

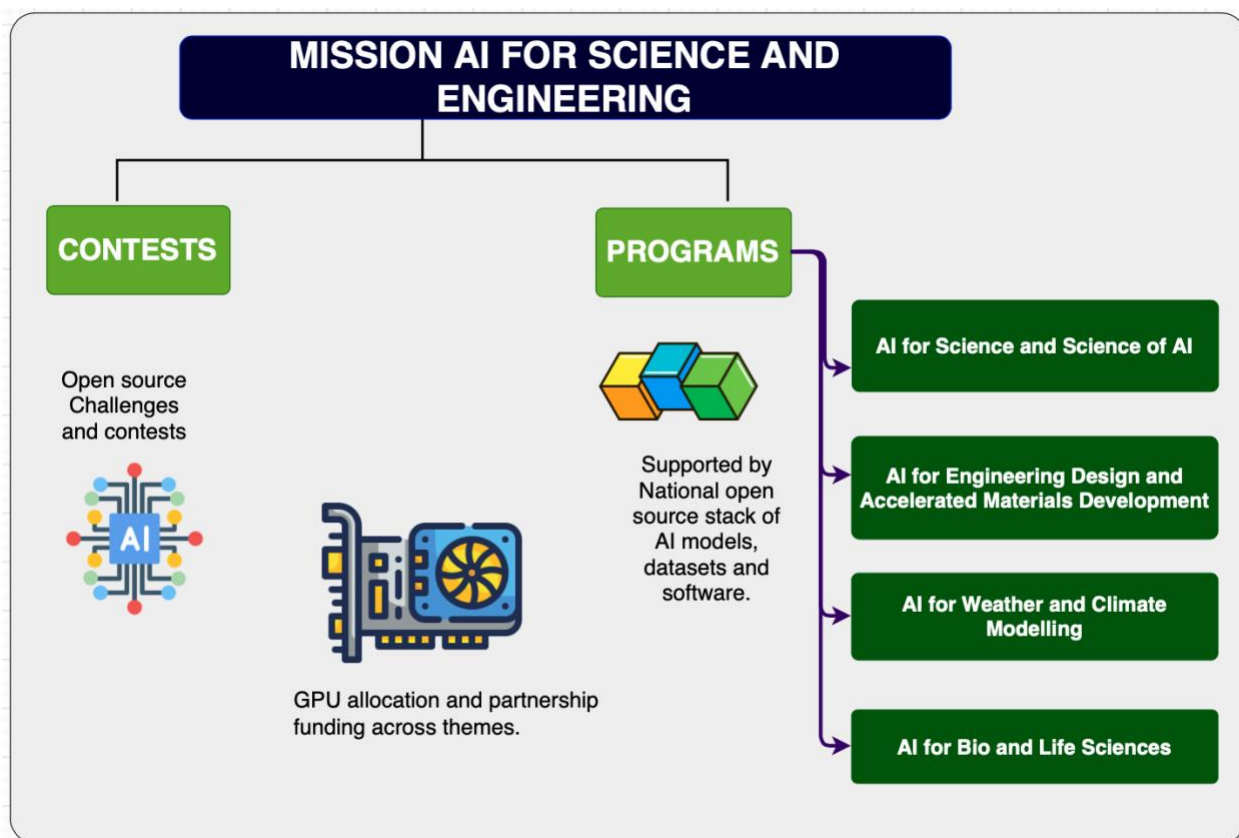
## ANRF MISSION AI for Science and Engineering (AI-SE)

### **Introduction:**

Anusandhan National Research Foundation (ANRF) is mandated to spearhead a new era of directed Research & Innovation in the country, translating ideas into tangible national and societal outcomes. Under its **Mission for Advancement in High-Impact Areas (MAHA)** program, ANRF promotes mission-mode, solution-oriented research. The newest flagship initiative under ANRF MAHA is **Artificial Intelligence for Science & Engineering (AI-SE)**, launched in collaboration with the **Ministry of Electronics and Information Technology (MeitY)**, and Scientific Departments.

### **Vision:**

To embed AI as a core enabler of India's scientific and engineering ecosystem by advancing foundational AI methods, domain-specific models, and national-scale infrastructure for accelerated discovery and innovation.



**Objectives:**

- Advance next-generation AI methods that **directly** model science and engineering, including neural operators, physics-informed learning, molecular and biological foundation models, and domain-specific models.
- Accelerate AI-driven discovery in strategic areas such as Climate Science, Advanced Materials, Biomanufacturing, and data-rich fields like microscopy, spectroscopy, medical imaging, astrophysics, and high-energy physics.
- Build an open, interoperable AI ecosystem of scientific models, datasets, tools, and infrastructure to embed and share scientific insights across domains.
- Catalyse cross-disciplinary collaboration to integrate AI research with domain expertise, advance the science of AI (including generative AI and domain adaptation), and strengthen India's scientific and technological self-reliance.
- Creation of a coherent set of opensource fundamental models and datasets for science and engineering.

**Significance of the Mission:**

This Mission positions AI as an integral component of the scientific and engineering enterprise — where scientific principles, engineering designs, data, and models are directly embedded in AI systems—thereby advancing both the frontiers of science/engineering and the science of AI to accelerate discovery, innovation, and national technological self-reliance.

**Scope of the Mission:**

The Mission adopts an interlinked support architecture through various domain specific programs.

The Mission will drive cutting-edge AI research, backing academia and research institutions to develop fundamental building blocks in science and engineering. This includes exploring novel architectures like domain-centric neural operators, sophisticated large-scale models tailored for specific knowledge domains in science and engineering, and AI-powered experimental platforms and digital twins.

The projects identified under the programs will be open for funding support by ANRF and/or partner scientific departments such as Ministry of Earth Sciences (**MoES**), Department of Biotechnology (**DBT**) and Defence Research & Development Organization (**DRDO**), based on the areas of interest. More entities including non-governmental organizations will be added to the mission as program partners, in future.

Projections for the programs include scalable GPU clusters supported by **MeitY**, a federated data backbone built on FAIR (Findable, Accessible, Interoperable, and Reusable) principles, and an open-source ecosystem of models, tools, and autonomous laboratories for machine-speed validation. These elements converge in the Open IndiaAI Stack, a composable catalogue of models, datasets,

and workflows that function like snap-together “LEGO blocks. These lego blocks can be composed into domain specific AI agents via automated AI techniques.

**Proposals are invited under the following tracks:**

**Track I: Programs** (in Partnership with **MeitY** for GPUs)

**Program I: AI for Science and Science of AI (ANRF)**

- a. Hybrid AI-HPC Approaches for Scientific Discovery
- b. Reimagining Design and Simulation through AI
- c. AI for Next-Generation Batteries and Sustainable Energy Storage
- d. AI for Medical Imaging
- e. AI for Computational Chemistry
- f. AI for Astrophysics, Cosmology, Nuclear and High Energy Physics
- g. AI-guided Molecular Design or Quantum phenomena
- h. AI methods inspired by Scientific Disciplines
- i. AI for Earth & Geological Sciences & Engineering
- j. AI for Multi OMICS for Plant and Animal Sciences

**Program II: AI for Engineering Design and Accelerated Materials Development (ANRF with DRDO)**

- a. Accelerating Materials Discovery and Optimization with AI
- b. Novel Materials design through AI for defence applications
- c. Digital Twins for naval systems like AIP, advanced propellers, unmanned underwater systems
- d. Real-time fluid dynamics modeling
- e. AI-enabled design and maintenance of maritime systems

**Program III: AI for Weather and Climate Modeling (ANRF with MoES under Mission Mausum)**

- a. AI emulators for physics parameterization and earth system models
- b. Multimodal rainfall nowcasting
- c. Climate modeling and environmental forecasting

**Program IV: AI for Bio and Life Sciences (ANRF with DBT)**

- a. Biomanufacturing
- b. AI-assisted strain selection and yield optimization
- c. Enzyme design and biocatalysis
- d. AI for Drug Discovery and Cell & Gene Therapies
- e. AI for Computational Biology
- f. AI for Protein and mRNA biologics
- g. AI for Therapeutics and Vaccines

**Nature & Duration of Support**

- Proposals must be collaborative, demonstrating strong expertise in both core Sciences or Engineering and AI, and may involve multi-investigator or multi-institutional consortia.

Proposals featuring meaningful collaboration with startups and industry partners will be actively encouraged over purely academic proposals.

- Proposals relying solely on pre-2020 “black box” machine learning approaches (e.g., basic machine learning and regression models, shallow neural networks, or standard convolutional/recurrent neural networks (CNN)/(RNN) pipelines) will not be prioritized for support. Proposals are expected to use modern AI methods (post-2020) that reflect the state of the art in scientific applications, transfer learning or emergent properties etc. Fine tuning of open source state of art foundation models is also encouraged using specialized data sets.
- Research grants of up to **₹30 Crore for a period of 3 years** may be awarded, inclusive of GPU usage costs. In rarer cases, upto **₹50 Crore** will also be considered, commensurate with the projected deliverables and impact of the proposal.
- The budgetary provision for GPU usage must not exceed 70% of the total project cost.
- GPU usage will be supported only through MeitY’s GPU-as-a-Service; purchase of GPUs or other HPC equipment will not be funded.
- Funding will cover Research Personnel (JRFs, SRFs, RAs/National Post Doctoral Fellows (NPDFs), Project Scientists etc.), AI/cloud compute hours, software tools, datasets, and experimental rigs. Additional allowable costs include travel, contingency, and institutional overheads as per ANRF norms.
- Funding may also cover on-demand HPC services through National Supercomputing Mission, to support experimental validation and hybrid science-in-the-loop approaches.
- Proposals with high capital cost requirements will not be supported.
- Duration of the projects shall not exceed 3 years.

#### **Who Can Apply for Track I Projects**

- Project proposals are invited in consortium mode, bringing together multiple Principal Investigators (PIs) and institutions/laboratories from academia, research organizations, industry, and startups.
- Each proposal must be submitted by a lead institution and will be headed by a lead PI.
- The lead PI will be from the academic institution or a National Research Laboratory, and must hold a regular position in the institution. The PIs can also be from Section 8 Companies and DSIR SIRO registered entities.
- Applicants must be Indian citizens or OCI holders.
- Applicants must have a Ph.D. in Science, Mathematics, Engineering, or relevant Social Sciences (for AI in quantitative social sciences) or M.D./M.S./M.D.S./M.V.Sc. degree holders.
- PIs nearing superannuation may apply if supported by a Co-PI from the same institution with at least 3 years of service remaining. Fellows under INSPIRE, Ramanujan, and Ramalingaswamy schemes may participate as Co-PIs.

#### **Mode of Support**

- The lead institution will be responsible for the financial and administrative management of the project.

- Post selection of the project, funds will be allocated to lead institution, which will in turn be distributed to other academic/ R&D lab partners, as required.
- Collaboration: Startups and Industry partners are invited to participate in the mission as a collaborating partner with academic institutions/ R&D labs and can aim to leverage open-source outputs of the mission to drive their innovation. No financial support will be provided for industry and startups by ANRF in this mission.

#### **What are the expected deliverables from a project under Track I:**

Each supported project must produce either an open-source model or an open-source dataset or its combination thereof, as its primary deliverable. Every proposal should include four mandatory dimensions:

1. **Technical Efficacy** – accuracy, speed, and robustness measured on peer-reviewed benchmarks or, where those are absent, on pre-agreed data;
2. **Open-Science Contribution** – code, checkpoints, and datasets released under approved licenses, together with reproducibility scripts
3. **Technology Readiness** – attainment of TRL milestones aligned with the project's declared pathway to deployment.
4. All funded projects will be required to contribute at least one well-defined benchmark task or an open-source model to support open source competitions in Track - II.
5. The PIs/Co-PIs must commit to releasing intermediate artefacts under approved open-source licenses. *The details of the licence can be found [here...](#)*

#### **Selection & Mode of Application:**

- Under the Mission, a lead PI is eligible to submit only one proposal during a given call.
- Information to be provided for pre-proposal:
  - Section A:** Objectives, Technical efficacy benchmarks including TRLs, planned open-science contributions, deliverables, impacts, and milestones with a clear deployment pathway (maximum 3 pages).
  - Section B:** Budget Requirements
    - Part I* - Proposed GPU usage requirements and envisaged costs, with technical justifications (maximum 1 page). Principal Investigators (PIs) can calculate the usage costs through the India AI Compute portal.
    - Part II* - Details of other costs (Non-recurring, Consumables, Travel, Contingency, Research Personnel, and Overheads) (Maximum 1 page).
- Full proposals will be invited by ANRF, based on the evaluation of the pre-proposals.
- The proposals will be evaluated by a domain-specific Technical Advisory Committee (TAC), and applicants may be invited for presentations or discussions as part of the selection process.

**Plagiarism Policy:**

All proposals submitted under the AI-SE Mission must be entirely original in both concept and content, reflecting the applicant's own research ideas, methodologies, and planned activities. Proposals found to contain any uncredited or unattributed copied content, whether from published literature, online sources, or previously submitted work, will be summarily rejected without further review.

**How to apply:**

Proposals must be submitted through [www.anrfonline.in](http://www.anrfonline.in) and will be evaluated under ANRF's standard procedures, aligned with the implementation strategies of this Mission. Applicants should carefully review the detailed PI guidelines on the portal to ensure full compliance with submission requirements and formats.

**Track - II (ANRF in partnership with MeitY)**

**National Challenges through open source contests:** Under the broad umbrella of the AI-SE mission, open source challenges and contests will be undertaken to build a national common of open-source AI models, datasets, and evaluation benchmarks. Grand challenges, public competitions, and community benchmarking will be the goal of this initiative. A key purpose of this effort is to foster the engagement of the wider scientific community and latent talents, including researchers, students, and innovators from Tier II and Tier III institutions and universities, thereby ensuring inclusive participation and broad-based capacity building in AI for Science and Engineering.

**Nature of Support for Contests and Challenges:**

- The mission will have national competitions over the year, to build open-source AI datasets, build opensource models, and benchmarks.
- Around 10 national competitions over the year will be targetted.
- The competitions are open to all Indian citizens or OCI holders.
- The competitions will entail prizes and access to GPUs through MeitY's shared infrastructure.
- The expected deliverables will be build datasets or build models for opensource.
- The applicants should affiliate/partner with any Indian academic institutions or national research labs if they win the contest, for GPU access/allocation.
- The PIs/Co-PIs must commit to releasing intermediate artefacts under approved open-source licenses. *The details of the licence can be found [here...](#)*

**Implementation of Open Source Challenges and Contests:**

- ANRF and MeitY will evolve mechanisms to support competitions to lead the development of national open-source AI models, datasets, and benchmarking platforms, including large-

scale competitions to crowdsource innovation. In addition ANRF and MeitY may procure support services for this AI Mission.

**Operational details will be informed shortly.**

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In addition to the general conditions set forth above as well as the conditions provided by AIKosh in its Terms of Use, the following conditions shall be applicable –

### **3. Responsible and Ethical Use**

(a) The Work shall not be used for:

- discrimination, exclusion, or violation of fundamental rights;
- development or deployment of autonomous systems in violation of humanitarian principles or public safety;
- any military or defence purposes;
- exploiting, harming, or attempting to exploit or harm minors;
- generating or disseminating verifiably false information and/or content with the purpose of harming others;
- generating or disseminating personal identifiable information without due authorization or for unreasonable use; and



- unlawful surveillance or profiling of individuals or groups.
- (b) Users shall ensure alignment with the **National AI Strategy of India** and global frameworks such as the **UNESCO AI Ethics Recommendation**.

#### 4. Global Interoperability

This license is designed to be **compatible with the permissive global open-source MIT license**. Works released under this license may be combined with or redistributed under MIT license, provided that the attribution and compliance conditions above are met.

#### 5. Limitation of Liability

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## **Frequently Asked Question**

### **Eligibility**

Q1. Who can apply as a Principal Investigator (PI)?

Applicants must be Indian citizens or OCI holders. The Lead PI must hold a regular position in an Indian academic institution or national research laboratory, with a Ph.D. in Science, Mathematics, Engineering, Social Sciences (quantitative AI), or equivalent medical degrees (M.D./M.S./M.D.S./M.V.Sc.)

Q2. Can a PI nearing retirement apply?

Yes, but only if supported by a Co-PI from the same institution who has at least 3 years of service remaining.

Q3. Can startups and industry partners apply?

Yes, but only as collaborators with academic or R&D institutions. They cannot receive direct funding but may leverage open-source outputs of the mission.

Q4. Who can participate in Track II open challenges?

All Indian citizens and OCI holders are eligible to participate in Track II contests.

Q5. Can a PI submit a proposal individually?

No, leading PI has to submit a proposal in collaboration with other PIs and other Institutions.

Q6: Will international collaborators be encouraged to contribute without any financial obligations from either end?

Certainly. If accomplished international researchers wish to collaborate with the PI/Co-PIs to contribute to the project, they are welcome, without any financial obligation from ANRF.

Q7: Is a prior clearance (Ethical, biosafety, animal, humans, etc) required at the time of submission of proposals?

The clearances may be submitted after approval of the proposal for funding.

### **Funding & Support**

Q8. Who will fund the projects under the AI-SE Mission?

A. The primary funding for projects under the AI-SE Mission will be provided by ANRF. MeitY will partner in the program by providing GPU resources through its India AI Mission. Additionally,

partner departments such as MoES, DBT, and DRDO will co-fund projects alongside ANRF within their respective verticals, in coordination with MeitY.

Q9. What is the maximum funding available?

- Up to ₹30 Crore for 3 years.
- In exceptional cases, up to ₹50 Crore may be awarded.

Q10. What costs are covered under the grant?

The funding covers:

- Research personnel (JRFs, SRFs, RAs, NPDFs, Project Scientists)
- GPU/cloud compute hours (via MeitY's GPU-as-a-service)
- Software tools, datasets, experimental rigs
- Consumables, Travel, contingency, and institutional overheads (As per ANRF norms)

Q11. Can I purchase GPUs with project funding?

No. GPU usage will only be supported through MeitY's GPU-as-a-service. Direct purchases of GPUs or HPC systems are not allowed.

Q9. Is there a cap on GPU usage costs?

Yes. GPU usage cannot exceed 70% of the total project budget.

Q12. Are high-capital projects (like new HPC clusters) supported?

No. Proposals with heavy capital expenditure will not be supported.

Q13. How can I calculate the GPU usage charges?

The GPU usage charges can be calculated through the India AI mission's AI Compute portal (Link: <https://compute.indiaai.gov.in/indiaaipricecalculator>)

### **Proposals & Deliverables**

Q14. What must each funded project deliver?

Each project is expected to deliver:

- An open-source model, dataset, or both
- Technical benchmarks (accuracy, speed, robustness)
- Open-science contributions (code, checkpoints, reproducibility scripts)
- Clear Technology Readiness (TRL) milestones, if any.
- Contributions to Track II (benchmarks or open-source models)

Q15. Are proposals based on older machine learning methods admissible?

No. Proposals relying only on pre-2020 "black box" ML approaches (basic regression, shallow neural networks, CNN/RNN pipelines) will not be prioritized. Applicants must use modern, state-of-the-art AI methods (post-2020), such as foundation models, transfer learning, domain adaptation, or physics-informed learning.

Q16. Are projects on AI for engineering processes admissible?

Yes. The goal of the project is open AI models for key chip design processes, or associated creation of open data sets, i.e. it is formulated as a direct modelling of engineering, then it could be admissible. Please note that several aspects of engineering: mass flow, heat flow, fluid flows, or P&ID diagrams for chemical processes etc could be directly modelled in AI in different ways, and ultimately leading to open digital twins. While we have given several examples, our intent is not to be restrictive. However we expect applicants to justify what open AI model (that directly models science or an engineering process) or open data set is being created in the proposed application..

Q17. What is the format for a pre-proposal?

- Section A (3 pages): Objectives , methodology, benchmarks, planned open-science contributions, deliverables, Impact and milestones with a clear deployment pathway (maximum 3 pages).
- Section B (2 pages): Budget (separate budgets for (a) GPU usage and (b) other costs)

Q18. Can one PI submit multiple pre-proposals in a call?

No. Each Lead PI can only submit one pre-proposal per call.

Q19. When to submit a full proposal?

A full proposal should be submitted only if your pre-proposal is selected. Pre-proposals will undergo a preliminary screening to assess their alignment with the mission's scope and objectives, as well as their technical merit and potential impact. Only those pre-proposals that pass this evaluation will be invited to submit a full proposal.

## **Track II: Open Challenges**

Q20. What is the goal of Track II contests?

To build a national commons of open-source AI datasets, models, and benchmarks through community-driven competitions.

Q21. What support is provided to winners of Track II contests?

- Prizes
- GPU access via MeitY's shared infrastructure (through an academic/research partner)

Q22. What are the expected deliverables from these contests?

Open-source datasets, models, and national benchmarks for AI in science and engineering.

### **Policies & Compliance**

23. Under what license must outputs be released?

All outputs must be released under the ANRF Open License (adapted from MIT), ensuring open access, ethical use, and global interoperability.