



## FRAMEWORK PROGRAMME OF EARLY STAGE RESEARCHER TRAINING<sup>1</sup>

### 1. BASIC DATA

Mentor's name and surname	<b>Matej Črepinšek</b>	Mentor's register number at <a href="#">ARIS (SICRIS):</a>	22707
Mentor's e-mail:	<a href="mailto:matej.crepinsek@um.si">matej.crepinsek@um.si</a>	Mentor's tel. no.:	+386 (2) 22 07 429
Research programme (RP) leader's name and surname:	Domen Mongus	RP leader's register number at <a href="#">ARIS (SICRIS):</a>	29243
Title of research programme:	Computer Systems, Methodologies and Intelligent Services	RP's Register number at <a href="#">ARIS (SICRIS):</a>	P2-0041
Research organisation (RO) of University of Maribor, where training shall be conducted:	University of Maribor, Faculty of Electrical Engineering and Computer Science	RO Register number at <a href="#">ARIS (SICRIS):</a>	0796
Research field according to <a href="#">ARIS classification</a> :	2.07.00	Research field according to EURAXESS classification	Computer science

### 2. DEFINITION OF RESEARCH PROBLEM AND GOALS OF DOCTORAL RESEARCH<sup>2</sup>

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:

Stochastic optimisation algorithms, particularly evolutionary algorithms, enable the effective solving of such problems and are widely used in practice. Nevertheless, real-world applications often face challenges such as stagnation, premature convergence, and limited algorithm adaptability, especially in multi-objective and dynamic optimisation tasks.

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

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

The doctoral research is embedded in the supervisor's research programme in the field of computational methodologies, evolutionary computation, and metaheuristic optimisation. It is based on the concept of MsMA (Metaheuristic with adaptive Meta-level partitioning). MsMA enables adaptive meta-level control of the optimisation process and provides more effective mechanisms for overcoming stagnation.

The central research problem is to investigate how different search patterns of evolutionary algorithms can be systematically identified, modelled, and self-adaptively combined into hybrid optimisation methods. Particular emphasis on integrating adaptive meta-level partitioning with long-term memory mechanisms for solving single- and multi-objective as well as dynamic optimisation problems.

The working hypothesis of the research is that self-adaptive meta-level search control will enable the development of more robust evolutionary algorithms with improved utilisation of the search space and broader applicability in practical optimisation tasks.

The objectives of the doctoral research are: the analysis and formalisation of search patterns in evolutionary and metaheuristic algorithms; the enhancement of the MsMA framework with self-adaptive mechanisms and long-term memory at the level of search patterns; the development of hybrid evolutionary algorithms; and empirical validation on static, multi-objective, and dynamic optimisation problems.

The expected results include new self-adaptive optimisation methods and an original scientific contribution to the development of robust stochastic optimisation with clear practical relevance.

### 3. STUDY PROGRAMME

Foreseen study programme, to which early stage researcher shall be enrolled in academic year 2026/2027:

Computer Science and Informatics

### 4. DESCRIPTION OF WORK AND TASKS

The early-stage researcher will be integrated into the research programme and will conduct basic and applied research, contribute to the development of methodologies, participate in the preparation of scientific publications, and fulfil the requirements of the doctoral programme.

### 5. REQUESTED LEVEL OF EDUCATION

Second Cycle Study Programmes

### 6. REQUESTED FIELD OF EDUCATION

Computer Science and Information Technologies

### 7. KLASIUS SRV

06 – Information and Communication Technologies (ICT)

## 8. KLASIUS P

0611 – Computer Science and Informatics

## 9. REQUESTED KNOWLEDGE

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## 10. REQUESTED SPECIAL REQUIREMENTS

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## 11. REQUESTED LANGUAGES

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## 12. REQUESTED WORK EXPERIENCE

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## 13. FORESEEN POSTDOCTORAL TRAINING

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Mentor's signature:

Matej  
Črepinšek

Digitally signed by Matej Črepinšek  
DN: cn=Matej Črepinšek, o=Univerza na Gorah, ou=Šola, email=Matej.Crepinsek@upg.si, c=SI  
Reason: I am the author of this document  
Location: Maribor  
Date: 2025.01.22 09:18:25+01'00'  
Email: Matej.Crepinsek@upg.si

Research programme leader's signature:

Domen  
Mongus

Digitally signed by Domen Mongus  
DN: cn=Domen Mongus, o=Univerza na Gorah, ou=Šola, email=Domen.Mongus@upg.si, c=SI  
Reason: I am the author of this document  
Location: Maribor  
Date: 2025.01.22 09:18:25+01'00'  
Email: Domen.Mongus@upg.si

Name and surname of Dean or  
authorised person<sup>3</sup>:

Kliknite ali tapnite tukaj, če želite vnesti besedilo.

Signature of dean or authorised person:

Gorazd Štumberger  
Digitally signed by Gorazd Štumberger  
Datum: 2026.01.23 10:49:18 +01'00'

Digitally signed by  
Barbara Ojstersek  
DN: cn=Barbara Ojstersek, o=Univerza na Gorah, ou=Šola, email=Barbara.Ojstersek@upg.si, c=SI

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

**Place and date:**

Kliknite ali tapnite tukaj, če želite vnesti besedilo.

Kliknite ali tapnite tukaj, če želite vnesti datum.

Stamp: