ANNUAL REPORT 2020-21

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Dear Friends,

I cannot thank you enough for your support.

As a Silicon Valley non-profit research organization that aims to re-freeze the North Pole, the Arctic Ice Project is a true moonshot venture. We've dedicated our efforts to this cause not in spite of, but because of, the magnitude of this herculean task. Climate change is the most important issue of our time and science-based solutions will make a critical difference.

In many ways, our organization has completed its most successful year yet. To an unprecedented degree our supporters, the scientific community, thought leaders, and the media are taking notice. We are spearheading two well-defined (and funded) external research projects that will allow us to move ahead. We've established a partnership with SINTEF, a world-class research organization in Norway that provides a pathway to future outdoor field testing in Svalbard. We've completed our first financial audit and broadened funding sources to include NASA Earth Exchange, Genpact and the Open Road Alliance.

This does not mean that we haven't experienced setbacks - far from it. I'd be remiss if I did not acknowledge that the IPCC's Sixth Assessment Report expressed doubts about whether surface albedo modification could result in substantial global cooling, and that this was in part due to insufficient peer-reviewed research supporting our approach. I cannot overstate the significance of our SINTEF partnership as an organizational milestone in addressing these concerns. Our strategy has always been to bring together the talent and prestige of leading academic institutions to transparently conduct and share research rather than go it alone. It allows us to pivot to a project management model where we coordinate and direct research rather than conduct it in-house. While we're proud that we've been able to bootstrap operations to get to this point, we also recognize that well-recognized global scientific research organizations are better equipped to validate the safety and efficacy of our solution.

The Arctic Ice Project is largely a volunteer organization. Our budget funds only a fraction of our work. I'd like to thank the amazing cast of staff and volunteers and supporters with specialized skill sets including world-class researchers, former NASA executives, and experts with PhDs in materials science, biology, physics, engineering, and climate modeling. (I don't mean to brag, but we have real rocket scientists.) We absolutely would not have come this far this quickly without their visionary and steadfast support.

Frankly, this year has been a discouraging one from a climate perspective. Government funding for climate technologies has not yet emerged and less than two percent of all philanthropic dollars are being spent to address the fight against climate change. Ever optimists, we see a silver lining – citizens and governments alike are increasingly recognizing this reality, and are gearing up to take action. We're also encouraged whenever we get to talk to people like you who share our concerns. We only move ahead with the support of our broader community. If you have questions or suggestions, please reach out anytime.

Tom Light

Executive Director

Dear Arctic Ice Project Donors and Friends,

It is with great appreciation that I write to thank you for your generous ongoing support of our critically important work to slow climate change devastation by preserving reflective polar ice.

In the light of the recently concluded COP26 in Glasgow and this year's climate report from the UN's IPCC, which sound a "Code Red for Humanity," it is clearer than ever that work like ours, funded by philanthropic donations like yours, is necessary to preserve a habitable planet for ourselves and our children. The world's governments failed to reach agreement on the measures needed to keep the planet below 1.5° C of warming, the threshold scientists agree would allow us to avoid the worst of climate risks. With large-scale governmental action on the backburner, low-risk, localized climate interventions are more important than ever if humanity hopes to reduce feedback loops that could catastrophically accelerate warming. Our ice-preserving intervention is meant to give the world more time to complete the transition to a carbon-free energy system and a sustainable economy.

This year our work at AIP was firmly on the map of solutions in consideration, evidenced by the standing-room-only panel discussion we hosted at the Arctic Circle Assembly in Reykjavik and the discussions we had there with Chairman Grimsson; our invitation to speak at Sir David King's Centre for Climate Repair at Cambridge University in the UK; the inclusion of our exhibit on ice restoration at COP26 in Glasgow, and the invitations from around the world to consider, in collaboration with local and indigenous leaders and scientists, a variety of urgent ice-related challenges.

This was also the first year our localized, surface approach was considered in the UN's IPCC assessment. Our approach is deliberately meant to be localized and at the ice surface, to detect and minimize risks, rather than a "big-hammer" global approach to cool the planet. Our non-profit's localized, light-touch approach is meant to find and use leverage points to reduce catastrophic feedback effects such as an ice-free Arctic in summer months, and to reduce the potential "loaded gun" of increased methane release from melting permafrost in the Arctic.

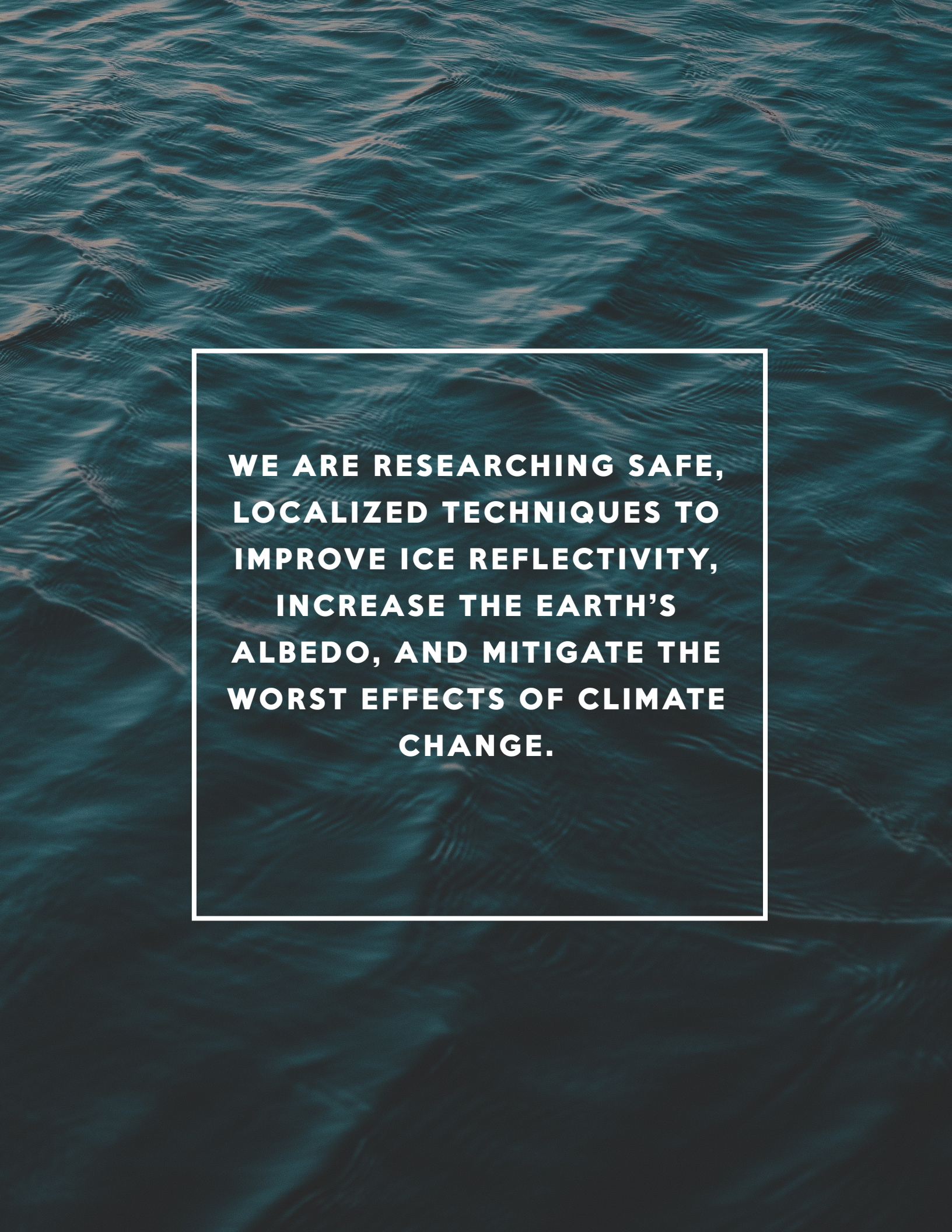
Our technical work this year, thanks to AIP's dedicated staff, collaborators, and expert volunteers (students through retirees), and despite the vast challenges of the pandemic, produced a data-rich demonstration of ice preservation on a small test pond in Minnesota; detailed climate modeling of the potential of using our approach on sea ice at a scale that could reduce climate risks (modeled by Climformatics, with donated supercomputer time from NASA Earth Exchange); and a soon-to-start collaboration with Norway's SINTEF Ocean, a group of expert marine biologists who will help assess fate and safety of our approach in a marine environment. We will share our testing and modeling results with the world through presentations at international conferences and papers in peer-reviewed scientific journals.

Your support helps our non-profit continue our work to save polar ice. Knowing you're with us on this challenging and exciting journey means the world to us.

With our heart-felt thanks and best regards,

Dr. Leslie Field,

Founder and CTO
Adjunct Lecturer, Stanford University


WE ARE RESEARCHING SAFE, LOCALIZED TECHNIQUES TO IMPROVE ICE REFLECTIVITY, INCREASE THE EARTH'S ALBEDO, AND MITIGATE THE WORST EFFECTS OF CLIMATE CHANGE.

2020 Highlights

1.

SCIENTIFIC COLLABORATIONS

New scientific collaborations will allow us to expedite our ecotoxicology and climate modeling testing, ensuring our solution is safe while gaining repute and working with top organizations in our field.

2.

EXPANDING OUR NETWORK

We've achieved a great leap forward with the execution of our first-ever formal contract with SINTEF, a prestigious scientific organization. Our future depends upon partnering with other world-class research organizations to test, evaluate and evangelize our proposed solution.

3.

PROMISING RESULTS

This year was our most promising year of testing yet. At our test pond in Minnesota, AIP treatment allowed ice to remain days longer than on the untreated half of the pond, long after the spring thaw.

The Crisis in the Arctic

A CRUCIAL LEVER FOR CLIMATE CHANGE...

The Arctic is ground zero for the climate crisis and our planetary emergency. Due to a phenomenon known as Arctic Amplification, the Arctic is warming at more than twice the global rate. Over the past four decades, the Arctic has lost over 95% of its oldest, most reflective ice. Arctic sea ice has been declining 10% per decade, and scientific consensus is that the summer Arctic Ocean will be sea ice free by 2050 with some experts predicting that it could occur as early as 2030.

WE'RE IN DANGER OF LOSING OUR PLANETARY HEAT SHIELD.

The global climate system has a series of "tipping points" that, if exceeded, will lead to irreversible change. The Arctic ice plays a critical role in maintaining a stable climate. It's done this for millions of years by serving as a mirror reflecting incoming solar rays safely back to space; keeping the planet at an even temperature.

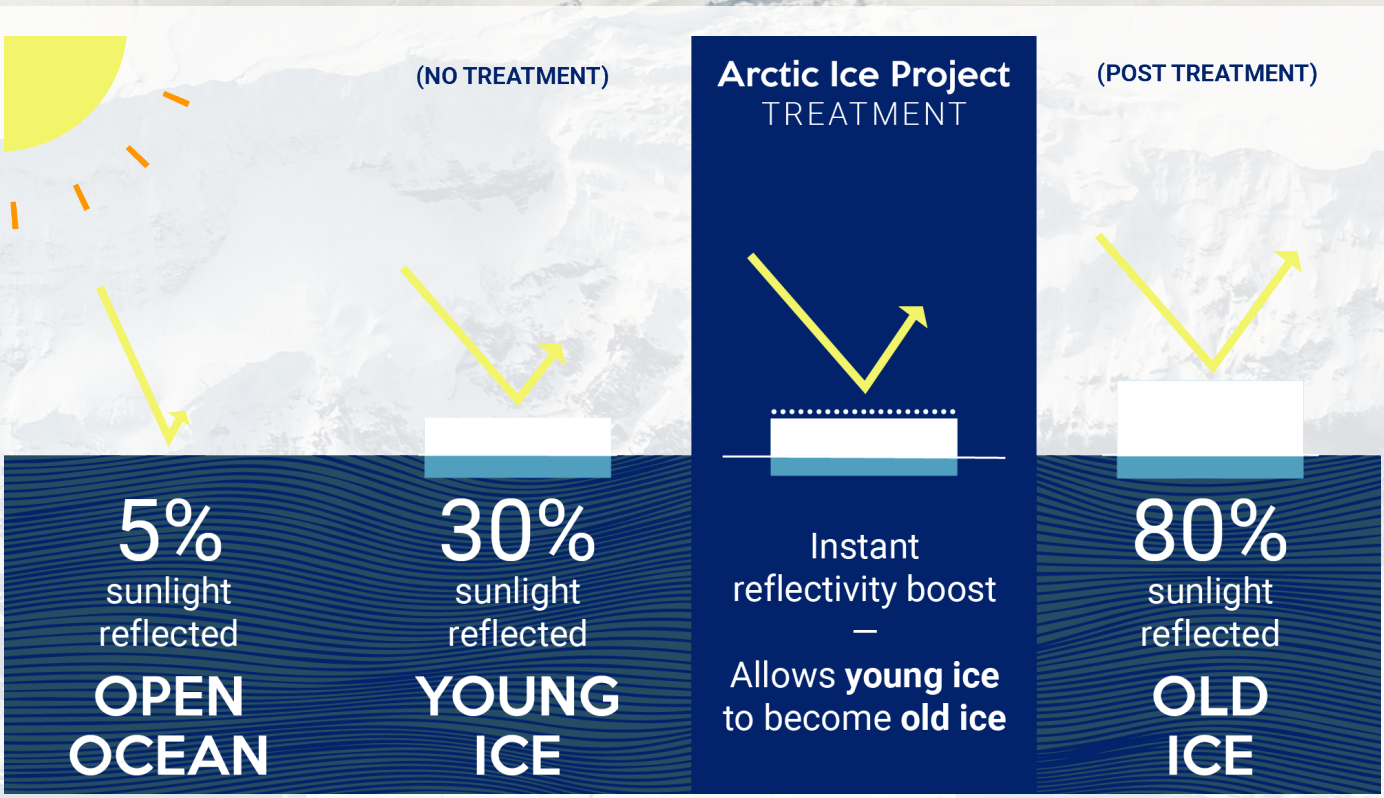
The current loss of sea ice in the Arctic, and its subsequent loss of reflectivity, is adding 25-50% to the global temperature rise.

A Solution

When sea ice in the Arctic melts, dark ocean is exposed. The ocean water absorbs far more of the sun's energy (95%) than ice (20-70%). As more Arctic sea ice melts, the cycle of heating increases in speed. More ocean water is able to absorb the sun's heat, fueling more ice melt, and the cycle goes on. Our mission is to stop this cascade and allow ice to remain throughout the summers, cooling the Arctic and stabilizing the global climate.

SURFACE ALBEDO MODIFICATION

Surface Albedo Modification (SAM) is a promising novel approach that proposes to deploy a thin layer of very small hollow glass microspheres across targeted regions of the Arctic to improve the reflectivity of sea ice, mimicking natural processes to reflect solar energy out of our atmosphere. During nearly a decade of testing, we have ensured this material is safe and effective, and with our new partners at SINTEF, we will be able to make great strides with our methodology and technology.



Meet the Arctic Ice Project

WHO WE ARE

The Arctic Ice Project is a non-profit organization that aims to slow climate change by restoring ice in the Arctic. We're researching safe, localized techniques to improve ice reflectivity, enhance the Earth's natural ability to reflect solar radiation out of the atmosphere, and slow the rate of global warming. Our scientific research in sea ice surface albedo modification (SAM) represents a moonshot opportunity to rescue our planetary heat shield.

WHAT WE DO

We represent the most studied ice restoration effort in the world. We estimate that the solutions we are developing represent an opportunity to provide up to fifteen more years for our global economies to decarbonize towards a more sustainable future. Through extensive field testing, scientific collaboration, and a technology focused funding model, we are able to prioritize research and innovation.

Technical Update

The most promising solution to date, currently at Technology Readiness Level 3 (of 8), is a novel materials approach that proposes to deploy a thin layer of very small hollow glass microspheres across strategically chosen small regions of the Arctic to improve the reflectivity of sea ice, mimicking natural processes to reflect solar energy out of our atmosphere.

FAST FACT

The material we are evaluating can be thought of as a kind of small, fine, white beach sand that floats. In a sense, the material is a lot like snow. The reflective beads stick to ice and water on contact, and their chemical composition ensures they don't attract oil-based pollutants.

The material we are evaluating is made from an amorphous glass primarily composed of silicon dioxide ("silica"). Silica is an inert compound made of two of the earth's most abundant materials: silicon and oxygen. The mass of Earth's crust is 59% silica, the main constituent of more than 95% of the known rocks, and is the major constituent of sand. Ocean water already contains a large amount of silica. Unlike crystalline silica, which can pose health risks, the hollow glass microspheres are made up of a completely amorphous material. The effect of weathering on the microspheres is still an active area of research, and we are investigating potential consequences of such weathering in the environment.

This past winter was our most successful season of testing to date. We gained insights from tests in self-contained pools of ice in the Serene Lakes region of California and Utqiagvik, Alaska, and in extensive internal testing outside of Lake Elmo, Minnesota, we found a 27% decrease in ice melt when protected by our technology. This finding came despite the difficulties we faced due to COVID. In Minnesota, the test ice lasted days longer than the control side, even after the surrounding ground had thawed out.

Moving forward, we aim to augment our current work by partnering with top organizations in our field, namely SINTEF Ocean and NASA Earth Exchange in future testing and climate modeling work.

Arctic ice restoration depends not only on technological breakthroughs but will depend on successful collaborations and co-development with Indigenous communities in the Arctic, nations and multinational organizations to implement ice restoration solutions. In parallel with our evaluation and development of engineering solutions to Arctic ice melt, we are developing a global network of climate restoration leaders to collaboratively chart the pathway for adopting climate restoration technologies.

Collaborations

SINTEF

We have drawn up a multi-year, multi-million dollar collaboration with SINTEF, one of the largest independent research organizations in Europe. SINTEF has over 2000 researchers centered in Trondheim, Norway. Our full joint work plan covers materials testing, safety, performance testing and methods for deployment. The initial phase, starting this fall, begins with lab testing on how our material performs in SINTEF's simulated Arctic Ocean environment. These detailed studies then become the basis for further experimentation in the field. SINTEF scientists have already identified field test locations in Svalbard, north of the Arctic Circle, that could provide invaluable real-world feedback. We still need to secure permits and additional funding to complete the full set of projects.

NASA EARTH EXCHANGE

Last year we conducted climate modeling on the Fram Strait. This year, with funding from the Open Road Foundation, we have been working with Climformatics to conduct more extensive modeling of the impacts of our solution deployed in two areas of the Beaufort Gyre, the "birthplace of Arctic Ice." AIP has received extensive support from the NASA Earth Exchange in the form of over $300,000 in supercomputer time. We plan to publish a paper on our findings next year.

HARVEY MUDD COLLEGE

The Arctic Ice Project Clinic Team at Harvey Mudd College developed a simulation of the dispersion of hollow glass microspheres (HGMs) from shipboard over Arctic sea ice. Taking into account force from a blower fan, wind, drag, and gravity, the simulation found that airborne distribution of microspheres could disperse to a distance of a few kilometers from the ship. By focusing on areas of the Arctic where spring melt leads to significant movement of sea ice, the impact of airborne distribution could be multiplied. The dispersion area could increase based on ship speed and ice speed. Other potential distribution methods will be evaluated. Many thanks to Harvey Mudd College for their generous collaboration.

Svalbard, Norway
Christopher Michel

No one organization can solve climate change. To solve the puzzle of ice preservation, we leverage our internal technical capabilities through collaborating with the world's most prestigious laboratories and universities. The majority of our budget will be directed externally towards funding and coordinating these world-class research partnerships to test and evaluate the most promising ice preservation solutions.

Scientific Organizations

The Arctic Ice Project coordinates and partners with key scientific organizations to collaborate on our climate restoration work

Indigenous Communities

Key to our success and imperative to the future of the Arctic, Indigenous groups function as essential partners and consultants

Funders

We raise capital from private donations to finance our work.

Policy Makers

A predeterminate for deployment is establishment of government policy from multilateral institutions (UN, Arctic Council)

BOARD OF DIRECTORS

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VICE CHAIR
Dr. Steve Zornetzer

SECRETARY
Carol Sontag

TREASURER
Carl Hekkert

MEMBER
Jennifer Dulski

MEMBER
Dr. Gary Wolff

MEMBER
Dr. Leslie Field

OUR TEAM

EXECUTIVE DIRECTOR
Tom Light

CHIEF TECHNICAL OFFICER & FOUNDER
Dr. Leslie Field

TECHNICAL DIRECTOR
Dr. Danielle Chamberlin

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Heather Becker

FUNDRAISING AND OUTREACH
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Polar Physical Oceanographer

Dr. Mimmi Throne-Holst
SINTEF

Dr. Steve Zornetzer
NASA AMES

OUR RESEARCH REPRESENTS A MOONSHOT OPPORTUNITY TO RESCUE OUR PLANETARY HEAT SHIELD, PROVIDING UP TO 15 MORE YEARS FOR THE WORLD'S ECONOMIES TO DECARBONIZE.

OUR WORK IS BUOYED AND STRENGTHENED BY OUR WONDERFUL NETWORK OF VOLUNTEERS, ADVISORS, AND PARTNERS.

ARCTIC RESOURCE DEVELOPMENT COMMITTEE

CHAIR

Carol Sontag

Deb Smith

Meredith McClintock

Bo Magnussen

Heidi Magnussen

Kholoud Zaman

HARVEY MUDD COLLEGE CLINIC STUDENT TEAM

Modeling for deployment methods

Olivia Hockley-Rodes

Yoo-Jin Hwang

Benjamin Jin

Naina Kamal

Wing-Yee Law

Dom Aiu Taber

Materials fate and physical characterization studies

Diana Contreras

Gracie Farnam

Gracey Heibert

Olivia Hockley-Rodes

Zooey Meznarich

VOLUNTEERS

Instrumentation, Data Analysis, Testing

Dr. Tony Manzara

Dr. Doug Johnson

Dr. Laura Nereng

Data analysis, Programming, & Liason

Tim Player

Data Analysis

Haider Sohail

OUR PARTNERS

NEX NASA Earth Exchange

genpact

ARCTIC CIRCLE

SINTEF

LAUREL FOUNDATION

OPEN ROAD KEEPING IMPACT ON TRACK

ADDA infusion

UIC COMMERCIAL SERVICES

Financial Progress

FUNDRAISING

2020 was undoubtedly an unusual year, marked by global disruptions and general uncertainty. From a fundraising standpoint, we faced difficulties as many supporters and donors shifted their giving towards the pandemic and its impacts, and total donations were lower than 2019. In 2019 we raised $1,041,331 while in 2020 we raised $965,057*. Despite the drop in contributions, it was an impressive performance during a challenging year as we saw a material uptick in donors, increasing 20% from 357 in 2019 to 441 in 2020.

A large part of this increase is due to the swift pivot we undertook as an organization once it became clear that we would need to adapt to Covid. This pivot included the large-scale introduction of online events like webinars, email and web campaigns including additional social media fundraisers. One area that benefited from these extra efforts was Giving Tuesday, where we raised $53,750, a 128% increase from the prior year.

We managed expenses down to reflect this more limited budget, but completed our Fram Strait climate modeling and conducted new tests in Alaska, Minnesota and the Lake Tahoe area. This work laid the groundwork for our partnership with SINTEF Ocean, with whom we will begin testing in late 2021 in Trondheim, Norway.

Government support for climate restoration research is not yet forthcoming, so we still need to raise funds from private donors and foundations. To bridge to government funding, we are beginning to build a network of supporters on the East coast while bolstering our existing support from legacy donors on the West coast. We have also established a new development committee with new volunteer members supplementing our core fundraising team. And social media has proven to be a cost-effective way to build a new base of followers and attract smaller donations. As we write this update, overall 2021 donations are running well ahead of the 2020 level and we have been able to kick off new research collaborations.

ORGANIZATIONAL CAPACITY BUILDING

We're pleased to report that we invested across all functional areas to ready ourselves for larger funding sources. Only 2% of global giving goes to curb climate change - we expect that number to triple over the next few years. The world is finally starting to tell the truth about the climate crisis. While it's arriving late, the sector is poised to receive a new wave of hundreds of millions of dollars of funding, and we have AIP volunteers lobbying the federal government to dramatically increase climate research spending.

INDEPENDENT AUDIT

We completed our first financial audit with BMP Accounting in September! It is a large investment of time and funding - but entirely necessary to scale. Going forward, AIP will break down organizational costs between six new programmatic tech areas, general and administrative costs, and fundraising costs. These changes in addition to the

*Restated for comparison to reflect change in accounting policy

audit's completion will make AIP eligible for federal and institutional funding.

ORGANIZATIONAL REBRAND

We revamped how we looked to the outside world with a marketing refresh that included a new name and logo.

SOCIAL MEDIA

We've invested in social media with a part-time social media manager. This has led to an increase in the number of online donations as well as institutional and journalistic opportunities such as our nomination for the Earth Shot prize, and coverage by other national and international news organizations.

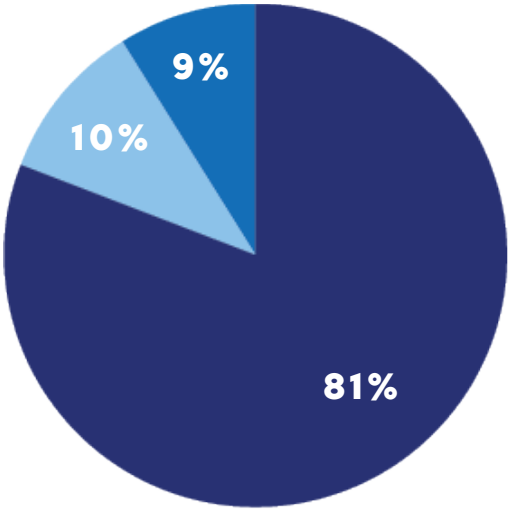
ARCTIC RESOURCE DEVELOPMENT COMMITTEE (ARDC)

A standing committee formed in 2021 with the goal to raise funds to insure the financial viability and stability of the Arctic Ice Project. The ARDC is led by AIP's Board Secretary Carol Sontag in collaboration with ARDC Members and the Executive Director.

SCIENTIFIC ADVISORY BOARD (SAB)

Established in 2020, our Scientific Advisory Board is an international group of experts that meets monthly to provide expert review of AIP's progress and priorities. The group is chaired by Dr. Gary Wolff, an environmental engineer with extensive experience in water regulatory issues.

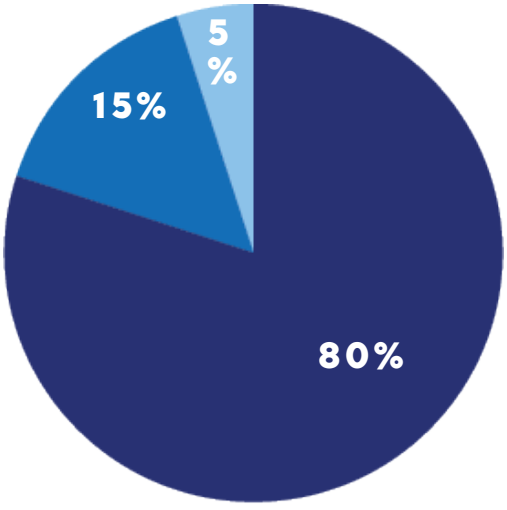
TOTAL EXPENSES
$921,366



PROGRAM EXPENSES
$746,545

MANAGEMENT & GENERAL
$93,839

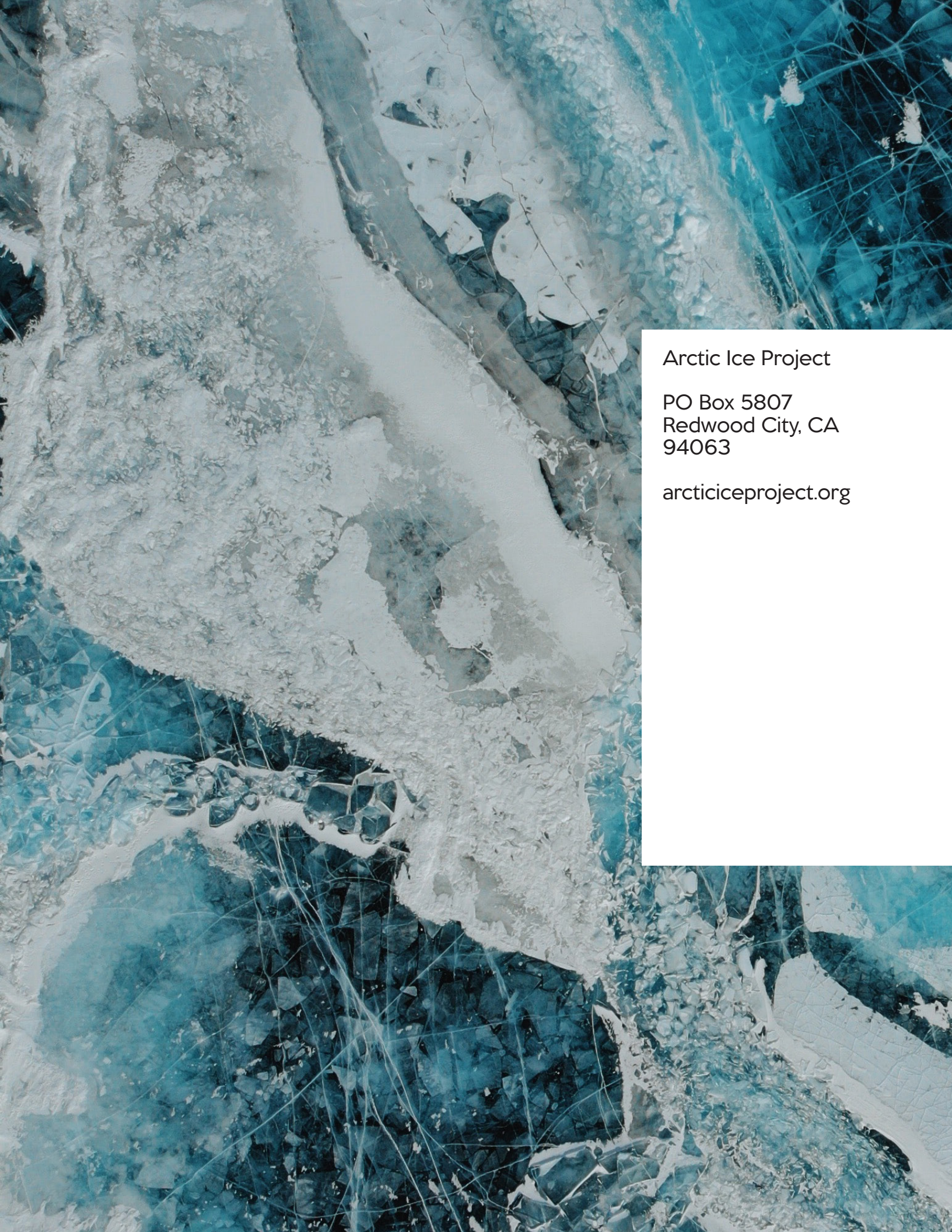
FUNDRAISING
$80,952



MAJOR DONORS

ONLINE/WEB

GRASSROOTS



Arctic Ice Project

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