NSF ENGINEERING RESEARCH CENTER: ADVANCED TECHNOLOGIES FOR THE PRESERVATION OF BIOLOGICAL SYSTEMS
College of Science and Engineering, University of Minnesota
Mayo Memorial Building, Room 748
420 Delaware Street Southeast
Minneapolis, MN 55455-111
atp-bio@umn.edu | www.atp-bio.org

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From Coral Reefs to the Moon: NSF ATP-Bio℠ Leaders Chart the Future of Cryopreservation

Nature spotlights Mary Hagedorn's pioneering work with NSF ATP-Bio℠ collaborators John Bischof, Mehmet Toner, and Susan Wolf

September 2025—A recent *Nature* article, *"Cryobiologist Mary Hagedorn aims to build a biorepository on the Moon"*, shines a spotlight on **Dr. Mary Hagedorn**, Smithsonian Conservation Biology Institute cryobiologist, and her bold vision to create a lunar biorepository safeguarding Earth's biodiversity. The article underscores the central role of the **NSF Engineering Research Center for Advanced Technologies for the Preservation of Biological Systems (ATP-Bio)** in driving these groundbreaking ideas.

Hagedorn, renowned for developing cryopreservation methods for corals and reef species, has worked closely with ATP-Bio to scale her innovations from field applications to global—and even extraterrestrial—solutions. Her pioneering approach to "freezing life" exemplifies ATP-Bio's mission to preserve cells, tissues, and organisms for healthcare, conservation, and beyond.

The *Nature* article also features insights from ATP-Bio leadership:

- **John Bischof, Ph.D.**, Director of NSF ATP-Bio and Distinguished McKnight University Professor at the University of Minnesota, emphasized the transformative potential of cryopreservation, noting its ability to safeguard both human health and environmental biodiversity.
- **Mehmet Toner, Ph.D.**, Helen Andrus Benedict Professor of Biomedical Engineering at Harvard Medical School and Deputy Director of NSF ATP-Bio, highlighted how ATP-Bio research is establishing the technical foundation for long-term preservation at scales once thought impossible.
- **Susan Wolf, J.D.**, Regents Professor and McKnight Presidential Professor of Law, Medicine & Public Policy at the University of Minnesota and Co-Lead for Ethics & Public Policy at NSF ATP-Bio, underscored the critical importance of integrating ethical and legal frameworks into this scientific frontier to ensure responsible stewardship of preserved biological materials.

Together, their perspectives illustrate ATP-Bio's unique strength: uniting cutting-edge science with social responsibility and visionary applications.

"Mary Hagedorn's work shows us the extraordinary reach of cryopreservation," said Bischof. "Whether restoring coral reefs or envisioning a lunar archive of Earth's biodiversity, ATP-Bio is proud to be part of this transformative journey."

About NSF ATP-Bio℠
NSF ATP-Bio is a world-class partnership between engineering, medicine, science, education, business, and ethics at six premier research universities. It supports the crucial advancement of biopreservation technologies and enables innovation, commercialization, and diverse workforce development. Across ATP-Bio, the institutional resources are abundant.
NSF ATP-Bio is co-led by the University of Minnesota (UMN) and Massachusetts General Hospital (MGH). Texas A&M University and the University of California-Riverside are core collaborating institutions. The University of California-Berkeley and Carnegie Mellon University are affiliated partner institutions.

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For more information, please contact atp-bio@umn.edu or visit us at https://www.atp-bio.org/

Media Contact: Elica Gardner
NSF ATP-Bio Communications Manager
atp-bio-aa@umn.edu