



SMASH

machine learning for science and humanities postdoctoral program



Co-funded by
the European Union

SMASH – in a nutshell

an inter sectorial view

Gabrijela Zaharijas
University of Nova Gorica



SMASH

What is SMASH

Project funded 2023-2028, 10MEU, the biggest in Slovenia.

Funds to hire **postdoctoral** researchers (50 postdocs, 2 year contracts)

Postdocs will be hosted in five Slovenian institutions ('implementing partners')

But will spend up to 8 months total in at least two of ('associated partner') institutions.

We have **23 academic and 7 non-academic associated partners**. Addition of new ones relatively straightforward.



Research areas

Postdoctoral researchers come with their own ideas among the five following areas:

RA1: **Machine Learning** for Scientific Applications

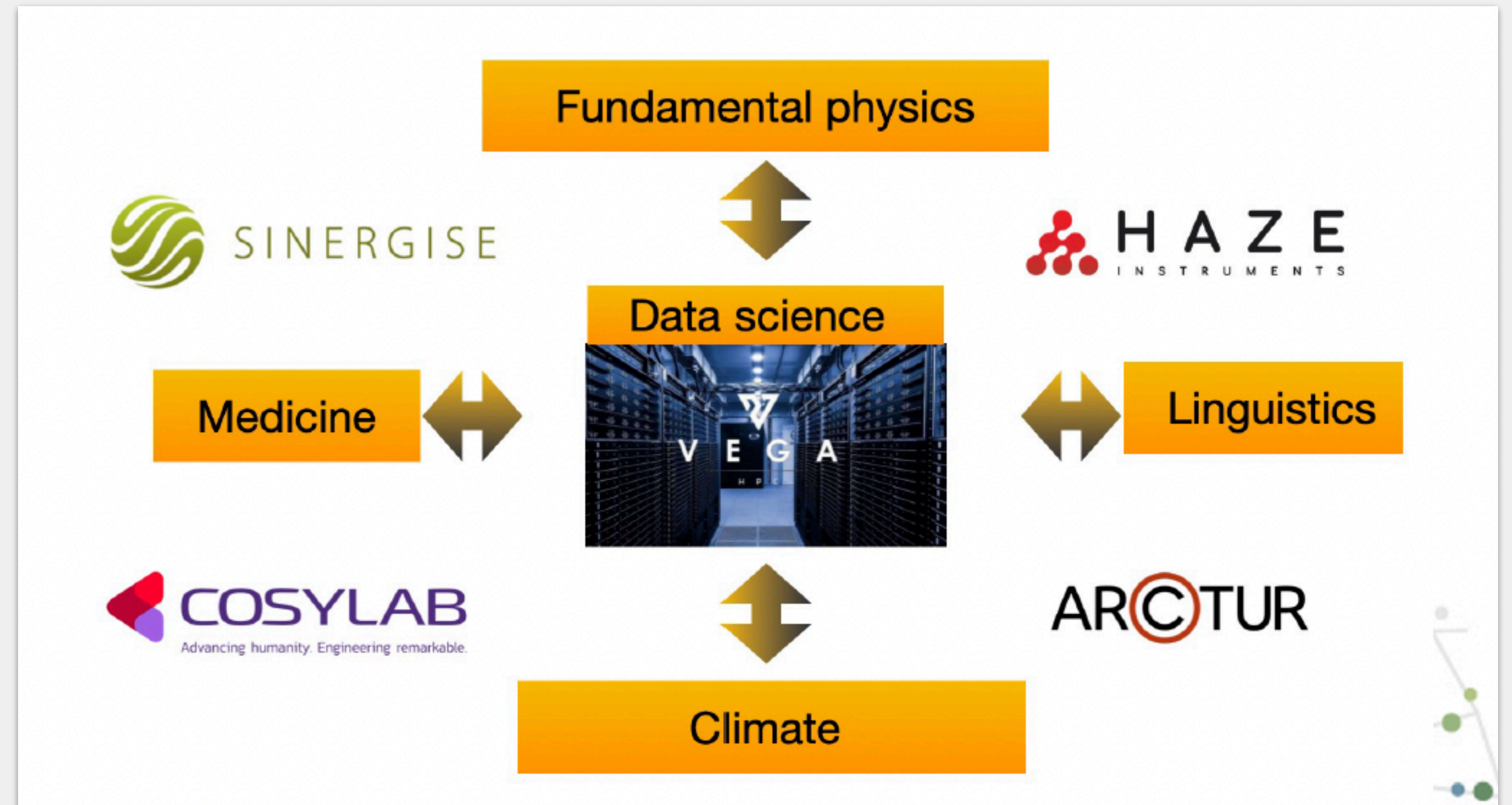
RA2: **Fundamental physics**

RA3 Computing for human and animal **communication**

RA4 Machine learning in **climate** research

RA5 Personalised **medicine and life sciences**

<https://smash.ung.si/research-areas/>



Currently

SMASH officially started July 2023 (contract with EC)

The recruitment for the **Call-1** finalised in July 2023:
8 postdocs hired

The recruitment for the **Call-2** finalised in March 2024:
18 postdocs hired

Two more calls **coming up:**

Call 3: Open July 2024, deadline October 21 2025

Call 4: Open December 2024, deadline April 2025

SMASH

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[Research areas](#)

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Become a fellow

SMASH is looking for postdoctoral researchers who will propose ambitious projects to advance a subject area of their choice in combination with the power of the High-Performance Computer Vega. SMASH offers attractive working conditions in beautiful surroundings, excellent personal mentoring from some of Europe's leading experts across a range of fields, and the chance to develop a powerful set of transferable skills matched to the needs of every individual postdoctoral researcher. This environment will help our researchers progress to rewarding careers in today's rapidly changing world.

[About SMASH Calls](#)

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[SMASH Fellows](#)

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[Application procedure overview](#)

→

[Benefits](#)

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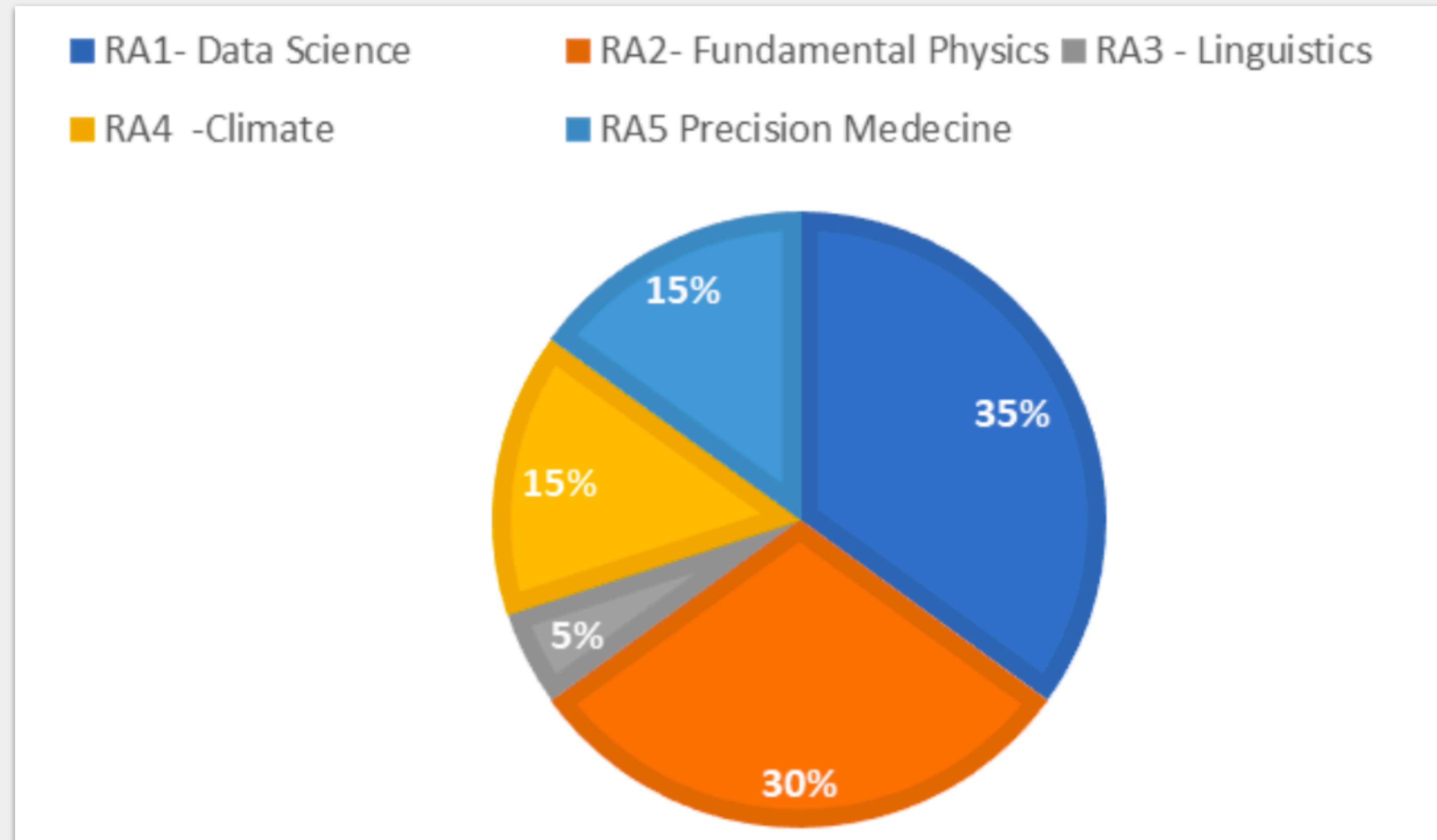
[FAQ](#)

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Currently



Our Fellows

About 20 currently here

<https://smash.ung.si/fellows/>
Project abstracts

Data Science - Machine Learning for Scientific Appli



Josip Šarić

Host institution: University of Ljubljana
Project: Maritime Open-vocabulary Panoptic Segmentation
Duration of fellowship: 1. 9. 2024 – 31. 8. 2026



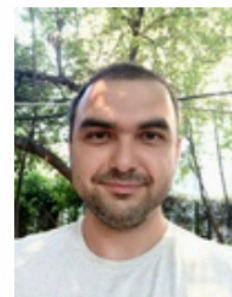
Bruno Gašperov

Host institution: University of Ljubljana
Project: Few-shot evolutionary reinforcement learning in uncertain and dynamic environments
Duration of fellowship: 19. 6. 2024 – 18. 6. 2026



Areeb Ahmed

Host institution: University of Ljubljana
Project: AI and ML for scientific applications through secure communications for 5G/6G
Duration of fellowship: 1. 9. 2024 – 31. 8. 2026



Sabin Roman

Host institution: Jožef Stefan Institute
Project: Human-Environmental Science Through Iterative Automation
Duration of fellowship: 1. 9. 2024 – 31. 8. 2026

Climate - Machine Learning in Climate Research



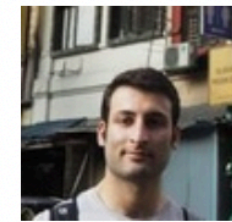
Marta Via Gonzalez

Host institution: University of Nova Gorica
Project: Upgrading Particulate Matter Source Apportionment Techniques through Data Science
Duration of fellowship: 15. 3. 2024 – 14. 3. 2026



MARCO STEFANELLI

Host institution: University of Ljubljana
Project: A neural-network methodology to define a 3D-Var n complex observation systems
Duration of fellowship: 3. 4. 2024 – 3. 4. 2026



JESUS YUS DIEZ

Host institution: University of Nova Gorica
Project: Machine Learning applications for constraining the w on ClimAte
Duration of fellowship: 1. 10. 2023 – 30. 9. 2025



Iva Međugorac

Host institution: Slovenian Environment Agency
Project: High frequency sea-level oscillations modeling in the learning
Duration of fellowship: 1. 8. 2024 – 31. 7. 2026

Fundamental Physics - Machine learning for Particle Physics, Astrophysics and Cosmology



Christopher Eckner

Host institution: University of Nova Gorica
Project: Dissecting the gamma-ray sky in the Galactic center with simulation-based inference
Duration of fellowship: 8. 1. 2024 – 7. 1. 2026



Tadej Novak

Host institution: Jožef Stefan Institute
Project: Deep generative models for fast silicon tracking detector simulation
Duration of fellowship: 1. 1. 2024 – 31. 12. 2025



Judit Pérez Romero

Host institution: University of Nova Gorica
Project: Machine learning for gamma-rays: the hunt for detection of galaxy clusters
Duration of fellowship: 15. 3. 2024 – 14. 3. 2026



Patrick Stengel

Host institution: Jožef Stefan Institute
Project: Applications of Machine Learning to LHC Searches for Charged Mediator Models and Mineral Detection Searches for Dark Matter
Duration of fellowship: 1. 9. 2024 – 31. 8. 2026

<https://smash.ung.si/fellows/>



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Teaser - few technical details from Fellow's projects

Types of data used

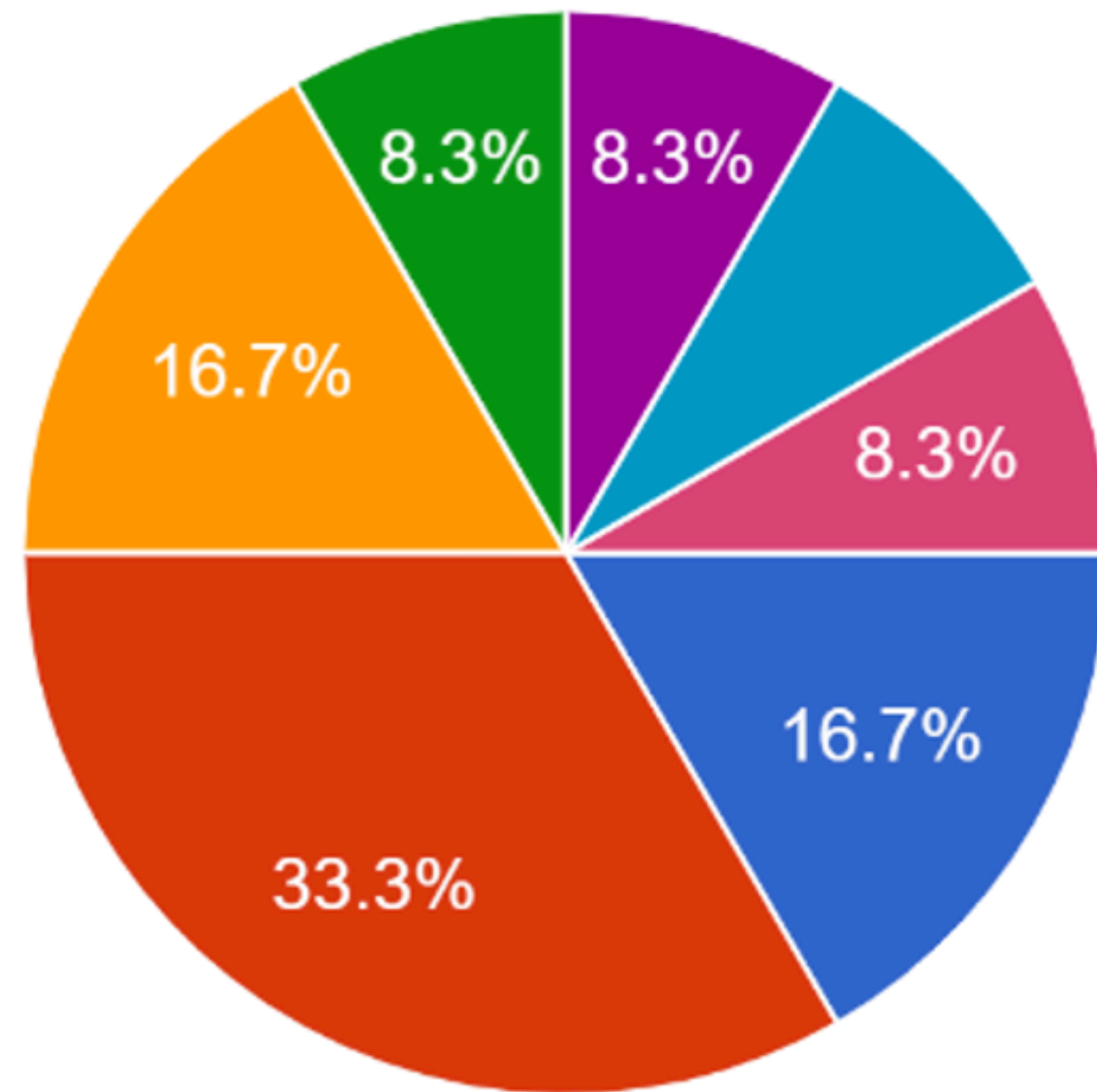
- Images
- Audio data (2)
- Time series data (1)
- Medical Text and Lab results (1)
- Astrophysics catalogues
- Reddit Text Comments
- protein structure data, images
- ...

Data format

- NetCDF storing temperature, humidity, pressure, wind speed, and direction.
- FITS files
- Tabular data of patients over 10 years
- ...



ML/AI techniques used



- LLM/Graphs/time series
- Computer vision/generative models
- Statistical approaches (bayesian networks, SBI)
- Reinforcement learning/unsupervised
- All of the above in different combinations. E.g. autoencoders for f...
- LM/LLM/Topic models/Text classification models
- metaheuristics and multi-objective opti...



SMASH Workshop

ML/AI might offer an opportunity for inter-sectorial dialog
—> this session the first step in such direction



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Thank you !



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