Public Annual Report
YEAR FOUR

A National Science Foundation Engineering Research Center

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Our Mission

ATP-Bio℠'s mission is to make transformative discoveries, train a diverse workforce, and connect resources and partnerships to ethically translate technologies for the storage and distribution of living biological systems.

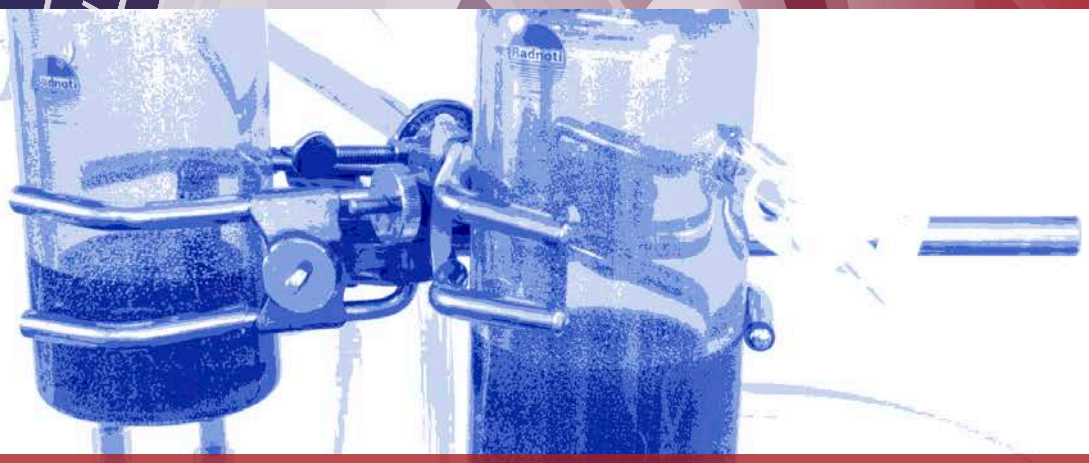
Our Vision

ATP-Bio℠'s vision is to stop biological time, allowing living products to be readily available across the globe to advance healthcare, biodiversity, and food supply and sustainability.

Our Pillars & Components

Diversity & Culture of Inclusion
Engineering Workforce Development
Convergent Research
Innovation Ecosystem
Ethics & Public Policy

Contents



Director's Message

Someone suggested a tongue-in-cheek slogan for ATP-Bio at the end of Year 4: "We have formed, normed, and performed." While we can't use it in our masthead, it's certainly accurate.

ATP-Bio is indeed fully "formed and normed" as an organization – thanks to the administrative leadership of Alyssa Burger, the hard work of ATP-Bio staff, and the general willingness of everyone to pitch in. We know how to constantly adapt to challenges and opportunities while staying true to our core mission. As for "performed," I'll let some of the Year 4 highlights speak for themselves:

On the **Convergent Research** front, ATP-Bio researchers keep getting grants and publications at rates much higher than those of other ERCs. Which shouldn't be a surprise, given their advances in organ preservation, nanoparticle design, thermodynamics, and other biopreservation fields. I'll also note that our cryopreservation toolkits are now being disseminated worldwide, expanding the field through both academic and industry channels.

Our **Innovation Ecosystem** now boasts 40 active members (more than a 50% increase from last year), including 16 start-ups and two ATP-Bio start-ups (BioChoric and NorthStar Cryo). We have also participated in over $14 M in SBIR funding applications. We now have 19 patent applications across core (9) and associated (10) projects, our first license agreement, elicensing possibility under discussion.

The **Engineering Workforce Development** and **Diversity and Culture of Inclusion** pillars expanded K-12 outreach to 400 young people in Deaf communities (Boston) and inner-city communities (Minneapolis). Forty undergraduates across six institutions were part of senior design projects in cryopreservation, and 21 more filled REU positions over the summer. With input from our amazing Scholar Leadership Council, we are developing a new strategic plan that will include the development of micro-credentialing and short courses in various sub-fields of biopreservation.

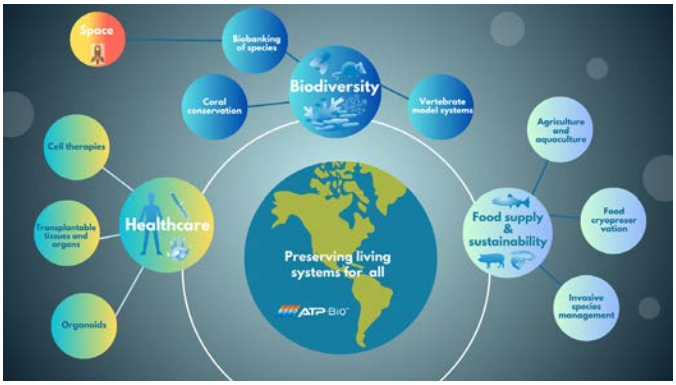
Our unique **Ethics & Public Policy** component has been tremendously productive. In addition to its regular talks and webinars in the ATP-Bio community, EPP 1) Led a symposium ("The Ethical, Legal & Policy Challenges of Stopping Biological Time") whose talks fill the Fall 2024 issue of the *Journal of Law, Medicine & Ethics,* 2) Developed and published an article in BioScience outlining a roadmap for creating a biorepository on the moon, and 3) Helped ATP-Bio develop online resources related to ethical cryopreservation.

Someone else suggested that ATP-Bio is now in a "steady state" phase. I have to disagree. We're grounded, but expanding every facet of biopreservation in our institutions and with our industry partners. In some weeks, it's hard to keep up with the number of inquiries we get from researchers and pioneers wanting to incorporate biopreservation into their work. That's why I'll bet that "steady" or "strong" or even "wild and unpredictable" **growth** is the real future of ATP-Bio.

Societal Benefits

At ATP-Bio, we envision a future where biological time stands still, and:

- **Patients receive organs without waiting**
- **Type 1 diabetes is managed without insulin injections**
- **Earth's biodiversity is safeguarded**



HEALTHCARE

ATP-Bio has made significant advances in the healthcare space including breakthroughs for the preservation of red blood cells and organs. We are looking to grow our efforts in the cell therapies spaces as well as broaden applications into space travel and traumatic brain injury.

Cell therapies

Transplantable tissues and organs

Organoids

BIODIVERSITY

ATP-Bio has primarily focused our biodiversity efforts on coral biopreservation. Moving forward, we seek collaborators that will expand this work into other key endangered species as well as explore different types of life such as plant & microbial preservation.

Biobanking of species

Coral conservation

Vertebrate model systems

Space

FOOD SUPPLY & SUSTAINABILITY

ATP-Bio has developed technologies with potential impact across aquaculture and food preservation. Moving forward, we hope to recruit more experts in this space to expand the reach of these technologies and expand into new markets.

Agriculture and aquaculture

Food cryopreservation

Invasive species management

The NSF Engineering Research Center for Advanced Technology for the Biological Systems (ATP-Bio) is a network of experts and motivated stakeholders working together to advance and ethically translate technologies for storage and distribution of living biological systems.

ATP-Bio is the largest, coordinated community of cryobiology researchers in the world and a driving force behind the advancement of cryopreservation technology. This network leverages the strengths of individual labs to achieve greater impact. Through the Center's unique infrastructure, ATP-Bio is well positioned to assemble large-scale collaborative and cutting-edge proposals to funding agencies. ATP-Bio is expanding the applications and utilizations of cryo- and biopreservation technologies through discovery, innovation and education.

ATP-Bio

- creates solutions to global challenges
- enables emerging technologies
- facilitates cryo- and biopreservation technologies into new markets

ATP-Bio contributes to positive societal impacts in healthcare by advancing medical science to extend life through red blood cell and organ preservation, biobanking of specimens, regenerative medicine, and wound care. ATP-Bio has made significant advances in healthcare (organs) and will expand efforts into coral and biorepositories Years 5-10.

A vital and viable biodiversity ecosystem is critical to the planet's sustainability. ATP-Bio's primary efforts to address this global biodiversity challenge has centered around coral biopreservation. Building upon this work, ATP-Bio's will be to translate the technology and protocols around other endangered species, plant & microbial preservation.

Food scarcity and insecurity are global societal issues that require innovative solutions. ATP-Bio is developing technologies to promote sustainable agriculture, storage and transport solutions, as well as preservation of products and feedstocks.

ATP-Bio collaborates with end-user stakeholders to consider ethical and legal implications of the innovation and translate technologies into relevant markets.

Leadership & Advocacy

Academic Institutions

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.

University of Minnesota (UMN) is the lead institution as ATP-Bio℠ headquarters. UMN's expertise includes heat transfer, nanomedicine, cryobiology, particle technology, aerosols, 3D printing, cell therapies, physiology, bioelectronics, chemistry, advanced manufacturing, STEM education, psychology, bioethics, law and policy, business, innovation and commercialization.

Massachusetts General Hospital (MGH), ATP-Bio℠'s co-lead institution, is a world leader in every facet of cryobiology including biopreservation, biomineralization, biostabilization, microfluidics, tissue engineering, cryopreservation, BioMEMS, chemical engineering, organ reengineering, organ preservation, and metabolomics.

Texas A&M University (TAMU) is a core partner (as of Y3) and the biggest university in America and has recently become an HSI. TAMU brings expertise in optics, laser nanowarming, molecular systems biotechnology in inflammatory diseases, microfluidic model systems, and intersections of thermodynamics and metabolic engineering in biopreservation and conservation biology.

University of California-Riverside (UCR) is a core partner and a Hispanic-Serving Institution (HSI) and one of America's most successful at graduating students from underrepresented and disadvantaged backgrounds. UCR brings expertise in nanofabrication, material science, nanostructures, nanoparticle development, laser technology, and optics.

University of California-Berkeley (UCB) is an affiliated partner and a leading public research university providing pioneers in cryobiology, micro-physiological systems, micro and nano energy conversion, organoids, drug discovery, and thermal measurement technologies.

Carnegie Mellon University (CMU) is an affiliated partner and brings cryobiology, cryosurgery, and cryomedicine research to the Center.

Broader & Societal Impact

ATP-Bio has significantly impacted the scientific community through its efforts in strengthening workforce representation, advancing technology translation, and fostering global scientific collaboration. In addition, ATP-Bio has made significant strides in advancing cryopreservation science and its applications, with notable impacts on society across several dimensions.

ATP-Bio Y4 Highlights of Significant Achievement

STRATEGIC PLANNING, PARTNERSHIPS, AND COLLABORATION	**Focus Areas:** ATP-Bio concentrates efforts in healthcare, biodiversity, food supply and sustainability, and space applications. While supply chain management of healthcare applications has been foundational to ATP-Bio, exploring opportunities in non-healthcare fields has enabled new research collaborations to emerge.
DIVERSE STAKEHOLDER REPRESENTATION	**Stakeholder Distribution:** ATP-Bio's ecosystem includes 40 members of which 67.5% are industry, 17.5% government and nonprofits, and 15% innovation sectors. This diverse representation reflects the growing visibility and successful translation of ATP-Bio's technologies, contributing to the broader cryopreservation innovation landscape.
COMMITMENT TO ETHICAL STANDARDS	**Infusing Ethical Considerations Into Practice:** By providing guidance on ethical, legal, and social issues, ATP-Bio ensures that its innovations are developed with a focus on broader societal benefits and responsible practices.
DATA-DRIVEN DIVERSITY AND INCLUSION AIMS	**DEI Climate Assessment:** ATP-Bio's use of an annual DEI survey helps identify and address areas needing improvement within the organization.
SMALL MOMENTS LEAD TO BIG CULTURAL IMPACTS	**ATP-Bio Cafés:** Informal gatherings foster a sense of belonging and community among ATP-Bio members. By providing a space for open dialogue, they enhance inclusivity and well-being within the organization.
INVESTING IN THE FUTURE	**Outreach:** ATP-Bio has expanded its K-12 outreach programs to engage over 400 young individuals, fostering early interest in cryopreservation science. **Undergraduate Opportunities:** ATP-Bio has provided research experiences for over 70 undergraduates, facilitating pathways to workforce placement. Of these, 26 students were recruited through strategic partnerships to enhance recruitment pathways and retention of historically underrepresented groups in STEM, and several have been hired into permanent positions related to work in ATP-Bio.
WORKFORCE ECOSYSTEM ROADMAP	**Addressing Industry Needs:** ATP-Bio's Workforce Development strategic plan includes a comprehensive roadmap for the cryopreservation industry. ATP-Bio aims to equip individuals with the expertise needed for successful careers in cryopreservation, integrating ethical and social considerations into training.
HIGHLY CITED PUBLICATIONS	**Citation Impact:** ATP-Bio's research has produced over 20 publications with a Field-Weighted Citation Impact (FWCI) greater than 2, indicating that these articles have received twice the number of citations compared to the world average for similar publications. ELSI Collaboration: ATP-Bio's partnership with ELSI (Ethical, Legal, and Social Implications) experts results in critical publications, such as the symposium issue in the Journal of Law, Medicine & Ethics.
ADVANCES IN CRYOPRESERVATION	**Unprecedented Impact on Healthcare:** ATP-Bio researchers have achieved a significant breakthrough by successfully cryopreserving pig kidneys for 30 days using a partial freezing method. This advancement holds promise for future clinical applications and could revolutionize organ transplantation practices. Additionally, ATP-Bio has developed a skin temperature detection device that can identify graft rejection across all skin types. This innovation has the potential to enhance equitable treatment, ensuring that patients of color receive timely and effective care. **Enhanced Cryopreservation Protocols:** ATP-Bio's collaborations have advanced cryopreservation protocols, improving access to reliable tools for this process globally. • **Non-invasive Optical Tools:** Researchers developed tools for thermodynamic analysis to enhance vitrification, laser nanowarming, and specimen viability, contributing to improved cryopreservation techniques. • **Isochoric Vitrification:** Successfully applied to cryopreserve coral sperm, larvae, and whole coral fragments, enabling year-round gene banking and reducing reliance on rare spawning events.
TECH TRANSFER AND COMMERCIALIZATION	**ATP-Bio Workshops for Research Community:** ATP-Bio's workshops are designed to assess and understand the capabilities and impacts of various technology platforms within the ERC. **Patent Activity:** ATP-Bio filed 19 patent applications (core and associated activity) in the most recent year, reflecting significant technological advancements and intellectual property development. ATP-Bio secured one licensing agreement, demonstrating the commercial viability of its technologies.

ATP-Bio℠ by the Numbers

SEPTEMBER 1, 2020 – JUNE 30, 2024

ATP-Bio℠ Personnel

39 Leadership & Administration & Management Faculty & Staff

33 Faculty

24 Postdocs

67 Administrative & Research Staff & Technicians

142 Trainees

Graduate and Undergraduate Students, Visiting College Students, REUs

Research Inputs & Outputs

40 Core Publications

24 Conference Proceedings

12 Associated Publications

3 Conference Proceedings

$30.8 MILLION Associated Project Funding

Formal & Informal Dissemination

8 Workshops, Short Courses, Trainings, Webinars

9 Innovation Focused Events

53 Conferences, Symposia, Colloquia, Invited Talks

Education & Outreach

16 New Courses, or Existing Courses Modified with ERC Content

21 Research Experiences for Undergraduates (REU) Program

20 High School Engagement Program (Young Scholars)

30 Graduates (undergraduates, Masters, PhD)

Center Diversity

Women, Racial & Ethnic Minorities, Persons with Disabilities

	Women	Racial & Ethnic Minorities	Persons with Disabilities
Leadership Team	38%	21%	13%
Faculty	30%	9%	6%
Postdocs	42%	17%	0%
Trainees	42%	29%	7%
REUs	69%	49%	5%

Innovation Ecosystem

10 ATP-Bio Partners (Industry, Innovation, NGO Members)

14 Core & Associated Inventions Disclosed

11 Core and Associated Provisional Patent Applications Filed

8 Core and associated full patent applicants filed

1 Licenses and options issued

4 New surgical or other medical technologies

By the Numbers Highlights

- **ATP-Bio researchers leverage $30 million dollars in non-ERC funding to advance the cryopreservation research agenda**
- **ATP-Bio publications are highly impactful - over 20 publications have received double the number of citations than the world average for similar published works**
- **ATP-Bio doubled the number of Member Partner organizations in the last year. Among them are 16 start-ups, several of which are spin-offs from ATP-Bio team members or initiatives**
- **The research is advancing towards translation as self-reported Technology Readiness levels are increasingly moving closer towards commercialization. In Y4, 19 patent applications were filed across core and associated projects and one licensing agreement was executed, and one startup was launched**
- **The number of program participants is increasing through strategic partnerships. In Y4, of 70 undergraduate researchers, 26 students were recruited through strategic partnerships and pathways**
- **A 10-article symposium in the Journal of Law, Medicine & Ethics is underway representing 27 authors across ATP-Bio in collaboration with experts from the Ethics and Public Policy Panel**

Anticipating Where We Go From Here

In a few short years, ATP-Bio will become a self-sustaining research consortium. The Center's goal is to create a self-sustaining ecosystem maintained through a centralized network of established connections. In Y4, ATP-Bio developed and operationalized a strategy to strengthen core partnerships through institutional leadership to increase the likelihood of long-term viability of the organization.

Self-sufficiency Strategy

1. Develop a Sustainability Plan that represents the vision for ATP-Bio following NSF graduation
2. Reinvigorate the ATP-Bio Council of Deans through relationship building, leadership capabilities, and serving as a solution for institutional priorities
3. Identify institutional leadership opportunities in research, innovation, and workforce development
4. Collaborate with institutional administrators to negotiate creative ways of supporting the ERC infrastructure

5. Implement the Sustainability Plan by leveraging institutional leadership pathways, commitments, and continued support of the ERC

Sustainablity Vision

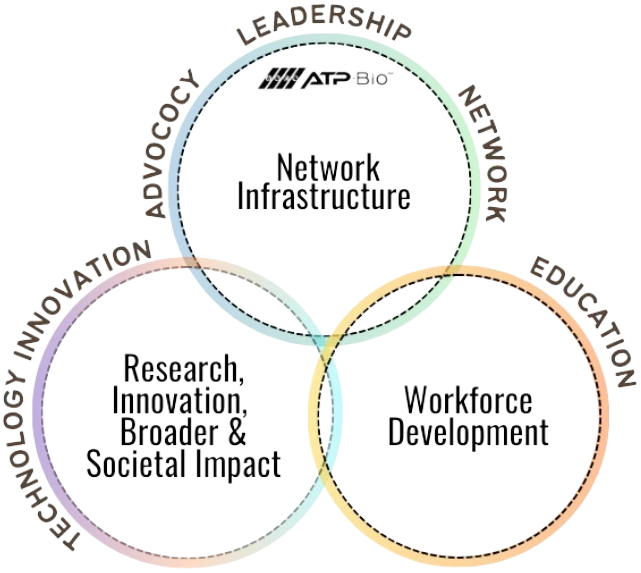
ATP-Bio's Sustainability Plan represented the vision for evolution and identified organizational priorities based on these values and guiding principles:

ATP-Bio Value to Stakeholders

- Network
- Technology and innovation
- Education
- Leadership and advocacy

ATP-Bio Guiding Principles:

- A "self-sustaining ecosystem" coordinated by a centralized network
- Maintain ERC core research and program functions
- Organize the infrastructure into:
  - Network Engagement & Governance
  - Research, Innovation, and Societal Impact
  - Workforce Development

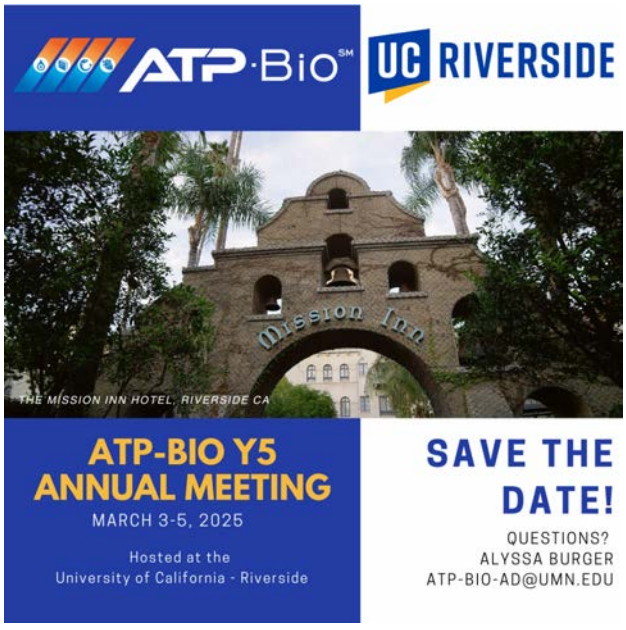


Role of Institutional Administration

ATP-Bio's engagement with administrators and institutional leaders is essential for the progress and sustainability of ATP-Bio across its partners, pillars, and components. The reinvigoration of the **ATP-Bio Council of Deans** (CoD) has significantly strengthened the integration of the board within the Center's operations. ATP-Bio Leadership, in close collaboration with CoD Chair, Dean Andrew Alleyne, has demonstrated a strong commitment to embedding the CoD influence and guidance through the development of a sustainability plan, renewal vision, and navigating institutional commitments from all core partner institutions. In addition to the 20% cost share obligation of each core institution, additional commitments include alignment of ATP-Bio goals with faculty recruitment plans, sponsorship of research and administrative space, new cash resources, and intention to help support ATP-Bio during transitional phases.

The CoD represents the five collegiate Deans of the core partner institutions (UMN, MGH, UCB, UCR, and TAMU). CoD provides leadership, operational guidance, and institutional commitment in support of coordinated convergent and multi-campus research, education, outreach, and innovation activities. They meet quarterly as a committee, led by Dean Andrew Alleyne, College of Science and Engineering, University of Minnesota.

ATP-Bio Annual Meeting



Save the Date | March 3-5, 2025
ATP-Bio Y5 Annual Meeting will be hosted at the University of California Riverside

ATP-Bio's Annual Meeting is an event for the biopreservation industry, academic community, and other stakeholders. The event connects industry to academic resources and talent through technical and research presentations, networking opportunities, facility tours, and other special features. The event also serves as host to closed-door meetings for ATP-Bio advisory boards.

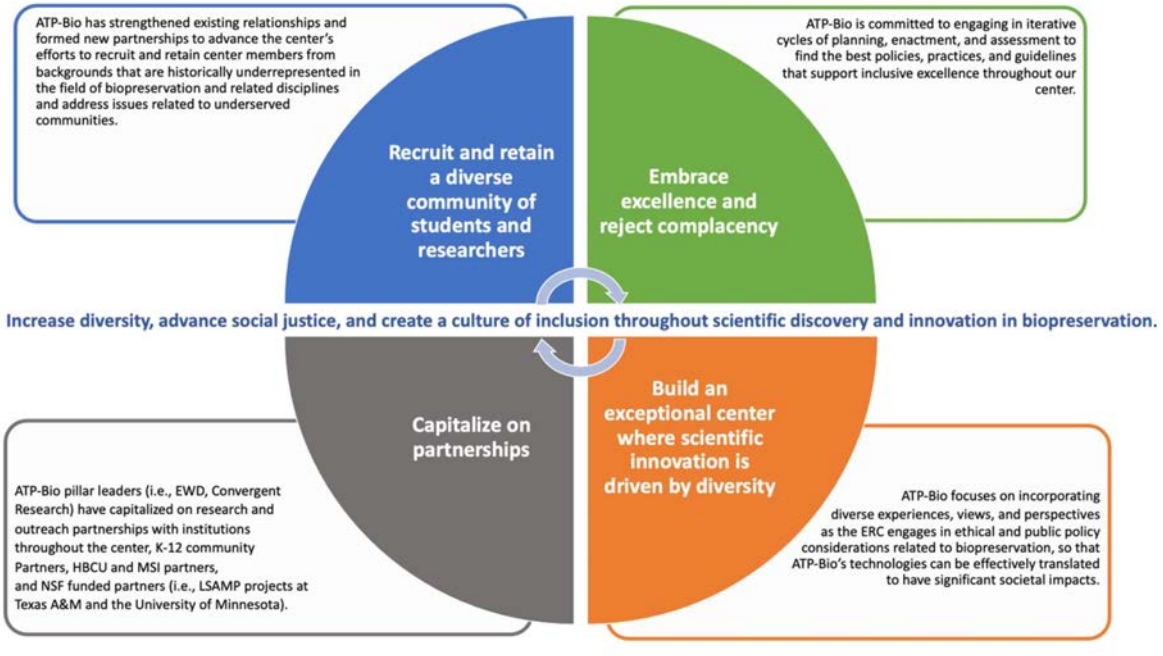
Diversity & Culture of Inclusion

PILLAR DCI

ATP-Bio℠ is broadening participation from groups that historically have been underrepresented in STEM and we are increasing the potential for impact and innovation.

The ATP-Bio Diversity and Culture of Inclusion (DCI) pillar fosters an inclusive environment where all center members feel a strong sense of belonging, are respected by their peers, and can fully engage in meaningful, innovative convergent research. These efforts align with the recommendations of the National Academies of Sciences, Engineering, and Medicine (NASEM, 2023). The DCI pillar focuses on increasing representational diversity within the center and creating pathways to diversify the community of scholars and industry professionals in biopreservation. By supporting ATP-Bio researchers, DCI activities contribute to broader societal impacts by raising public awareness of biopreservation's role in everyday life, engaging learners of all ages, and creating and sharing accessible knowledge through convergent research and collaborative partnerships.

The Diversity and Culture of Inclusion Pillar is guided by a strategic vision that includes four interrelated objectives working together to support a shared, aspirational vision to increase diversity and create a culture of inclusion throughout scientific discovery and innovation in engineering.



DCI Year Four Highlights

- **DCI led a center-wide evidence-based action planning session** that led to two actions-increasing opportunities for onboarding and expanded opportunities for mentoring.
- **DCI spearheaded a new HBCU partnership with North Carolina A & T** that brought four students to join the summer REU program and set up a continued collaboration so that they are continuing their work with faculty at NC A&T this academic year.
- **DCI's Broader and Societal Impacts Research** was presented at two national conferences.
- **DCI expanded connections with NSF funded LSAMP projects** and began partnerships with plans to work together to increase opportunities for undergraduate students to present their research and connect with industry partnerships.

DCI Year Five Priorities

- Increase strategic recruitment efforts to improve representational diversity in the center and all ATP-Bio research disciplines through our partnerships with LSAMP stakeholders
- Strengthen partnerships with Community Colleges, Minority Serving Institutions, Tribal Colleges, and Historically Black Colleges and Universities
- Develop long-term action plans to continue to address needs of our organizational culture
- Administer DEI Climate Survey and conduct analyses to compare change over time.

DCI Broader and Societal Impacts

- Dr. Keisha Varma led the DCI pillar with two presentations at national meetings (1). The American Society for Engineering Education (ASEE), and (2). The Annual Advancing Research Impacts in Society (ARIS) Summit. The presentations highlighted the activities that led to Increases in the ways that ATP-Bio researchers highlight broader and societal impacts. These efforts are led in collaboration with the EWD and EPP pillars.
- Through this work, ATP-Bio is training a generation of engineers who understand how their research activities can address societally relevant challenges and produce positive societal impacts. Over time, the ERC strives to cultivate engineers who base their research on societal benefits and possess a comprehensive understanding of the connections between technology development and humanity.

Diversity & Culture of Inclusion

PILLAR DCI

Historically Black Colleges and University Partnerships

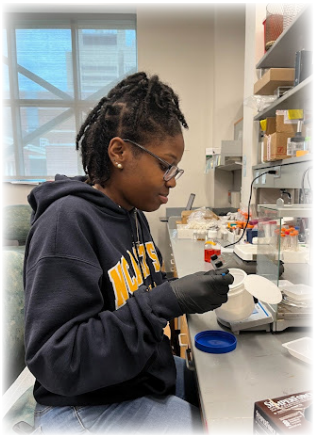
- Dr. Keisha Varma (DCI), Dr. Chris Hogan (CR), Dr. Paul Iazzio (CR), and Dr. Seth Thompson (EWD) created a pathway for four students from North Carolina A&T to participate in the 2024 ATP-Bio Summer REU experience. This is the first step in a partnership that is already expanding to include opportunities for co-curricular offerings, a 3 + 2 MA pathway program, and multiple convergent research collaborations.

- Faculty from NC A&T are planning to visit the U of M this summer, faculty and students from the U of M are planning to visit NC A&T in the fall, faculty and students from NC A&T will visit MGH in the spring. In all of these visits, the faculty and students will learn about programs at each institution. The goal is to enhance their research and education experiences by providing bi-directional access to labs, research expertise.

- An ongoing partnership with Morgan State is being expanded to include similar connections.

- Reciprocal relationships, like the ones being established through ATP-Bio are an imperative component of MSI partnerships, yet institutions still engage in behaviors (i.e., last minute requests, shallow, one-sided opportunities, etc.) that prevent respectful, meaningful, and sustainable MSI-PWI partnerships.

- This model of a multi-faceted, relationship-based, collaboration will serve as a model for PWI- MSI partnerships.



Signature Events & Initiatives

DCI Cafés: These monthly, 30-minute meetings were designed as an informal space for ATP-Bio members to discuss important topics related to diversity, equity, and inclusion (DEI). In Year 3, the focus was on developing DEI knowledge and skills. In Year 4, the meetings shifted to strengthening connections within the ATP-Bio community. In Year 5, these gatherings will continue to emphasize community building, with a particular aim of fostering a stronger sense of belonging among faculty, staff, and trainees

Center Climate Survey: The ATP-Bio center climate survey is a tool for cultural change. By regularly assessing the climate and tracking progress over time, the center can work towards creating a more inclusive and equitable culture. Trainees, staff, and faculty are ready to learn more from the data and the center is committed to action.

- Over 80% of the ATP-Bio community feel that the ERC has a strong commitment to DEI.
- Close to 80% of the ATP-Bio community members feel a strong sense of belonging within the ERC.

Partnerships to Enhance Representational Diversity

ATP-Bio's partnerships have opened new opportunities for underrepresented minority (URM) undergraduate students to engage in impactful research.

HBCU Partnerships

- North Carolina A&T

North Carolina Agricultural and Technical State University

- Morgan State University

Morgan State University

Pathways for URM Undergraduate Students in STEM

- National GEM Consortium Getting Ready for Advanced Degrees (GRAD) Lab
- NSF Louis Stokes Alliance for Minority Participation (LSAMP) Partnerships
- North Star STEM- University of Minnesota
  - CAMP- University of California Riverside and University of California- Berkeley
  - TAMUS LSAMP- Texas A&M University System

New in Year 5

- **DEIJ Awards**. ATP-Bio's new DEIJ Awards recognize trainees, faculty and staff who have done significant work to advance diversity, equity, inclusion, and justice.
- **Cascading Mentorship Program**. A new cascading mentoring program will feature multiple small teams of faculty, industry partners, postdocs, graduate students and undergraduate students.

Engineering Workforce Development

PILLAR EWD

ATP-Bio℠ educates a STEM workforce that is a demographic reflection of the nation and recognizes that diversity of perspective strengthens STEM fields.

Ultimately realizing the potential of new cryopreservation technology requires a diverse and skilled workforce for implementation and to continue to support a culture of innovation for future advancements. ATP-Bio strives to change the face of biopreservation by providing opportunities for a diverse population to be involved in biopreservation--women, underrepresented minorities,those with disabilities and others. ATP-Bio is committed to recruiting, engaging and retaining a diverse audience in its programs: university faculty, undergraduate and graduate students; pre-college students and teachers; and students of all ages through its outreach activities. In doing so, ATP-Bio will educate an engineering workforce that is a demographic reflection of the current and future nation to maximize the relevance and benefits of cryopreservation technology on society. The center envisions a future where the innovation and impact of the cryopreservation ecosystem is but supported and synergized by a robust and diverse workforce; a future that harnesses the power of the cryopreservation ecosystem to create opportunities for economic and social mobility for communities that have historically been excluded from the STEM enterprise.

EWD Year Four Highlights

- **Building a Foundation of Interest in Cryopreservation Science**: ATP-Bio continues to strengthen its K-12 outreach by expanding local partnerships to broaden its impact. Recent initiatives include establishing an educational partnership around cryopreservation concepts with students and teachers at The Learning Center for the Deaf in the Boston Area (Framingham) and showcasing cryopreservation technologies at multiple events hosted by Twin Cities STEM. Through these efforts, ATP-Bio has engaged more than 400 young people, raising awareness of ATP-Bio technologies, and building a foundation of interest in cryopreservation to support the future workforce.

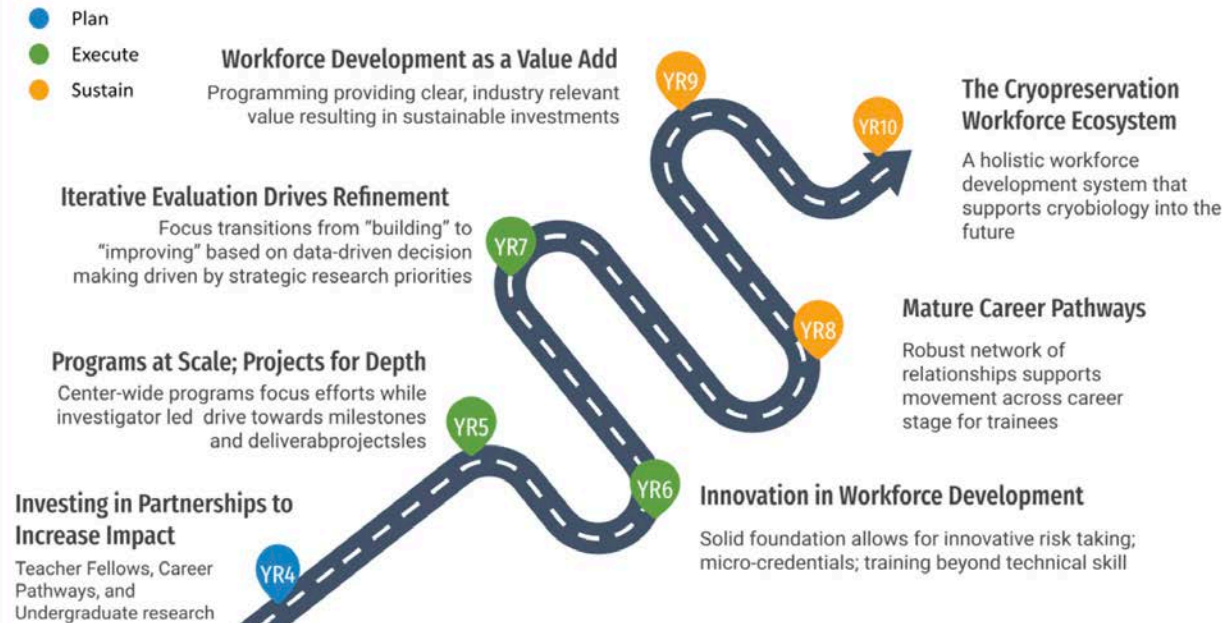
- **Paving Workforce Pathways Through Undergraduate Capstone Projects and Research Experiences**: Enhancing access to undergraduate research experiences is one of the most effective practices for developing a diverse and robust engineering workforce. Since ATP-Bio's inception, participation in undergraduate research programming has shown year over year growth, adding more than 40 new undergraduate research program participants in the fourth year of the Center.

Engineering Workforce Development

PILLAR
EWD

- **Building Trainee Engagement Through the Scholar Leadership Council**: ATP-Bio made substantial improvements in the engagement and organization of its Scholar Leadership Council (SLC), including implementing a new management structure that aligns SLC leadership positions with corresponding functional areas within ATP-Bio. This new structure has resulted in stronger connections between SLC and Pillar and Component leadership and increased participation from SLC officers and representatives in Center-wide meetings and events. To further enhance local community building among trainees, the SLC has transitioned to a bi-monthly hybrid meeting format. This new model has improved active engagement in SLC meetings for trainees across the Center, resulting in a more connected trainee community.

- **Developing a Roadmap to the Cryopreservation Workforce Ecosystem**: ATP-Bio revamped the Engineering Workforce Development (EWD) strategic plan, roadmap, and evaluation framework to integrate and enhance activities beyond isolated local programs. This new infrastructure offers greater transparency and clarity around navigating multiple ATP-Bio EWD programs and building pathways for sustained engagement. To complement these efforts, ATP-Bio developed an alumni database with the external evaluator and new evaluation metrics around workforce placements of program participants to bring programmatic priorities and evaluation metrics into alignment. Together, these efforts position ATP-Bio to lead the way in defining the relevant knowledge, skills, and abilities needed in the cryopreservation workforce and to provide impactful programming across the country.



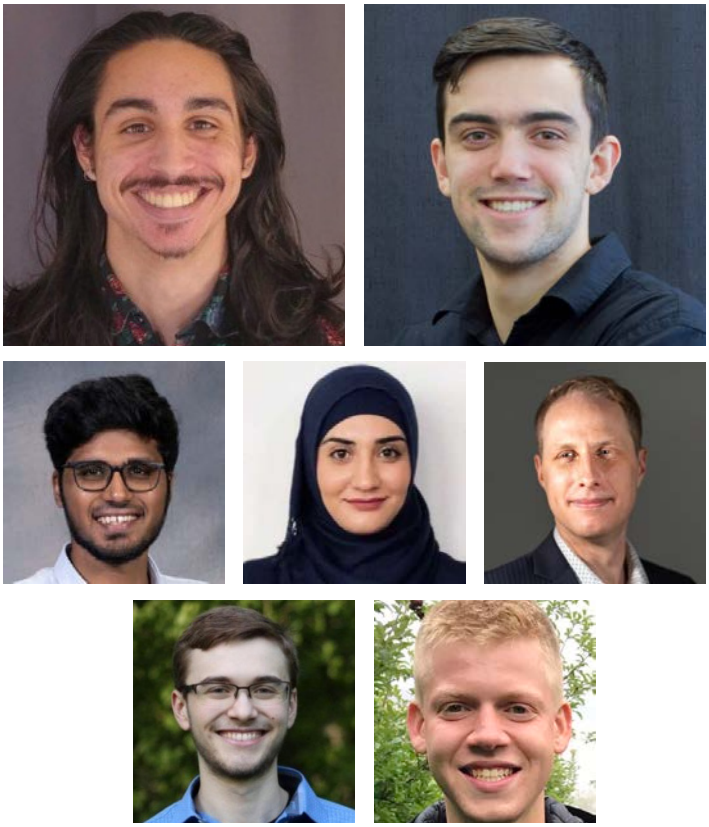
Meet the Scholar Leadership Council

The primary role of the ATP-Bio℠ Scholar Leadership Council (SLC) is to advise ATP-Bio.

The SLC also functions as a service organization, a social club, and a scholar government entity for all scholars of ATP-Bio. The SLC promotes inter-university and industrial collaboration directly with ATP-Bio scholars, provides scholars with opportunities to conduct outreach programs at their local universities, organizes scholar social events and seminars, and is also responsible for guiding the annual scholar retreat.

Each university nominates one scholar representative to serve on the SLC. The officers may be university representatives, but it is not required.

The SLC serves as a liaison between the scholar body and the senior ATP-Bio leadership, voicing concerns and relaying important information between these two groups.



From top left: Co-chairs Maxwell Johnson, UCB, and Casey Kraft, UMN. Communications Lead, Balaji Baskar, TAMU. Career Development Lead, Rasha Al-attar, MGH. Networking Lead, Nikolas Zuchowicz, UMN. Outreach, Inclusions, and EPP lead, Alexander Ulate, UMN. Evaluation Lead, Daniel Emerson, CMU.

Convergent Research and Engineering

PILLAR CR

ATP-Bio℠ is accelerating technologies that enable wide-spread preservation and distribution of cells, microphysio-logical systems, tissues and organs, and whole organisms.

ATP-Bio℠ aims to "stop biological time" and radically extend the ability to bank and transport cells, tissues and micro-physiological systems (MPS), whole organs, and even whole organisms, such as aquatic or terrestrial embryo and larvae, using a team approach to build advanced preservation technologies. ATP-Bio℠ envisions a world in which a vast range of biological systems are preserved in a high throughput manner for a wide range of benefits to humankind and the natural environment, with advances in bioengineering, nanotechnology, 3D printing, genetics, and numerous other fields. The convergent science of ATP-Bio℠ is developing the foundational knowledge base, which informs the technology base; together these are integrated at the testbed level.

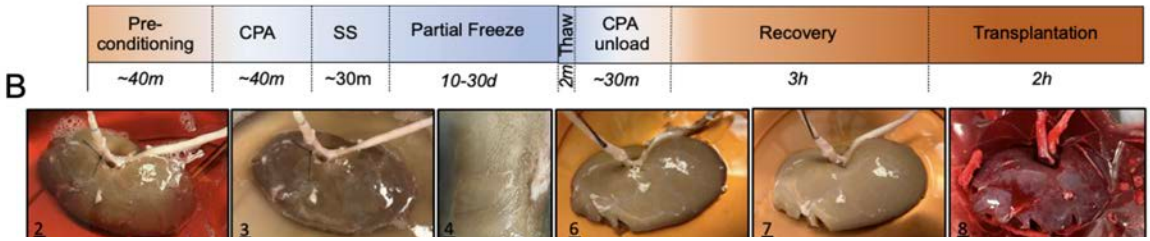
ATP-Bio Convergent Research pillar is organized along three focused areas of research:

- **Thrust 1, Biological Engineering**: Preparing the biological testbed to survive preservation by cooling or "cryopreservation."
- **Thrust 2, Multiscale Thermodynamics of Water**: Entering a cryopreserved state by cooling the testbed to a subzero temperature.
- **Thrust 3, Rapid and Uniform Warming**: Rewarming the system to physiological temperatures for restored biological function.

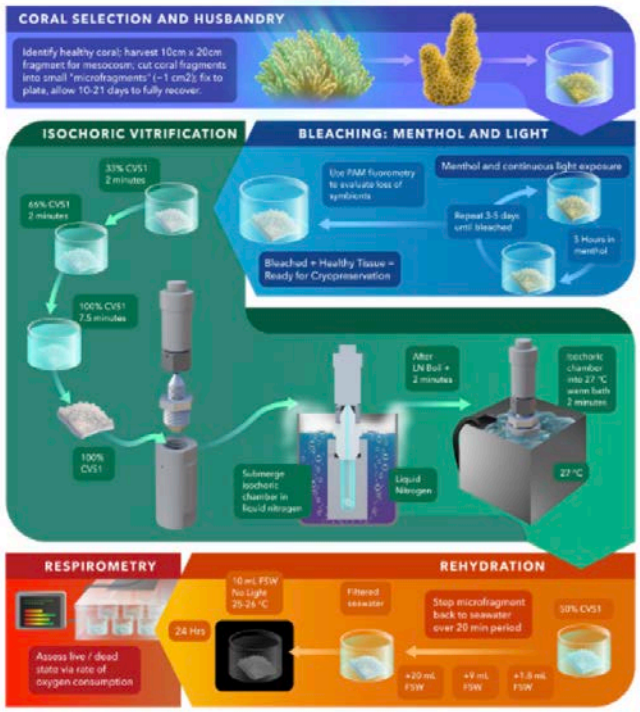
At each stage, the aim is to
- eliminate or control ice
- mitigate toxicity from cryoprotective agents
- prevent thermal and mechanical stress

CR Year Four Highlights

- **Breakthrough Advances in Organ Preservation**: Researchers successfully cryopreserved pig kidneys for 30-days by using a partial freezing approach to -15°C, followed by a simulated retransplantation. This new method significantly extends storage time compared to the current gold standard of 48 hours for clinical kidney storage. This promising breakthrough paves the way for potential clinical implementation in the near future.



Additionally, research teams have developed a skin temperature detection device capable of identifying graft rejection earlier and is effective across all skin pigmentation, which holds great promise for ensuring equitable treatment for patients of color.



- **Development of Cryopreservation Toolkits**: ATP-Bio research teams are advancing processes, protocols, and implementations to improve access to reliable cryopreservation tools around the world. One team developed a very affordable, portable and automated vitrification device to eliminate submersion speed variability in biospecimens that do not tolerate high concentrations of CPAs. Another team successfully used isochoric vitrification to cryopreserve coral sperm, larvae, and whole coral fragments, effectively decoupling the preservation process from rare spawning events and enabling year-round gene banking.

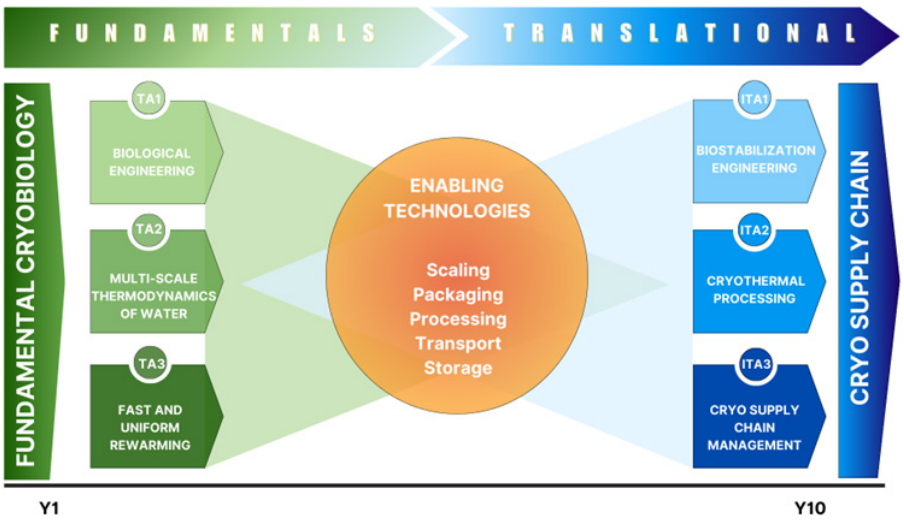
- **Improvement of Cryopreservation Protocols through inter-institutional multidisciplinary approach**: ATP-Bio researchers applied a multi-pronged approach to enhance the heating of biosystems by: (i) engineering the intrinsic rewarming properties of the nanoparticles, (ii) improving coating for biocompatibility and colloidal dispersion, and (iii) precisely modulating the heating rates at various stages of the warming process. Another ATP-Bio research team developed non-invasive optical tools for thermodynamic analysis for cryopreservation to improve vitrification, laser nanowarming, and specimen viability. These achievements will help improve overall control, scaling up and translation of the cryopreservation processes across diverse testbeds

- **Numerous and Highly Impactful Publications**. Over the first four years, ATP-Bio boasts 160 peer-reviewed core publications in peer-reviewed journals and conference proceedings, nearly double the output of other ERCs. Moreover, 20 of these publications have a Field-Weighted Citation Impact (FWCI) of over 2 which means that the article has received double the citations than the world average for similar publications. In Y4 alone, the overall output of ATP-Bio investigators has led to 64 new core publications and conference proceedings, of which close to 40% (25) have authors from multiple ATP-Bio institutions, testifying to the convergence of ATP-Bio's research.

- **Significant Associated Funding**. In Y4, ATP-Bio secured nearly $31M of associated project funding from NIH, NSF, and other public and private sources, which is 2.75 times more than in Y3. Of the four other ERCS launched in ATP-Bio's award year ($18M), this is almost double the average, and triple the average of other ERC's in the biotech sector ($10M). Since inception, ATP-Bio's total associated funding sums up to $61 M which is a major contributing element of ATP-Bio's sustainability and self-sufficiency plan.

CR Year Five Goals

- The large scale vision is to continue efforts in healthcare, but increasingly focus on biodiversity and food supply/ sustainability.
- The goal is to move from exploring fundamentals of cryobiology, which led to proof of concept of many enabling technologies of cryo/biopreservation, into scaling up and translating those technologies to develop a cryo-supply chain and ultimately make biosystems available around the world for access to all.
- To deliver these ambitions goals, the approach of Convergent Research is two-fold:
  - Bring in new talent and expertise in the research ecosystem, and foster inter institutional collaborations: In Year 4, the newly launched RFP and SIRP seed fund programs brought in 8 new, mostly inter institutional projects. In Y5, seed funding was allocated to 6 new projects, with special emphasis on expanding the research ecosystem at TAMU and UC Riverside.
  - Redefine new Integrated Thrust Areas that will pave the way for the Convergent Research Pillar in the years to come, including a brand new Thrust Area totally dedicated to translating our technologies in order to develop the cryo-supply chain management.



ATP-Bio's Growing Research Network

"ATP-Bio is an Engineering Research Center that is pushing biopreservation "light years ahead" because of the cross- disciplinary and non-siloed nature of the Center. It is an impressive program addressing critical gaps in an innovative manner. They are advancing technology that works at scale from cells to whole organs and across species. This would not be possible without the resources and coordination of the ERC. They are developing the foundational technology for biopreservation that addresses the two major challenges of the ecosystem:

- simplifying the complexity of biopreservation processes, and
- customization in biopreservation processes." [ATP-Bio SAB SWOT analysis]

As mentioned above, the research ecosystem was further expanded in Y4 and Y5 thanks to:

i. the deliberate decision of the Center to add new talent from within ATP-Bio institutions,

ii. the addition of temporary partners from sites internal and external to ATP-Bio brought in through the yearly seed funding programs and

iii. the exchange programs put in place to facilitate internal and external visits to ATP-Bio labs.

Year 4 also marks the start of a new trend with multiple ATP-Bio postdocs transitioning to junior faculty positions at prestigious research institutions, and for some bringing along sources of funding related to cryopreservation. Finally, multiple international societies of cryobiology research have expressed a growing interest in joining ATP-Bio's research network.

Innovation Ecosystem

PILLAR IE

ATP-Bio℠ is building a healthy, self-sustaining ecosystem that brings together stakeholders to solve the most complex issues in the preservation of biological systems.

The overriding goal of the Innovation Ecosystem (IE) is to enable translation of convergent research efforts to create net positive societal impact. The role of the IE will continue to develop over the life cycle of the ERC, especially as technologies mature and pathways for application to societal needs become more visible.

The conceptual model of the ecosystem consists of technologies being generated by the CR effort leading to commercialized technologies. The reality is that a vast majority of technologies do not make it to commercialization; there are multiple failure modes and often only one path to success. With many of the ATP-Bio technologies being early-phase and being launched into emerging applications (indeed in some cases, emerging industries), development of an appropriate ecosystem will be biased towards start-ups or licensing partnerships with established private sector entities. While this situation has its challenges, it also offers the opportunity for step-change impact, rather than the incremental impact found in research efforts in more mature industries.

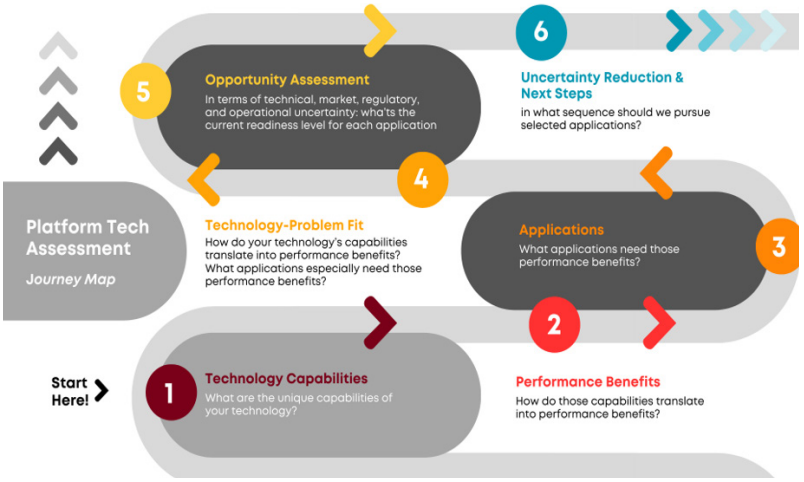
IE Year Four Highlights

The primary strategies to achieve our aims include:

- Increasing the readiness of technologies for commercialization: This activity includes advancing the technology readiness level (TRL) for projects and associated intellectual property development.
- Connecting technologies and talent to commercialization partners and stakeholders: The focus is on developing member partners across the value chain who can assist in driving forward applications or would be interested in licensing or acquiring technologies.
- Developing workforce capability for commercialization: Included in this strategy is increasing the commercialization and startup capability of trainees and staff.

In Y4, we had significant progress in advancing our strategies in each area:

- ATP-Bio Intellectual Property and Technology Readiness Levels Increase: In Y4, a total of 19 patent applications were filed, including both provisional and full patents across core (9) and associated (10) projects. Additionally one licensing agreement was successfully completed, with another currently under negotiation with a major multinational organization. This demonstrates strong activity in protecting innovative technologies. Overall, research project teams reported an increase in Technology Readiness Levels (TRLs) of projects tracked from Y3 to Y4 from 3.7 to 3.9. Notably, one project achieved full commercialization, marking a significant milestone in its development and market readiness. This underscores the commercial potential and value of ATP-Bio's technology.
- ATP-Bio Growth and Representation of Member Partner Stakeholders: ATP-Bio has grown to 40 members, a jump in membership of nearly 50% between Y3 to Y4; the membership network encompasses a diverse range of stakeholders: 67.5% from industry, 17.5% from government and nonprofits, and 15% from innovation sectors. This significant growth in both numbers and representation within the cryopreservation innovation ecosystem is attributed to the increasing visibility and successful translation of ATP-Bio technologies. Among our Member Partners, 16 are start-ups, and 2 are ATP-Bio spin-offs (BioChoric and NorthStar Cryo) that have collectively secured over $14 million in SBIR and DoD grants. We are also in the process of establishing an in-kind exchange membership with the Advanced Regenerative Manufacturing Institute (ARMI), which will significantly strengthen our connections with key players in the US bioeconomy.
- ATP-Bio Launches Platform Technology Assessment Workshops for Research Community: ATP-Bio hosted two in-person platform technology assessment workshops at the University of Minnesota and Massachusetts General Hospital. These workshops focused on evaluating and understanding the capabilities, potential, and impact of technology platforms within the ERC. The objectives were two-fold: (i) to assist project teams in making informed decisions about technology investments and ensuring that selected platforms align with organizational priorities, and (ii)to provide training for students and postdoctoral fellows in intellectual property strategy, translational research, and commercialization.



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IE Year Five Goals

- Develop industry partnerships for financial sustainability
- Increase licensing activity
- Accelerate translation through successful startups

ATP-Bio Members & Partnerships*

INDUSTRY: Provide the voice of industry, end user, or customer voice to ATP-Bio as well as technical and strategic direction to the center, particularly with respect to tech transfer, commercialization, and industry priorities.

- **Sustaining Members**: AMF Life Systems; Instant Systems; Nevada Donor Network; ThermoFisher Scientific
- **Full Members**: American Type Culture Collection (ATCC); Boston Scientific; MidAmerica Transplant
- **Associate Members**: Allosource; Archive Sciences, Inc.; AutoIVF; BioChoric; CaseBiosciences; Evia Bio, Inc.; Expanse Bio; Heisenberg Inc; Iowa Donor Network; OmniLife Health; PanTHERA CryoSolutions; Recombinetics; Sylvatica Biotech Inc; The 2030 Group Advisors, LLC; The Elizabeth Crook & Marc Lewis Foundation; Tissue Testing Technologies LLC; VitriStor LLC

NON-PROFIT/GOVERNMENT: Provide end user or other voices in the value chain and/or ecosystem to ATP-Bio but due to tax status cannot accept IP benefits. They provide technical and strategic direction to ATP-Bio and participate in the IAB as non voting members.

- Agricultural Utilization Research Institute (AURI); Isthmus Foundation; LifeGift; Sea Grant Minnesota; Museum of Science, Boston; Organ Preservation Alliance; Smithsonian Institution; Society for Cryobiology; Taronga Conservation Society of Australia.

INNOVATION: These partners help get ATP-Bio technologies to the market (e.g. economic development organizations, incubators/accelerators, investors, etc.) They contribute to other center activities and events in targeted fashion, but do not participate in the IAB.

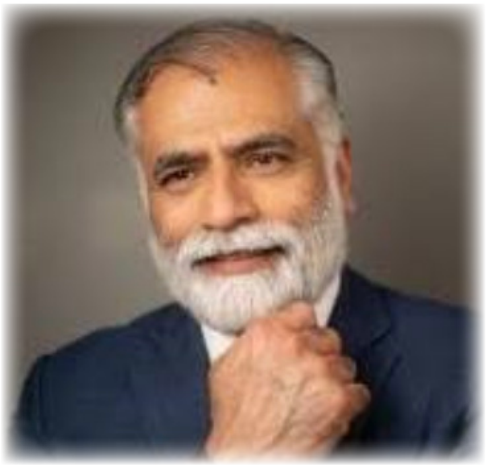
- Fogarty Institute for Innovation; gener8tor Management, LCC; MNSBIR Inc.; University Enterprise Laboratories, Inc.

*Members/Partners current as of October 2024

ATP-Bio Industrial Advisory Board

The Industrial Advisory Board (IAB) provides strategic review and counsel to ERC. The group meets semi-annually to review ATP-Bio's research programs and mechanisms for technology transfer.

The IAB meets quarterly, two of which happen at the fall Site Visit and spring Annual Meeting. IAB Chairs are Uzair Rajput (Instant Systems), and Rob Goldstein (AMF Life Systems), both representing Sustaining Members of the ATP-Bio Partners program. Its members include representatives of companies or organizations supporting ATP-Bio at various membership levels. Members provide guidance and perspectives on the Center's research strategy, future technology priorities, and the funding of ATP-Bio research projects. In Y4, the IAB continued a Stakeholder-Inspired Research Program (SIRF) to identify and sponsor areas of research of particular interest to members.



Uzair Rajput, M.S.
Chief Operating Officer Instant Systems

Rob Goldstein
Director of Engineering
AMF Life Systems

IAB Board Members

JASON ACKER
President & CEO
PanTHERA CryoSolutions Inc.

JAY BEYER-KROPUENSKE
Director of Operations
University Enterprise Laboratories, Inc.

KELVIN BROCKBANK
CEO and Managing Partner
Tissue Testing Technologies LLC

NILAY CHAKRABORTY
Principal Scientist
American Type Culture Collection (ATCC)

PIERRE COMIZZOLI
Project Leader of the Pan- Smithsonian Cryo-Initiative
Smithsonian Institution

SUZANNE CONRAD
CEO
Iowa Donor network

JONATHAN DALY
Conservation Biologist
Taronga Conservation Society Australia

PAT DILLON
President
MNSBIR, INC.

JOHN DOWNING
Director
MN Sea Grant

ROSS DUNBAR
President
Isthmus Foundation

NICOLE EVANS
Executive Director
Society for Cryobiology

MICHAEL FLOREN
Director
AlloSource Innovation Center, Allosource

KEVIN FLYNN
CSO
CaseBioscience

BRUCE FORSYTH
Sr. Fellow, R&D/Interventional Oncology
Boston Scientific

ROBERT GOLDSTEIN
Executive Director, Strategic Planning & Product Development
AMF Life Systems, LLC.

INSOO HYUN
Director of the Center for Life Sciences and Public Learning
Museum of Science, Boston

RAVI KAPUR
CEO
AutoIVF

CHARLES Y. LEE
COO
VitriStor LLC

RACHEL LEON
Director, Business Development
Evia Bio, Inc.

JEDEDIAH LEWIS
CEO
Organ Preservation Alliance

MARC LEWIS
Owner, Co-Director
The Elizabeth Crook & Marc Lewis Foundation

YUE LIU
Assistant Director
Aquatic Germplasm and Genetic Resources Center (AGGRC)

KEVIN MYER
President and CEO
LifeGift

HUNTER DAVIS OZAWA
Head of Science
Heisenberg Inc

MICHAEL PETTIGREW
Founder and CEO
Archive Sciences, Inc.

MATTHEW POWELL-PALM
CEO
BioChoric Inc.

MARK POWERS
VP, R&D
Thermo Fisher Scientific/Life Technologies Corporation

SHANNON SCHLECHT
Executive Director
Agricultural Utilization Research Institute

DALTON SHAULL
CEO, President
Omnilife

KURT SMITH
VP, Strategic Innovation
Fogarty Institute for Innovation

LINDSEY SPEIR
VP, Organ Operations
Mid-America Transplant

TROY VOSSELLER
Co-founder
gener8tor Management, LLC

ADRIENNE WATSON
Recombinetics Inc.

BRAD WEEGMAN
President
Expanse Bio LLC
Chief Operating Officer
Sylvatica Biotech Inc.

Ethics & Public Policy

COMPONENT
EPP

Through ethics and public policy analyses, ATP-Bio℠ is establishing guidance for the responsible development and deployment of ATP-Bio℠'s breakthrough technologies for societal benefit.

ATP-Bio advanced biopreservation technologies have the potential to transform a wide range of domains, including organ transplantation, conservation biology, and aquaculture. Achieving net societal benefit and minimizing risk requires a clear understanding of the ethical and public policy implications of ATP-Bio's discoveries, as well as strategies to address potential societal concerns. ATP-Bio has incorporated an explicit Ethics & Public Policy component to identify and address the ethical, legal, and societal implications (ELSI) posed by ATP-Bio research and emerging technologies. This work enables the ATP-Bio research community and others to responsibly research, develop, and deploy emerging biopreservation technologies.

EPP Year Four Highlights

- Hosted two EPP seminars for the full ERC:
  - Paul Thompson, PhD (Michigan State University; EP3 member) on "What would a Bioethics for Agriculture and Food Applications of Cryopreservation Look Like?"
  - Evelyn Brister, PhD (Rochester Institute of Technology; EP3 member) on "Using Advanced Preservation for Conservation: Ethics & Justice Considerations."
- Hosted a special SLC Trainee Tuesday Webinar, which was trainee led, on "How Working with ATP-Bio's Ethics & Public Policy Researchers Can Help You Publish Your Papers and Seek Grants."
- Other presentations by EPP leadership have included presentations by EPP Lead Susan Wolf on "How New Biopreservation Technology May Advance & Disrupt the Organ Allocation System" for the Boston Museum of Science and Harvard Center for Bioethics, and "The Neglected Role of Ethics in Team Science" for the National Academies of Sciences, Engineering, and Medicine committee working on team science.

- To advance ethics in the leadership of science and engineering research teams, EPP Lead Susan Wolf is working with fellow members of the National Academies Strategic Council for Research Excellence, Integrity, and Trust.

- Continued to make progress on our related NSF-funded grant project on "NetEthics: Building Tools & Training to Advance Responsible Conduct in Complex Research Networks Pioneering Novel Technologies" (Wolf, Roehrig, Pruett, Varma, K. Uygun, PIs; 09/2022-08/2025). EPP researchers are using ATP-Bio as a "laboratory" to study and advance research ethics in big team science that crosses multiple institutions and disciplines. This effort is filling a critical gap in research ethics, advancing ATP-Bio's work, and benefiting the ERC program.

- Hosted plenary panel of national experts at the 2024 Annual Meeting on "Challenges in Applying Advanced Biopreservation to Human Health Beyond Organ Transplantation." Speakers included Claudia Cohn, MD, PhD, University of Minnesota Professor and Director of the Blood Bank Laboratory; Diego Ponzin, MD, Medical Director and Corneal Consultant at the Veneto Eye Bank Foundation in Venice, Italy; and Andrew Cap, MS, MD, PhD, FACP, Independent Consultant in Hematology to the U.S. Department of Health and Human Services, Biomedical Advanced Research and Development Authority, through Tunnell Government Services.

- Made progress on multiple EPP papers. ATP-Bio leaders have partnered with experts in ethical, legal, societal implications (ELSI) to complete a symposium issue of the Journal of Law, Medicine & Ethics to advance knowledge, address societal challenges, and influence policy, regulation, and practice. This 10-article symposium involving 27 authors across the ERC and beyond is in press for Fall 2024 publication.

- Collaborated on multiple ATP-Bio articles with engineers and scientists within the ERC to address the ethical, legal, and societal implications of ATP-Bio research and translation, including publications on biorepositories (Hagedorn et al., 2024) and ethical genetic modifications to enhance organ transplantation (Filz von Reiterdank et al., submitted). These publications will pave the way for successful translation of ATP-Bio technologies and achieving net societal benefit.

- Collaborated with NSF and Gen-4 ERCs on a stakeholder collaborative. EPP Lead Susan Wolf co-chairs the NSF Gen-4 Stakeholder Engagement & Impact Collaborative (SEIC) to foster collaboration across the Gen-4 ERCs to secure societal benefit. Prof. Andrew Maynard, Arizona State University and EP3 member, also contributes to the SEIC.

- ATP-Bio continued to participate in the UMN Consortium on Law & Values in Health, Environment & the Life Sciences, chaired by Prof. Wolf. This Consortium links us to 20 other centers, including those focusing on stem cell and biotechnology research, conservation and healthy foods, translational science, and biosecurity. In Y4 ATP-Bio participated actively in all Consortium member meetings.

- EPP leadership worked with the ERC leads to develop a policy statement distinguishing cryopreservation research (which focuses on preserving living systems) from the dubious field of cryonics (which claims to focus on returning deceased human beings to life).

EPP Year Five Goals

1. Facilitate responsible translation of ATP-Bio technologies: EPP will work with ATP-Bio Partners to map translational pathways, benefits, and threats. EPP will also collaborate to promote harmonized terminology in advanced biopreservation, which is essential for clearing regulatory hurdles, technology sharing, protocol reproducibility and replicability, technology adoption, and funding.
2. Conduct collaborative research & publication: ATP-Bio's research and innovation has the potential to change the world. Anticipating the potential implications of ATP-Bio technologies is critical to achieving the societal benefits. EPP members will continue to collaborate on publications with ATP-Bio scientists and engineers, contributing to ELSI (ethical, legal and societal implications) analyses.
3. Offer expertise and resources to embed ethics in ATP-Bio: EPP leaders will continue to provide ERC scientists, engineers, and trainees with bibliographical resources, direct access to ethics and policy expertise, and exposure to EPP methods. EPP will use multiple strategies to accomplish this, including collaboration on publications, invitations to Ethics & Public Policy Panel (EP3) meetings, a posted ATP-Bio EPP Bibliography, the "Ask your Ethics Question" Google Form on the HUB, and a posted list of ERC-wide ethics resources at ATP-Bio's core institutions. These efforts to embed ethical, legal, and societal considerations in ATP-Bio encourage a culture and workforce that is attuned to these issues and integrating them into ERC work.
4. Expose ATP-Bio investigators and trainees to EPP experts: In Year 5, we will offer two ATP-Bio EPP webinars for the ERC, both delivered by EP3 members. In the fall, Andrew Maynard, PhD, will present "Successfully Bridging Innovation and Application: Exploring a Risk Innovation Approach to Developing and Using Advanced Biopreservation Technologies." Another presentation will occur in the spring. EPP will also host an expert panel at ATP-Bio's Annual Meeting.

5. Lead breakthrough research on ethics in ERCs & complex networks: EPP leadership will continue to make a major contribution to the ethical conduct of research in ERCs and other complex research networks through its associated NSF-funded project on "NetEthics: Building Tools & Training to Advance Responsible Conduct in Complex Research Networks Pioneering Novel Technologies."
6. Build stakeholder and public engagement: EPP will work collaboratively to build public outreach, exhibits, and events.

Ethics & Public Policy Panel (EP3)

The Ethics & Public Policy Panel (EP3) is comprised of 15 top experts from across the country. EP3 serves a critical advisory and collaborative function for the ERC and EPP component. ATP-Bio engages with EP3 members through three meetings each year devoted to EPP, three additional EP3 meetings devoted to NetEthics, the Annual Meeting, joint publications, and targeted consultations. Overarching goals are:

- analyze the ethics and policy challenges raised by ATP-Bio research, technology development, and application;
- guide ATP-Bio research and development to manage risk and secure societal benefit; and
- generate consensus guidance plus publications on cutting-edge issues in governance of ATP-Bio's emerging technologies.

EP3 Members

Evelyn Brister, PhD
Professor of Philosophy and Philosophy Program; Director; Governing Board member, Public Philosophy Network; Rochester Institute of Technology

Shawneequa L. Callier, JD, MA
Associate Professor; Department of Clinical Research and Leadership; School of Medicine and Health Sciences; The George Washington University

Alexander Morgan Capron, LLB
University Professor Emeritus; Scott H. Bice Chair Emeritus in Healthcare; Law, Policy, and Ethics, Gould School of Law; Professor Emeritus of Law and Medicine, Keck School of Medicine; Founding Co-Director, Pacific Center for Health Policy and Ethics; University of Southern California

James F. Childress, PhD
Professor Emeritus; Ethics and Religious Studies; Core Faculty, Center for Health Humanities and Ethics; School of Medicine; University of Virginia

Barbara J. Evans, JD, PhD, LLM
Professor of Law and Stephen C. O'Connell; Chair, Levin College of Law; Professor of Engineering; Herbert Wertheim School of Engineering; University of Florida

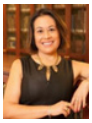
Ethics & Public Policy

COMPONENT
EPP

Michele Bratcher Goodwin, JD, LLM, SJD
Linda D. & Timothy J. O'Neill Professor of Constitutional Law and Global Health Policy; Co-Faculty Director, O'Neill Institute; Georgetown University Law Center

Insoo Hyun, PhD
Director; Center for Life Sciences and Public Learning; Boston Museum of Science

Rosario Isasi, JD, MPH
Associate Professor of Human Genetics, Macdonald Foundation Department of Human Genetics, Hussman Institute for Human Genomics and Interdisciplinary Stem Cell Institute, University of Miami; School of Medicine Adjunct Professor of Law, University of Miami School of Law



Gary E. Marchant, PhD, JD, MPP
Regents Professor of Law and Faculty Director, Center for Law, Science, and Innovation; Lincoln Professor of Law, Ethics & Emerging Technologies, Lincoln Center Applied Ethics, Sandra Day O'Connor College of Law Arizona State University

Andrew D. Maynard, PhD
Professor, School for the Future of Innovation in Society; Senior Global Futures Scholar, Global Futures Scientists and Scholars Arizona State University

Kenneth Oye, PhD
Professor of Political Science, School of Humanities Arts and Social Sciences; Professor of Data Systems and Society, School of Engineering; Director, Program on Emerging Technologies (PoET); Massachusetts Institute of Technology

Timothy L. Pruett, MD
Professor, Division of Transplantation, Department of Surgery; Director, Liver Transplantation Program University of Minnesota

Paul B. Thompson, PhD
Professor & W.K. Kellogg Chair Emeritus in Agricultural, Food and Community Ethics Michigan State University

Terrence R. Tiersch, PhD
Professor, School of Renewable Natural Resources; Director, Aquaculture Germplasm & Genetic Resources Center
Louisiana State University

Susan M. Wolf, JD
Regents Professor; McKnight Presidential Professor of Law, Medicine & Public Policy Faegre Drinker Professor of Law Professor of Medicine; Chair, Consortium on Law and Values in Health, Environment & the Life Sciences University of Minnesota

Year Four Annual Meeting Highlights

The ATP-Bio Y4 Annual Meeting was hosted at Texas A&M University (TAMU) on March 19-21, 2024.

ATP-Bio's Annual Meeting brought together the biopreservation industry, academia, and stakeholders to enhance connections through technical presentations, networking, and facility tours.

The opening event was a wonderful start to the meeting and featured a fun Hocus Focus photo booth. Key sessions addressed diversity in organizational climate, food sustainability, and advanced biopreservation. Special highlights included laboratory tours at Texas A&M University (TAMU), showcasing facilities like the Agui-Lab and the Rapid Prototyping Studio to foster collaboration.

Year Four Annual Meeting Highlights

The ATP-Bio Trainee Poster Competition showcased innovative research from 32 trainees, with notable attendees like Mrs. Donna Walker and guest speaker Prof. Christine Picard. Poster winners included Linnea Warburton (first prize) and a tie for second among Crystal Alvarez, Lakshya Gangwar, and Brad Ellis.

The event also featured partner exhibits and a Perfect Pitch Competition, won by Srivasupradha Ramesh for their presentation on cryopreservation challenges. Closed-door meetings facilitated strategic discussions and integration activities.

Congratulations to Srivasupradha Ramesh (PhD Candidate in Mechanical Engineering with a minor in BME at the University of Minnesota) for being awarded third place prize at 2024 National Science Foundation Perfect Pitch Competition!

The competition is part of the NSF ERC Biennial Meeting that took place September 8-10 in Alexandria, VA. This meeting happens every two years gives trainees an opportunity to present the societal impact of their work in a 90 second pitch.

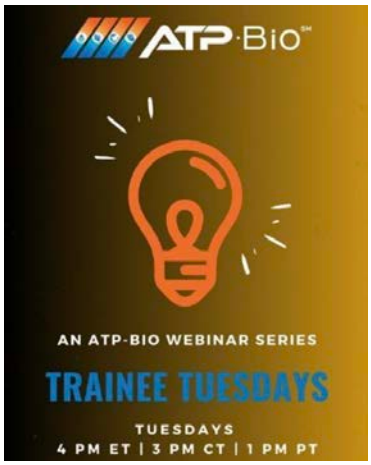
Get Involved with ATP-Bio℠

ATP-Bio Public Webinar Series

The ATP-Bio Public Webinar Series is offered for members of the ATP-Bio community and the external public at large. Topics include biopreservation research and related content. The goal of the public webinar series is to be accessible to stakeholders beyond our inner community.

- Audience: ATP-Bio Community, Member Partners, Institutional Leadership, Public
- Frequency: Monthly. [Every other month, ATP-Bio will promote the Society for Cryobiology Public Webinars

ATP-Bio Trainee Tuesdays



The ATP-Bio Trainee Tuesdays are offered exclusively to ATP-Bio students and postdocs. Topics include skill building sessions as well as open forums for trainee exchange.

- Audience: ATP-Bio Trainees
- Frequency: Every 2 months
- Visit atp-bio.org/WHAT'S HAPPENING for upcoming webinar information

Get Involved

atp-bio.org

Advanced Technologies for the Preservation of Biological Systems (ATP-Bio℠)

A National Science Foundation Engineering Research Center

University of Minnesota, Twin Cities Campus 420 Delaware Street SE
Mayo Memorial Building, Room A452
Minneapolis, MN 55455
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