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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.¹ 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.² Additionally, the various disciplinary or cultural contexts in which research is undertaken value different ways of knowing.³ 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.⁴

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).⁵ 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.⁶ 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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¹Hinkel and Nelson, “Anthropogenic Heat Island at Barrow”; Forbes et al., “High Resilience in the Yamal-Nenets Social-Ecological System”; Reynolds et al., “Cumulative Geoeological Effects of 62 Years.”

²Lawrence, “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*.

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

⁴Miller et al. “Epistemological Pluralism.”

⁵In 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.

⁶Jewell, “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), **Hannah Epstein** (Dept. of Environmental Sciences), **Matthew Hill** (Dept. of Architecture)

The Arctic is characterized by extremes of environment that have led to the development of a wide range of unique ecosystems, cultures, and traditions. Northern high-latitude ecosystems are presently some of the most dynamic systems on Earth, owing to unprecedented climate change, human land use practices, and utilization of lands for marine ecosystems. Even as tundra, tundra, and marine ecosystems respond to climate change, the human presence in the Arctic is likely to grow, as it has in major fisheries, indigenous communities, 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 converge, 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 starting point for collaborative creative collaborations and co-production of knowledge.

MONDAY, SEPTEMBER 23

@ Pavilion VII (Commons Club)

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

09:00-09:05: INTRODUCTION
Hannah Epstein, Professor & Chair of Environmental Sciences

09:05-09:20: OPENING REMARKS
Matthew Burner, Director, Dept. of Music; **Kevin McClellary**, Professor of Environmental Sciences & Design, UVA Environmental Resilience Institute

SESSION 1: LAND, COAST & OCEAN

09:20-09:50: **Anna Lifshitz**, University of Alaska Fairbanks "The best of all worlds. Combining different approaches and data for top of the world permafrost technology discrepancy"

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

10:00-10:30: **Caig Tweedie**, University of Teesside at B Pao "Tensions, causes, and implications of coastal change near a Uqviq, AK"

10:30-10:40: **Carer Price**, 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 "Converging science, education, and community at the Beaufort Lagoon ecosystem LTER"

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

13:30-14:00: **Shay Wilkins**, University of Alaska Fairbanks "Navigating the new Arctic: Landscape evolution adapting to change in ice-rich permafrost systems"

14:00-14:30: **Lara Nolan**, TRIBU 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: **Jeanette Trowbridge**, Arctic Youth Ambassador

15:10-15:40: **Martin Jeffery**, U.S. Army CEREL "Arctic communities"

15:40-16:10: **Genevieve Vachon**, Laval University "Behind the curtain: Research partnerships in Indigenous contexts"

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

16:20-16:40: CLOSING REMARKS
Leena Cho, Assistant Professor of Landscape Architecture
Matthew Hill, 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 Quarter**

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 Center, the Center for Global Inquiry (Helen Wiggins, Olivia Lee), the UVA Environmental Resilience Institute (Kevin McClellary, Jason Fogel), Ross Lee, Chidi Ngunjiri, Theodore Tischman, and Elizabeth Johnson for supporting the facilitation of this event.

TUESDAY, SEPTEMBER 24

@ Pin-University Institute, 1400 University Avenue

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

09:00-10:00: PANEL DISCUSSION - LAND
Eben Hopson, **Maia Mustafa Pella**, **Anna Lifshitz**, **Yvonne Love**
Moderators: **Leena Cho** & **Hannah Epstein**

10:00-10:15: BREAK

10:15-11:15: PANEL DISCUSSION - OCEAN
Ruth Dain, **Carer Price**, **Christina Bonnell**, **Caig Tweedie**
Moderators: **Clair Griffin** & **Matthew Burner**

11:15-11:40: POSTER SESSION & LUNCH
Lunch is provided for all invited guests and registrants @ Pin-U. Inv.

11:40-15:00: PANEL DISCUSSION - INFRASTRUCTURE
Cade Tranda, **Kate McWilliams**, **Martin Jeffery**, **Shay Wilkins**
Moderators: **Hannah Epstein** & **Matthew Hill**

15:00-15:15: BREAK

15:15-16:15: PANEL DISCUSSION - COMMUNITIES
Gabriel Storch, **Jeanette Trowbridge**, **Sara Hayes**, **Lara Nolan**, **Genevieve Vachon**
Moderators: **Leena Cho** & **Clair Griffin**

16:15-16:45: GALLERY TALK & RECEPTION
@ Kuffler Hall Gallery, 179 Gallichurst Road
"A Quick and Tragic" Theme" by **Lara & Rasmusgaard Collaborative**
Reception 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 COSMOTOLOGISTS WORKSHOP
Leads: **Matthew Burner** & **Christopher Lago**
All interested guests and registrants are welcome to participate

10:15-10:30: BREAK

10:30-12:00: SYNTHESIS & CLOSING DISCUSSION
All invited and interested guests, moderated by **Genevieve Vachon**

14:00-16:00: TOUR II - Inuit Art Gallery @ 23 Elmwood Avenue
Limited participation. Register as the symposium registration table.

Figure 1. Symposium brochure of schedule and invited guests. Symposium participants included scientists, artists, musicians, designers, policy makers, Arctic Youth Ambassadors, Arctic local community representatives, and University of Virginia students and faculty. Brochure design: Leena Cho.

one invited guests across the sciences, arts, and design, as well as from the Arctic Youth Ambassador Program, from Alaska and beyond. While the geographic focus of the symposium was in the U.S. Arctic (Alaska), several participants shared their perspectives of working with communities in the Canadian Arctic. Approximately one hundred people attended the symposium, including researchers, educators, students, and practitioners from the disciplines of the environmental sciences, visual arts, music, architecture, landscape architecture, arctic social sciences and policy studies. Participants were mainly from the U.S. with several others joining from Canada, Spain, Australia, and the U.K. Community representatives from Arctic Alaska, University of Virginia, and Charlottesville were present throughout the event.

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).

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,⁷ 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.⁸ 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.⁹

⁷Brewster, “Native Contributions to Arctic Science.”

⁸Petrov et al., “Arctic Sustainability Research.”

⁹Vachon 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.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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