Dear ARCUS Members, Friends, and Colleagues,

At the end of another year of disruption and uncertainty, we want to take the time to appreciate all that we have to celebrate and be proud of.

We embraced all-virtual gathering spaces this year and held events on Virtual Speed Networking, Arctic Research Collaboration, Engaging Rural and Alaska Native Undergraduates and Youth in Arctic STEM, Community and Citizen Science in the Far North, and others. As you'll see in this report, we continued to deliver projects and products across the spectrum of our communication, research coordination, and education efforts. We assisted organizations like the Inuit Circumpolar Council Alaska and Kawaiak, Inc. to help make their virtual meetings the best they could be. We leaned into designing activities that were accessible to those across disciplines and perspectives, and experimented with ways to embody a spirit of “come as you are” in all that we do.

As we end this year, we know that many of us are reflecting on how we can take the lessons of the year and continue to build and nurture this wonderful community that is working together to advance Arctic research and education. On behalf of the ARCUS staff, Board, Members, and Partners, please know that we are grateful for your ongoing perseverance, your creativity, and your many contributions to advancing collaborative Arctic research and education efforts during a challenging time.

We look forward to continuing our work with you in the new year and know that all we’ve been doing together to adapt and grow in 2021 will continue to strengthen future Arctic research community endeavors for many years to come.

Sincerely,

David Cairns
Board President, ARCUS

Helen Wiggins,
Executive Director, ARCUS

Cover photo credit: Jennifer Baldacci (PolarTREC 2017), Courtesy of ARCUS

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Pg 18: Financial Report
STRATEGIC GOALS & OBJECTIVES (2020–2025)

Goal 1: Facilitate and Support Arctic Research Collaboration

- **Objective 1.1:** Provide Resources and Promote Innovative Practices for Collaborative and Interdisciplinary Research
- **Objective 1.2:** Connect and Support the Arctic Research Community Around Shared Topics of Interest
- **Objective 1.3:** Partner with Other Arctic Organizations to Catalyze and Broaden Networking Opportunities
- **Objective 1.4:** Promote Exchange, Collaboration, and Co-Production Between the ARCUS Community with US-Based Arctic Indigenous Community Members

Goal 2: Enhance the Effectiveness of Arctic Research Communication

- **Objective 2.1:** Increase Information Exchange and Knowledge Sharing Within the ARCUS Community
- **Objective 2.2:** Amplify and Share Arctic-Related Research, Knowledge, and Issues with Diverse Audiences
- **Objective 2.3:** Work with ARCUS Members to Prioritize and Address the Critical Needs of the ARCUS Community
- **Objective 2.4:** Build Awareness of and Cultivate Group Identity Between ARCUS, our Members, and our Partners

Goal 3: Educate K-16 Students and Formal and Informal Educators about the Arctic, and Engage them in Arctic Research

- **Objective 3.1:** Develop Professional Training Opportunities for Arctic Educators
- **Objective 3.2:** Champion Culturally Responsive Arctic Education and Outreach
- **Objective 3.3:** Foster Arctic Citizen Science and Community-Based Research
- **Objective 3.4:** Encourage Arctic Youth Involvement in Arctic Research Activities and Learning

Goal 4: Secure Resources to Support the ARCUS Mission

- **Objective 4.1:** Expand and Sustain a Diverse and Inclusive ARCUS Membership
- **Objective 4.2:** Strengthen ARCUS’ Organizational Capacity
- **Objective 4.3:** Diversify ARCUS’ Funding Sources
- **Objective 4.4:** Grow Reserves to Adapt and Respond to New Opportunities
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Learn More: https://www.arcus.org/arcus/board-of-directors
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www.oceanleadership.org

Represented By: Melody Brown Burkins,
melody.b.burkins@dartmouth.edu
Represented By: Ross Virginia,
ross.virginia@dartmouth.edu
www.dickey.dartmouth.edu/arctic-environment

Learn more & become part of the ARCUS community at: https://www.arcus.org/arcus/member-information
ARCUS PARTNER ORGANIZATIONS

National Science Foundation Office of Polar Programs
Many ARCUS activities are supported by the National Science Foundation’s Office of Polar Programs under Cooperative Agreement No. PLR-1304316 and Cooperative Agreement No. PLR-1928794.

Association of Polar Early Career Educators (APECS)
ARCUS and APECS have a Memorandum of Understanding that acknowledges the joint commitment of both organizations to the professional development of early career polar researchers. Additionally, APECS serves as a partner in the newly funded Early Career Travel Awards.

Eskimo Walrus Commission
The Eskimo Walrus Commission partners with ARCUS to produce the Sea Ice for Walrus Outlook (SIWO). SIWO is a resource for Alaska Native subsistence hunters, coastal communities, and others interested in sea ice and walrus.

National Weather Service - Alaska Region
The National Weather Service - Alaska Region partners with ARCUS to produce the Sea Ice for Walrus Outlook (SIWO).

Alaska Native Science & Engineering Program (ANSEP)
ARCUS partners with ANSEP by serving as a host to ANSEP Summer Bridge students (high school graduates) or Fellows (University of Alaska Fairbanks undergraduate students).

Alaska Natural Resource & Outdoor Education Association (ANROE)
ARCUS and ANROE have a Memorandum of Agreement that establishes a partnership to collaborate on the development and delivery of natural resource education content and resources.

Interagency Arctic Research Policy Committee (IARPC)
ARCUS administers NSF funding to the Interagency Arctic Research Policy Committee’s secretariat. Additionally, ARCUS works with the IARPC secretariat to support community-driven research initiatives emerging from IARPC Collaboration Teams.

Inuit Circumpolar Council - Alaska (ICC-Alaska)
ICC-Alaska is a co-lead with ARCUS on the Arctic Indigenous Scholars Program, which creates opportunities for Indigenous scholars to educate and inform policy- and decision-makers in Washington, DC. Additionally, ARCUS has detailed a staff member to ICC-Alaska to forge stronger partnerships and add capacity at the hosting organization.

Smithsonian Arctic Studies Center
The Smithsonian Arctic Studies Center provides D.C. host support for the ARCUS Indigenous Scholars Program and hosts full-day visits from the scholars.

Polar Educators International (PEI)
ARCUS provides in-kind secretariat support for PEI, which is an international professional network for everyone who educates in, for, and about the polar regions.

Anchorage Museum
The Anchorage Museum and others have partnered with ARCUS to host the Anchorage Arctic Research Summit.

Learn More: https://www.arcus.org/arcus/partners
**COMMUNITY & CITIZEN SCIENCE CONFERENCE STEERING COMMITTEE**

<table>
<thead>
<tr>
<th>Annette Bombsch</th>
<th>Kaare Sikuq Erickson</th>
<th>Roberta Tuurraq Glenn</th>
<th>Lisa Sheffield Guy</th>
<th>Janet Warburton</th>
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**ARCUS MEMBERSHIP COMMITTEE**

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<thead>
<tr>
<th>Adrian Gall</th>
<th>James Hemsath</th>
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<th>Helen Wiggins</th>
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**PO Lat Rec Advisory Committee**

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<th>Regina Brinker</th>
<th>Janet Warburton</th>
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<th>Marilyn Sigman</th>
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<td>Sarah Crowley</td>
<td>Judy Fahnstock</td>
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<td>Diewurtje Kast</td>
<td>Dominique Richardson</td>
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**Early Career Awards Committee**

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<tr>
<th>Lavanya Ashokkumar</th>
<th>Claire Griffin</th>
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<td>Josephine-Mary Sam</td>
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**2021 Arcus Individual Members**

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<tr>
<th>Anne Kari Meisingset</th>
<th>Hajo Eicken</th>
<th>Rolf Radven</th>
<th>Matt Heavner</th>
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<tr>
<td>Rebecca Atwood</td>
<td>Murielle Nagy</td>
<td>Jeffrey Mar</td>
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<td>Victoria Herrmann</td>
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<td>Craig Fleener</td>
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<td>Eric Willman</td>
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<td>Julie Raymond-Yakobian</td>
<td>Randy Kee</td>
<td>Ann McElvein</td>
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<td>Stanislav Ksenofontov</td>
<td>Michelle Mack</td>
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<td>Kaja Holloway Cripps</td>
<td>Dave Grant</td>
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<td>Muhammad Asaduzzaman</td>
<td>Larry Hurst</td>
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<td>Michael Weintraub</td>
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<td>Bernadette Engelstad</td>
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<td>Karen Grosskreutz</td>
<td>Sarah Johnson</td>
<td>Jessica Dutton</td>
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<td>Nathalie Ylenia Triches</td>
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<td>Cana Uluak Itchuaqyid</td>
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<td>Kaare Sikuq Erickson</td>
<td>Gaurav Madan</td>
<td>Igor Appel</td>
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<td>Temenuzhka Spasova</td>
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<td>Ayumi Fujisaki-Manome</td>
<td>Craig Dorman</td>
<td>Thomas Farrugia</td>
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<td>Michael Mackiewicz</td>
<td>Acacia Johnson</td>
<td>Marta Kumle</td>
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<td>Anne Kari Meisingset</td>
<td>Jessica Miller</td>
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<td>Beatrice Brownstein</td>
<td>Steven Lee</td>
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<td>Hannah Holland-Moritz</td>
<td>Tanguy Sandre</td>
<td>Asma Shethwala</td>
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<td>Seth Campbell</td>
<td>Olivia Lee</td>
<td>Lavi Appel</td>
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<td>Robert Hollister</td>
<td>Kate Rock</td>
<td>Christopher Ivins</td>
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<td>Diane Hirshberg</td>
<td>Pips Veazey</td>
<td>Kimberly Rand</td>
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<td>Patricia Johnston</td>
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<td>Gabriella Gricius</td>
<td>Jason Zottola</td>
<td>Darcy Dugan</td>
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<td>Marian Leberburger</td>
<td>Grant Gunn</td>
<td>Stacy Porter</td>
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**Interdisciplinary Research Committee**

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<thead>
<tr>
<th>Liz Weinberg</th>
<th>Benita LeNoble</th>
<th>Savannah Peery</th>
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<td>Helen Wiggins</td>
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<td>Joshua Butterick</td>
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<td>Holly Hapke</td>
<td>Kuba Grzedzka</td>
<td>Peng Lian</td>
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<td>Mia Bennett</td>
<td>Loring Pensa</td>
<td>Jessie Meyer</td>
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<td>Martin Jeffries</td>
<td>Paul O'Sullivan</td>
<td>Saskia Hirsch</td>
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<td>Brit Myers</td>
<td>Robert Krasnow</td>
<td>Manwei Chan</td>
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**Annual Meeting Committee**

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<tr>
<th>Claire Griffin</th>
<th>Julie Loisel</th>
<th>Caitlyn Wylie</th>
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<td>Karl Huemrnic</td>
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<td>Brit Myers</td>
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<td>Joyanne Hamilton</td>
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<td>Kuba Grzedzka</td>
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<td>Kyle Lambert</td>
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ARCUS is deeply grateful to the many individuals who supported our efforts in 2021 through countless volunteer hours, membership dues contributions, & active participation in ARCUS programs and events!
A three-year NSF-funded Cooperative Agreement (2019–2022; Award # OPP-1928794) supports the work we do to nurture collaborations across disciplines, sectors, and perspectives; and to broaden participation across the Arctic research enterprise.

ARCUS Cooperative Agreement activities focus on:
- Research community support, including fostering community-driven research initiatives through virtual tools, and support of early-career researchers;
- Networking activities, including network analysis and community-building events for the Arctic research community;
- Collaboration with Indigenous communities and knowledge systems, including integration of Indigenous knowledge with weather and ice predictions, and support for Indigenous scholars of all career levels;
- Arctic research communications and outreach; and
- Support of the Interagency Arctic Research Policy Committee (IARPC).

The added value of these research support functions—effective collaboration management, networking, communications, and outreach—is key to successful interdisciplinary research.

WHAT KINDS OF ACTIVITIES DOES THE COOPERATIVE AGREEMENT SUPPORT?
COMMUNITY & CITIZEN SCIENCE IN THE FAR NORTH

The Community & Citizen Science in the Far North virtual conference (#CCSFarNorth) was held 5-7 October to provide an opportunity for researchers, community members, and other practitioners of community and citizen science in the circumpolar Arctic to meet and share knowledge. A conference white paper, archived conference presentations, and a growing community of practice will continue developing a shared knowledge base and advance our community's long-term strategic objective to foster Arctic citizen science and community-based research.

More information: https://www.arcus.org/meetings/2021/arctic-ccs

EARLY CAREER CONFERENCE FUNDING AWARDS

This ARCUS Early Career Conference Funding Award supports the participation of US-based, early career researchers in meetings and events relevant to Arctic research, with a focus on underrepresented minorities (Black, Indigenous, and People of Color; BIPOC).

Congratulations To:

Jillian Sanders (Texas A&M)
Leslie Baker (Portland State)
Hannah Zimmerman (Standford)
Mark England (UC Santa Cruz)
Mia Bennett (U Washington)
Shouwei Li (UC Riverside)

"Without the award I would not be able to present and network at perhaps the most important conference of my career."

More information: https://www.arcus.org/early-career-funding
COMMUNITY CONNECTIONS

COOPERATIVE AGREEMENT ACTIVITIES (Year 2 of Award: September 2020–August 2021)

**Mailing Lists**
- ArcticInfo: 5,238 subscribers, 294 postings, emails opened 347,831 times
- Polar Education List: 1,646 subscribers

**ARCUS Community Meetings & Events**
- Arctic Research Speed Networking - 95 participants
- Arctic Research Webinars - 7 seminars with 471 participants from 11 countries and 27 US states
- Webinar Archive - seminars recording during the reporting period were viewed 2,274 times
- ARCUS Annual Meeting - 128 attendees & 21 ARCUS Institutional Members represented
- Funders Meet & Greet - 103 attendees with 7 featured funding organizations

**Witness the Arctic Newsletters**
- 8,808 subscribers
- 44 articles from 78 contributors
- 31,836 webpage views

**Website**
- www.arcus.org
- 270,411 page views and 153,353 unique visitors
- 51% users from US and rest from 201 different countries
- Arctic Calendar with 2,984 events and 31,217 page views
- Publications Directory - 220 publications with 1,216 page views
- Directory of Arctic Researchers with 4,209 Arctic experts

**HOW TO JOIN THE ARCUS COMMUNITY ONLINE:**

1) Subscribe to ArcticInfo for weekly news from the broader Arctic research community. This is a place to submit your event announcements, job openings, & other news: www.arcus.org/arctic-info
2) Subscribe to the Witness The Arctic newsletter to receive more in-depth articles highlighting Arctic research & education efforts: www.arcus.org/witness-the-arctic
3) Subscribe to the ARCUS Monthly Report to receive a monthly update on ARCUS & ARCUS Member Organization news as well as a digest of job openings, professional development opportunities, and funding opportunities: www.arcus.org/arcus/member-newsletter.
4) Submit your Arctic-related meetings, events, & funding deadlines to the Arctic Calendar: www.arcus.org/events/arctic-calendar
5) Subscribe to the Polar Education Mailing List for education-related news & announcements: www.polartrec.com/about/education-list
5) Join the Directory of Arctic Researchers: www.arcus.org/researchers
4) Join us on Social Media:

- @ArcticResearch
- @PolarTREC
- @ArcticResearchConsortium
- @PolarTREC
- @SealceForWalrus
- Company: ArcticResearch Group: Sea Ice Prediction Network
Sea Ice for Walrus Outlook

The Sea Ice for Walrus Outlook (SIWO) is a resource for Alaska Native subsistence hunters, coastal communities, and others interested in sea ice and walrus. The SIWO provides weekly reports each spring with information on weather and sea ice conditions relevant to walrus in the northern Bering Sea and southern Chukchi Sea regions of Alaska.

More information: www.arcus.org/siwo
Follow us on Facebook: www.facebook.com/sealiceforwalrus

LOCAL OBSERVERS:

Shishmaref: Curtis E. Nayokpuk
Wales: Robert Tokeinna, Jr.
Brevig Mission: Marcus Barr
Nome: Frank (Boogles) Johnson, II
Gambell: Clarence Irrigoo, Jr.
Savoonga: Aqef Waghysi
Diomede: Eleengayouq Ozenna

SIWO is managed by ARCUS and produced in partnership with the National Weather Service, Eskimo Walrus Commission, University of Alaska Fairbanks, and local observers. Support for SIWO is provided by the National Science Foundation’s Arctic Sciences Section (PLR-1928794).

The 2021 SIWO season ran from 26 March - 18 June. At the start of the season, open water patches & leads shifted with the winds & were not often accessible to hunters. Walrus were present April through June. Some communities still had difficulty accessing walrus during this time, however. Ice lingered in the region longer than in recent years.

Walrus resting on ice near Gambell in mid-May. Photo by Clarence Irrigoo, Jr.

# of Weekly Reports in 2021 (March-June)
13

# of local observations
60

# of Alaskan communities engaged
43

# of Facebook Followers
1,652
ARCTIC RESEARCH COLLABORATION WORKSHOP

ARCUS, UC Irvine, and IARPC Collaborations co-hosted a series of networking and collaboration activities in 2021, including the Arctic Research Collaboration Workshop held virtually on 16 April.

A panel of experienced interdisciplinary researchers shared examples of successful collaborative research projects and processes that support project conceptualization, disciplinary integration, and effective engagements with local communities. Participants also took part in small group discussions to help project teams identify and define specific research problems that might be used to stimulate ongoing research collaboration.

Panelists & Small Group Facilitators

- Holly Hapke (UC Irvine)
- Elise Miller-Hooks (George Mason University)
- Katherine Duderstadt (University of New Hampshire)
- Jennifer Brewer (University of New Hampshire)
- Courtney Carothers (University of Alaska)
- Pips Veazey (University of Maine)
- Liz Weinberg (IARPC Collaborations)
- Olivia Lee (University of Alaska Fairbanks)

More information: https://www.arcus.org/meetings/2021/interdisciplinary-workshop
2021 RESEARCH SUPPORT HIGHLIGHTS

ARCUS regularly serves an important facilitation role for collaborative research endeavors seeking to engage participants across institutions, sectors, disciplines, cultures, geographic locations, and/or career levels.

Sea Ice Prediction Network - Phase 2 (SIPN2)

SIPN2 activities aim to improve Arctic sea ice forecasts using a multi-disciplinary approach that includes modeling, new products, data analysis, and scientific networks.

- ARCUS’ role in SIPN2 (funded by NSF) includes strategic planning, project management, networking, and outreach & communications.
- A key activity of SIPN is the Sea Ice Outlook, with reports in June, July, and August containing a variety of perspectives on Arctic sea ice—from observations of current conditions, to advanced numerical models, to qualitative perspectives from citizen scientists. In 2021, 45 groups from around the world contributed to the effort.

More information: https://www.arcus.org/sipn

Navigating the New Arctic (NNA)

Navigating the New Arctic is a National Science Foundation initiative designed to support fundamental convergence research across the social, natural, environmental, engineering, computing, and information sciences.

- In year 2 of the ARCUS Cooperative Agreement, ARCUS staff worked with NNA project teams to develop an online hub featuring all 69 of the NNA grants that had been funded to date. The hub shared project descriptions, field location data and mapping, team member profiles, and project timelines and were viewed 7,345 times during the reporting period.

More information: https://www.arcus.org/nna
Arctic Research Community Meetings

Although COVID-19 health and safety concerns continue to make it difficult for ARCUS to host in-person conferences, meetings, and events, ARCUS staff have been very successful over the past two years in pivoting to virtual forms of engagement and collaboration.

In the second year of our Cooperative Agreement with NSF, we were also able to extend more guidance, expertise, and staffing to the virtual gatherings of our Member and Partner organizations.

A few of the organizations and virtual community events supported by the ARCUS team during the reporting period include:

- Interagency Arctic Research Policy Committee (IARPC) Research Plan Development Workshop (2020)
- Woodwell Climate Research Center’s Carbon Flux Workshop (2020)
- Adaptable Microgrids in Arctic Communities Research Advisory Workshop
- Engaging Youth in Arctic STEM
- Kawerak Tribal Representatives Meeting
- Inuit Circumpolar Council Alaska's Ethical and Equitable Engagement (EEE) Meetings
- Permafrost Carbon Network Annual Meetings

National Park Service Beringia Days

In 2021, ARCUS staff began working with the National Park Service on plans to host the next Beringia Days International Conference during the summer or fall of 2023. Stay tuned for this unique heritage event!
EDUCATION HIGHLIGHTS

ARCUS education programming and outreach efforts promote access for students and teachers to Polar research experiences, projects, and professionals. In 2021, ARCUS staff were active in promoting culturally-relevant STEM education for Alaskan Native students through their work with the IARPC Arctic STEM Education Working Group and through additional collaboration with the North Pacific Research Board (NPRB).

Engaging Rural & Alaska Native Undergraduates & Youth in Arctic STEM

The virtual workshop Engaging Rural and Alaska Native Undergraduates and Youth in Arctic STEM was held from April 13–15, 2021. The goal of the workshop was to bring together rural and Alaska Native youth and undergraduates, federal agency representatives, researchers on Arctic STEM projects, Indigenous faculty and staff, those from the private sector, and rural Alaska community members to discuss the gaps, challenges, opportunities, and successful practices to increase and support the representation of rural and Alaska Native undergraduates and youth in STEM education and career pathways.

The workshop was an initiative of the IARPC Arctic STEM Education Working Group and was hosted by ARCUS in collaboration with the International Arctic Research Center (IARC) with funding from the National Science Foundation (Grant #s: NSF PLR 1304316 and PLR 1928794).


Report Cover Photo by Peggy McNeal (PolarTREC 2014), courtesy of ARCUS.

Visual notes of workshop outcomes by participant Sarah Crowley

More information: https://www.arcus.org/meetings/2021/arctic-youth-stem
PolarTREC 2020-21  STEM at the Poles!

The PolarTREC education program, now in its 14th year, has provided more than 170 US teachers a unique opportunity to work with scientists in the polar regions. Currently supported through the STEM at the Poles! Research Experiences for Formal and Informal Educators in the Polar Regions grant from the National Science Foundation (Award# 1918637), this program invigorates polar science education and understanding by bringing educators and polar researchers together through field-based, hands-on, research experiences in both the Arctic and Antarctica.

Due to the global COVID-19 pandemic, ARCUS made the difficult decision to postpone deployment of all 2020 Polar TREC educators to both the Arctic and Antarctica with most of the expeditions postponed until 2022. During the summer of 2021, two teachers were deployed. In late June, teacher Liza Backman traveled to Alaska and worked with Dr. Jeremy May and Dr. Steve Oberbaur, at Toolik Field Station. In September, teacher Jon Pazol participated in a ship-based expedition as part of a biennial cruise in the Eastern Eurasian Basin. In addition, Polar TREC alumnus Mark Goldner returned to Svalbard, Norway to work with Dr. Julie Brigham-Grette. For the latest news on the program or to follow the PolarTREC teachers on their expeditions, please visit the PolarTREC Virtual Base Camp online at www.polartrec.com.

More information: https://www.polartrec.com

2020-2021 PolarTREC Cohort

Erin Towns  Jon Pazol  Tammy Drillo
Cassie Kautzer  Sarah Johnson  Bill Henske  Jenn Heidrich
Kathy Ho  Elaine Krods  Liza Backman  Eric Filardi
2021 FINANCIAL REPORT

Fiscal Year 2021 Revenue by Source (October 2020 – September 2021)

FY21 Direct Revenue by Source

<table>
<thead>
<tr>
<th>Revenue Source</th>
<th>Amount</th>
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<tr>
<td>NSF Cooperative Agreement #1928794 (39.3%)</td>
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