> (SICRIS):	0552-2547
Research field according to <u>ARIS classification</u> :	1.03.01	Research field according to Ortelius classification (EURAXESS)	6.1

2. DEFINITION OF RESEARCH PROBLEM AND GOALS OF DOCTORAL RESEARCH²

Starting point of research task of the early stage researcher and its position in the research programme, where the mentor is included, work hypothesis, research goals and foreseen result with emphasis on an original contribution to science:

Title: Biodiversity - Analysis and Evaluation

Starting Point: In the last three years, the United Nations and the European Community have adopted three ambitious documents containing in-depth biodiversity content. At the UN level, the "Kunming-Montreal Global Biodiversity Framework" has been adopted. At the EU level, these are the "Corporate Sustainability Reporting Directive (CSRD)" and the "Nature Restoration Directive."

¹ Term early stage researcher (ESR) is written in male form and used as neutral for women and men.

² Research and study programme of training have to harmonise with contents of the research programme, where the mentor is a member.

All three documents are a reaction from the world's political and professional public to the continuous reduction of biodiversity. These documents significantly interfere with the management of nature and impose obligations on state authorities and major economic companies for responsible and sustainable operations. In addition to general legal norms, they mandate a significant increase in investments in the preservation and understanding of biodiversity, as well as reporting on various biodiversity indicators and activities related to the restoration and sustainable management of nature. These regulations significantly increase the responsibility of companies and state authorities, as well as the expectations of regulators and the public, that experts in the field of biodiversity will participate in explaining the importance of biodiversity for sustainable development and ecosystem services.

Content of the MR Training: Biodiversity is recognized today in three aspects: taxonomic, functional, and phylogenetic diversity. We evaluate each aspect according to three dimensions: richness, diversity, and evenness of biodiversity. The content of the MR training will mainly focus on research into functional and phylogenetic diversity using model organisms from selected species of mammals and birds. Participants will be trained to research and evaluate the functional alpha and beta diversity of individual communities of organisms, creating a library of functional traits for model organisms. Phylogenetic diversity will be evaluated using the methodological approach of analysing nucleotide sequences in DNA. Estimates of phylogenetic diversity of model organisms by independent sequencing and analysing inheritance and using global libraries of nucleotide sequences. Participants will include genetic information in the analysis and research of phylogenetic diversity for selected groups of animals. In their work, they will use solutions in the R programming environment and develop original program codes.

Objective: A doctoral student in the field of analysis and evaluation of biodiversity will be able to independently plan and carry out research on taxonomic, functional, and phylogenetic diversity. They will be able to evaluate and explain the causes and consequences of events in nature that affect the state of biodiversity.

MR's Original Contributions to the Development of Science: Analysis and evaluation of the impact of functional diversity on the stability and resilience of ecosystems, and the search for functional traits that are key to maintaining ecosystem services.

Using phylogenetic diversity to understand and explain evolutionary patterns and processes. The role and importance of functional and phylogenetic alpha and beta diversity in ecological communities and the factors driving differences between them.

Use and functionality of R software packages in biodiversity analyses.

The importance of implementing the new legal framework on nature management and biodiversity conservation.

3. STUDY PROGRAMME

Foreseen study programme, to which early stage researcher shall be enrolled in academic year 2025/2026:

3rd degree study program Ecological Sciences (doctoral school)

4. DESCRIPTION OF WORK AND TASKS

Candidate's Work and Tasks Throughout the Entire Training Period:

- 1. Establishment and implementation of a library/database of functional traits for selected groups of birds and mammals. These will be used to evaluate functional alpha and beta diversity in target ecological communities.
- 2. Implementation of functional diversity in ecological gradients, e.g., functional diversity of small mammals along an altitudinal gradient; functional diversity of prey in the predator-prey relationship in the case of owl predation; response of morphological variability to ecological gradients in the case of dormouse variability.
- 3. Development and implementation of geometric morphometric results into functional diversity indices for model species from the group of small mammals.
- 4. Implementation of global nucleotide libraries and megatrees in phylogenetic diversity research of selected groups of birds and small mammals.
- 5. Establishment and implementation of nucleotide sequence barcoding to monitor the genetic structure of selected animal groups.
- 6. The candidate will be actively involved in writing scientific articles, attending professional and scientific conferences, and training both domestically and abroad.
- 7. The candidate will be involved to a lesser extent in teaching at the Department of Biology, Faculty of Natural Sciences and Mathematics, University of Maribor.

5. REQUESTED LEVEL OF EDUCATION

Completed 2nd Bologna level VII/2.

6. REQUESTED FIELD OF EDUCATION

Natural Sciences and Mathematics

7. KLASIUS SRV

Required education: 17003 (Second-level university education and similar education)

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9. REQUESTED KNOWLEDGE

Knowledge and application of biological concepts in solving biological challenges in the field of biodiversity. Computer skills: use of MS Office and basics of programming.

10. REQUESTED SPECIAL REQUIREMENTS

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11. REQUESTED LANGUAGES

Slovene and English

12. REQUESTED WORK EXPERIENCE

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13. FORESEEN POSTDOCTORAL TRAINING

I strongly advocate that the candidate will receive postdoctoral training at a reputable institution abroad. The field of biodiversity analysis has received exceptional research attention and opportunities due to the encouragement of the world public to halt its steady decline. And in this perspective I see the career development of a PhD student.

Mentor's signature:

Janžekovič

Research programme leader's signature:

Name and surname of Dean or authorised person³: Prof. dr. Iztok Banič

Signature of dean or authorised person:

Place and date:

Maribor

28. 01. 2025

Stamp:

³ The training program is signed by the dean of the member where the ESR's employment and training will take place.