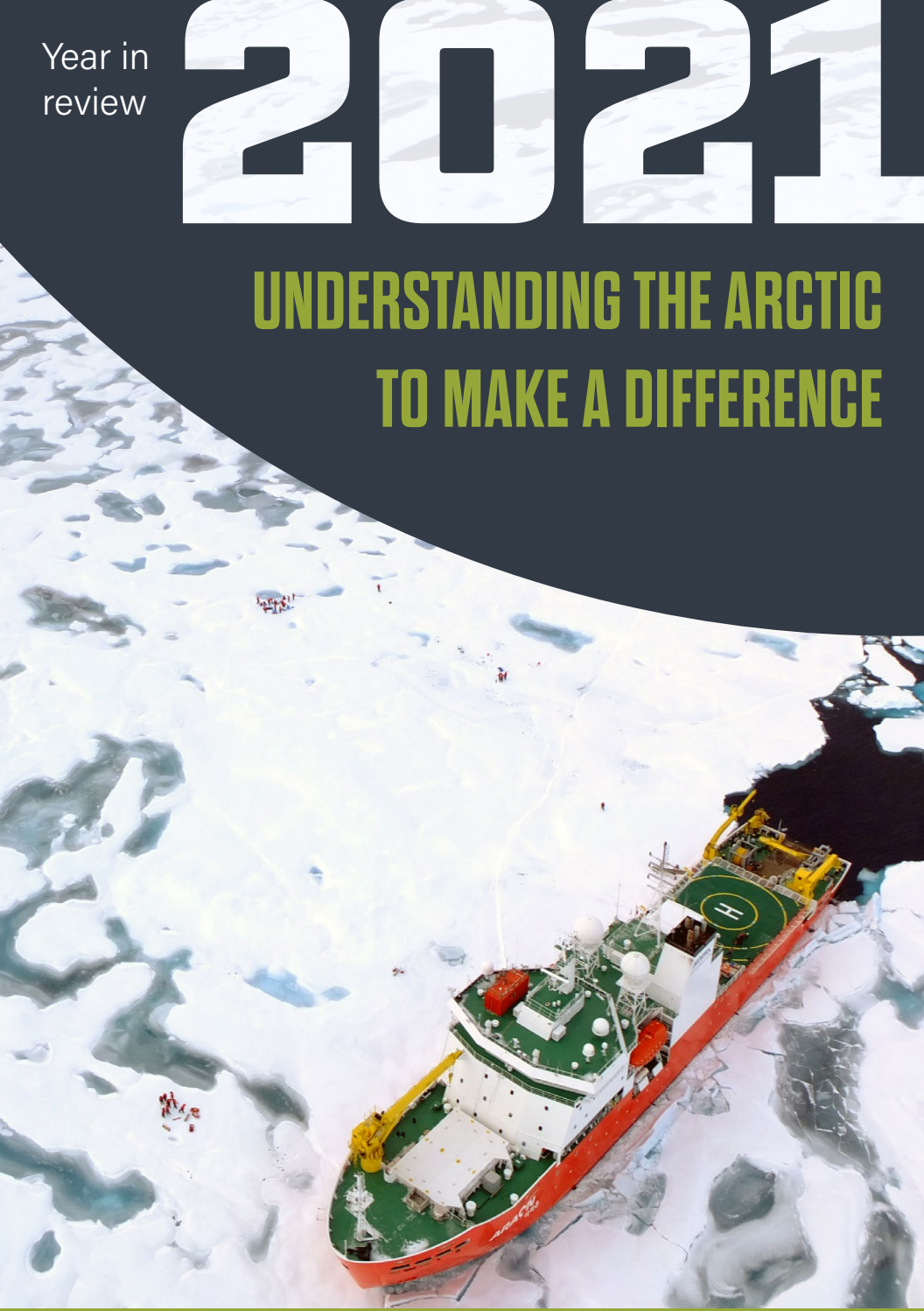
Year in review

2021

UNDERSTANDING THE ARCTIC TO MAKE A DIFFERENCE



UNIVERSITY OF ALASKA FAIRBANKS

International Arctic Research Center

The Korean icebreaker Araon unexpectedly found itself in the path of an Arctic cyclone, the data it gathered improved understanding of sea ice decline (page 8). *Photo by Joo-Hong Kim*

Message from the Director

2021 has further strengthened IARC's role as a leader in Arctic collaboration — a key aspect of the strategic planning initiative we worked on this past year. IARC's new Massive Open Online Course illustrates the many facets of our researchers' expertise and engagement. Under leadership of John Walsh, Rick Thoman and Mike DeLue, more than 20 IARC scientists, and another dozen outside collaborators, created Climate Change in Arctic Environments (p. 15). Since the launch in late 2021, nearly 1,000 people registered to take the MOOC, and I invite you to explore the resource as well.

The course segment illustrating Malinda Chase's work supporting rural Alaska communities in their efforts to address local impacts of climate change is particularly compelling. Chase's Alaska Tribal Resilience Learning Network (p. 10), funded by the Alaska Climate Adaptation Science Center, draws on a range of different research, education and science communication activities within IARC. At the same time, learning from and sharing with Indigenous knowledge holders is essential to the success of these efforts.

IARC is engaging in a multitude of interesting work. It has been both humbling and gratifying to see the ingenuity, stamina and dedication of faculty, staff and students in advancing our understanding of the Arctic in spite of the ongoing pandemic. This applies to researchers like Elizabeth Figus and her ocean monitoring work driven and guided by the community of Kake in Southeast Alaska (p. 12). Equally inspiring was IARC's Nansen Amundsen Basins Observing System team who navigated a maze of pandemic-related challenges while mounting a major ocean-going expedition. This NABOS cruise replaced a slew of moored instruments along the Eurasian Arctic continental shelf, tracking some of the most dramatic ocean changes observed anywhere on the globe.

Enjoy the report and stay in touch!

Hajo Eicken
IARC Director
heicken@alaska.edu

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We want to hear from you!

Email us your comments or questions to uaf-iarc@alaska.edu or call 907.474.6286

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About us

We are the International Arctic Research Center (IARC) on the University of Alaska Fairbanks Troth Yeddha' Campus. Our purpose is to understand the Arctic to make a difference. These six core values guide our research and frame how we interact with our partners:

Useful, actionable science

Our research responds to society's needs in a changing Arctic and world.

Deeper understanding

Our emphasis on fundamental research sets the groundwork for understanding and responding to Arctic change.

Grounded in place

Living and working in Alaska gives us a holistic knowledge and understanding of the Arctic. We value what the North and its people teach us.

Inclusion and diversity

We actively cultivate an environment where all individuals and groups feel welcomed and heard. Our different experiences, expertise and ways of knowing are our strength, creating diverse thoughts and ideas.

Innovation and expertise

Drawing on our expertise, we value a culture of creativity that fosters innovation.

Collaboration

We solve problems through local to international collaboration with different disciplines, knowledge systems and by engaging with government agencies.

Consortium

Our scientists work on independent research as well as through larger initiatives. The following are groups and collaborations at IARC that build connections between research and stakeholders within and outside the United States.

Alaska Arctic Observatory & Knowledge Hub ▪ arctic-aok.org
Tools, resources, and scientific and administrative support for northern Alaska coastal communities to share their expertise.

Alaska Center for Climate Assessment & Policy ▪ accap.uaf.edu
Innovative and collaborative research that informs climate policy, decision-making and action. University partner with NOAA.

Alaska Climate Adaptation Science Center ▪ casc.alaska.edu
Regionally relevant science for a changing climate. University partner with U.S. Geological Survey.

Alaska Fire Science Consortium ▪ frames.gov/partner-sites/afsc
Bridging the gap between wildland fire science research and managers. University partner with the Joint Fire Science Program.

Arctic & Earth SIGNS ▪ bit.ly/3BBEs4m
Culturally responsive climate change education.

Center for Arctic Policy Studies ▪ caps.uaf.edu
Facilitates sharing of University of Alaska expertise to more readily serve policy makers in the Arctic.

Climate, Ocean, & Ecosystem Studies ▪ cicoes.alaska.edu
Cooperative Institute for tapping into the brainpower at universities to help meet NOAA's research, education and public engagement goals.

Experimental Arctic Prediction Initiative ▪ bit.ly/3uVvaie
Innovative seasonal and subseasonal weather prediction for the North.

Inspiring Girls Expeditions ▪ inspiringgirls.org
Free wilderness science and art expeditions for high school girls.

NABOS ▪ uaf-iarc.org/nabos
Studies changes in the Nansen & Amundsen Basins of the Arctic Ocean.

Next Generation Ecosystem Studies ▪ ngee-arctic.ornl.gov
Improves predictions by understanding Arctic terrestrial ecosystems. University partner with Oak Ridge National Laboratory.

Scenarios Network for Alaska + Arctic Planning ▪ snap.uaf.edu
Helps people plan in a changing climate through downscaled climate data and interactive climate and weather tools.

117

science faculty, staff, students and affiliates

1:8

for every $1 invested in IARC from the State of Alaska, we earned $8 through competitive research grants

134

research projects investigating the Arctic system from the ocean and ice to atmosphere, land and society

82

peer reviewed publications and technical reports authored by IARC people

USFWS/Katrina Mueller

Heading off invasives

$159 million in damages

Invasive species that aggressively overtake aquatic habitats are moving north. Science tells us that Alaska's best chance of fighting them off is prevention.

These hitchhikers threaten the health of aquatic ecosystems worldwide, impacting agriculture, forestry and fisheries. Alaska's relatively low human population, remoteness, and cold winters have prevented many invasives from gaining footholds, but that's changing. Species like *Elodea,* quagga and Zebra mussels are showing up in or near Alaska waters. Unchecked, their cost to our environment and economy would be catastrophic.

Zebra mussels firmly attached to a boat propeller, which is one of the ways that these invasive species hitchhike to new water bodies.

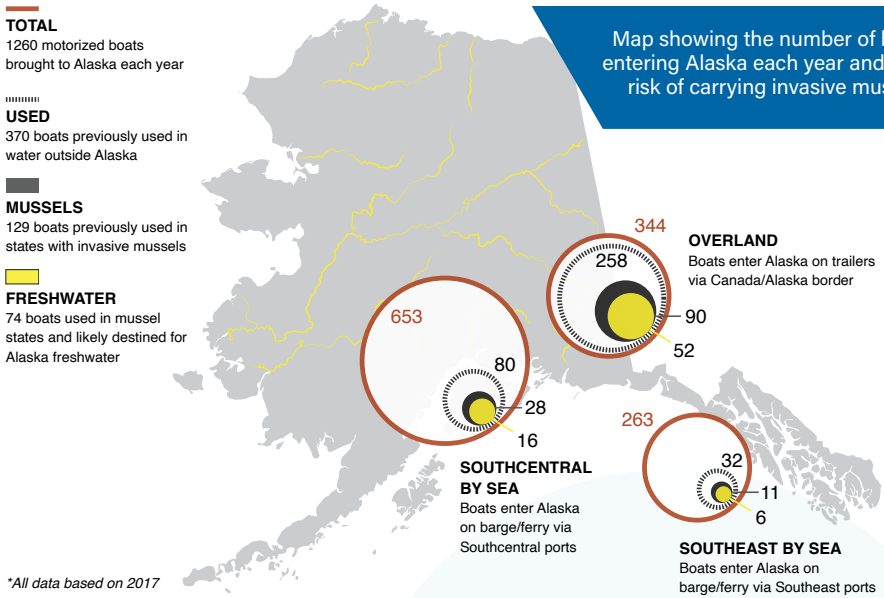
IARC economist Tobias (Toby) Schwoerer found that if *Elodea* becomes established in Alaska, it could cost the commercial sockeye salmon fishery $159 million annually, or $5.1 billion over the next 100 years. Alaskans food security, especially in rural communities, would also be jeopardized.

Where to focus resources

In such a huge state, knowing where to focus management resources is critical. Schwoerer is informing these decisions by studying how invasive species enter Alaska and which areas are at highest risk.

He surveyed float plane pilots to learn how invasive species may travel to remote water bodies. He also identified the hidden costs associated with not keeping float planes clean and ignoring existing infestations that could become hot spots for spreading *Elodea*. For example, the average Alaska float plane pilot will lose $185 (average trip value) if their planned destination was an *Elodea*-invaded lake.

Float planes were not previously recognized as a major transporter of aquatic invasive species, explained Aaron Martin, an invasive species program coordinator for the US Fish and Wildlife Service. "This work really shed light that float planes can be a major



vector to the point where now there's a national research project mirroring Toby's work."

Schwoerer is also studying ways Zebra mussels may reach Alaska, highlighting that used boats traveling from the Lower 48 pose the greatest risk. Each year, an estimated 74 boats previously used in mussel-infested states are destined for Alaska freshwater. About 70% of those boats enter Alaska on trailers via the Alcan Highway at the Canada-Alaska border crossing.

The USFWS, who funded Schwoerer's work, is already using this information to prioritize monitoring efforts and increase watercraft inspections at the Alcan land border. Expanding collaborative inspection efforts would help catch boats arriving on barges or ferries in southcentral and southeast Alaska ports.

"The work with Toby has really helped us understand where these hot spots of introductions are and how things are moving around," explained Martin.

Preemptive action

Policy changes can also improve Alaska's invasive species defense. Making funding available for rapid and targeted response to small isolated infestations can stop invasive species from becoming widespread and costly problems.

"The value of prevention is the main story," emphasized Schwoerer.

All Alaskans play a part and can make a difference by reporting invasive species online to the Alaska Department of Fish & Game or calling the hotline 1-877-INVASIV (468-2748). "If something looks different, report it," said Martin.

"Our own actions as people can make the problem a lot worse or a lot better," added Schwoerer. "We're primarily responsible for transporting invasive species across the landscape, introducing them into new areas where they can harm biodiversity."

Cyclone encounters

In the path of an Arctic cyclone

In August 2016 a massive storm on par with a Category 2 hurricane churned in the Arctic Ocean. The cyclone led to the third-lowest sea ice extent ever recorded. But what made the Great Arctic Cyclone of 2016 particularly appealing to scientists was the proximity of the Korean icebreaker Araon.

For the first time ever, scientists were able to see exactly what happens to the ocean and sea ice when a cyclone hits. IARC researchers and their international colleagues were at the center of a study showing that sea ice declined 5.7 times faster than normal during the storm. They were also able to prove that the rapid decline was driven by cyclone-triggered processes within the ocean.

"Generally, when storms come in, they decrease sea ice, but scientists didn't understand what really caused it," said IARC's Xiangdong Zhang.

There was general speculation that sea ice declined solely from atmospheric processes melting ice from above. Zhang and his team proved this theory incomplete using *in-situ* observations from directly inside the cyclone. The measurements reflected things like air and ocean temperature, radiation, wind and ocean currents.

It was a stroke of good luck for science, and perhaps a bit nerve-wracking for those onboard, that the icebreaker was in position to capture data from the cyclone. Usually ships try to avoid such storms, but Araon had just traveled into

The Korean icebreaker Araon, which unexpectedly found itself in an Arctic cyclone in 2016, unlocked the key to how these storms wreak havoc on sea ice in the Arctic Ocean. *Photo by Joo-Hong Kim, Korea Polar Research Institute*

the middle of an ice-covered zone and was locked in an ice floe.

Cyclones act like a blender

Thanks to the ship's position so close to the storm, Zhang and his team were able to explain that cyclone-related sea ice loss is primarily due to two physical ocean processes.

First, strong spinning winds force the surface water to move away from the cyclone. This draws deeper warm water to the surface. Despite this warm water upwelling, a thin layer of cool water remains directly beneath the sea ice.

That's where a second process comes into play. The strong cyclone winds act like a blender, mixing the surface water.

Together, the warm water upwelling and the surface turbulence warm the entire upper ocean water column and melt the sea ice from below.

Lasting storm impacts

Although the August storm raged for only 10 days, there were lasting effects.

"It's not just the storm itself," explained Zhang. "It has lingering effects because of the enhanced ice-albedo feedback."

The enlarged patches of open water from the storm absorb more heat, which melts more sea ice, causing even more open water. From Aug. 13-22, the amount of sea ice in the entire Arctic Ocean declined by 230,000 square miles, an area more than twice the size of the state of Arizona.

Zhang is now working with a new computer model for the Department of Energy to evaluate whether climate change will lead to more Arctic cyclones. Previous research shows that over the past half-century, the number and intensity of cyclones in the Arctic has increased. Some of those storms, like the biggest Arctic cyclone on record in 2012, also led to record low sea ice extent.

Xiangdong Zhang studies Arctic cyclones.

Zhang was lead author on the study, which was published in Geophysical Research Letters. The paper includes two IARC graduate students, Liran Peng and Han Tang, along with Korean researchers Joo-Hong Kim, Kyoung-Ho Cho and Baek-Min Kim, and Zhaomin Wang from China.

The research was funded by the Department of Energy, National Science Foundation and Korean Polar Research Institute.

Tribal network

Climate adaptation needs

Access to hunting, fishing and gathering; thawing of permafrost that damages local infrastructure; increased impacts from extreme events; and land and game management decisions in a complex web of fractured land—Alaska communities face compounding challenges. In response, Alaska Tribes draw on Traditional Ecological Knowledge gained from generations of stewarding the land. There are also emerging needs related to climate change that require both scientific knowledge and a familiarity with, and respect for, the traditions of Tribes.

The Building Resilience Today training in 2020. *Photo by Molly Tankersley*

In 2020, a team led by Malinda Chase successfully completed the Building Resilience Today project. Chase is the Alaska Tribal Climate Resilience Liaison for IARC's Alaska Climate Adaptation Science Center. The effort brought communities and scientists together to identify Tribal needs and develop responsive approaches to climate adaptation planning.

Together scientists, local decision-makers and community members from Quinhagak, Kwigillingok, St. Michael, Iliamna and Kotlik highlighted observed changes and identified areas of concern, which they used to create reports that inform community adaptation planning.

While the project was successful, feedback from the Building Resilience Today project identified the need for more spaces to discuss successful climate mitigation strategies. People wanted to hear about hurdles other communities faced and how they overcame them.

Creating a network

The Alaska Tribal Resilience Learning Network responds to this need. It provides a system of support to increase the voice of Tribal communities engaged in adaptation planning.

Chase is growing the network by engaging a skilled team committed to maintaining community connections. That team includes Bureau of Indian Affairs Pathway Intern Alexis Wagner, IARC's first Alaska Fellow Megan Pittas, and network coordinator Krista Heeringa. In addition to connecting Tribes, an emerging goal of the network is to share information about agencies

that fund new projects, provide planning support or climate information.

"The Building Resilience Today project was an attempt to push climate science to complement local and Indigenous knowledge in a mutually beneficial way," said Heeringa. "This network is helping us build that out even further. It braids two ways of knowing together, making it more relevant and empowering."

Successful adaptation models implementing traditional knowledge and recent innovations within Tribal communities do exist. Yet the knowledge can sometimes be hard to access and share across distances and communities, highlighting the importance of longstanding relationships in the adaptation planning community.

The network has been successful in creating a persistent communication channel to share knowledge and support relationship-building among scientists and Tribal partners. The space has grown to promote conversations that support planning needs, while also welcoming presentations and conversations from knowledge holders and experts across the state. Information sessions have covered:

- How to access climate tools created by IARC's Scenarios Network for Alaska and Arctic Planning.
- Planning strategies and projects at the Tanana Chiefs Conference.
- Ongoing work on food sovereignty (learn more on page 18).
- UAF's Cold Climate Housing Research Center discussed impacts of permafrost thaw on rural infrastructure.
- Youth opportunities in climate adaptation planning and education.
- Concerns and observations seen by Alaskan berry harvesters.

Putting into practice feedback from the Building Resilience Today training, the network hosted its first in-person event in summer 2021. The two-day training on Tribal Wellness in Climate Adaptation Planning integrated understandings of trauma and stress into community wellness, resilience-building strategies and climate adaptation planning. When surveyed afterwards, 90% of participants felt that the workshop increased their understanding of how culture and traditional practices support climate change adaptation. The same proportion said they better understand how to integrate health and wellness into more holistic climate adaptation and vulnerability assessments and planning.

"It was a significant training, exploring how our traditions and beliefs are foundational to maintaining our strength and resilience as a community" reflected Chase. "Our traditional knowledge is the core guide for Alaska Native people and climate science should work with that knowledge. We hope to host more events like this moving forward as a network."

The community of St. Michael.
Photo by Jeremy Littell

Local climate force

Science that serves

Most definitions of science focus on the pursuit of knowledge through rigorous and systematic investigation. For the Kake Climate Partnership, that isn't enough. "We're trying to go a step further by providing services for the Tribe and community," said Elizabeth Figus, who is leading the partnership with the Tribe, tribal corporation and municipal government in Kake, Alaska, to understand nearby ocean changes.

The partnership has already provided over 30 part or full time jobs for local residents. When the project ends, the local partners in Kake will jointly own all the data and govern how the findings are used.

Though Figus, who is a postdoctoral researcher at IARC's Alaska Center for Climate Assessment and Policy, expects the data from the partnership to be useful, the process is the real focus. She's coproducing the research with local leadership, and together they chose what to study, how to collect the data and who is involved. Ultimately, she hopes that the research will help create a climate workforce in Kake, where local residents are well compensated for their time, receive useful training, and gain tools to monitor their environment longterm and plan how to adapt to future climate changes.

Simon Friday is a student employed by the Kake Climate Partnership. He's a psychology major at the University of Alaska Fairbanks and a member of the Organized Village of Kake Tribe. During the COVID-19 pandemic, he was home working another job when Figus offered him additional part time fieldwork.

He said yes, and has continued to say yes since, advice he hopes other young people will follow. "Say yes to every opportunity that you possibly can," said Friday. "You never know what you're going to learn from those experiences or the people that you might meet, and those can very well be the relationships that help you in undergrad or even graduate school."

Simon Friday and two other local residents gather water samples during the Kake Climate Partnership. *Photo by Lloyd Davis*

Local residents walk a beach during field work for the Kake Climate Partnership. *Photo by Burt Jackson*

Though Friday does not intend to pursue a career in climate science, he emphasized that the skills he developed and people he met during the project support his goal of becoming "Dr. Friday" and practicing psychology.

Through the Kake Climate Partnership, Friday learned to appreciate research, got a taste of office work, saw first hand the value of precise data handling and more. But his favorite experiences were those involving people and getting to work with his community to understand the world around them.

"I'm a people oriented person just by nature, so sharing those moments with all of my closest friends, even if it was just a silent car ride, I valued because we're all working towards this one goal," said Friday.

Monitoring the ocean

In Kake, people are concerned about how global climate change will impact the community's ability to harvest traditional foods. With help from Figus and UAF resources, they designed and initiated a longterm ocean monitoring study for tracking how saltwater environments near their community are changing. With the future in mind, they prioritized creating a framework so that the Tribe and community can continue monitoring efforts after outside scientists have moved on.

The community is also concerned about pollution coming from tourist and shipping vessels. They decided to take advantage of the dramatically reduced ship traffic during the pandemic to create a baseline dataset. The team collected shellfish and ocean water samples, analyzing them for heavy metals and bacteria. They also measured things like ocean temperature, salinity, pH and nutrients to assess the overall ecosystem health.

"So far it's a lot of good news," said Figus. The 2020–21 results showed mostly clean, healthy ocean waters. There is now a starting point to compare future data. As is the goal of all aspects of the Kake Climate Partnership, it's all about the long game. Twenty years from now, the Tribe and community in Kake will be able to see how the ocean has changed, and hopefully mitigate climate change impacts on their traditional foods.

Arctic leadership

Recognized as an Arctic leader

IARC continues to impact national and international spheres by providing leadership in Arctic research, synthesizing knowledge and clearly communicating about Arctic change.

In 2021, IARC's chief scientist John Walsh received one of Arctic research's most prestigious awards, the Mohn Prize. The award committee recognized Walsh as an "influential generator of new, groundbreaking knowledge about the changing Arctic climate system that is simultaneously creative, practical and of high public value beyond the scientific community."

With an impressive scholarly record of over 300 peer-reviewed publications, Walsh is one of the most authoritative experts in modern Arctic climate change. The breadth and depth of his contributions to the field have advanced our understanding of the Arctic's future.

"He has taught us that linking all elements of a system is essential to understanding and predicting the future," said Dag Rune Olsen, Mohn Prize chair and rector of The Arctic University of Norway. Walsh hopes the award will spur more international collaboration in Arctic research and make a difference for global climate change.

"The Arctic University of Norway is Europe's premier Arctic university, and UAF is America's Arctic university," Walsh said. "Together we have the scientific expertise to advance the frontiers of Arctic science."

Climate reports

During Walsh's career, he has contributed to numerous climate change reports like the Arctic Report Card, Arctic Monitoring and Assessment Programme, National Climate Assessment and Intergovernmental Panel on Climate Change.

"I've dedicated years of my life to these reports, and the motivation is to make the science more useful," said Walsh.

He's not alone in this work. IARC's Rick Thoman has been a lead editor of the Arctic Report Card and the State of the Climate reports for several years. Others at IARC, like Gabe Wolken and Tom Ballinger, contribute to specific chapters on Arctic change related to glaciers, wildfire, air temperature and more.

These climate reports summarize numerous individual research studies to provide an interdisciplinary, unbiased and trustworthy picture of the state of our knowledge.

"If we accept that climate change is a serious problem, we need to convey the information clearly", explained

Walsh, who is supported, along with Thoman, by IARC's Alaska Center for Climate Assessment and Policy. "These assessments try to provide a balanced view."

The synthesized information compiled in these reports influences policy and decision making by world governments. Increasingly, there is also a push to make them relevant to decision makers at regional to local scales. They inform emissions standards, health officials use them to address the impacts of climate hazards, they can guide infrastructure and city planning in response to sea level rise and more.

Massive open online course

To make their knowledge of Arctic climate change even more accessible to people globally, Walsh and Thoman developed a free massive open online course. They shaped the MOOC, Climate Change in Arctic Environments, by bringing together over 30 experts from across the Arctic. Over half have ties to IARC.

The course is divided into a series of short videos that provide an overview of the state of Arctic climate change as it relates to sea ice, glaciers, fish, birds, Indigenous knowledge, international policy and more.

940 people from 75 countries have already enrolled and are learning about these modern climate science topics. Throughout the course, participants gain hands-on skills using Arctic climate tools and data created by IARC's Scenarios Network for Alaska + Arctic Planning.

The course fills a need for quickly digestible and data-driven climate change information. "It's useful in a variety of settings, from teachers using individual videos for science or humanities classes to policy makers or reporters needing background knowledge for decision making or stories," said Mike DeLue, the MOOC coordinator and a science communicator at IARC's Alaska Climate Adaptation Science Center.

Feedback from federal employees, private industry and Alaska leadership emphasizes the value of the MOOC as an important educational and professional development tool.

Rick Thoman and John Walsh while filming the MOOC on Arctic climate change.

Turning science to music

Sounds of climate change

If climate change was a song, what would it sound like? Alaska composer Michael Bucy has an answer.

Warming oceans, melting ice and disrupted jet streams came to life in his original composition, Babel 2.0.

Complex changes in the Bering Sea inspired the musical representation, which Bucy created with the help of IARC scientist Vladimir Alexeev.

We can imagine ways to musically convey the sounds of ravaging storms or melting ice. Making music from the intricate and multifaceted processes revealed by science poses a more subtle challenge. Patterns offer a bridge — music and science both explore them using math. In doing so, they help us understand and relate to the world around us.

The process

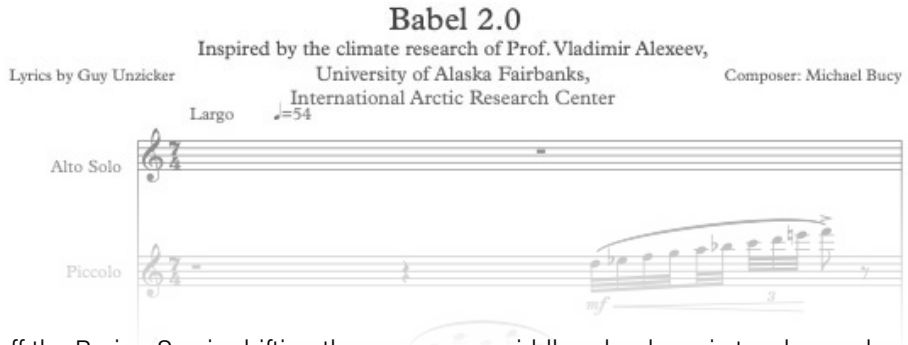
Bucy and Alexeev started with data. Alexeev shared measurements showing rising ocean temperatures in the Bering Sea. He explained that warming conditions disrupt the global circulation systems and trigger feedback loops that can impact weather across the Northern Hemisphere. From there, Bucy set about creating a cast of characters to tell the story.

The instruments, rhythm and key worked together to depict each character. Slow and undulating to represent the historical Bering Sea, with cool waters and seasonally predictable sea ice. Flourishing woodwinds to illustrate the jet stream that normally arches along the Aleutian Islands and affects the winter weather we expect to see across Alaska, like rain in Juneau and cold winters in the Interior. Increasingly urgent bursts disrupt these timeless sounds to signify the story's villain.

Juneau composer Michael Bucy playing the trombone. *Photo courtesy of Michael Bucy*

Ocean heat alters jet stream

According to research published in Nature by Alexeev and his Japanese collaborators in 2019, warm air rising



off the Bering Sea is shifting the trajectory of the jet stream farther north. Cascading effects are felt globally, like in the winter of 2017–18 when extreme cold blanketed eastern Canada and Asia. Alexeev equates the jet stream to a river, and the warm air rising off the Bering Sea to a rock in the river's midst.

"The 'rock' sends standing waves upstream and downstream," explained Alexeev. "In the Bering Sea, the warm blob ripples the jet stream, which makes some places unusually cold and others unusually warm."

The urgency in Bucy's music accelerates as the piece nears its end, signifying impending danger as the climate system shows signs of collapse. He hopes the rising alarm notes will help the listener experience climate change in a new way, ultimately inspiring them to act.

Babel 2.0 was first performed by the Juneau-based Con Brio Chamber Series in fall 2021. It was accompanied by Marta Lastufka, who sang a poem by Guy Unzicker likening the disruption of the jet stream, by the column of rising warm air, to the Biblical destruction of the Tower of Babel.

"I feel like Vladimir is doing something super important," said Bucy, who is a middle school music teacher and part of the Juneau Composers Consortium. "If we can do a little something to help get his information out, add some emotion to it, that feels very, very meaningful right now."

Bringing people together

Bucy and Alexeev were brought together by Kaja Brix, a program director at NOAA and an affiliate faculty member at IARC. Brix, who is engaged in the Fairbanks science and Juneau music worlds, began brainstorming ways to connect diverse communities.

"Our goal became connecting people and communities, telling the story of a changing climate that impacts each one of us in Alaska," said Brix. "We thought music could help do that, exposing people to climate science in a way that doesn't require reading a science paper. Music can inspire us, it's accessible, and it brings people together."

The project has already inspired media coverage and new collaborations bridging science and music. Babel 2.0 is the first of several planned musical representations of climate science by the Juneau Composers Consortium.

Alexeev's research was funded by NOAA and the National Science Foundation.

New projects

Coordinating Arctic observing to support food sovereignty

IARC director Hajo Eicken is leading a new international effort to improve coordination among Arctic observing networks. The project, which is called Research Networking Activities for Coordinated Observations, prioritizes research activities that benefit society.

As a part of this effort, three Indigenous liaisons at IARC are leading a Food Sovereignty Working Group. They build connections that support coastal and marine food security for Arctic residents. Craig Chythlook makes community connections, Victoria Qutuuq Buschman creates international connections, and Margaret Anamaq Rudolf builds science and research connections.

"Together the liaison leadership team looks to support Indigenous-led observing and monitoring that views food security through an Indigenous lens," explained Chythlook.

The working group helps:

- Weave human health and wellness into observing systems.
- Build capacity in Indigenous organizations, communities and researchers — including community-driven research and monitoring.
- Ensure project outcomes inform resource management and policy decision making that impacts Indigenous food sovereignty.

Navigating the New Arctic Community Office

IARC is co-hosting the Navigating the New Arctic Community Office with University of Colorado Boulder and Alaska Pacific University. They build awareness, partnerships, opportunities and resources for collaboration and equitable practices within, between and beyond research funded by the National Science Foundation's NNA Initiative.

Youth engagement during NNA funded research. *Photo from Fresh Eyes on Ice*

Elena Sparrow and Katie Spellman lead the Education and Outreach team at IARC and support NNA projects that engage Arctic communities and educators. Together the team:

- Introduces Alaska and Arctic-inspired educators to NNA knowledge and resources.
- Helps NNA researchers create coordinated, impactful and culturally appropriate education and outreach.
- Trains early career researchers on a holistic understanding of the Arctic that includes its natural environment, built environment, and diverse cultures and communities.

Help us make a difference!

Climate change is one of the greatest challenges facing Alaska today. Arctic residents experience a near constant barrage of new threats, from severe weather extremes, to failing infrastructure and changing subsistence resources. Climate research can give communities, agencies and private enterprise an advantage to better understand and address climate change impacts. Sound climate modeling and localized data can help Alaskans be proactive about the future.

In 2021, IARC research supplied climate data and tools that make it easier to design Alaska infrastructure to withstand the future climate. We helped coastal communities facing relocation access local climate data and develop informed adaptation plans. Our citizen scientists contributed critical information to make life along Alaska rivers safer.

You can come alongside our team of world renowned scientists, talented staff and forward thinking students by supporting research that makes a difference in the lives of Alaskans. Consider making a donation to our new fund, Alaska Climate Research Makes a Difference Fund. With your support, IARC scientists can:

- Nimbly respond to needs of Alaskans adapting to climate change
- Build strong collaborative relationships with Indigenous communities, private sector, agency partners and policy makers
- Bring trusted climate change information to public venues
- Engage students in meaningful climate change research

Make your donation today!

https://uaf-iarc.org/donate

Let's connect

linktr.ee/IARC_Alaska

The Western Arctic Caribou herd at a water crossing on Alaska's Seward Peninsula. National Park Service / N. Herber