MISM
Multiscale Immune Systems Modeling

Pilot Grant Request for Proposals
December 2025

The Center for Multiscale Immune Systems Modeling (MISM)

The mission of the MISM is to develop innovative frameworks for bridging across biological scales. Our vision is that these bridging frameworks will enable multiscale models that (1) address fundamental gaps in our mechanistic understanding of immune-related health and disease, particularly regarding infectious disease pathogenesis, transmission, and sequelae; and (2) provide *in silico* laboratories for evaluating prophylactic and therapeutic interventions. By design, these bridging frameworks encompass (1) computational models that create an output-input bridge between two scales; (2) an informatics infrastructure for sharing data and models across modeling groups; (3) a community of practice that links experimental and computational researchers; (4) a community of learning that provides education and mentoring for skill development, research opportunities, access to expertise, and computational resources for graduate students, postdocs, and ESI; and (5) policies and processes to coordinate — and flexibly re-direct in the event of a disease outbreak — the diverse multiscale modeling community.

Objective of this Pilot Grant RFP

MISM Pilot projects are expected to lead to future independent immunology and/or computational biology funding. The MISM is especially interested in proposals from new and early-stage investigators and those from established investigators who are initiating new and unique collaborations. Trans-disciplinary partnerships are highly encouraged. Multiple Pilot Awards are available annually (contingent on available funding) for a maximum award of $60,000 each, DIRECT cost funding. Proposals should engage cross-cutting areas of immunology and computational biology research. **<u>Project topics include, but are not limited to:</u>**

- Protective responses of the immune system within the context of particular pathological conditions and/or physiological states
- Molecular, cellular, organ, within-host, or between-host scales to determine mechanisms related to infection and the immune response.
- Cellular factors of cell-entry, replication, and pathogenesis.
- Environmental factors, such as zoonotic diseases, nutrition, and access to medical care.
- The public health system, encompassing processes related to infection and immunity.
- Host-pathogen dynamics, vaccines, and therapeutics
- Multiscale Models of Interest:
    - Pathogens that differentiate between within-host dynamics and between-host pathogen transmission.
    - Respiratory virus infection and treatment.
    - Disease induction, progression, or remission of immune-mediated diseases within NIAID's mission (e.g., allergy, asthma, autoimmunity, transplant rejection [cell, tissue, and/or organ]).
    - Immune-mediated sequelae, including autoimmune responses, following pathogenic infection
    - Pathogen genomic heterogeneity (e.g., HIV or Staphylococcus aureus) and the immune response

- Time to viral rebound in persons living with HIV and advance understanding of the persistent HIV reservoir.

RFP Schedule

• Due Date for Letter of Intent (required)	December 15, 2025 (5pm EST)
• Due Date for Proposals	January 31, 2026 (5pm EST)
• Application Review	February 2026
• Projected Award Date	April 1, 2026
• Period of Award	12 months or less

Eligibility for MISM Pilot Grant Award

- Scientists at any US academic institution are invited to apply

Faculty

- Applicants with prior/current funding on their submission topic are encouraged to apply and indicate how other resources will be leveraged, and these resources are non-overlapping

Post-doctoral and Clinical fellows

- A separate letter of support from a faculty mentor is required; please see the *Application* information below.
- If your proposal is reviewed and meets the scoring criteria for the award, you will be required to include your mentor's name and email as a part of your application.

Letter of Intent

An LOI is **required** to submit a MISM Pilot Grant. LOIs are mandatory and will be used to determine appropriateness for the RFA, provide feedback to submitters, aid the recruitment of appropriately knowledgeable reviewers, and for other review planning. LOIs should include the following information:

1. Name and email of the Principal Investigator(s)
2. Names of other key personnel and Institution/Department/Division Affiliation
3. Descriptive title of proposed research
4. Abstract (less than 350 words) describing hypotheses and aims
5. LOIs should be emailed to MISM@duke.edu

Application and Submission of Pilot Grant

Applicants will submit their applications using our online submission portal. As a part of this online form, applicants should expect to provide the project title and PI name(s), as well as complete the MISM Pilot Grant Checklist. All documents should be compiled and uploaded as a single PDF. *Applications must contain the following components in the specified order*:

1. Specific Aims and Research Strategy (3-page limit altogether, including tables and figures). Formatting Requirements:
   - 11-point Arial font
   - 0.5-inch margins on all sides
   - Single line spacing
   - Significance section: applicants should address "…the strengths and weaknesses in the rigor of the prior research (both published and unpublished) that serves as the key support for the proposed project."

- Approach section: applicants should “describe plans to address weaknesses in the rigor of the prior research that serves as the key support for the proposed project.’
- References section (no page limit): https://grants.nih.gov/grants/guide/notice-files/NOT-OD-18-228.html
- For resubmissions, the Research Strategy should include a section that addresses the concerns of reviewers.

2. NIH Biosketches (5-page limit for each biosketch)
   Include updated biosketches for the Principal Investigator and key members of the research team. Use the current NIH Biosketch format.
3. Budget and Budget Justification (no page limit)
   Use NIH 398 form pages. The Budget Justification should include sufficient detail for reviewers to assess whether appropriate resources have been requested. Research efforts are allowed on the grant (excluding administrative or clerical tasks). Faculty effort must comply with the primary department policy. Multi-investigator applications must provide sufficient justification for each investigator’s involvement in your project within this section.
4. Faculty Support Letter (no page limit)
   A letter from a faculty PI, *if the submitting PI is a postdoctoral fellow or trainee (non-faculty)*, on how this pilot award will enable subsequent external research support.

Applications must be prepared and submitted as a single, complete PDF file, using the proper naming convention (e.g., firstinitial.lastname.MISM.2025), and uploaded directly to our online submission portal.

How to Apply

MISM uses the MyResearchProposal online application software to submit full applications.

- To apply, visit https://duke.is/DukeMRP, click on “Create New Account” (or log in if you already have an account). Proposals must be submitted under the Primary Applicant’s name.
- A step-by-step user’s guide for applying via the MyResearchProposal software is available here.
- Enter Access Code ‘**MISM**’ in the search box in the upper right-hand corner, scroll down the page, select the “MISM Pilot Award 2025”, and follow the instructions.
- For any questions concerning MyResearchProposal passwords or system issues, please contact myresearchproposal@duke.edu.

Review Process

Applications will be reviewed by the MISM Study Section, which is comprised of leaders from the MISM CoE, as well as external experts, as deemed necessary to evaluate the scientific merit of a proposal. The Committee will review applications in accordance with standard NIH review criteria, with additional MISM-specific considerations:

Standard NIH Review Criteria:

- Significance: Do the proposed rationale, scientific background, and impact have the potential to advance scientific knowledge, solve critical problems, or create valuable conceptual or technical advances?
- Innovation: Does the application propose novel concepts, methods, or technologies, or use existing concepts, methods, or technologies in novel ways?

- Approach: Will the scientific quality of the proposed work result in compelling, reproducible findings (rigor), and can it be done well and within the timeframes proposed (feasibility)?
- Investigator(s): Have the PD/PIs, collaborators, and other researchers demonstrated background, training, and expertise, as appropriate for their career stage, to conduct the proposed work?
- Environment: Are the institutional resources appropriate to ensure the successful execution of the proposed work?

<u>MISM-Specific Considerations:</u>

- NIH Next Generation Researchers Policy: Priority given to Early Stage Investigators (ESIs) and Early Established Investigators (EEIs) as defined by NIH policy.
- MISM Integration: Quality and feasibility of the Resource Sharing Plan and engagement with MISM infrastructure and community.
- Potential for Independent Funding: Likelihood that pilot results will lead to successful R01 or equivalent funding.
- Multiscale Innovation: Degree to which the project advances multiscale modeling approaches and bridges biological scales.
- Collaborative Potential: Evidence for developing new interactions between or among MISM investigators and the broader community.

<u>Special Considerations for Next Generation Researchers:</u>

- In alignment with the NIH Next Generation Researchers Policy, applications from ESIs and EEIs will receive funding priority when scientifically meritorious. ESIs are investigators within 10 years of completing a terminal research degree/clinical training who have not previously received substantial NIH independent research awards. EEIs are investigators within 10 years of their first substantial NIH R01-equivalent award who are at risk of losing research support.

Additional Award Information

<u>Allowable Costs:</u>

- Research effort is allowed on the grant (no administrative or clerical support).
- *Faculty effort must comply with the primary department policy.*
- Travel is restricted and must be in support of project completion or presenting results directly from the MISM Pilot Award. Approval for travel should be requested in advance.

<u>Collaboration Expectations:</u>

- Collaboration with MISM core labs is not required, but very highly encouraged.
- Engagement can take many forms, including scientific collaboration, use of lab services, or MISM members serving in an advisory capacity on the pilot grant.
- Awardees should be prepared to present their findings in the form of a seminar, at either the MISM Seminar Series or other related events, within 6 months of project completion.

<u>Post-Award Requirements:</u>

- *Awardees will be required to provide the following documentation to be approved for funding*:
  - "Authentication of Key Biological and/or Chemical Resources" as discussed in NIH notice NOT-OD-17-068.
  - Resource Sharing Plan (2-page limit). Describe in detail:
    - Data Sharing: List all data that the proposed research will generate and specify how these will be made available to MISM members and the broader scientific community.

        - Model and Code Sharing: Describe all computational models, algorithms, and software code that will be developed, and provide a timeline for making these resources available through MISM infrastructure.
        - MISM Integration: Explain how you will engage with MISM core facilities, databases, and community platforms to maximize resource sharing and collaboration.
        - Community Building: Detail how your project will contribute to building the MISM community of practice, including potential mentoring opportunities, cross-disciplinary interactions, and knowledge transfer activities.
        - Sustainability: Describe plans for maintaining and updating shared resources beyond the pilot period.
        - If any resources cannot be made available, provide a strong scientific or ethical justification. The Resource Sharing Plan will be a significant factor in the review process, as it directly supports MISM's mission of building an integrated multiscale modeling community.
    - Human Subjects statement, if applicable (no page limit). Applications proposing human subjects research must address: Protection of Human Subjects, Adequacy of Protection Against Risks, Data and Safety Monitoring Plans, Inclusion of Women and Minorities, and Inclusion of Children. Human Research Protection Office (HRPO) approval is not required prior to submission; however, it is required before award contracting for all projects involving human subjects.
- Progress reports will be required of all awardees.
- Any publications stemming from the pilot award should reference MISM and be reported to MISM administration.
- Projects will undergo an Internal Review Process, including mid-term (6-month) and final reviews by the MISM Study Section to assess progress, deliverables, and community impact.
- Participation in the annual MISM symposium and community activities is expected.
- Final resource sharing deliverables must be submitted within 6 months of project completion.

Restrictions:

- No outside subawards or international components will be permitted.
- All computational resources and models developed must be compatible with the MISM sharing infrastructure.

Questions regarding this RFP, please contact MISM@duke.edu