

Call for Pilot Foundations: Helmholtz Foundation Model Initiative

The Helmholtz Association has launched an ambitious initiative to harness the recent advancements in AI and the rise of "Foundation Models". The Helmholtz Foundation Model Initiative (HFMI) aspires to lead in creating generic AI models for a variety of research domains. Several recent examples demonstrated the potential of foundation models, e.g. [RETFound](#), [Segment Anything](#) and [IBM NASA Geospatial](#). The program aims to establish domain-focused pilot foundation projects with a clear path to transform research data into high-impact tools for scientific discovery. In this context, foundation models are defined as "(...) any model that is trained on broad data (generally using self-supervision at scale) that can be adapted (e.g., fine-tuned) to a wide range of downstream tasks;" ([arXiv:2108.07258v3](#)).

This call initiates our search for the highest-impact pilot foundation projects within the Helmholtz Association.

Through this call, we wish to extend an opportunity to all Helmholtz researchers to apply for pilot foundation projects, inviting them to take part in the Helmholtz Foundation Model initiative with their specific existing datasets, related research questions, and unique foundation model approach. HFMI will facilitate the pairing of domain and AI experts where required.

Consortial structure

A consortium of at least three Principal Investigators (PIs) will guide each pilot foundation project: one expert from the respective research area ("Domain Lead"), and one from the AI field ("AI Lead"). A third PI will contribute HPC expertise. Project teams will comprise data specialists with domain expertise as well as AI specialists with core machine learning expertise, and potentially HPC specialists. Together, they work to create a high-impact foundation model in the specific research domain. An overarching synergy team will facilitate exchange and collaboration between the pilot foundation projects.

HFMI follows the idea of the step-wise approach, with Foundation Stage, Readiness Stage, and Visionary Stage, with progression from single-modal data or a few closely related modal data in the foundation stage to multi-modal in the visionary stage. Therefore, every application should explicitly lay out the envisioned evolution between the stages and incorporated data.

More details about the underlying concept are available [here](#).

Eligibility

All Helmholtz researchers are eligible to apply. External partners can participate in consortia but are not eligible for funding.

Duration

Projects should run for up to 36 months, starting May 2024.

Funding scheme

Central funding will be provided for personnel and equipment in each pilot foundation project up to EUR 1.000.000 in 2024 (May-Dec) and up to EUR 1.500.000 in 2025.

The contributing centers must underwrite funding for the remaining period (Jan 2026 – Apr 2027), since central funding will not be guaranteed after 2025. This must be confirmed by a letter of support by the research center leadership. This letter must be submitted with the proposal.

The recommended team structure comprises 8 FTE with domain and/or data experts hosted at centers with relevant domain expertise (2-4 FTE), and AI experts hosted at a center with relevant AI expertise (5-6 FTE). To ensure efficient and effective team science, the AI experts are highly recommended to be hosted at a single site.

Selection Criteria

Projects should leverage existing large & complex data sets to build Foundation models to solve several highly impactful, well-defined downstream tasks to with quantifiable success.

A consortium of at least two Principal Investigators (PIs) will guide each pilot foundation project: one expert from the respective research area (“Domain Lead”), and one from the AI field (“AI Lead”). In addition, a PI who has HPC expertise is recommended. Access to adequate highest performance computing facility should be documented.

Proposals should therefore address:

- Provenance, access, and availability of high-volume data, and how its extent and complexity are expected to give rise to a Foundation Model.
- How consortia merge domain, AI, and compute expertise to build domain-leading Foundation Models.
- The amount of compute resources required and a detailed and reliable plan to access them throughout the duration of the project.

In addition, proposals should demonstrate:

- Scientific relevance and the extent to which the model provides solutions to the central questions of our time ([Helmholtz Mission](#)).
- A viable research program including defined objectives and desired results for each project phase, with work plan, milestones, deliverables, risk assessment and mitigation for a number of work packages.
- A specification of foundation model approach (e.g. architecture, training & tuning paradigms, etc.), and proof of ability to scale to large-scale HPC.
- Plan for efficient and effective cooperation within the consortium (“[team science](#)”).
- Qualification and track record of project personnel in the research domain, AI/ML, and HPC.
- Assessment of readiness for a timely start of the project.

The proposal template contains guidelines for the information to be provided.

Application Process

The rapid progress in AI commands a timely initiation of projects. To this end, the application process will be implemented as follows:

01.02.2024	Call published.
08.02.2024	Info event

15.02.2024	Optional matchmaking event between domain- and AI experts, organized by the Helmholtz Head Office. To participate, applicants submit the appropriate questionnaire by 15.02.2024 (see Appendix "Domain Questionnaire" and "AI Questionnaire").
15.03.2024	Deadline for submission of full applications by consortia of domain- and AI experts
21.03.2024	Following the formal check, the proposals will be sent to the selection panel for review and preparation of the meeting
10.04.2024	Selection meeting, funding decision
01.05.2024	Start of funding

A proposal template will be provided.

Submission

Proposals must be submitted via email to inkubator@helmholtz.de.

Formal requirements

Submission checklist

Your submission must meet all of the following criteria or it may be rejected without review.

- a. Strictly adhere to the proposal template regarding the structure, word and page limits of your proposal, including mandatory appendixes and CVs.
- b. All parts of the application must be addressed and all requested information provided at the time of submission.
- c. Financial planning must be transparent and sound.
- d. A letter confirming the financial commitment by the host center(s) for the project period beyond 2025 must be supplied.
- e. Signed declarations or guarantees of matched funding from each Helmholtz center, or letters of support from external partner must be provided (if applicable).
- f. The proposal must be submitted as a single PDF.

Reporting and other obligations

HFMI PIs shall prepare reports that demonstrate progress in the project plan (milestones) and results (deliverables) to Helmholtz head office and the Helmholtz Information and Data Incubator. Reports are due annually and at the end of the funding period.

Project leaders commit to actively participate in Helmholtz Foundation Model Initiative activities, such as progress or method exchange workshops, the Helmholtz AI and Imaging conference or seminar series, that will be organized by the synergy team.

Funded PIs and researchers commit to acknowledging financial support through the Helmholtz Foundation Model Initiative funding line in any related published output.

Funded PIs commit to regularly communicate updates about ongoing related activities, for publication e.g. on the Helmholtz website and/or associated social media channels. The head office may approach PIs for such updates.