ARCTIC ICE PROJECT

ANNUAL REPORT 2023-2024

RESEARCH. REFLECT. RESTORE.

ARCTIC ICE PROJECT (AIP) IS A NONPROFIT RESEARCH ORGANIZATION DEDICATED TO DEVELOPING SAFE, INNOVATIVE CLIMATE INTERVENTION STRATEGIES TO PRESERVE ARCTIC SEA ICE AND SLOW THE PROGRESSION OF CLIMATE TIPPING POINTS.

Thank you for contributing to the impact you will see represented in the pages of this annual report. We are grateful to be working with you as part of our global community.

Hope for Our Children

TAKING ACTION TODAY FOR A BETTER TOMORROW

I recently attended my very last back-to-school night at my youngest daughter's high school. I am on the cusp of becoming an empty nester and this night was a poignant reminder of how quickly time flies. Moving between classrooms, we met seven different teachers and caught a glimpse into her final year of high school.

One class that stood out was her sixth period, AP Environmental Science, or "APES" as they call it on campus. The instructor is extraordinary — a passionate educator who also works with the Department of Forestry. My daughter and her classmates are set for an enriching experience in this class. APES, an elective, has seen an unprecedented surge in enrollment this year, so much so that multiple additional sections had to be added to accommodate student interest. The teacher and administration attribute this spike to the growing concern among students about climate change. These young people are paying attention, and they care deeply.

As I skimmed the syllabus, something unexpected caught my attention: an emphasis on student wellness integrated throughout the course. The teacher explained that while climate change is a central topic, it's also a heavy and burdensome one. Recognizing its impact on mental well-being, she aims to provide tools and space for students to manage their emotions. After just a few classes, it was apparent how anxious these students are. They feel that not enough is being done now, and they bear the weight of a crisis that will likely fall upon their shoulders to solve.

Hearing this made my heart sink. How have we reached a point where our children, who should be brimming with optimism and dreams, are instead overwhelmed with fear and a sense of impending responsibility? They are teenagers, yet they feel compelled to "fix" the issues that previous generations have neglected. With the climate deteriorating rapidly, what kind of world will they inherit when they step into their roles as professionals, leaders, parents?

This is why the mission of Arctic Ice Project is so urgent and vital. We are stepping up to take meaningful action now, so our children do not feel they have to carry this enormous burden alone. By advancing scientific research on potential climate interventions, we are working to restore a critical part of our planet's ecosystem and aiming to alleviate some of the pressure that weighs so heavily on today's youth. They deserve a future where the path to a stable climate is not just a dream but a concrete reality.

At Arctic Ice Project, we are developing technologies to slow the melting of Arctic ice and are committed to demonstrating that climate solutions are within reach. We want young people to know they are not alone in this fight. By taking decisive action now, we can empower them with the confidence that their future can be shaped by what we can achieve together. Let's provide them with the tools, the science, and the hope they need to envision a brighter, more sustainable world. We have a responsibility to act now — for them, for their children, and for all generations to come.

ANNETTE EROS
CHIEF EXECUTIVE OFFICER

Stephanie Olinger, PhD.

JOINS ARCTIC ICE PROJECT AS TECHNICAL DIRECTOR

This spring, Arctic Ice Project announced Stephanie Olinger has joined the team as technical director. She brings a wealth of experience and a deep passion for climate science action.

Olinger, who holds a Ph.D. in cryospheric geophysics from Harvard University and was a Thompson Postdoctoral Scholar at Stanford University, brings a strong background in geophysical systems to further its environmental mission.

“Joining Arctic Ice Project is an exciting opportunity to apply my expertise in a way that has direct, tangible impacts on climate mitigation,” Olinger said. "I am committed to advancing our understanding of Arctic sea ice and developing innovative solutions to address the urgent challenges of climate change.”

In her new role, Olinger is leading research and development initiatives focused on Arctic sea ice albedo modification, a strategy aimed at mitigating climate change by increasing the reflectivity of ice surfaces to reduce heat absorption.
AIP is focused on the safe use of reflective materials designed to slow ice melt and contribute to increasing global climate stability.

Olinger’s expertise in remote sensing, in-situ observations, and mathematical ice physics modeling is instrumental in advancing the project’s goals.

STEPHANIE OLINGER, PHD
TECHNICAL DIRECTOR

Meet our Team

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Research & Development

UPDATES • PROGRESS • PLAN

> Climate change requires immediate action, and our most urgent, non-negotiable priority must be to tackle the root cause, carbon emissions. But as pressure grows to supplement emissions reductions with active, large-scale intervention in Earth's climate system, we must ensure that research is done in ways that are inclusive, representative and just, carefully considering risks and benefits."

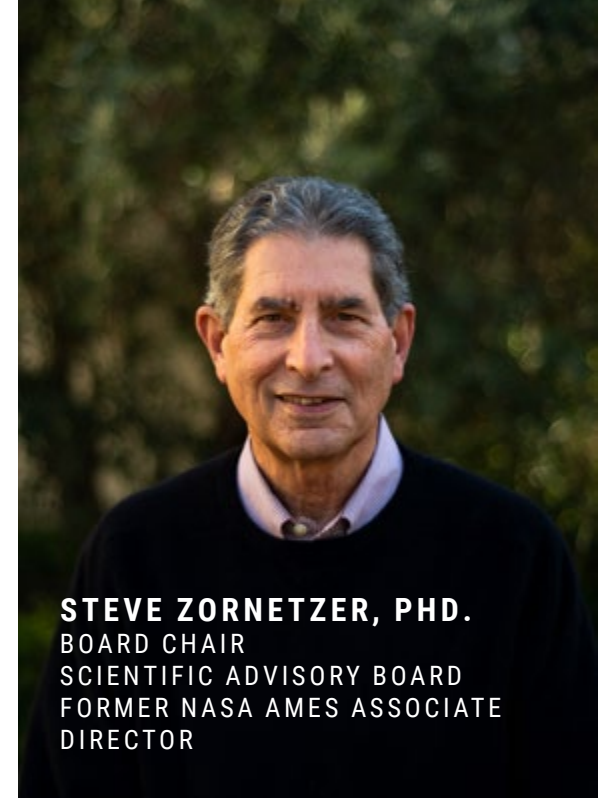
LISA J GRAUMLICH
AMERICAN GEOPHYSICAL UNION PRESIDENT

Recent Research & Development Progress

Today the country, indeed the world, is at a critical juncture that will determine the fate of future generations. Will humankind, through our leaders and politicians, take clear and determined action to decarbonize our economies to reduce and potentially eliminate new greenhouse gasses from our atmosphere? Or will we further delay, obfuscate and procrastinate?

Recent history suggests the latter. Neither developed nor underdeveloped countries have met their promised goals towards decarbonization over the past four decades. The clock is ticking. Global warming is accelerating. Climate models have underestimated the rate of warming globally, and importantly, at the polar regions. Today the Arctic is warming four times faster than the rest of the planet. But there is hope. Arctic Ice Project believes we can help slow down Arctic and global warming alongside humanity's efforts to decarbonize. That is our goal, and we believe we can succeed.

Your support of AIP's research and development has enabled significant progress in recent months, and I'm pleased to share a summary of these achievements. Your contributions have been crucial in advancing our expertise, outreach, and global recognition. We are grateful for your support. Below, we outline the accomplishments made possible by your funding and set the stage for continued partnership.



STEVE ZORNETZER, PHD.
BOARD CHAIR
SCIENTIFIC ADVISORY BOARD
FORMER NASA AMES ASSOCIATE DIRECTOR

OUR MISSION

Preserving and enhancing Arctic ice is the most effective short-term and potentially safest way to slow climate change. AIP's science-based solution uses surface albedo (reflectivity) modification (SAM), a form of solar radiation management, to extend the lifespan of Arctic sea ice through the summer. This approach leverages natural climate feedbacks to minimize potential unintended consequences.

Our message, that we have the knowledge and expertise to actually combat the climate crisis, has resonated with Arctic scientists and political leaders alike. Our global research aims to validate this approach, offering the potential to preserve Arctic sea ice for a decade or more while the world transitions to a decarbonized future.

OUR RECENT RESEARCH PROGRESS

Over the past 18 months, AIP has made exciting progress that advances our core research and brings us closer to our goal of preserving and restoring sea ice. First, we have utilized state-of-the-art climate modeling and simulation to evaluate the predicted climatic ramifications of highly reflective hollow glass microsphere (HGM) material in altering the surface reflectivity of sea ice. Second, we have continued to study various HGM materials to characterize their physical, chemical, and optical properties in order to identify the optimal material for increasing sea ice reflectivity. Third, and finally, we have rigorously tested selected materials for potential ecotoxicological effects in representative Arctic Ocean organisms spanning the food chain from algae and phytoplankton to consumers like mollusks and squid. Below is a summary of our recent progress in each of these three research efforts.

MODELING AND SIMULATION

Our encouraging progress supports the fundamental hypothesis that SAM of Arctic sea ice can cool the Arctic, and by extension, have global cooling effects. In collaboration with our research partner Climformatics, we found that simulated multi-year applications of HGMs to enhance sea ice reflectivity in a portion of the Beaufort Gyre (in an area equivalent to about eleven percent of the total Arctic Ocean) restored multi-year Arctic sea ice and resulted in cooling of both the entire Arctic and portions of Northern Europe. This work is currently being prepared for publication in a major scientific journal. The work provides important support for the assertion that multi-year, real-world applications of albedo-enhancing HGMs on Arctic sea ice would prolong the longevity of such ice, increase both its thickness and areal coverage, and finally, result in cooling of the atmosphere. Also, the work supports the idea that there are strategic areas of the Arctic Ocean that, when treated with highly reflective HGMs, can have an amplification effect, that is, can serve to stimulate ice growth beyond the specific area actually treated with HGMs. This is an extremely important finding because it suggests that treating such smaller strategic areas with HGMs, eliminates the need to treat the entire Arctic ocean, which would be both logistically impossible and prohibitively expensive.

MATERIALS CHARACTERIZATION

We are advancing our ability both to accurately characterize HGM optical properties, increasing how effectively we can optimize our selection of materials to enhance sea ice reflective power. Our new technical director, Dr. Stephanie Olinger, is leading this effort. Dr. Olinger established research partnerships with both Stanford University and the University of Utah, both research leaders in the area of materials characterization of optical properties. Recent laboratory research conducted by Dr. Olinger and her collaborators accurately measured the optical properties of HGMs used in a previous field study reported a few years ago by Dr. Leslie Field. That study, which demonstrated that HGMs could indeed preserve ice in a Minnesota pond, eventually led to a controversy in the scientific literature, and it was claimed that the HGM used by Dr. Field would actually accelerate the loss of Arctic sea ice rather than protect it. This, of course, was a serious claim that could undermine AIPs approach. The claim was based on a series of calculations and assumptions, rather than actual laboratory or field measurements. To resolve this issue, Dr. Olinger and her collaborators conducted carefully controlled optical analyses of the same HGM material used in the original study by Dr. Field. The results of these laboratory analyses provided clear evidence that the HGM did indeed have the optical properties to protect, rather than accelerate, melting of ice. A journal article refuting the inaccurate claims concerning Dr. Field's work has been submitted for publication and will be published shortly.

There is a more important long-term contribution of Dr. Olinger's efforts to develop a standardized optical properties characterization capability for AIP. Going forward, we now have the ability to screen a multitude of commercially produced HGMs to identify those with the best optical and materials properties for our purposes. This new capability will significantly accelerate our research efforts. This is critical in a situation where time is short and the window of opportunity is closing for a climate restoration.

ECOTOXICOLOGY

Identifying the optimal optical and material properties of HGMs is only part of the challenge; ensuring their environmental safety is equally crucial. Any material used in the sensitive Arctic environment must balance these two requirements. Since our goal is to preserve and restore Arctic ice by deploying reflective HGMs in strategic areas of the Arctic Ocean, demonstrating their ecological safety is essential. We've recently made significant progress in this area with our partner, SINTEF, a highly respected Norwegian ocean research institute.

AIP and SINTEF have conducted a series of ecotoxicology studies to determine if our HGMs show harmful effects on a variety of indigenous marine species from the Arctic Ocean water column. To date, short term laboratory exposure (10 days) to a variety of concentrations of HGMs show no evidence of significant mortality in four different native marine species: a zooplankton, an ocean-bottom annelid worm, blue mussels, and Atlantic cod embryos.

These results are promising and provide AIP with optimism that our overall approach of using selected HGMs to preserve Arctic sea ice can be environmentally safe. We are currently planning another round of longer-term studies to understand how chronic exposure to HGMs influences marine life. These studies will use realistic concentrations of HGMs from an ongoing modeling study that seeks to predict HGM concentrations in the Arctic ocean water column using observations of real ocean currents and a state-of-the-art model of fluid dynamics. In order to proceed with real-world field studies in the Arctic ocean, it is essential that AIP first conclusively demonstrates the safety of our HGM approach for the natural environment.

SUMMARY

With your support we have made rapid and significant progress towards achieving our mission. With the recent hire of our new technical director we anticipate that this progress will accelerate. This is essential given the limited time available for effective climate intervention in the Arctic. Accelerated warming in the Arctic is predicted to result in the loss of all summer sea ice in around two decades, at which point the climate system will reach a tipping point, and it will be too late.

Of course, our research and development progress is limited largely by funding. AIPs success is crucially dependent upon your continued generosity and support of our common cause. We believe we have demonstrated we are using your support effectively and efficiently, and the significant progress we have made will only continue with increased efficiency. We are being recognized world-wide as leaders in Arctic ice preservation and restoration – but much more work remains to be done. Your continued support will help ensure that we will achieve our mission to buy time for humankind to effectively decarbonize and eventually stop global warming. Together, we can contribute to overcoming the most significant existential challenge humankind faces today.

HOW HOLLOW GLASS MICROSPHERES (HGMS) ARE PAVING THE WAY FOR A COOLER FUTURE

PROTECTING SEA ICE WITH INNOVATION

As we embark on another year of groundbreaking climate research, we want to highlight the promising potential of a material that could help protect Earth's vanishing sea ice. HGMs possess unique properties that make them particularly effective for sea ice preservation.

HIGH REFLECTIVITY

HGMs have an extremely high albedo and reflect nearly all incoming solar radiation, a critical factor for any material to perform well as a protective coating for sea ice. Our preliminary field test on a pond in Minnesota found that HGMs were able to reduce the melt rate of the pond's frozen surface by 30% by reducing the amount of solar radiation absorbed.

LOW DENSITY

During the melt season each year, ponds of meltwater form on the sea ice surface. Because HGMs can be less dense than water, they may be able to float on the surface of melt ponds and continue reflecting sunlight. The low density of HGMs also means that a smaller amount of material is required to cover a given area of sea ice and that the material can be transported to the Arctic with relative ease.

NONTOXIC

Any material used for sea ice albedo enhancement must be environmentally safe to avoid harming Earth's sensitive oceans. Luckily, HGMs are composed of silica– just like natural sand. AIP's first round of ecotoxicology studies suggest that acute exposure to HGMs has no negative effects on the health of all tested marine organisms, and we are continuing our work by incorporating predicted HGM concentrations from physics-based ocean flow modeling.

INEXPENSIVE

HGMs are inexpensive to manufacture, making them a cost-effective material to use when applying a protective coating to a relatively large area of sea ice. Because HGMs are already manufactured on a commercial scale, AIP can avoid the high costs of developing and manufacturing a new material.

Research & Development Plan

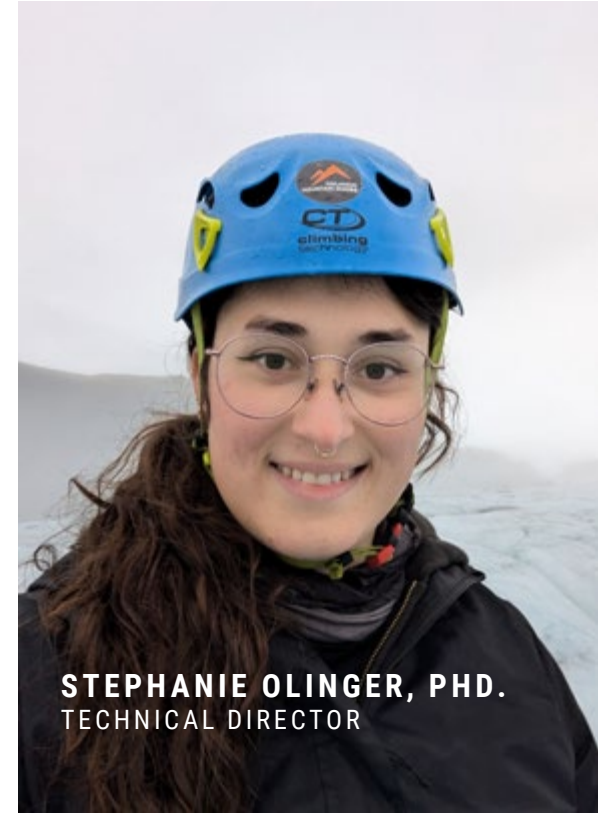
As Arctic Ice Project's new technical director, I am thrilled to guide the trajectory of our scientific program and lead our research and development efforts. The global symptoms of climate warming grow more and more dire every day, and the scientific community must redouble our efforts to understand every option available that can prevent our planet from slipping further into disequilibrium. Our work at AIP represents an important part of humanity's most critical mission – to preserve the habitability of the planet that we all call home. In the coming years, AIP will continue to strengthen the core science that supports the utility of surface albedo modification (SAM) while broadly expanding our scientific program as we continue moving towards technological readiness for use in the Arctic.

For the international community to accept sea ice SAM as a viable climate mitigation strategy, AIP must demonstrate its utility, feasibility, and safety. The rapid loss of Arctic sea ice requires efficient research and development to ensure SAM is ready for deployment before climate feedbacks eliminate the remaining sea ice in the Arctic Ocean. To meet this challenge, AIP will conduct a comprehensive, multi-pronged research program with renewed vigor, utilizing modeling from individual glass microspheres to global climate systems, alongside laboratory measurements, controlled field tests, and real-world experiments in the Arctic.

CORE RESEARCH

Our core research program consists of the basic laboratory and modeling experiments required to quantify the impact of SAM. To determine the impact of SAM on Arctic temperature and sea ice melting for a realistic deployment, AIP will conduct a new round of climate modeling studies in partnership with universities and research institutions experienced using whole-Earth climate models. These studies will seek to identify strategic regions of the Arctic capable of producing cooling over an area well beyond the immediate treatment area. In addition, we will simulate the sea ice restoration and cooling that would occur if SAM began in 2030, 2040, and 2050, all to build a robust understanding of the deployment scenarios that maximize our ability to preserve sea ice.

While the promising results of our research so far suggest that SAM holds enormous potential for sea ice preservation, it remains essential to fully understand whether glass microspheres present a risk of toxicity in marine life at realistic concentrations. Our partners at SINTEF Norway are currently



conducting a simulated experiment to predict the concentration of HGMs in the ocean after an envisioned deployment. The results of this project will form the basis for updated ecotoxicology experiments spanning the marine food chain for several promising HGMs.

FIELD EXPERIMENTS

Before conducting a full field test of SAM in the Arctic, AIP will perform a series of controlled outdoor experiments that allow us to test key elements of SAM without

AS MANY OF YOU MAY KNOW, a paper released by Webster and Warren in 2022 claimed that our approach to sea ice preservation would actually cause more sea ice to melt, warming the Arctic as a result. The Arctic Ice Project scientific team and technical advisors have been working diligently to examine these claims in detail, and we are pleased to report that we have written, revised, and submitted a response demonstrating that surface albedo modification using hollow glass microspheres (HGMs) **presents a viable method of preserving sea ice**. In order to refute their claims, we conducted a new set of measurements that accurately and precisely characterized the optical properties of HGMs.

Our lab work found that the specific HGM material considered by Webster and Warren is actually **much more reflective** than they assumed, and is therefore unlikely to absorb a significant amount of solar radiation. This means that deploying a thin coating of HGMs **would indeed slow sea ice melting and cool the Arctic** – in strong support of our core mission. We'll be sure to share the article refuting these claims upon publication.

Here at AIP, we are grateful to have your continued support as we persevere in our efforts to slow down the planetary warming that threatens to remove Arctic sea ice entirely.

risking unintended impacts. Facilities like the Churchill Marine Observatory (CMO) and the Sea Ice Research Facility (SERF) at the University of Manitoba can create real sea ice in controlled pools by freezing seawater, making them ideal for our next phase of field experiments. We aim to investigate several critical questions: Do HGMs deposited on real sea ice delay melting caused by solar radiation? How does the strength of sea ice reflectivity enhancement vary with HGM layer thickness? How do HGMs on the sea ice surface respond to wind and wave forces? These controlled field tests will help us answer these questions and allow us to observe the cooling effects of our approach on real sea ice for the first time.

Once we identify an environmentally safe HGM with favorable optical properties, AIP plans to conduct an in-situ field experiment in a fjord along the coast of the Svalbard archipelago. With adequate funding, we aim to begin this critical field study by 2028. In late spring of the deployment year, when sea ice reaches its seasonal maximum, AIP will treat a 1 km² area of ice with a 0.5 mm coating of HGMs. We will deploy in-situ instruments to record temperature, incoming and reflected radiation, and ice thickness. Additionally, we will utilize satellite-based observations to track changes in ice albedo, extent, and thickness across the fjord. All aspects of the field study will be planned and executed in collaboration with Norwegian scientists and engineers who have expertise in local sea ice conditions and experience with government-approved Arctic Ocean studies. We will also partner with local indigenous Arctic communities to co-develop our research, and execute deployment, data collection, and analysis for the study.

AIP and our local Norwegian research partners will adhere to all permitting requirements, at all levels of government: local, regional and national. Outreach and governance discussions will be conducted with local and regional stakeholders, including indigenous peoples and local residents. Our community outreach goals are to educate and engage stakeholders in the possibility of local sea ice and climate restoration. We will highlight the potential benefits of our field study research and be responsive to questions and concerns, and we will share with stakeholders our modeling and ecotoxicology findings and discuss any potential negative impacts of our field study. Our approach to field work is driven by robust observations, respect for local ecosystems and inhabitants, and an unwavering commitment to the Arctic's protection. This controlled field experiment is the next major milestone on AIP's horizon, providing us with the most significant opportunity to validate our research efforts thus far and to demonstrate the efficacy of our approach in the real Arctic environment to the international community.

EXPANDED RESEARCH

To maximize the positive climate impact of AIP's work, we are investigating alternative applications of SAM that can utilize the same fundamental approach to mitigate other climate warming processes. First, we are investigating SAM as a method of glacier stabilization. During the winter, a melange of iceberg fragments and sea ice buttresses coastal glaciers in Greenland, reducing the Greenland ice sheet's wintertime contribution to sea level rise. During the spring, melange breaks up over a few weeks due to sea ice thinning, and icebergs begin breaking off into the ocean regularly. Highly localized SAM may slow the spring breakup of the melange and reduce the Greenland Ice Sheet's total yearly contribution to sea level rise. We are currently developing a funding proposal in collaboration with global investigators at two prestigious universities that seeks to that seeks to better understand whether local climate intervention could be used to stabilize coastal glaciers and slow sea level rise.

Second, we are investigating SAM as a method of permafrost preservation. Frozen ground and wetlands in the Arctic tundra, referred to as permafrost, are major reservoirs of methane, a potent greenhouse gas. As the Arctic warms more rapidly than the rest of Earth, permafrost thaws increasingly quickly, releasing more methane and encouraging further Arctic warming. Solar radiation is a key part of the surface energy balance that determines how quickly permafrost thaws. Targeted surface albedo modification in regions of methane-rich permafrost may reduce the rate of thawing and reduce methane emissions, slowing the permafrost feedback and reducing the rate of Arctic warming.

INDIGENOUS ENGAGEMENT

For millennia, Arctic Indigenous communities have maintained a deep connection with sea ice, possessing extensive knowledge about its crucial role in the Arctic ecosystem. Sea ice is vital not only to the environment but also to Indigenous infrastructure and livelihoods. Recognizing the importance of Indigenous voices and their essential role in shaping the future of the Arctic, we are committed to partnering with Arctic Indigenous peoples as equal collaborators in SRM research and development. We are actively working to build meaningful relationships that foster opportunities for co-creating research goals, objectives, and methodologies that reflect both Indigenous and scientific perspectives. Our collaborations will ensure that traditional knowledge and community priorities inform our approach, processes, and outcomes.

SUMMARY

Your support enables AIP to continue strengthening and expanding our scientific program, and we grow ever closer to completing our mission of providing the world with a tool that can prevent the most dire consequences of Arctic warming. Thank you for trusting us to improve the health of the planet on your behalf. As we expand our scientific program, we are poised to strengthen our role as a leader in climate innovation, attracting partners and resources necessary to ensure the success of our mission. I am confident that our research and development efforts will continue to gather momentum and offer a beacon of hope in the face of the greatest crisis facing humanity today.

THIS SUMMER, ARCTIC SEA ICE has once again reached near-historic lows, with NASA and the National Snow and Ice Data Center (NSIDC) reporting a minimum extent of 1.65 million square miles on September 11, 2024. This marks the seventh-lowest level recorded since satellite observations began in the late 1970s, continuing a concerning trend of shrinking and thinning ice in the Arctic Ocean.

NASA's latest findings underscore the urgent need for awareness and action regarding climate change. As the Arctic continues to warm, understanding the implications of ice loss becomes critical. Thinner ice affects not only local ecosystems but also global weather patterns and climate systems.

The changes in Arctic ice are a stark reminder of the interconnectedness of our planet and the necessity of sufficient climate action.

This image, taken from NASA's scientific data visualization studio, shows Arctic sea ice minimum extent on September 11, 2024. The yellow line marks the average sea ice minimum between 1981 to 2010. Credit: NASA's Scientific Visualization Studio/Trent L. Schindler

Ocean Visions Road Map

ARCTIC ICE PROJECT'S ROLE IN ADVANCING SOLUTIONS FOR ARCTIC SEA ICE PRESERVATION

In 2024, Ocean Visions released a significant new initiative—a first-of-its-kind digital road map aimed at identifying and advancing potential pathways to slow the loss of Arctic sea ice. Ocean Visions suggests a broad range of research solutions is necessary, including research into Surface Albedo Modification (SAM), the method Arctic Ice Project is principally investigating, in the global effort to combat one of the most urgent indicators of climate change: the accelerated melting of Arctic summer sea ice.

"Given current and projected levels of greenhouse gas pollution, even in the best scenario of emissions reductions we risk levels of Arctic sea ice loss that will exacerbate changes in other parts of the Arctic, like permafrost, that could fuel even more warming," said Ocean Visions Senior Program Officer Dr. Kerry Nickols. "This reality underscores the need to carefully and collaboratively investigate all potential options to slow further loss of Arctic sea ice while we continue to decarbonize."

The Ocean Visions Road Map, published in collaboration with an international team of climate and earth science experts, provides a detailed assessment of 21 approaches to mitigate Arctic sea ice loss. These approaches range across five main categories: Arctic Protection, Pollution Management, Ice Management, Surface Albedo Modification, and Solar Radiation Modification. The road map is designed to catalyze research and investment into solutions that address knowledge gaps, assess potential risks, and explore the feasibility of various strategies to preserve Arctic sea ice. Ocean Visions does not endorse any specific approach.This digital roadmap is an effort to mobilize the advance of collective knowledge on Arctic sea ice preservation.

ALIGNMENT WITH GLOBAL CLIMATE GOALS

Arctic Ice Project is dedicated to innovative, science-based approaches to Arctic sea ice preservation. By contributing to the development of potential solutions, we have demonstrated our alignment with the goals of the UN Decade of Action for Cryospheric Sciences (2025-2034), which emphasizes the need for urgent action to protect and restore vulnerable cryospheric systems. SAM is one such action, and while Ocean Visions and AIP agree that more research is needed, reports such as this road map reinforce SAM as a potential part of the overarching approach to addressing Arctic ice melt.

ADDRESSING KNOWLEDGE GAPS THROUGH INNOVATION

A key highlight of the road map is the emphasis on accelerated research and development of emerging technologies like surface albedo modification, a focus area for AIP. As the road map outlines, the current pace of greenhouse gas emission reductions alone may not be sufficient to prevent the further loss of Arctic sea ice. This context creates a vital space for AIP's work, particularly in developing technologies that enhance ice resilience and promote local cooling effects.

The inclusion of AIP's technology in the assessment helps address critical knowledge gaps related to the risks, impacts, and reversibility of such interventions. By exploring the potential of surface albedo modification and other innovative approaches, AIP is contributing valuable insights that can guide decisionmaking processes at the regional and global levels.

SUPPORTING COLLABORATIVE AND INCLUSIVE RESEARCH

The Ocean Visions Road Map also emphasizes the importance of careful, collaborative research, especially in areas where knowledge is limited and governance considerations are crucial.

AIP's longstanding commitment to transparency, public engagement, and multi-stakeholder collaboration aligns seamlessly with this approach. Our technology's role in the road map enables us to foster deeper partnerships with scientific, public, and policy communities — ensuring that our work is grounded in responsible research practices that prioritize justice and inclusivity.

A PLATFORM FOR FUTURE GROWTH AND COLLABORATION

The Road Map highlights the urgency of moving innovative approaches to demonstration scale within the next decade. As we continue to build on our research, this recognition opens doors for increased funding, collaboration with international experts, and deeper engagement with stakeholders who share our vision of a more resilient Arctic. In a year marked by new challenges and new opportunities, this groundbreaking assessment by Ocean Visions is important — as it highlights the importance of an all hands on deck approach. Arctic Ice Project and our partners remain committed to advancing the knowledge, technology, and collaborative spirit needed to protect Arctic sea ice and safeguard the future of our global climate system.

For the past few years, Ignik, an industry leader in sustainable outdoor gear, has been a valued corporate partner of AIP. Known for their innovative products like eco-friendly heating solutions and reusable heating packs, Ignik is committed to reducing environmental impact while enhancing outdoor experiences. Their dedication to sustainability perfectly aligns with AIP's mission to protect Arctic ecosystems and combat climate change.

Through this partnership, Ignik has provided vital support for AIP's research and development efforts, helping to advance our goal of using innovative technologies to preserve polar ice and mitigate global warming. Together, we've worked on initiatives that reflect a shared vision of environmental stewardship and climate resilience.

Ignik's contributions go beyond financial support: they have also been a vocal advocate for climate action and sustainability, amplifying AIP's message to a broader audience. We are proud to collaborate with Ignik and look forward to continuing our joint efforts in creating solutions for a healthier planet.

Featured Stories

FROM OUR AMAZING COMMUNITY

NOLAN AND DEVON RAISE FUNDS FOR THEIR FUTURE

Siblings Nolan (age 13) and Devon (age 7) from Wilmington, Delaware, took a sweet step toward addressing climate change by running a lemonade stand in honor of Lemonade Day. Inspired by a desire to protect the planet, they donated a portion of their proceeds to support Arctic Ice Project research.

Their heartfelt contribution highlights how even young children understand the urgency of addressing global warming. Every donation, no matter the size, helps strengthen AIP's efforts to protect sea ice and slow climate change impacts.

Nancy Hahn

A CHAMPION FOR FUTURE GENERATIONS

Nancy Hahn is one of those rare individuals whose commitment to others shines through in every aspect of her life. From her work with foster youth to her dedication to supporting children living in poverty, Nancy consistently puts the needs of others ahead of her own.

Her passion for making a difference extends to her deep concern for our planet's future.

Nancy's support for Arctic Ice Project was inspired by her firsthand experience with the escalating effects of the climate crisis.

Witnessing the rising temperatures in the Southwest and the growing threat of wildfires across the West, Nancy felt a profound urgency to act. Her concern became deeply personal when family members in Arizona found themselves confined indoors for days due to extreme heat. For Nancy, these events underscored the critical need to invest in science and solutions that can help mitigate climate impacts.

Since 2017, Nancy has been a steadfast supporter of Arctic Ice Project. Her generosity reflects her unwavering belief in our mission and the urgent need for innovation in climate action. Nancy's commitment inspires us to push forward, knowing that the work we do today will create a more sustainable and resilient world for generations to come.

Thank you, Nancy, for your dedication, your vision, and for making a tangible difference in the lives of so many. Your continued support helps ensure a brighter future for our planet and its people.

We'd love for you to get involved

ARCTIC ICE PROJECT'S VOLUNTEER EVENTS AND FUNDRAISING GROUP

Climate change can be a distressing topic, often leaving us feeling helpless and uncertain about how to make a difference. That's how I felt until I learned about Arctic Ice Project. In 2017, I attended a presentation on Arctic sea ice loss and was introduced to AIP's inspiring approach to climate intervention in the Arctic. It was a turning point for me. I soon became a volunteer, marking the start of a fascinating and fulfilling journey. I've had the privilege of working alongside a diverse group of scientists, engineers, philanthropists, business leaders, non-profit experts, and fellow volunteers.

Through this experience, I realized that each one of us can make a difference, and so can you.

I'm reaching out to invite you to consider joining our Arctic Resource Development Committee (ARDC). We are a dedicated group of volunteers who meet weekly or bi-weekly via Zoom, collaborating with AIP staff to increase awareness and raise vital resources to support our mission. We're currently looking to expand our team!

If any of this resonates with you, we would love to hear from you! Please reach out to me at **csontag@arcticiceproject.org** to learn more and see if joining ARDC would be a good fit for you!

ARE YOU

- [x] **PASSIONATE ABOUT ADDRESSING CLIMATE CHANGE AND EAGER TO TAKE ACTION?**
- [ ] **INSPIRED BY ARCTIC ICE PROJECT'S MISSION AND WILLING TO CONTRIBUTE YOUR TIME, TALENT AND IDEAS TO SUPPORT IMPORTANT RESEARCH AND DEVELOPMENT GOALS?**
- [ ] **ENTHUSIASTIC ABOUT SHARING YOUR PASSION THROUGH OUTREACH, COMMUNICATION, AND FUNDRAISING?**
- [ ] **SKILLED IN AREAS LIKE MARKETING, COMMUNICATIONS, EVENT ORGANIZING, OR CONNECTED TO COMMUNITY LEADERS, PHILANTHROPISTS, FOUNDATIONS OR GRANTS?**

***OR PERHAPS YOU SIMPLY WANT TO TURN CLIMATE PARALYSIS INTO CLIMATE ACTION?**

CAROL SONTAG
BOARD SECRETARY

IF ANY OF THIS RESONATES WITH YOU, WE WOULD LOVE TO HEAR FROM YOU!
Email csontag@arcticiceproject.org to learn more and get involved!

WHY RECURRING DONORS ARE CRITICAL TO OUR MISSION

At Arctic Ice Project, our mission to restore and preserve Arctic ice is driven by cutting-edge research and innovative climate solutions. However, none of this work would be possible without the dedicated support of our donors,especially those who give on a recurring basis.

Recurring donations provide a reliable stream of funding that allows us to plan ahead and execute long-term projects. With consistent support, we can maintain momentum in our research, make strides in public outreach, and advance our technology. Recurring donors ensure that we can focus on what matters most: developing effective strategies to slow the melting of Arctic ice and combat climate change.

While a single monthly contribution may feel small in the grand scheme of tackling climate change, the collective power of all our recurring donors is truly transformative. Together, you make an enormous impact; fueling progress, sustaining innovation, and helping us protect one of the world's most critical ecosystems.

Thank you for being part of the solution. Your ongoing support brings us closer to a sustainable future!

Financials & Fundraising

UPDATE AND LANDSCAPE

Heartfelt Thank You to our Donors

YOUR SUPPORT IS BRIDGING THE GAP

We want to express our deepest gratitude for your unwavering support in the fight against climate change. Your generosity has been instrumental in advancing scientific research and innovation – in particular our vision to use hollow glass microspheres to help protect and restore Arctic sea ice. Because of you, organizations like ours are pushing boundaries, exploring new frontiers, and making significant strides toward a sustainable future.

This is a critical time for initiatives to reduce the climate catastrophe. Federal funding is starting to flow to research efforts like Arctic Ice Project, but as you might imagine, this is happening slowly. Until more government research funding becomes available, we will continue to rely on private donations and foundations to maintain momentum in our race to save the planet.

Thanks to you, we have been able to move swiftly, dedicating resources to pioneering solutions in solar geoengineering, which hold the potential to mitigate some of the most immediate and severe impacts of climate change. And it's not just the amount of funding - you'll read in this report how we are collaborating with universities and other research groups to get more work done for less money.

But our work is far from finished. The support you have given us allows us to be flexible, agile, and innovative — traits that are essential in a rapidly changing world. With your continued partnership, we can sustain our momentum, bridge the remaining funding gap, and accelerate our efforts to ensure that groundbreaking solutions are ready when they are needed most.

We deeply appreciate your ongoing commitment to our vital mission. Your contributions have already made a profound difference, and together, we can continue to lead the charge in combating climate change. We invite you to stay with us on this journey, as every step forward brings us closer to a thriving planet for all.

Thank you for standing with us. Your support is truly changing the world.

STEVE PAYNE
BOARD OF DIRECTORS

P.S.

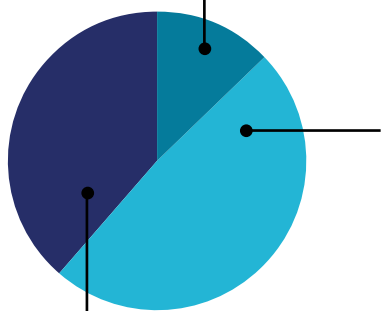
If you ever want to discuss new funding ideas, my email is spayne@arcticiceproject.org.

Financial Report

2023 BY THE NUMBERS

INCOME

$1,217,716



$156,800
FOUNDATION/TRUST GRANTS

$592,332
INDIVIDUAL/SMALL BUSINESS CONTRIBUTIONS

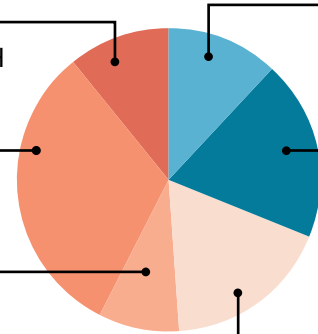
$468,583*
DONATIONS IN KIND
*$309,000 directly funded climate modeling.

In fiscal year 2023, AIP's operating budget was $1 million, with support coming from grants, individual contributions, and corporate donations.

Research and education accounted for 68% percent of AIP's total expenses, while management, administration, and development expenses made up the remaining 32% percent.

EXPENSES

$999,956



$106,370
LABORATORY RESEARCH

$318,485
CLIMATE MODELING

$85,405
EDUCATION

$176,929
PROGRAM

$156,800
FUNDRAISING

$196,000
MANAGEMENT & ADMIN

ARCTIC ICE PROJECT (AIP) IS A NONPROFIT RESEARCH ORGANIZATION DEDICATED TO DEVELOPING SAFE, INNOVATIVE CLIMATE INTERVENTION STRATEGIES TO PRESERVE ARCTIC SEA ICE AND SLOW THE PROGRESSION OF CLIMATE TIPPING POINTS.

VISIT US

arcticiceproject.org

CONTACT US

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CONNECT WITH US

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*@arcticiceproj ON X (TWITTER)

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Arctic Ice Project is tax-exempt under Section 501(c)(3) of the U.S. Internal Revenue Code
Tax ID 26-4434262