



## Bridging science, art, and community in the new Arctic

Leena Cho , Matthew Burtner , Howard Epstein , Claire Griffin & Matthew Jull

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ARTICLE



## Bridging science, art, and community in the new Arctic

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Although an increasing number of researchers focus on environmental, infrastructural and cultural dimensions of the Arctic, few efforts have been made to address how these various dimensions coalesce and may be changing in concert.<sup>1</sup> Transdisciplinary models of research are critical to address the complexity and magnitude of issues many Arctic communities face – especially due to the impacts of climate change, urbanisation and economic transformation – that a single discipline alone cannot solve.<sup>2</sup> Additionally, the various disciplinary or cultural contexts in which research is undertaken value different ways of knowing.<sup>3</sup> Therefore, recognising and communicating the ‘epistemological plurality’ inherent in any collective, community-based research is an important first step towards the study and management of socio-ecological systems in the Arctic.<sup>4</sup>

In order to further the development of convergent research practice frameworks that can mutually benefit Arctic communities and scholars conducting transdisciplinary research, a three-day symposium entitled *Bridging Science, Art, and Community in the New Arctic* was held in September 2019 at the University of Virginia (Figure 1).<sup>5</sup> The symposium aimed to develop a network for Arctic residents and researchers pursuing similar goals, facilitate knowledge exchange, and outline research practices that can generate mutual understanding and benefit. It further aimed to catalyse creative forms of communicating knowledge across multiple sectors and disciplines by integrating diverse voices and presentation formats into the symposium structure such as storytelling by Alaskan and indigenous youths, recommended in recent Arctic-focused gatherings.<sup>6</sup> Organised by the University of Virginia (UVA) Arctic Collaboration Lab (Arctic CoLab), within the UVA Environmental Resilience Institute, the symposium convened twenty-

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<sup>1</sup>Hinkel and Nelson, “Anthropogenic Heat Island at Barrow”; Forbes et al., “High Resilience in the Yamal-Nenets Social-Ecological System”; Reynolds et al., “Cumulative Geoecological Effects of 62 Years.”

<sup>2</sup>Lawrence, “Deciphering Interdisciplinary and Transdisciplinary Contributions”; Eicken, Forbes, and Wiggins, “State of the Arctic Conference 2010”; Petrov et al., “Arctic Sustainability Research”; Triscott, “Curating Contemporary Art”; Cho and Jull, *Mediating Environments*.

<sup>3</sup>Heyes, “Inuit and Scientific Ways of Knowing”; Raymond-Yakoubian et al., “Mapping and Indigenous Peoples in the Arctic.”

<sup>4</sup>Miller et al. “Epistemological Pluralism.”

<sup>5</sup>In addition to ‘Navigating the New Arctic,’ the National Science Foundation (NSF) identified ‘Growing Convergence Research’ as one of the NSF’s 10 Big Ideas. The *Bridging* symposium adopted and further explored the NSF’s description of convergence: ‘the merging of ideas, approaches and technologies from widely diverse fields of knowledge to stimulate innovation and discovery’ to address complex challenges of today. For more information on the convergent research practice, see [https://www.nsf.gov/news/special\\_reports/big\\_ideas](https://www.nsf.gov/news/special_reports/big_ideas).

<sup>6</sup>Jewell, “This Arctic Life”; Fisher, Kelly, and Kling, *Arctic Futures 2050 Conference Report*.

# BRIDGING SCIENCE, ART, AND COMMUNITY IN THE NEW ARCTIC

ARCTIC COLAB SYMPOSIUM  
University of Virginia | September 23 - September 25, 2019

Organized by: **Matthew Burner** (Dept. of Music), **Leena Cho** (Dept. of Landscape Architecture), **Clair Griffin** (Dept. of Environmental Sciences), **Howard Epstein** (Dept. of Environmental Sciences), **Matthew Jull** (Dept. of Architecture)

## MONDAY, SEPTEMBER 23

@ Pavilion VII (Colonade Club)

08:30-09:00: REGISTRATION, COFFEE & LIGHT BREAKFAST

09:00-09:15: INTRODUCTION

**Howard Epstein**, Professor & Chair of Environmental Sciences

09:05-09:20: OPENING REMARKS

**Matthew Burner**, Director of Center for Arctic Research

**Karen McGlashan**, Professor of Environmental Sciences & Design

**Clair Griffin**, Professor of Environmental Sciences & Design

SESSION 1: LAND, COAST & OCEAN

09:20-09:50: **Anna Lipofsky**, University of Alaska Fairbanks

"The best of both worlds: Combining different approaches and data for use of the world's most vulnerable landscapes"

09:50-10:00: **Eben Hagan**, Arctic Youth Ambassador

10:00-10:30: **Craig Tweedie**, University of Alaska at Fairbanks

"Patterns, causes, and implications of coastal change near Upernivik, AK"

10:30-10:40: **Center Prize**, Arctic Youth Ambassador

10:40-10:55: BREAK

10:55-11:15: **Eight Blackbird**

"In a Landscape" composed by John Cage (1948)

11:15-11:45: **Christina Bonnell**, University of Texas at Austin

"Connecting science, education, and community in the Hudson River ecosystem LTR"

11:45-11:55: **Gabriel Storch**, Arctic Youth Ambassador

12:00-12:30: LUNCH

Lunch is provided for all invited guests and registrants @ Pavilion VII

SESSION 2: INFRASTRUCTURE & COMMUNITIES

12:30-14:00: **Shipwreck**, University of Alaska Fairbanks

"Navigating the new Arctic: Landscape evolution and adapting to change in ice-rich permafrost systems"

14:00-14:30: **Lara Nelson**, TRIM LLC & North Slope Borough

"American Arctic Infrastructure: Planning for uncertainty"

14:30-14:40: **Kate McWilliams**, Arctic Youth Ambassador

14:40-15:00: BREAK

15:00-15:10: **Janetle Trueblood**, Arctic Youth Ambassador

15:10-15:40: **Martin Joffin**, Arctic Youth Ambassador

"Arctic communities"

15:40-16:10: **Generative Vachon**, Laval University

"Behind the curtain: Research partnerships in Indigenous contexts"

16:10-16:20: **Cade Tranda**, Arctic Youth Ambassador

16:20-16:30: CLOSING REMARKS

**Leena Cho**, Assistant Professor of Landscape Architecture

**Matthew Jull**, Associate Professor of Architecture

18:00-19:30: DINNER

Dinner is provided for all invited guests and registrants @ Pavilion VII

20:00-21:00: CONCERT @ Old Cabell Hall, UVA Grounds

**Eight Blackbird** & **Diwanne Spring Quartet**

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**Eight Blackbird** & **Diwanne Spring Quartet**

The Arctic is characterized by extreme environments that have led to the development of a wide range of unique ecosystems, cultures, and settlements. Northern high-latitude ecosystems are presently some of the most dynamic systems on Earth, owing to anthropogenic climate change, human land use practices, and utilization of land for marine environments. Even as tundra, tundra, and marine ecosystems respond to climate change, the human presence in the Arctic is likely to grow, as it is home to major fisheries, indigenous subsistence, industrial sites, scientific practices, military installations, and some of the most extensive resource extraction operations on the planet.

Although active research continues on environmental, infrastructure, and cultural aspects of the Arctic, few efforts have been made to address how these different aspects coalesce, and how knowledge that bridges disciplines may be necessary for Arctic systems to be resilient and adaptive to change. Bridging Science, Art, and Community in the New Arctic brings together researchers, students, community representatives, and policy makers from Alaska and beyond to facilitate knowledge exchange and catalyze a common interest in the future of the Arctic, as a setting that emphasizes creative collaborations and co-production of knowledge.

## TUESDAY, SEPTEMBER 24

@ Pin-University Institute, 1400 University Avenue

08:30-09:00: COFFEE & LIGHT BREAKFAST

09:00-10:00: PANEL DISCUSSION - LAND

**Eben Hagan**, **Make Measure Public**, **Anna Lipofsky**, **Yvonne Love**

Moderators: **Leena Cho** & **Howard Epstein**

10:00-10:15: BREAK

10:15-11:15: PANEL DISCUSSION - OCEAN

**Rob Durr**, **Center Prize**, **Christina Bonnell**, **Craig Tweedie**

Moderators: **Clair Griffin** & **Matthew Burner**

11:15-11:40: POSTER SESSION & LUNCH

Lunch is provided for all invited guests and registrants @ Pin-Inst. Inst.

1:40-1:50: PANEL DISCUSSION - INFRASTRUCTURE

**Cade Tranda**, **Kate McWilliams**, **Martin Joffin**, **Shipwreck**

Moderators: **Howard Epstein** & **Matthew Jull**

15:00-15:15: BREAK

15:15-16:15: PANEL DISCUSSION - COMMUNITIES

**Gabriel Storch**, **Janetle Trueblood**, **Scott Hayes**, **Lara Nelson**, **Generative Vachon**

Moderators: **Leena Cho** & **Clair Griffin**

16:15-16:45: GALLERY TALK & RECEPTION

@ Ruffin Hall Gallery, 179 Clifton Road

"A Quick and Tragic Turn" by **Leena Cho** & **Rapamagoo Collaborative**

Exhibition: August 30 - October 18, 2019

## WEDNESDAY, SEPTEMBER 25

@ Pin-University Institute, 1400 University Avenue

08:30-09:00: COFFEE & LIGHT BREAKFAST

09:00-10:15: ARCTIC ECOSYSTEMS WORKSHOP

Leads: **Matthew Burner** & **Christopher Lupo-Maga**

All interested guests and students are welcome to participate

10:15-10:30: BREAK

10:30-12:00: SYNTHESIS & CLOSING DISCUSSION

All invited and interested guests, moderated by **Clair Griffin** and **Howard Epstein**

12:00-12:30: TOUR I - UVA Schools and Departments

Sign-up at the registration reception table

1:00-1:30: TOUR II - Inuit Art Gallery & 22 Elmwood Avenue

Limited participation, sign-up at the registration reception table

The symposium is funded by the National Science Foundation, the American Geophysical Union, the UVA Center for Global Inquiry and Innovation, and the UVA Institute of the Humanities and Global Culture. Special thanks to the Arctic Research Consortium of the United States (Helen Wiggins, Oliver Lee), the UVA Environmental Resilience Institute (Kerrie McGlashan, Jason Jull), Ron Lee, Chad Nagay, Theodore Tschman, and Elizabeth Jackson for supporting the facilitation of this event.

**ANNA LIPOFISKY**, Research Scientist, Division of Science and Technology, University of Alaska Fairbanks  
Dr. Lipofsky studies how rocks have been used by the Arctic Native peoples for thousands of years. She is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**CHRISTINA BONNELL**, Research Scientist, Division of Science and Technology, University of Alaska Fairbanks  
Dr. Bonnell is a research scientist in the Division of Science and Technology, University of Alaska Fairbanks. She is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**CHRISTOPHER LUPU-MAGA**, PhD Candidate in Construction and Management, University of Virginia  
Dr. Lupu-Maga is a PhD candidate in the Department of Construction and Management, University of Virginia. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**CLAIR GRIFIN**, Professor of Environmental Sciences and Engineering, University of Virginia  
Dr. Griffin is a professor in the Department of Environmental Sciences and Engineering, University of Virginia. She is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**CRISTIAN VACHON**, Professor of Planning and Urban Design, Laval University  
Dr. Vachon is a professor in the Department of Planning and Urban Design, Laval University. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**EGHTEH BLACKBIRD**, Musician  
Eight Blackbird is a musical group that performs contemporary music. They are currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**GENERATIVE VACHON**, Professor of Planning and Urban Design, Laval University  
Dr. Vachon is a professor in the Department of Planning and Urban Design, Laval University. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**LARA NELSON**, TRIM LLC & North Slope Borough  
Dr. Nelson is a research scientist in the Division of Science and Technology, University of Alaska Fairbanks. She is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**MARTIN JOFFIN**, Arctic Youth Ambassador  
Dr. Joffin is a research scientist in the Division of Science and Technology, University of Alaska Fairbanks. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**SCOTT HAYES**, Arctic Youth Ambassador  
Dr. Hayes is a research scientist in the Division of Science and Technology, University of Alaska Fairbanks. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**SHIPWRECK**, Arctic Youth Ambassador  
Dr. Shipwreck is a research scientist in the Division of Science and Technology, University of Alaska Fairbanks. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**YVONNE LOVE**, Arctic Youth Ambassador  
Dr. Love is a research scientist in the Division of Science and Technology, University of Alaska Fairbanks. She is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**HOWARD EPSTEIN**, Professor of Environmental Sciences and Engineering, University of Virginia  
Dr. Epstein is a professor in the Department of Environmental Sciences and Engineering, University of Virginia. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**LEENA CHO**, Assistant Professor of Landscape Architecture, University of Virginia  
Dr. Cho is an assistant professor in the Department of Landscape Architecture, University of Virginia. She is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**MATTHEW BURNER**, Director of Center for Arctic Research, University of Virginia  
Dr. Burner is the director of the Center for Arctic Research, University of Virginia. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**MATTHEW JULL**, Associate Professor of Architecture, University of Virginia  
Dr. Jull is an associate professor in the Department of Architecture, University of Virginia. He is currently working on a project to map the distribution of rocks in the Arctic region, which will help to understand the history of human settlement in the Arctic.

**KEVIN MONTGOMERY**, Arctic Youth Ambassador  
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**CARL EMMETT TRANDA**, Arctic Youth Ambassador

The three-day symposium started on 23 September with a series of short talks and performances by invited guests who shared their research, stories, music, and perspectives on the Arctic. These talks and performances were thematically organised into two sessions: 'Land, Coast, and Ocean' and 'Infrastructure and Communities.' Arctic Youth Ambassadors presented their stories and lessons from living in the Arctic throughout the day, interspersed among lectures and performances. On 24 September, the individual themes were revisited in the format of four sequential panel discussions moderated by the Arctic CoLab organisers, with each session representing a panel of participants with diverse viewpoints and expertise, including Arctic Youth Ambassadors on each panel. There was additionally a lunchtime poster session, highlighting the environmental and data science research done by students, postdoctoral researchers and faculty, and providing opportunities to communicate their work to the audience of diverse, non-science backgrounds. The symposium extended into the evenings of the first two days with an Arctic-themed eco-acoustics concert featuring the Grammy Award-winning ensemble Eighth Blackbird, and an art exhibition 'A Quick and Tragic Thaw' by Love & Russomagno Collaborative. On 25 September, an interactive music workshop tested new forms of engagement, and a final synthesis discussion allowed participants to unpack the previous two days of discussions and develop an initial sketch of 'action plans' for community-oriented convergent research, with the aim of identifying effective and inventive forms of collaboration and communication (Figure 2).

Participants in the symposium came away with a broader understanding of the relationships between the natural and built environments in the Arctic, as experienced from multiple disciplinary and cultural viewpoints, as well as with various tool sets for communicating these viewpoints – from data and musical compositions to personal storytelling and visual narratives. Several challenges and opportunities for bridging



**Figure 2.** Diverse forms of research sharing and communication were used during the symposium, including oral and poster presentations, music performance, interactive eco-acoustics workshop, art exhibition, and panel discussions with Arctic Youth Ambassadors. Photo credit: Chloé Nagraj and Arctic Design Group ([www.arcticdesigngroup.org](http://www.arcticdesigngroup.org)).

disciplines and communities through research were also discussed. Key lessons and insights shared during the symposium are summarised as follows:

**Communicating Transdisciplinary Knowledge:** In the sciences, data are the normative form of research outcomes. In the visual, sound, and applied arts, data often act as a starting point for interpretation and adaptation towards a new, creative work. The symposium participants presented their work in a variety of different formats in addition to the oral and poster presentations, such as performance, exhibition, music workshop, film viewing, and open discussions in smaller groups. Many participants noted during the synthesis discussion that these interactive and inclusive forms of engagement were effective in understanding and appreciating diverse viewpoints on the Arctic, and allowed them to join the conversation more easily. Furthermore, identifying and experimenting with alternative forms of communicating knowledge, such as the music workshop on the last day of the symposium, provided an opportunity to interpret data creatively, thereby forming and sharing knowledge collectively. Interactive forms of research sharing beyond one-way presentations or static visualisations of data have the capacity to solicit great public interest and participation, and form mutual understandings among researchers for collaborative work.

**Foregrounding Indigenous Knowledge:** Indigenous knowledge must be incorporated into as many stages of Arctic research as possible. However, several participants of the symposium, including the Arctic Youth Ambassadors, noted that the term '*co-production* of knowledge' used widely in research and grant-making protocols continues to assume a dichotomy between the western and indigenous ways of knowing. Successful convergent research should find ways to not only highlight the indigenous science and formally acknowledge indigenous contributions,<sup>7</sup> but also integrate various systems of knowing the Arctic environment into a holistic, multi-dimensional research methodology. Indigenous knowledge is expressed in myriad forms, such as storytelling and dialogue, but also as arts. Creating more opportunities for storytelling, especially from youths, and accommodating other forms of knowledge expression and sharing, will facilitate integration by engaging indigenous artists, musicians, filmmakers, or designers who already employ synthetic approaches to understanding the Arctic environment.

**Sustaining Convergent Research that Matters to Community:** Translating research to action-oriented outcomes can facilitate interdisciplinary collaborations, clarify collective research goals, benefit Arctic communities, and contribute to a long-term sustainment of convergence efforts that have tangible, valuable impacts for Arctic residents. 'Action research' that matters to the Arctic communities will have a clear framework for its application that contributes to immediate, local decision-making and capacity building.<sup>8</sup> Arctic research projects – across topics, disciplinary and collaborative positions – should promote the use of local resources that benefit the livelihood of communities economically, culturally, and environmentally. Furthermore, action-oriented outcomes can start with action-oriented research processes, which many of the arts- and design-based models of practice already employ, such as participatory mapping, design charrettes or documenting research with film or photography to create a collective storytelling.<sup>9</sup>

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<sup>7</sup>Brewster, "Native Contributions to Arctic Science."

<sup>8</sup>Petrov et al., "Arctic Sustainability Research."

<sup>9</sup>Vachon et al., "Imaginer l'aménagement soutenable des villages inuits du Nunavik."

As a direct result of the symposium, reflecting and building on the insights generated during this event, the Arctic CoLab has initiated a new pilot project entitled Arctic Environmental Data Narratives (AEDN). Four interdependent research objectives of AEDN are to: 1) instal an array of environmental and acoustic sensors in Utqiagvik, Alaska, to study the interactions between the natural and built Arctic systems, 2) identify architectural design and urban landscape management parameters responsive to these changing coupled systems, 3) develop methods for collaborative knowledge production among researchers and local Inupiaq residents and organisations, and 4) explore visualisation, sonification and animation strategies using collected environmental data to develop creative work, as well as interactive ways of communicating and reciprocating research.

## Acknowledgments

This symposium was funded by the National Science Foundation Navigating the New Arctic workshop grant #1744413; an American Geophysical Union Centennial grant; the University of Virginia Institute for the Humanities and Global Cultures; the University of Virginia Center for Global Inquiry and Innovation; and the University of Virginia Environmental Resilience Institute. We extend our gratitude to the Arctic Research Consortium of the United States (Helen Wiggins and Olivia Lee) and a team of students and staff (Jane Lee, Theodore Teichman, Chloé Nagraj, and Elizabeth Jackson) at the University of Virginia for their logistical planning and support for the event.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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