ATP-BIO Y5 REQUEST FOR PROPOSALS

Funding Period: 9/1/2024 - 8/31/2025. Due date: 4/23/2024.

BACKGROUND

ATP-Bio is an NSF Engineering Research Center leading the field of biopreservation by synergizing the expertise of 6 world-class research institutions (UMN, MGH, UCB, UCR, TAMU and CMU). Its vision is to "suspend biological time", thereby allowing living products to be readily available across the globe to advance healthcare, biodiversity, and food supply and sustainability. Along with the crucial advancement of biopreservation research, ATP-Bio's other mission is to train a diverse workforce through its Engineering Workforce Development (EWD) and Diversity and Culture of Inclusion (DCI) pillars. It also aims to connect resources and partnerships to ethically translate technologies for storage and distribution of living biological systems through its Innovation Ecosystem (IE) and Ethics and Public Policy pillars (EPP).

The technological barriers to biopreservation by cooling (mostly to subzero temperatures) and rewarming (to normal biological temperatures) are essentially the same for all living systems and can be summarized as unwanted ice formation, toxicity of cryoprotective agents (CPAs), and thermal and mechanical stress. Three research thrust areas (Biological Engineering, Multi-scale Thermodynamics of Water, and Fast and Uniform Rewarming) have been identified to overcome these barriers. The technological advances developed in these thrust areas are tested on a diverse spectrum of living systems grouped in four testbeds: cells, microphysiological systems and tissues, whole organs, and organisms.

CALL FOR PROPOSALS

The center is looking to fund new research projects through a competitive procedure for Year 5 up to **$50,000 per year per project. These projects are expected to tackle a research topic or novel area of expertise related to biopreservation, preferably related to biodiversity, food sustainability or cell therapy as identified by the Center** (see below). **Proposed projects also need to correspond to one or more ATP-Bio Thrust Area milestones**. Investigators of UMN and MGH are not eligible to lead projects but can participate in projects led by the other institutions. Proposals potentially involving two or more institutions are strongly encouraged.

PROPOSAL TIMELINE

March 6, 2024	Issue proposal call
April 23, 2024	Proposal submission deadline
May 20, 2024	Awardees are notified and funded projects are announced
September 1, 2024	Projects begin; funding is issued through Y5 subawards

A template for the proposal is provided at the end of the document. Applicants should submit their proposals by the deadline through this **ONLINE APPLICATION**.

POLICIES

All proposals will be reviewed by a committee selected amongst ATP-Bio investigators, IAB members and

select external biopreservation experts. External researchers will need to provide a letter of support, preferably from an ATP-Bio researcher, explaining the importance of the proposed research with respect to impact on ATP-Bio's convergent research, potential for multi-institutional collaborations, and integration with other pillars. Awards will be made on the basis of the review committee recommendations, programmatic needs, and quality of the science and technology. Awarded projects will receive one year of funding capped at $50,000 direct costs (indirect costs will be added to the allocation). The awarded projects will be required to *(i)* present their progress in person at the annual meeting and in the ATP-Bio webinar series, *(ii)* write a quad chart and research brief for the annual report*, (iii)* be available to host an REU (Research Experiences for Undergraduates) student, *(iv)* have any potential trainees gain complementary expertise in other institutions and labs if deemed useful, *(v)* have any potential trainees engage with ATP-Bio's Scholar Leadership Committee (SLC), and *(vi)* provide a final report including a post-project plan at the end of the funding period. Any residual funding in excess of 15% of the original total budget will be applied to future funding or will be returned unless approved by ATP-Bio Director. The applicant is expected to abide by the MoA and the ATP-Bio's IP Policy and code of conduct.

LIST OF RESEARCH GAPS AND NOVEL EXPERTISE IDENTIFIED BY ATP-BIO

Novel Expertise

ATP-Bio is seeking proposals primarily in the following areas:

- Biobanking of animal species with intended goals of advancing research in biodiversity and/or food supply/sustainability
- High-throughput production and testing of CPAs and/or model systems
- Expertise in agricultural and human health pest management
- Novel approaches and technologies in food supply and sustainability
- Molecular biology approaches to optimize metabolism, improve stress tolerance, and/or identify regulatory mechanisms
- Advanced technologies for temperature sensing, ice formation sensing, digital holography, and laser-speckle imaging.

Testbeds

ATP-Bio has four "testbeds" with research gaps: cells, microphysiological systems (MPS), organs and whole organisms. Each is directed to broad market segments in biopreservation. Possible testbed-related topics in biopreservation include but are not limited to:

- Cells:
    - preserving cell therapy products (such as exosomes and mitochondria), preserving immunotherapy products (such as CarT cells, T cells, and NK cells)
    - preserving gametes for biodiversity and animal husbandry
- MPS & Tissues : new approaches to preserving organoids or tissues
- Organisms: preserving organisms with an outlook towards biodiversity, food supply, and sustainability. This includes aquatic organisms invertebrates (e.g. shellfish), freshwater fish, and saltwater fish) and non aquatic organisms.
- Any testbed: transportable technologies for field work.

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PROPOSAL TEMPLATE (2 page limit including figures, at least 11pt and 1" margins)

Project Title:

Applicant(s) *(role, institution)***:**

1. PROJECT DESCRIPTION

A. Research Team

- *Provide any ATP-Bio and/or other institutional affiliation(s), role, and relevant background and expertise of the team.*
- *Provide the information of any ATP-Bio Partners or other external collaborators.*

B. Description and explanation of research goals and approach *(major section)*

- *Describe the biopreservation gap you are addressing or novel expertise you are bringing to the center.*
- *Discuss the current state-of-the-art and its limitations.*
- *Describe your research plan to address the limitations and its innovative aspects.*
- *If available, report any supporting preliminary results and deliverables.*

C. Brief timeline of major milestones and deliverables

D. Project Role in Support of ATP-Bio Strategic Plan

- *Describe how the project integrates and synergizes with ATP-Bio:*
  - *Which thrust area and testbeds will the project synergize with?*
  - *What milestones will this project work towards?*
- *Describe collaborations with other ATP-Bio thrusts and testbeds and researchers outside ATP-Bio.*

E. Integration with other ATP-Bio pillars (consult *ATP-Bio website*)

- *Describe any contribution and/or engagement with the other ATP-Bio pillars (Engineering workforce development, Diversity and Culture of Inclusion, Innovation Ecosystem, and Ethics and Public Policy.)*

F. Broader & societal impacts

- *If the research is successful, what are the long term impacts on society in reference to the previous pillars?*

2. COMMERCIALIZATION POTENTIAL:

- *Using the **TRL** chart, determine:*
  - *What TRL is the idea now?*
  - *What is the expected TRL upon completion of the project?*
- *Describe potential application areas and the market needs the technology addresses. Describe the commercialization pathway(s) for the project, including what industry or other partners will be important for commercialization.*

3. PLAN FOR EXTERNAL FUNDING

- *Is there any current external funding?*
- *What is the external funding strategy for continuation of the project?*

4. REFERENCES

- *Include patents, citations, and other published literature.*

5. BUDGET & JUSTIFICATION

- *Include a simple budget and justification articulating the allocation to functional expenditures.*

6. ADDITIONAL:

- *If the project is approved, the following items will be requested: a formal institutionally approved budget, an agreement with ATP-Bio's IP policy, and the ATP-Bio Non-Binding Project Awardee MOA.*
- *If approved, the project is expected to meet all expectations described in the policies.*