University of Maribor

FRAMEWORK PROGRAMME OF EARLY STAGE RESEARCHER TRAINING[1]

1. BASIC DATA

Mentor's name and surname	**TONICA BONČINA**	Mentor's register number at ARIS (SICRIS):	**14334**
Mentor's e-mail:	tonica.boncina@um.si	Mentor's tel. no.:	02/2207866
Research programme (RP) leader's name and surname:	IVAN ANŽEL	RP leader's register number at ARIS (SICRIS):	10369
Title of research programme:	Technologies of metastabile materials	RP's Register number at ARIS (SICRIS):	P2-0120
Research organisation (RO) of University of Maribor, where training shall be conducted:	Faculty of mechanical engineering	RO Register number at ARIS (SICRIS):	0795
Research field according to ARIS classification:	2.04.00 2.10.00	Research field according to EURAXESS classification	Materials engineering

2. DEFINITION OF RESEARCH PROBLEM AND GOALS OF DOCTORAL RESEARCH[2]

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:

The proposed doctoral research within the framework of the young researcher program is in the field of developing new aluminum alloys. The development of new aluminum alloys is one of the basic topics of the P-120 Metastable Materials Technologies research program. The aim of the work is to synthesise new alloys from the Al-Mn-Cu system with alloying elements (rare earth metal additives, light element additives Li, Be, etc.) that form precipitates and other phases during hardening. The anticipated properties of the new alloys will be competitive with other alloys, and they will also have the potential to be manufactured and processed using various casting, additive, and other technologies, which can be used to achieve complex shapes and exceptional mechanical properties.

[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.*

The first objective is to determine the parameters for vacuum casting, powder and wire production that can be used in additive technologies.
The second objective is advanced metallographic characterization of alloys, which would enable process design and improvement of the properties of new alloys. For new alloys from the Al-Mn-Cu system and a reference alloy from the Al-Mg-Si system, melting and atomization processes would be used for powder production. For wire production, classic casting and mechanical forming processes with drawing or a similar process would be used.
The working hypothesis would be that the new alloys are suitable for use in additive technologies such as 3D printing or wire welding onto a substrate, whereby the planned microstructure and desired properties can be achieved.
Expected contribution to science
To identify the impact of microalloying on microstructure development during solidification and the properties of new alloys in the cast state, after remelting and atomization, after deformation by drawing, and after additive manufacturing processes.
To determine and compare the properties of materials produced using additive manufacturing technologies for new alloys and reference alloys.

3. STUDY PROGRAMME

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

Doctoral School of Mechanical Engineering

4. DESCRIPTION OF WORK AND TASKS

Implementing projects of scientific research.
Taking part in the design of research programmes.
Cooperating with research sponsors.
Drawing up research and other reports.
Monitoring and coordinating research work according to the grant agreement.
Ensuring safety and health at work.
Organising and instructing employees and students on using personal safety equipment and other safety measures.
Performing other tasks at the behest of the superiors.
Participating in ad-hoc and permanent committees of university or faculty bodies.
Acting on behalf of colleagues and superiors during their absence (upon authorisation).
Participating in annual and other inventories.
Performing other related tasks delegated by superiors.

5. REQUESTED LEVEL OF EDUCATION

VII/2. tariff group

6. REQUESTED FIELD OF EDUCATION

Technical, Natural sciences

7. KLASIUS SRV

Seventh level: Second cycle of higher and similar education/Second cycle of higher and similar education

8. KLASIUS P

01 – Educational sciences and teacher education
05 – Natural Sciences, Mathematics and Statistics
07 – Technology, production technologies and construction

9. REQUESTED KNOWLEDGE

Computer skills: MS Windows, Word, Excel, Internet, e-mail, e-commerce

10. REQUESTED SPECIAL REQUIREMENTS

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11. REQUESTED LANGUAGES

Active knowledge of one world language

12. REQUESTED WORK EXPERIENCE

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13. FORESEEN POSTDOCTORAL TRAINING

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Mentor's signature:

Tonica Bončina

Digitally signed by Tonica Bončina
DN: C=SI, S=Slovenija, OU=individuals, G=Tonica + SN=Bončina + SERIALNUMBER=24694586812034 + CN=Tonica Bončina
Reason: I am the author of this document
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Research programme leader's signature:

Ivan Anžel

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DN: C=SI, ST=Slovenija, OU=individuals, GN=Ivan, SN=Anžel, CN=Ivan Anžel, serialNumber=2469795312035
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Date: 2026.01.20 13:25:42+01'00'
Foxit PDF Editor Version: 13.2.2

Name and surname of Dean or authorised person[3]:
prof. dr. Matej Vesenjak

Signature of dean or authorised person:

Place and date:

Maribor, 20. 01. 2026

Stamp:

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