

The Belfer Center for Science and **International Affairs Arctic Initiative** John P. Holdren CO-DIRECTOR **Henry Lee** CO-DIRECTOR Halla Hrund Logadóttir Amanda Sardonis Karin Vander Schaaf **Brittany Janis** COPYWRITER **Brittany Janis** PHOTOGRAPHY Bennett Craig DESIGN Andrew Facini The Arctic Initiative would like to thank all of our partners and advisors who make our work possible. With special thanks to Schmidt Futures and the Gordon and Betty Moore Foundation for their crucial support of our work. Fellows and Staff......27

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The Belfer Center's Arctic Initiative at Harvard Kennedy School strives to increase understanding and improve policies to respond to what is happening in the changing Arctic region by initiating new research; by convening scientists, policymakers, and diplomats; and by developing a new generation of public officials and nongovernmental leaders with a much greater knowledge of the factors that are affecting the Arctic ecosystems and the implications for the environmental, social, and economic systems around the globe.

Since our launch in 2017, the Arctic Initiative has grown rapidly and has emerged as a leader on Arctic issues at the intersection of environmental science and policy. We have grown our team, expanded our course offerings, engaged more students, and developed key research partnerships that have allowed us to make substantial contributions to research and policy for the circumpolar Arctic region.

Much of our work revolves around the idea of resilience—how communities can survive and thrive in times of rapid change. The global COVID-19 pandemic has been a stark reminder about the importance of preparation and organization in defending against major threats to society, whether these emerge suddenly, as COVID-19 did, or over a period of decades, as climate change has and will.

At the Arctic Initiative we have needed to respond to the new reality of COVID-19 with resilience of our own. We have had to test new formats for our research, our teaching, and our policy engagement, taking our research online, designing a virtual field-study course; and co-hosted a virtual innovation workshop, jointly with our Greenlandic collaborators in academia and government, to create the Greenland Policy Challenge. We packed the fall semester with events that leveraged the best of what the new virtual working environment can offer, building community across the Arctic with less cost and less carbon. We remain resolved to continue our important work.

John P. Holdren · Henry Lee · Halla Hrund Logadóttir



The Arctic Course and Greenland Policy Challenge

by Katie Segal, Arctic Initiative Research Assistant and Course Assistant

From Cambridge and Nuuk to Belgium and Oman, students from Harvard Kennedy School (HKS) and the University of Greenland embarked on an interactive policy development project this spring—all without ever leaving their homes. COVID-19 halted plans to meet in Nuuk, but it could not stop the dedicated students from the HKS course and their counterparts in Greenland from a successful collaboration on the "Greenland Policy Challenge." The project, which was nearly one year in the making, aimed to inspire and connect the next generation of leaders for a changing Arctic.

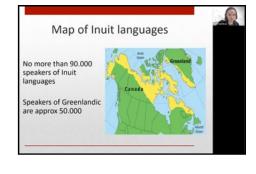
Over the course of two weeks, student teams tackled some of Greenland's most pressing policy challenges in four categories: climate change and environment, foreign affairs, education and cultural preservation, and trade and economic development. The experience culminated in an interactive virtual



workshop, where mentors shared perspectives from Greenland and across the Arctic and students presented their proposals to an expert panel.

The Greenland Policy Challenge connected HKS students with students from very different backgrounds in the Arctic (primarily indigenous students), and gave them first-hand experience working with international teams. The idea stemmed from Minister Ane Lone Bagger's September 2019 visit to HKS, when Halla Logadóttir and Minister Bagger saw an opportunity for mutually beneficial collaboration that would last much longer than the workshop.

Members of the
Arctic Initiative
and the University
of Greenland developed the project
in collaboration
with Greenland's
diplomatic
representation in



Washington, D.C. to ensure that students' work addressed several of the Greenlandic government's priority issues. Minister Bagger paid participants a visit on the first day of the workshop, reminding participants that "Inuit culture has always had a high degree of adaptability to changing conditions" and that she "[hoped] that [students] will be able to find innovative and creative ideas that Greenland will be able to draw inspiration from."

STUDENT ENGAGEMENT

Students also heard first-hand perspectives from some of Greenland's leading policy experts and government officials during the workshop, including Jørn Skov Nielsen, Greenland's Deputy Minister, Ministry of Industry, Energy, Research and Labour, Lene Kielsen Holm Greenlandic Research Scientist and Project Leader in the Climate and Society Research Group at the Greenland Climate Research Centre, Katti Fredricksen, Head of the Language Secretariat of Greenland and poet, and Inuuteq Holm Olsen, Head of Representation of the Greenland Representation in Washington, D.C..

Inuuteq praised the students' collaboration, highlighting the need for Greenland to "[build] relationships with other institutions while also building up [Greenland's] own capacities in education and research."



Lene advocated for greater cohesion and knowledge sharing between conventional science and Indigenous knowledge to solve climate-related challenges. Lene spoke of the "sila assallatseq," or switched seasons, experienced by Indigenous communities, and encouraged participants to "recognize that indigenous knowledge has monitoring methodologies. Understanding our ways of seeing the world and our language helps you to understand that our knowledge is systematic and brings together different pieces of our environment. Scientists need to bring natural and social together [and] Indigenous knowledge can help scientists learn how to do that."

Katti shared her linguistic expertise and challenged students to consider the connections between social issues, environmental issues, and language. When describing some of the new words that her team develops to meet changing circumstances, Katti noted that "our environment affects our language, the way we

think, and the way we act. When our environment changes, it challenges us, but it also develops our language as we are forced to develop new words, and we also reuse old words."

Looking back at the experience, including the opportunities and challenges presented by the shift to a virtual workshop, Halla reflected that "what is so exciting about this journey is that we are bringing all this talent together. We are bringing people from the Arctic and connecting them with people from across the world. I think it is through that type of collaboration, that type of future network, that we can in a meaningful way address the challenges that the Arctic is facing."

The Greenland Policy Challenge was organized as a part of Harvard's Arctic Course, IGA- 671, Policy and Social Innovation in the Changing Arctic, taught by Halla Hrund Logadóttir. The course covers Arctic issues from an interdisciplinary and circumpolar perspective and engages students in the journey of developing an idea that can help address challenges or create opportunities for the region. The course has a network of over 40 mentors who connect with students in that process, and it traditionally ends with an Arctic Innovation Lab or a policy workshop where students present their ideas.



Students around the world may have been physically separate while completing the Greenland Policy Challenge, but they should be proud of how they came together to build incredible connections and push the boundaries of policy innovation. They ended the experience with a new toolkit for solving Arctic policy challenges and a new set of friends and colleagues.

Resilience Study Groups:

Advancing the Arctic Resilience Framework in Collaboration with the Sustainable Development Working Group



Joel Clement speaks with **Anders Oskal**, Director of the International Centre for Reindeer Husbandry and Professor **Svein Mathiesen**, UArctic EALÁT Institute, about challenges indigenious communities face when it comes to financing resilience during the Spring 2020 Study Group.

The Arctic Initiative has been working with the Sustainable Development Working Group (SDWG) of the Arctic Council to build out the Arctic Resilience Action Framework, an effort to advance a coordinated, regional approach to building resilience and adapting to rapid change in the Arctic.

In the Fall of 2019, Senior Fellow Joel Clement led a study group focused on governance and identifying laws and policies that are barriers to or accelerators of resilience. Then in the Spring of 2020, he co-hosted a second study group on Financing Arctic Resilience with Graham Sinclair, an expert in sustainable finance.

These study group sessions brought together students with Arctic leaders, policy experts, and people from industry to better understand the realities on the ground in the Arctic, from governance challenges to what it takes to get financing for a community driven project.

Students then worked collaboratively to develop a report on recommendations

for SDWG to help strengthen resilience within these priority areas. In Fall 2020 the third study group in the series will be focused on Arctic Knowledge Systems.

These study groups not only give students opportunities to go deep on issues related to resilience, learn from Arctic experts, and develop their network; it also lets them to hone their communications skills in the course of writing reports targeted towards busy policy makers. Papers from all study groups will be handed off to the SDWG at the conclusion of the series to aid in their efforts to grow the community of practice around resilience.

Jennifer Spence, Executive Secretary of the Sustainable Development Working Group said of this effort, "It's fantastic to have so much student energy behind promoting resilience, and addressing some of the priority issue areas highlighted in the Arctic Resilience Action Framework".

This effort is part of a larger collaboration between the Arctic Initiative and SDWG around resilience, the Fall 2020 ten-week virtual Arctic Resilience Forum co-hosted by the Icelandic Chairmanship of the Arctic Council.

For more on the **Study Groups**, visit **belfercenter.org/publication/ arctic-initiative-spring-study-group- financing-climate-resilience**

Policy and Action on Plastic in the Arctic

The Arctic Initiative signed a statement of collaboration with the Icelandic Chairmanship in 2019 to help provide knowledge to advance policy work within the Arctic Council. Iceland chose to highlight the issue of plastic debris in the Arctic Ocean as one of the focus areas during its Chairmanship of the Arctic Council from 2019-2021, with the goal of creating a Regional Action plan to tackle this problem. The Arctic Initiative, which has always included a focus on preserving the Arctic marine environment, prartneredwith Wilson Center to focus on addressing the plastic-pollution problem in the Arctic. problem of plastic in the Arctic.

The Protection of the Arctic Marine Environment Working Group, UNEP and OSPAR representatives and industry leaders in the tourism, fishing, recycling, and circular economy spaces. The goal was to begin developing a framework for tackling Arctic plastic pollution.

"The growing plastic pollution problem in the Arctic will not be solved by players in the Arctic alone. It requires experience, knowledge and action of global stakeholders which was the reason we focused on bringing this group together for this work", said Halla Logadóttir, Arctic Initiative Co-Founder and Co-Director.



In October 2019, the Belfer Center's
Arctic Initiative and the Wilson Center's
Polar Institute co-hosted a workshop
on Policy and Action on Plastic in
the Arctic Ocean with the Icelandic
Chairmanship of the Arctic Council.
The event at Harvard Kennedy School
convened a diverse group of over sixty
global thought leaders, stakeholders, and
experts that included Indigenous leaders
from Alaska and Norway, scientists from

David Balton, Senior Fellow at the Wilson Center's Polar Institute, said, "The workshop provided extraordinary insight into the spread of plastic pollution in the Arctic Ocean. We learned what we know—and what we do not know—about this problem. We also developed a range of practical recommendations to address plastic pollution in the Arctic, even as we strive to improve our understanding."



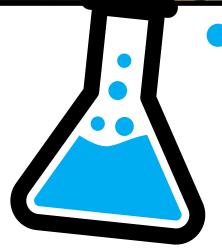
Following the two day workshop a summary of that conference, accompanying case studies, and white paper were published in a report entitled "Policy and Action on Plastic Pollution in the Arctic Ocean." which offered targeted recommendations to researchers and policymakers for how to begin to tackle the plastic problem. Since its publication this paper has helped shape the Arctic Regional Action Plan for addressing plastic pollution. Magnús Jóhannesson, the Arctic Council Special Coordinator on Plastics Pollution and Marine Litter, said of the report "Most of the strategy action recommendations from the Belfer Center report are on the table in the discussion for the development of the regional action plan."

The Arctic Initiative's work on plastic pollution continues as Arctic Initiative's co-Founder Halla Logadóttir described for the World Economic Forum.

Expanding the effort beyond the work for the Arctic Council, the Initiative's two post-doc fellows, Dr. Sarah Dewey and Dr. Sarah Mackie, are now working with a science group of the Nordic Council of Ministers, which includes 5 of the 8 Arctic states, to craft a summary of recommendations for policy makers.



Arctic Innovation Labs



Each fall, the Arctic Initiative sends student delegates to the Arctic Circle Assembly and collaborates on the Arctic Innovation Lab there, which convenes young people from around the Arctic and the world to share their solutions for a changing Arctic.



This year, four students from Harvard represented the Arctic Initiative at the annual Arctic Innovation Lab, together with eleven students from other universities. Students had the opportunity to network with peers from around the globe to discuss their solutions to Arctic Challenges.

The Harvard delegation had the opportunity to meet with experts such as Ambassador David Balton to share their ideas in advance of the Innovation Lab. The ideas presented ranged from a new naval policy of greater collaboration in the Arctic, to an indoor air quality sensor program for school children in Alaska,

and the students got great feedback from the participating experts.

This spring, fifteen students were selected from dozens of applicants to participate in the "Policy and Social Innovations for the Changing Arctic" course. Selected students developed creative solutions to some of the most pressing Arctic challenges, and pitched their ideas to Arctic experts and the greater Harvard community in a virtual Innovation Lab in April. Ideas ranged from inclusive community participation in mining development to increasing online schooling access in remote communities.



Throughout the course, students built skills from oral presentation to op-ed writing in order to improve their ability to communicate policy ideas, all within an Arctic context. Each student wrote an op-ed outlining their idea for a wider audience. They worked in collaboration with the editor of Arctic Today, one of the main news publications in the region, to prepare their op-eds and gather peer feedback. Several of the students will have their work published by Arctic Today.

While most students entered the course with limited knowledge of Arctic issues, they left with a greater understanding of the region and appreciation for the interconnectivity of policy issues in the Arctic with challenges faced around the world.

Engaging students through the course is just the beginning of a longer Arctic educational journey. Most students may not pursue careers specifically on Arctic issues, but lessons from the Arctic can inform approaches to a wide array of policy issues in other contexts, from coastal resilience to the rights of indigenous peoples. In the years to come, our students will surely reflect on lessons from their experience as Arctic Innovators to inform policy decisions, no matter where they are in the world.

For more on the

Arctic Innovation Labs, visit

belfercenter.org/arctic-initiative/
overview/arctic-innovators

COVID-19 Impacts on the Arctic



When COVID-19 caused the shuttering of our offices at Harvard, the Arctic Initiative team remained busy from our homes, bringing all of our research, teaching, partnering, and policy engagement online. It also became apparent that understanding how COVID-19 is impacting the Arctic was another important question for us to be asking.

Arctic Initiative Senior Fellow, Fran Ulmer, in her role as Chair of the Arctic Research Commission helped convene a virtual conference with the U.S. Naval War College, the Wilson Center Polar Institute, and the U.S. Arctic Research Commission on COVID-19 Impacts in the Arctic. Over two days, the conference featured a series of panels focusing on Arctic community health, economic activities, US Coast Guard Operations, scientific research, international impacts, and more. Speakers included leading voices from Arctic communities, federal and state agencies, academia, international entities, and the private sector.

Environment and Natural Resources Program Fellow, Cris Russell also conducted research and wrote an article for Arctic Today about the implications of COVID-19 on Arctic Research. Russell noted "Researchers hope that by putting off travel to the region, they will avoid spreading the disease in vulnerable rural communities and in field outposts with close living and working quarters. But the disruption will hinder a wide variety of ongoing studies, including research on ice sheets, glaciers, permafrost, plant and animal habitats, and ocean fisheries—research that underpins human understanding of global climate change and other vital scientific questions in the circumpolar North."

Smithsonian Earth Optimism Summit: Science Diplomacy in the Arctic



The most pressing challenges facing the world today are transnational and require scientific expertise to solve. In the past, science and its values have been at the core of international affairs, informing and supporting foreign policy objectives and lending strength to diplomatic and international relations. But what will science diplomacy look like in the future?

These are the issues that Senior Fellow Fran Ulmer explored, along with other experts, as part of a panel on "What is science diplomacy and why is it essential in the 21st century?" hosted as part of the Smithsonian's Earth Optimism Summit. Ulmer focused on the critical role science diplomacy has historically played in the Arctic and the important role it can play going forward as geopolitics in the region evolve.

A Conversation on What it Takes to Build Climate Resilience with Prof. Henry Lee and David Festa



Resilience is a term for the ability of social-ecological systems to adapt, bounce back, and even thrive through shocks or stresses. David Festa, Senior VP of Ecosystems at the Enivironmental DeFense Fund (and a Kennedy School alum), has been working to develop strategies to incentivize management practices support resilient ecosystems throughout his tenure at EDF.

Mr. Festa has a long track record of bringing diverse stakeholders together to meet growing needs for food, water and shelter in ways that benefit the environment and the economy. In these interactons he focuses on what it takes to create resilient ecosystems that make it possible for people and nature to thrive, even as the planet changes because of climate change, population growth and other stressors. In conversation with one of his early mentors from HKS, Arctic Initiative Co-Founder and Co-Director Henry Lee, Mr. Festa spoke about the three major challenges for most climate-adaptation projects: financing, building equity, and aligning diverse stakeholders and conflicting policy structures. While his remarks made it clear that planning for resilience is cost-effective in the long term, he noted that ,in the near term, it takes considerable work to align the financing, interests, and policy to design climate adaptive systems. Mr. Festa pointed to the great need for Kennedy School students to focus on the leadership and consensus-building skills they are learning during their time at HKS as the key to being effective in building connections and trust across diverse communities. These Skills were key to his work in building more resilient communities, he said.

"Conversations about community priorities are deeply relational. You can't build resilience without engaging with people."

-David Festa



Climate Change Communication

The national media continue to sound the alarm about climate change, but the gloom and doom narrative may fail to engage the public in a mean- ingful way. Elizabeth Arnold, Chair and Professor of Journalism, at the University of Alaska, former NPR national correspondent, and former Shorenstein Center fellow, spoke with Environment and Natural Resources Senior Fellow Cris Russell about reporting that conveys a catastrophic vision with little in the way of how individuals, communities, and governments are responding.

After a decade of reporting from some of the most remote areas of the Arctic, Arnold advocated for a solutions-focused approach to more effectively communicate about the risks of climate change.

This event was part of the course taught by Ms. Russell, herself a highly respected science journalist, on climate communications. The course culminates with a simulation of a press conference on Arctic climate change.

Indigenous Women Leaders Seminar

Almost four million people live in the Arctic today, and roughly ten percent of that population is Indigenous. Women have long played a crucial lead-ership role in many of the Arctic's Indigenous communities. Now, as climate change and other forces cause dramatic shifts in the



region, the role of women as community leaders is more important than ever.

The Arctic Initiative brought together three Indigenous leaders—Gunn-Britt Retter, Head of Arctic and Environmental Unit of the Saami Council; Deenaalee Hodgdon, Brown University student and Indigenous activist, who is a Deg Hit'an Athabaskan and Supiaq woman from the villages of Anvik and South Naknek, Alaska; and Raina Thiele, Founder and President of Thiele Strategies who was born and raised in Alaska and is Dena'ina Athabascan and Yup'ikas—to discuss how they see their communities adapting to the changes happening around them.

The three women shared their stories of growing up in traditional Indigenious households, the value of the lessons they learned from their community, and the fear they share that these kinds of subsistence lifestyles are at risk because of rising temperatures. Marginalized groupsare particularly vulnerable to climate change, with existing research providing evidence of ongoing and potential threats to their roles in community adaptation and in shaping change. The speakers shared their insights about how to address these threats and highlighted strategies to elevate women's voices and Indigenious voices in the climate-policy dialogue.

They noted that colonial Western ideas around who can lead and what a leader looks like are different from what they grew up with in their Indigenious culture, where all genders were viewed as equally able to 'lead' and to contribute to community in ways that are meaningful and acknowledged. The group discussed how to build local Indigenious institutions to lead in the Arctic, instead of forcing Indigenious groups to work through Western institutions that may not share their vision. Ms. Hodgdon summarized this idea noting; "Who better to direct the future of the Arctic than the people who have lived there for time immemorial?"

Minister Ane Lone Bagger: Greenland Seminar



When the Arctic Initiative invited Greenland's Minister of Education, Culture, Church and Foreign Affairs, Ane Lone Bagger, to the Kennedy School for an Arctic dialogue it was still a few weeks before President Trump had declared his interest in purchasing Greenland.

This new focus on Greenland made for an exciting conversation when the Greenlandic delegation visited the Kennedy School in September. Minister Bagger spoke about how Greenland is responding to the shifting dynamics in the Arctic as climate change is transforming the island and the waters surrounding it, opening up the region to the outside world. Minster Bagger declared Greenland as "Open for business, but not for sale" as she spoke about how Greenland is adapting to the dynamic future it faces and can advance its goals of cultural preservation, expanded commerce, and resilience in the face of its dissolving world.

Implications of Arctic Change

Arctic Initiative Senior Fellow, Fran Ulmer, continues to be a font of insights about every aspect of change in the Arctic. A former Mayor of Juneau, former Lieutenant Governor of Alaska, former Chancellor of the University of Alaska in Anchorage, and, until recently, the Chair of the U.S. Arctic Research Commission, her experience has been invaluable in the Initiative's work on the Arctic Ocean, building resilience in Arctic communities, Indigenous people's issues, governance at the Arctic Council, and the global impacts and implications of rapid climate change in the Arctic. She has also been a huge resource for our students.



Arctic Initiative at the Arctic Circle Assembly



The Arctic Initiative brought a strong delegation to the 2019
Arctic Circle Assembly. In addition to hosting the annual
Arctic Innovation Lab, Arctic Initiative also hosted a session on Arctic Melt & the Media: Human Stories of Climate
Adaptation and Resilience featuring Elizabeth Arnold,
Professor, Department of Journalism, University of Alaska,
Mark Trahant, Editor, Indian Country Today, Heather
Exner-Pirot, Managing Editor, University of Saskatchewan &
The Arctic Yearbook and Alice Rogoff, Publisher & Editorial
Director, Arctic Today, moderated by Cris Russell.

We also used the Arctic Circle Assembly as a venue to host a continuing conversation around our work on Arctic Governance. The Arctic Initiative in partnership with the Wilson Center, published A Strategic Plan for the Arctic Council: Recommendations for Moving Forward, written by Arctic Initiative Senior Fellow, Fran Ulmer, and Ambassador David Balton. Mike Sfraga, Director of the Polar Institute, said of the report; "Balton and Ulmer lay out practical and actionable recommendations that I am confident will positively inform the Council's work going forward and by doing so, also provide a clearer picture of our new, global Arctic." This paper was presented at the Arctic Circle Assembly and launched further conversations about how the Arctic Council should evolve as the region gains global attention.

Arctic Community Resilience

"If we set our collective shoulders to the wheel, we can build the necessary resilience to protect health and safety, culture, economies and ecosystems until climate mitigation actions begin to slow the rate of change later this century."

This was Arctic Initiative Senior Fellow Joel Clement's message as he spoke at the Arctic Frontiers Conference in Tromsø, Norway.



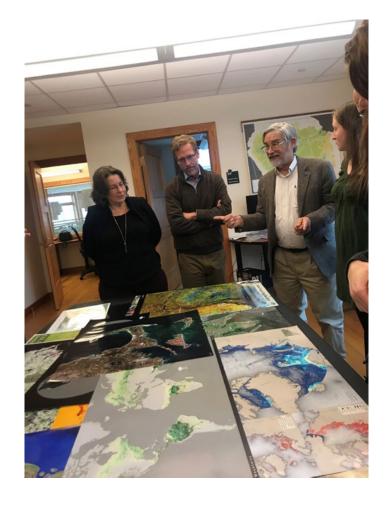
Joel has been exploring the topic of resilience as a key to addressing the challenges of rapid climate change in the Arctic since joining the Arctic Initiative team. This focus on resilience connects back to his work on the Arctic Resilience Action Framework with the Arctic Council during his time in the Obama Administration. He's brought his message about the need for a coordinated, regional approach to building resilience to the Arctic Indigenious Climate Summit and the Arctic Futures 2050 Conference, as well as to university audiences and in media appearances. Joel's approach has been a key ingredient in the resilience study groups we hosted this year and our continued work with the Sustainable Development Working Group of the Arctic Council on Arctic resilience.

National Academy of Sciences Seminar on Permafrost Thaw

Since launching our collaboration with the Woodwell Climate Research Center (formerly known as Woods Hole Climate Research Center) last year, we have been working together to better understand the wealth of data about permafrost thaw being collected by Woodwell's Arctic Carbon Monitoring and Prediction program—and to communicate insights about the implications of these data to a wide audience.

In that connection, John Holdren, Arctic Initiative Co-Founder and Co-Director, organized a seminar for the 2020 annual meeting of the National Academyof Sciences on Thawing Arctic Permafrost: Regional and Global Impacts. This session highlighted the threat thawing permafrost poses to buildings, roads, and pipelines, and communities due to increased erosion, as well as the wider consequences of the release of carbon dioxide and methane by the decomposition of previously frozen organic matter.

There is estimated to be something like 2.5 times as much carbon in the permafrost as in the entire global atmosphere; the key question is how fast it will come out. There is great uncertainty about the answer, but, at the high rates of release that appear possible over the decades ahead, the pace of climate change worldwide would be accelerated and the chances of keeping the global average temperature increase below 2 degrees celsisu would be reduced. The panelists, who came from both the Kennedy School and Woodwell teams, , explained the complex science of thawing permafrost and elucidated the implications both regionally and globally.



Meet our RAs

At the Arctic Initiative we are very fortunate to work with talented students from across Harvard University. In the 2019/2020 Academic Year we had the opportunity to bring on nine Research Assistants who helped us with our research and coursework.



Katie Segal, Louis Bacon Environmental Leader Fellow, Harvard Kennedy School, MPP Class of 2020

background is in biology and environmental policy, and the Arctic provides the perfect setting to focus on the science-policy interface.



Daniel Bicknell, Harvard Kennedy School, MPP Class of 2020

Share a few sentences about the work you did for the Arctic

Initiative this year: This year, I co-authored an article on marine plastic pollution, which was published on the World Economic Forum's Agenda page. I also had the opportunity to author a case study on the Icelandic Recycling Fund for the Arctic Initiative/Wilson Center publication "Policy and Action on Plastic in the Arctic Ocean." As a Course Assistant for the "Policy and Social Innovations for the Changing Arctic" course, I helped develop a collaborative policy project between students at HKS and the University of Greenland.

Why are you interested in the Arctic? I find the Arctic to be a fascinating example of international collaboration, and there is potential for additional cooperation around climate change and other critical environmental issues, like plastic pollution. The U.S. is an Arctic nation but few Americans realize this. I'm optimistic that the innovations that occur in the Arctic can serve as examples for the world.

What have you learned while working with the Arctic Initiative?

Working with the Arctic Initiative is an incredible learning opportunity. I have gained a deeper appreciation for the resilience of the region and its people, and for the changes taking place there, from climate change to shipping routes.

How does this work fit into your career goals? My focus has been on regional climate change policy. In the past, I have worked with U.S. states to mitigate emissions, adapt to changes, and build resilience. Working with the Arctic Initiative is a perfect fit for my career goals because I am able to expand this regional focus to new jurisdictions and international contexts. I also value working at the intersection of science and policy, as my

Share a few sentences about the work you did for the Arctic Initiative this year: This past year, I served as a course assistant for IGA-671M and helped guide the 15 students through their Arctic Innovation development process - from problem statement to their pitch at the HKS Arctic Innovation Lab. In addition, I have helped launch the Greenland Policy Challenge with the IGA-671M students and ten Greenland students from Greenland. While initially planned to occur in-person, we pivoted the format online and developed out a two-day virtual field experience that included briefings and mentorship from government representatives, professionals, and experts.

Why are you interested in the Arctic? As a South Florida native, I grew up with constant conversations about environmental degradation and climate risks. I developed an interest in the Arctic after arriving at HKS and hearing about the unique vulnerabilities that Arctic communities faced as a result of climate change.

What have you learned while working with the Arctic Initiative?

The Arctic Initiative demonstrates the potential to form deep and lasting relationships with individuals throughout a region even if they are not present in-person. The Arctic communities demonstrate the importance of on-the-ground truth, experience-based knowledge, local empowerment, and cross-cultural connections. The Arctic Initiative couples the urgent focus on addressing the social and environmental challenges with the long-lasting consequences of sustainable Arctic interventions.

How does this work fit into your career goals? I am interested in working at the nexus of government, science, and communities to combat the climate crisis. The Arctic Initiative developed my capabilities to work with individuals from various disciplines and across nations. It has also strengthened my abilities to develop iterative interventions that address real community concerns as opposed to imagined challenges inside a classroom or office.



Charlotte Dyvik Henke, Harvard College Class of 2021, SEAS Concentration in Environmental Science and Engineering

Share a few sentences about the work you did for the Arctic Initiative this year: This spring I worked with the Financing Arctic Resilience team to draw up a framework for climate resiliency in the Arctic, developing case studies around renewable energy development in the Arctic to inform a final white paper to the Sustainable Development Working Group at the Arctic Council.

Why are you interested in the Arctic? I have long been deeply engaged with contributing to various solutions of climate change. Being Norwegian, it felt natural to focus my attention towards the Arctic, especially given that the Arctic is one of the regions most heavily impacted by climate change.

What have you learned while working with the Arctic Initiative? I

have enjoyed learning more about renewable energy development in the Arctic, and the need for individualised solutions as well as collaboration and knowledge sharing. There is already a wealth of opportunity and knowledge about renewable energy and resilience; the key will be to unlock this to allow the Arctic to reach a climate resilient future.

How does this work fit into your career goals? I am excited about a future career in which I combine my environmental science and engineering background with implementing tangible ideas and projects, through policy and/or business. I have found working with the Arctic Initiative at HKS to be an invigorating combination of all of these aspects.



Sunaina Pamudurthy, Harvard Kennedy School, MPP, Class of 2022

Share a few sentences about the work you did for the Arctic

Initiative this year: A major part of my work involved ideating on innovative ways to engage Indigenous youth on topics of climate resilience and adaptation. With the help of our indigenous partners in the Arctic, we co-designed gamified simulations for youth to be equipped with the right skills on leading through a crisis, such as the COVID-19 pandemic. In addition, I had a chance to conduct research on the COVID response in the Alaskan region and also prepare interactive educational material on the Swedish mining town of Kiruna.

Why are you interested in the Arctic? We've always known that the magnitude of impact this region has on global ecosystems and communities is hugely significant. Unfortunately, the Arctic has had quite a bit of a head start on global warming compared to other geographies, but what's fascinating is that the solutions applicable to these communities will be relevant globally as the planet continues to heat up, so we all need to pay very close attention to the climate discussions in the circumpolar North.

What have you learned while working with the Arctic Initiative?

I had the wonderful opportunity of working alongside some of the most innovative minds from the Indigenous Arctic. My stint with the Arctic Initiative made me aware that it's not enough to be designing for the communities, but with them in every step of the climate challenge. Co-developing knowledge can be challenging but always leads to a far better solution that has longer term benefits.

How does this work fit into your career goals? I have a keen interest in the intersection of technology and climate resilience. I strongly believe Indigenous knowledge systems give strong grounding for modern science to rely on, and a lot of our climate goals can achieved through respectful collaboration. The Arctic Initiative exposed me to some of the most inspiring scientists, researchers, and Indigenous community leaders. Working with this team helped me gain a pragmatic view on resilience, and has trained me well on how to prioritise while working with communities on ground.



Mie Dahl, Crown Prince Frederik Scholar, Harvard Kennedy School, MPA Class of 2022

Share a few sentences about the work you did for the Arctic

Initiative this year: I worked as a summer research assistant for the Arctic Initiative this summer. I worked on producing a case study and gather teaching material for a study group on resilience and knowledge systems. In the case study work, I explored how to blend Indigenous and scientific knowledge systems by looking at shipping in the Canadian Arctic.

Why are you interested in the Arctic? I'm passionate about economic development, environmental issues and inclusive governance processes. The Arctic is the ideal place for exploring the intersections between all of these areas - and I see shipping in the Canadian Arctic as a particularly good example of that. I believe it is important to build more on Indigenous knowledge and perspectives in science and public policy in order to build more resilient, sustainable solutions for the future.

What have you learned while working with the Arctic Initiative?

I've been impressed by the great knowledge held by Indigenous people in the Arctic. They have so many important insights and stories that I had never imagined prior to working with the Arctic Initiative. The work has also been an eyeopener as to how much we still need to do to make sure that Indigenous knowledge is better utilized and honored. I've realized what a difficult, yet important work that is.

How does this work fit into your career goals? I aspire to work on reducing inequalities by making governance processes more inclusive - both in the private or public sector. Working at the Arctic Initiative has taught me important lessons about what needs to be in place for marginalized voices to get heard - and it has shown me the value of bringing those voices to the table.



Rachel Westrate, Editor-in-Chief, Harvard Environmental Law Review, Harvard Law School Class of 2021

Why are you interested in the Arctic? During my 1L summer, I interned in Mexico City and worked on the confluence of climate change and human rights, specifically with Latin American indigenous communities who were under threat from climate change. I loved the work, and when I came back to Harvard, wanted learn more about how I can use my law degree to assist those being impacted by climate change. These issues are especially pertinent in the Arctic, which is facing the fastest warming of any place on the planet.

What have you learned while working with the Arctic Initiative?

I learned the importance of interdisciplinary teams of study. My background is in environmental law, but at the Arctic Initiative I work with policymakers, public health experts, scientists, and designers. Climate change cannot be remedied only through the law, and stopping climate change will not address all the problems the Arctic faces; all of these disciplines have important work to contribute to the sustainable development of the Arctic region.

How does this work fit into your career goals? Eventually, I hope to work in international climate law, with a focus on human rights. At the Arctic Initiative, I am learning about the impacts of climate change on one region, and the methods used to adapt there. This knowledge is crucial to designing international law and policy that can help communities mitigate and adapt to climate change around the world.



Carina Peng, Harvard College Class of 2023

Share a few sentences about the work you did for the Arctic Initiative this year: I researched on the economic feasibility of renewables in the sub-Arctic regions of Alaska.

Why are you interested in the Arctic? I am interested in the Arctic because of its unique geopolitical characteristics and the intersection of energy and village resilience.

What have you learned while working with the Arctic Initiative?

I have grown tremendously through my work with the Arctic Initiative, from best research practices to knowledge on the region. To name one, I appreciated knowing that renewable alternatives do not automatically guarantee resilience and would require intentional designing of the policies and programs to accommodate the framework.

How does this work fit into your career goals? Through the Arctic Initiative work this summer, I learned about some of the inner workings of state agencies in sustainable energy.



Emily Kent, MPP, Harvard Kennedy School, Class of 2021

Share a few sentences about the work you did for the Arctic Initiative this year: My work with the Arctic Initiative centered around understanding how rural, coastal communities in Alaska are already seeing the impacts of climate change and how they are responding to those impacts. As part of this research, we looked at the type of infrastructure, government capacity, and financial resources that would be needed for an adequate climate response in these communities. Our hope was that this work would also be applicable to other regions in the Arctic, many of which are facing similar concerns.

Why are you interested in the Arctic? My professional and academic work has been focused on climate change policy more broadly, but the Arctic is such a rare and important case where

we can already see both causes and impacts of climate change. It was really interesting to be able to dive into some of these more specific causes and effects in the region.

What have you learned while working with the Arctic Initiative?

I have learned about the importance of engaging with local communities and their distinct contexts, rather than making assumptions based on regional framing or expected outcomes. I have also learned that resiliency is central to the way of life for many communities in the Arctic, and while resilience is relatively new in the climate change field, communities in the Arctic have been doing this work successfully for generations.

How does this work fit into your career goals? I hope to continue working in climate change policy after graduating from HKS this year, so the experience in this key region and broadening of my perspective will be invaluable and will help inform my policy work wherever I end up next.



Cayla Calderwood, HLS JD/MPP Joint Degree, Class of 2020

Why are you interested in the Arctic? The Arctic region is one of the fastest changing regions in the world. There are so many opportunities right now to influence the way that we approach this area. We have a rapidly closing window of time to make the right decisions and set us up for success in the region.

What have you learned while working with the Arctic Initiative:

I learned a lot about the Arctic environment, the people that live there, and the growing international dynamics in the area. Most importantly, I learned that there is space for people to make big impacts, even if they are still in school.

How does this work fit into your career goals? I just graduated with a joint law and policy degree and want to work on international environmental issues, specifically regarding the ocean. My time at the Arctic Initiative introduced me to people who will help me pursue this goal and gave me valuable tools as I move forward after school.

Student Highlight: Michelle Li

Michelle Li is a PhD candidate in public policy researching climate change and infrastructure resilience. For her innovative idea, Michelle focused on the relocation of Alaskan villages as a result of climate change, highlighting the high costs and emotional toll of native communities moving their homes to avoid rising seas and erosion. She cited a 2004 report commissioned by the Army Corps of Engineers that has served as the basis for the high costs estimates associated with relocation. The report estimates that relocation of Shishmaref would cost \$180 million over five years. However, Michelle challenged the continued validity of using this cost estimate because the report is so outdated that it does not "take into account technological innovation in the past 16 years."

Michelle argues that "the emergence of cost-saving technologies, in particular 3D-printed housing, may lower the cost of relocation." A 3D printed home or building costs around \$10,000 today; using this technology would result in a cost of relocation equivalent to ~10% of the previously estimated cost. Of course, challenges remain in pursuing a project of this scale and difficulty, especially in cold climates where the technology has been not yet applied extensively. Perhaps Michelle's idea will encourage more investment in new technologies to build resilient communities.

Michelle credits the course with expanding her perspective on the Arctic. She said that "class readings, discussion with my peers, and guidance from my mentor, Henry Lee, helped me learn about the unique challenges facing Alaskan villages that are trying to relocate and challenged me to think outside the box when crafting an innovation idea for serving these communities." Students like Michelle benefited from the academic experience of the course, and also found value in the social and networking opportunities. Michelle remarked that "in addition to having wonderful mentors in Halla and other leading experts, this course introduced me to many amazing peers of rich and varied backgrounds who have been instrumental in helping me learn and think in new ways. I'm grateful and humbled for the experience."



"I'm grateful and humbled for the experience."

Meet our Post-Docs

The Arctic Initiative welcomed two new Postdoctoral Research Fellows to our team in January, Dr. **Sarah Dewey** and Dr. **Sarah Mackie**. While each has a background in a different discipline—Dr. Dewey in oceanography and Dr. Mackie in environmental law—they have found the Arctic Initiative to be a place where cross disciplinary collaboration is encouraged.

"We sat down together our first week at HKS," explains Dr. Dewey, "and during a casual chat realized that we could combine our expertise to write a journal paper about Arctic marine plastic pollution. This kind of collaboration would never have happened without the

Arctic Initiative bringing us together in Cambridge."

Since joining the team Dr. Dewey and Dr. Mackie have been working on this joint publication as well as guiding students and Research Assistants through their own paper-writing processes for our Resilience Governance and Resilience Finance study groups. Abstracts for a number of these projects have been accepted for major international conferences due to take place in the coming year.

Not to be deterred by the pandemic, Dr. Dewey and Dr. Mackie have been leading outreach projects both at the Kennedy School and abroad, making use of new technological opportunities to reach people beyond Massachusetts. From elementary school aged Girl Scouts to graduate students, Dr. Dewey and Dr. Mackie have shared their expertise on the importance of understanding how climate change is impacting the Arctic and the actions that students can take to help to protect the environment.

"As part of this outreach work, we deliberately wanted to emphasize the ways in which racial injustice and environmental injustice are deeply intertwined for many communities in the Arctic." said Dr. Mackie. "We

hope that our post-doctoral work will contribute to the enhancement of racial, social and environmental justice in the Arctic and are grateful to the Arctic Initiative for giving us a platform from which to conduct this work."



"We deliberately wanted to emphasize the ways in which **racial injustice and environmental injustice** are deeply intertwined for many communities in the Arctic."

-Sarah Mackie

Meet Stuart Harris, Newly Affiliated Faculty

Dr. **N. Stuart Harris** first met Arctic Initiative Co-Director John Holdre, on a research trip in Alaska's permafrost region with our collaborators at the Woodwell Climate Research Center. Dr. Harris was serving as the team physician for expedition, which was taking samples and emplacing monitors to better understand current and future emissions from thawing permafrost.

Dr. Harris is the founder and Chief of the Massachusetts General Hospital Division of Wilderness Medicine, and the Director of the MGH Wilderness Medicine Fellowship. He is a full-time attending physician in the MGH Emergency Department and an Associate Professor of Emergency Medicine at Harvard Medical School. He graduated from the Harvard Affiliated Emergency Medicine Residency in 2003.

Dr. Harris's research focuses on investigating the pathogenesis and treatment of acute hypoxia/ high altitude illness and on the interplay between climate change and human health. His drive to



increase physician awareness of the interaction between environmental degradation and individual and public health has led to the creation of the first Wilderness

Medicine Fellowship at MGH. In Spring 2020 the Arctic Initiative was fortunate to welcome Dr. Harris as a Faculty Affiliate, so we sat down with him to learn a bit more about his work.

Q: What attracted you to wilderness medicine?

Dr. Harris: It's both harder and much easier. You are resource limited and under austere conditions, so you have to figure out how to take care of a patient and structure an environment where a patient can be effectively treated. You need to know how to act decisively under limited knowledge. You also need to talk to your patient. Narrative and human engagement is the most important tool we have as doctors. In the field

"There is a lot to be said for the recognition that **wilderness** and nature are really not two different things, and humans are part of nature."

-Stuart Harris

you can't hide behind fancy machines or a computer screen. It's a way to keep humanism at the heart of all medicine. With Wilderness Medicine I get to take care of everyone, and the whole person. Not just taking care of medical problems. It distills medicine to its roots.

Q: What are some lessons you've learned while practicing wilderness medicine?

There is a lot to be said for the recognition that wilderness and nature are really not two different things, and humans are part of nature. We've failed at the ecological part of health. Much of the damage inflicted on the land is also reflected in the communities. The tragedy of homo sapiens in the 21st

century is we don't see ourselves as part of the ecological community.

Q: How did you originally become interested in the Arctic?

Before I went back to medical school, I had several different careers, including working as a commercial fisherman in Alaska, and later in Denali National Park as a climbing ranger patrol. I fell in love with Alaska and its people.

Q: Since 2016 you've been the Medical Program Advisor of the Maniilaq Native Alaska Association in Kotzebue, AK, focused on medical programs for remote Native Alaska villages. What is unique about practicing medicine in the Arctic? In these more remote villages?

The challenge is you're on your own, so even when people get really sick you have to be the one to help them.

However medical care isn't an architectural phenomenon, it's about individuals. Medicine in much of America has gotten so far away from people, and in these remote places you can really spend time with people, which helps to make you a more effective doctor.

Q: Why were you interested in becoming a faculty affiliate of the Arctic Initiative?

Each day through my work I try to present science and medicine, but in some conversations we can see that data by itself is not enough. You need to make the story relevant, to people, to policy makers, to other decision makers. The Arctic Initiative is focused on that storytelling, connecting science and policy, and helping young leaders understand not only Arctic issues but how to communicate about them. That was something I wanted to be part of. Then of course the opportunity to spend more time with John, was also an attraction.

"Medicine in much of America has gotten so far away from people, and in these remote places you can really spend time with people, which helps to make you a more effective doctor."

-Stuart Harris

Meet our Arctic Course Mentors and Guest Lecturers

Bringing together current Arctic experts with graduate students to learn about the challenges and opportunities in the changing region allows the Arctic Initiative to build a bridge from current to future leaders. We are so grateful to our team of mentors who are contributing their time and expertise to empower the next generation of leaders who work with the Arctic Initiative.

	Alice Rogoff	Founder, Arctic Today; Arctic Initiative Global Advisory Board Member		Terzah Tippn Poe	Co-Instructor, Harvard Extension School
D. CL	Ástríður Jónsdóttir	Director of Program Management, Arctic Circle		Catherina Hvistendahl	First Secretary at Greenland Representation in Washington, D.C.
	Cristine Russell	Lecturer in Public Policy, HKS		Inuuteq Holm Olsen	Minister Plenipotentiary and Head of Representation for Greenland in the Danish Embassy
	David A. Balton	Former Ambassador for Oceans and Fisheries, U.S. Department of State		Mîtdlârak Lennert	Ph.D. fellow, University of Greenland
	Greg Poelzer	Professor, School of Environment and Sustainability, University of Saskatchewan		Sarah Dewey	Post Doc Fellow at Arctic Initiative, HKS
	Henry Lee	Senior Lecturer in Public Policy, HKS		Sarah Mackie	Post Doc Fellow at Arctic Initiative, HKS
	John Holdren	Professor, HKS and Department of Earth & Planetary Sciences		Svend Hardenberg	Chairman, Greenland Invest
	Lawson Brigham	Global Fellow, Wilson Center's Polar Institute		Tukumminnguaq Olsen	University of Greenland
	Marisol Maddox	Arctic Analyst, Polar Institute	BACTIC DINCASS TIS	Ulunnguaq Markussen	University of Greenland
	Michael Sfraga	Director, Global Risk and Resilience Program & Director, Polar Institute		Katti Frederiksen	Head of Secretariat, The Language Secretariat of Greenland
	Tero Vauraste	Global Fellow, Wilson Center's Polar Institute			

Arctic Course Mentor Highlights

Throughout the year a team of expert mentors assisted the students in developing their innovations. Mentors such as David Balton, Fran Ulmer, Alice Rogoff, **Tero Vauraste** (pictured), Cris Russell, and Terzah Tippen Poe challenged students to reconsider assumptions and brainstorm new policy models. Although the project was primarily an academic exercise, students benefited from real-world interaction with mentors. Students and mentors alike reported that the mentorship opportunity was a highlight of the learning experience.

Tero Vauraste is a Global Fellow at the Wilson Center's Polar Institute, among an array of other accomplishments ranging from his role as Vice Chairman of the Arctic Economic Council and Chairman of the Finnish Arctic Society. Mr. Vauraste mentored a student for the course, and remarked that he and the student "had a tremendously inspiring time [...] as we developed his research items on Arctic investments from various angles and viewpoints during very special COVID-19 circumstances. This kind of studying and interaction really serves the new Arctic futures."





"I thoroughly enjoyed the opportunity to hear and discuss the students' ideas. **Their innovative concepts were creative and related to many significant policy issues.** Since they are not from the Arctic region, and I am, our ability to talk about the ideas from our different perspectives was a mutually educational experience. I would gladly be a mentor again."

-Fran Ulmer

Co-Directors



John P. Holdren is the Teresa and John Heinz Professor of Environmental Policy at the Harvard Kennedy School; Co-director of the Science, Technology, and Public Policy Program at the Belfer Center; Professor of Environmental Science and Policy in the Department of Earth and Planetary Sciences; Affiliated Professor in the School of Engineering and Applied Science; and Senior Advisor to the Director at the independent, nonprofit Woodwell Climate Research Center.

Holdren is a member of the U.S.
National Academy of Sciences, the
U.S. National Academy of Engineering,
the American Academy of Arts
and Sciences, and the American
Philosophical Society. From January
2009 to January 2017, he was President
Obama's Science Advisor and the
Senate-confirmed Director of the White
House Office of Science and Technology
Policy (OSTP).



Halla Hrund Logadóttir is the
Co-Founder and Co-Director of the
Arctic Initiative at the Harvard Kennedy
School's Belfer Center. She also teaches
Harvard's interdisciplinary Arctic course
on Policy and Social Innovation for the
Changing Arctic.

Ms. Logadóttir co-curates the World Economic Forum's Arctic Transformation Map where she focuses on environmental issues. In her native Iceland, Ms. Logadóttir serves on the advisory board to Iceland's Minister of Industry and Commerce on Iceland's Energy Fund and chairs the Arctic Innovation Lab, that she established to encourage business and social innovation across the Arctic region. Ms. Logadóttir is the former Director of the Iceland School of Energy at Reykjavík University where she lectures on Arctic policies.



Henry Lee is the Jassim M. Jaidah
Family Director of the Environment
and Natural Resources Program at the
Belfer Center, Faculty Co-Chair of the
Sustainability Science Program, and
a Senior Lecturer in Public Policy. He
also serves on the Advisory Board of
the Harvard Kennedy School's Kuwait
Program.

Before joining the school, Mr. Lee spent nine years in Massachusetts state government as Director of the State's Energy Office and Special Assistant to the Governor for environmental policy. He has served on numerous state, federal, and private boards, and advisory committees on both energy and environmental issues.

Fellows and Staff

Cristine Russell is

an Adjunct Lecturer in Public Policy and Senior Fellow at the Environment and



Natural Resources Program. She is an award-winning freelance journalist who has covered science, environment, public health and STEM issues for more than three decades. Russell, a former national science reporter for The Washington Post, has also written for news media outlets such as Scientific American, Columbia Journalism Review, and The Atlantic. Russell is an Advisory Board member and former Fellow at HKS' Shorenstein Center on Media, Politics & Public Policy.

Joel Clement is a
Senior Fellow at
the Arctic Initiative.
Clement is a science



and policy consultant with a background in resilience and climate adaptation, landscape-scale conservation and management, and Arctic socialecological systems. As Director of the Department of Interior's Policy Office, he led a team of policy analysts and economists, provided advice and analysis to White House leadership and two Secretaries of Interior, developed innovative policies to address landscape conservation needs, and was the Interior Department's appointed principal to the U.S. Global Change Research Program. He also co-chaired the Arctic Council's groundbreaking 2016 Arctic Resilience Report.

Fran Ulmer is a

Non-Resident Senior Fellow at the Arctic Initiative. She is the former chair of the



U.S. Arctic Research Commission, where she served since being appointed by President Obama in March 2011. In June 2010, President Obama appointed her to the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling. From 2007 to 2011, Ms. Ulmer was chancellor of Alaska's largest public university, the University of Alaska Anchorage (UAA). Before that, she was a Distinguished Visiting Professor of Public Policy and Director of the Institute of Social and Fconomic Research at UAA. She is a member of the Global Board of the Nature Conservancy and on the Board of the National Parks Conservation Association. Ms. Ulmer served as an elected official for 18 years as the mayor of Juneau, a state representative, and as Lieutenant Governor of Alaska.

Sarah Dewey is a postdoctoral research fellow with the Belfer Center's Arctic Initiative. She holds



a PhD and MS in Oceanography from the University of Washington and a BS in Geology & Geophysics from Yale University, and her field experience centers on the use of aerial platforms to observe the western Arctic Ocean. Dr. Dewey's current research quantifies time and space scales of ice-ocean interaction and links them to the scope of environmental policy, strategic response, and mitigation of marine pollution. Besides her passion for fieldwork, a background in journalism and environmental education has fed Dr. Dewey's interest in science education, outreach, and the connection between geophysical research and policy.

Sarah Mackie is

a postdoctoral research fellow at the Belfer Center's Arctic Initiative. She holds a law degree



from the University of Cambridge and an LLM in environmental law from Newcastle University. A qualified lawyer in England and Wales, she has worked as a Judicial Assistant for the Lord Chief Justice of England and Wales. Dr. Mackie recently completed a PhD on comparative environmental law in the Arctic, with a particular focus on endangered species protection across Arctic jurisdictions. This research was conducted at a number of Arctic and other institutions including Newcastle University, Harvard Law School, Ilisimatusarfik (Greenland), the Arctic Centre (University of Lapland, Finland) and the KG Jebsen Centre for the Law of the Sea (University of Tromso, Norway).

Brittany Janis is the Research Manager for the Arctic Initiative. She is helping to lead the Arctic Initiative's research on advancing resilience in Arctic communities and developing policy solutions to combat plastic pollution in the Arctic Ocean. She graduated in May of 2019 from the Harvard Kennedy School MC/ MPA Program. She is a co-founder of Harvard Alumni for Climate and the Environment (HACE) Special Interest Group. While a student at HKS, Brittany worked as a Research Assistant for the Arctic Initiative, was a student member of the HKS Sustainability Leadership Council, and served as Program Director for the student-led Social Enterprise Conference. Before coming to Harvard, she spent her career working in strategic fund development and nonprofit management for a range of nonprofit organizations, most recently the Environmental Defense Fund (EDF).

Amanda Sardonis is the Associate Director of the Environment and Natural Resources Program (ENRP). She



development concerns. Amanda also manages ENRP's student support programs and the Roy Family Award for Environmental Partnership. Her research focuses on the potential of environmental public-private partnerships to meaningfully address complex environmental challenges such as climate change. She has a Master of Liberal Arts (ALM) in Sustainability and Environmental Management from Harvard University and a BA in English from Mount Holyoke College.

Karin Vander Schaaf

is the administrative coordinator of the Science, Technology, and Public Policy



Program (STPP) and provides faculty assistance to Professors Venkatesh Naravanamurti, John Holdren, Jim Waldo, Afreen Siddigi, Bruce Schneier and Arctic Initiative Co-Director Halla Logadottir. Her administrative responsibilities include financial management and budget oversight, logistics planning for conferences, seminars, and workshops, and working with the STPP and Environment and Natural Resources Program fellows on HKS administrative matters. Karin is passionate about the environment and is a Co-Chair of the HKS Green Team. She also serves on the HKS Joint Council.

Arctic Initiative

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