

# INDIGENOUS KNOWLEDGE SYSTEMS AND CROSS-CULTURAL RESEARCH

Ray Barnhardt  
University of Alaska Fairbanks

White Paper Submitted to AOS 2016, Theme 6

The initiatives outlined in this article are intended to advance our understanding of cultural processes as they occur in diverse community contexts, as well as contribute to the further conceptualization, critique, and development of Indigenous Knowledge Systems in their own right. Just as those same initiatives have drawn from the experiences of Indigenous Peoples from around the world, the organizations and personnel associated with this article have played a lead role in developing the emerging theoretical and evidentiary underpinnings on which the associated research is based. The expansion of the knowledge base that is associated with the interaction between western science and Indigenous Knowledge Systems will contribute to an emerging body of scholarly work regarding the critical role that local observations and Indigenous Knowledge can play in deepening our understanding of human and ecological processes, particularly in reference to the experiences of Indigenous Peoples.

This White Paper addresses issues of relevance to underserved populations in Alaska, the Arctic and other geographic regions inhabited by Indigenous Peoples. It provides a much-needed impetus toward organizing research and education support structures that contribute to the broadening of an infrastructure fostering the use of multiple knowledge systems and diverse approaches to research. The international scope of the initiatives described provides multiple benefits derived from the economies of scale associated with linking numerous small-scale populations, as well as increased generalizability of outcomes associated with the extensive opportunities for cross-cultural comparison.

Indigenous Peoples of the circumpolar north have been caretakers of the land for millennia and thus have acquired extensive deep knowledge regarding the environment in which they live. Furthermore, Indigenous residents of the Arctic and subarctic regions have been at the forefront of debates about the impacts and responses to accelerating ecological changes. The Alaska Observation Summit (AOS) provides an opportunity to forge more meaningful institutional and collaborative research links with Indigenous communities and to entrain and support emerging Indigenous scholars. It was clear that implementing a successful research program requires working closely with Indigenous stakeholders in all phases of developing and implementing an Indigenous research agenda.

Some of the near- and long-term goals of Indigenous-driven cross-cultural research are as follows: (1) develop a strategy and support activities to increase the numbers of Alaska Native graduate and undergraduate students in underrepresented fields of scientific research; (2) foster inclusion of Alaska Native perspectives in planning and research activities at UAF that have implications for Native people and communities, including seeking funding to engage Native graduate students in affiliation with such research initiatives; (3) work with researchers to insure compliance with protocols for cultural and intellectual property rights, including the Principles for the Conduct of Research in the Arctic and the Research Guidelines of the Alaska Federation of Natives (<http://www.ankn.uaf.edu/rights.html>); and (4) help implement a program of graduate fellowships and residencies to enhance exchange between Arctic Indigenous Peoples, and

between Indigenous and western perspectives on topics of relevance to the circumpolar north.

### **In Pursuit of Indigenous Research Methodologies**

The graduate education initiatives outlined here integrate the tools and approaches of the natural and social sciences in a cross-cultural and interdisciplinary framework for analysis to better understand the emerging dynamic between Indigenous Knowledge systems and western science. The focus is on the interface between Indigenous knowledge and research on an international scale, with opportunities for collaboration among Indigenous Peoples from throughout the major Indigenous regions of the world. The emphasis is on engaging a new generation of Indigenous PhD's by providing support for a cohort of Indigenous graduate students and scholars who can effectively integrate multiple cultural perspectives. In so doing, we are pursuing the development of a deeper understanding of Indigenous Knowledge systems as they relate to conceptions of research and the application of that understanding to contemporary issues, particularly in the context of Indigenous research initiatives. It also draws and builds upon past and current Indigenous research initiatives that have sought to utilize Indigenous Knowledge to strengthen the research and pedagogical practices in K-16 education.

With numerous research initiatives currently in various stages of development and implementation that revolve around themes that drive The University of Alaska Fairbanks (UAF) engagement with Indigenous research, there is an unprecedented window of opportunity to open new channels of communication between scientists and Indigenous communities, particularly as they relate to those research activities that are of the most consequence to Indigenous Peoples (e.g., effects of climate change, environmental degradation, contaminants and subsistence resources, health and nutrition, bio/cultural diversity, natural resource management, economic development, resilience and adaptation, community viability, cultural sustainability, language education, etc.). To the extent that there are competing bodies of knowledge (Indigenous and western) that have bearing on a comprehensive understanding of particular research initiatives associated with the Indigenous themes, we seek to provide an opportunity for faculty and students to embed an Indigenous perspective within their graduate research initiatives to contribute to and learn from a collaborative research process.

Given the range of interdisciplinary applications and research topics that come into play at the interface between Indigenous and western knowledge systems, the UAF Indigenous Studies PhD program has been structured to insure that students achieve both breadth and depth in their graduate studies. This is accomplished by requiring all students to complete a set of core courses, coupled with specialization from a choice of six emphasis areas:

Indigenous Knowledge Systems	Indigenous Pedagogy/Education
Indigenous Research	Indigenous Leadership
Indigenous Languages	Indigenous Sustainability

By providing graduate fellowships and support for a cohort of Indigenous PhD candidates who are matched with various research initiatives, while at the same time they are engaged in an articulated course of graduate studies focusing on the Indigenous Knowledge theme, we are preparing a new generation of scholars whose legacy will extend well beyond the projected time frame of the current research initiatives. The crosscutting nature of

Indigenous knowledge systems provides opportunities to not only deepen our understanding within particular thematic areas, but also to better understand processes of interaction across and between thematic areas.

Much research has been done in recent years on identifying discrete features of Indigenous knowledge systems that are recognized as having scientific relevance and application in various fields (Krupnik and Jolly, 2005). However, few cultural insiders have engaged in systematic studies of Indigenous Knowledge systems to identify the underlying epistemological structures that connect those discrete elements together and the processes by which the knowledge is accrued, adapted and passed on to succeeding generations (Kawagley, 1995). By addressing these latter considerations, we are confronting some of the most long-standing educational, social, and political challenges in Indigenous societies around the world.

In addition to conducting research on the inner dynamics of Indigenous Knowledge systems, the graduate students (and associated faculty) are also examining the interplay between Indigenous and western knowledge systems, particularly as it relates to processes of knowledge construction and utilization. Given the complexities that have arisen from the intermingling of disparate systems of thought and ways of knowing on a global scale, it is essential that the issues be addressed in a coordinated, comparative, cross-cultural and cross-disciplinary manner. We are seeking to take advantage of the geographic context and cultural diversity of Alaska and the research strengths that have been developed over the past 30 years at the University of Alaska Fairbanks (UAF) to assemble a comprehensive research agenda and strategy that will meet the challenge before us. As the only PhD-granting institution in Alaska, UAF serves as the lead institution in the development of the described initiatives, in cooperation with related strategically distributed partner institutions with distinguished reputations in Indigenous scholarship.

Alaska, including UAF, has been at the forefront in bringing Indigenous perspectives into a variety of policy arenas through a wide range of research and development initiatives in recent years. From 1995 to 2005, the National Science Foundation supported the implementation of the Alaska Rural Systemic Initiative, a joint effort of the Alaska Federation of Natives and UAF's Center for Cross-Cultural Studies (CXCS), to integrate Indigenous Knowledge and pedagogical practices into all aspects of the education system, K-20 (the Alaska Rural Systemic Initiative, AKRSI, 2005). Through this effort, a network of partner schools and communities throughout Alaska has been formed, providing a fertile real-world context in which to address many of the research issues associated with Indigenous Knowledge systems outlined above. In the past few years alone, the National Science Foundation has funded projects incorporating Indigenous Knowledge in the study of climate change, the development of indigenous-based math curriculum, a geo-spatial mapping program, the effects of contaminants on subsistence foods, observations of the aurora, and alternative technology for waste disposal. A major limitation in all these endeavors, however, has been the lack of Indigenous People with advanced degrees and research experience to bring balance to the Indigenous Knowledge/western science research enterprise.

One of the long-term purposes of the current initiatives is to develop a sustainable research infrastructure that makes effective use of the rich cultural and natural environments of Indigenous Peoples to implement an array of intensive and comparative research initiatives, with partnerships and collaborations in Indigenous communities across the U.S.

and around the Indigenous world. The initiatives outlined in this article are intended to bring together the resources of Indigenous-serving institutions and the communities they serve to forge new configurations and collaborations that break through the limitations associated with conventional paradigms of scientific research. Alaska, along with other participating Indigenous regions, provides a natural laboratory in which Indigenous graduate students and scholars can get first-hand experience integrating the study of Indigenous Knowledge systems and western science.

### **Cultivating an Interdisciplinary Research Culture**

The heart of the Indigenous Knowledge systems research initiative is made up of a cohort of PhD students enrolled in the newly created UAF Indigenous Studies PhD program, established in 2009 and currently enrolling 30 students distributed throughout Alaska and extending to students across the country through a distance education delivery system. Through the research requirements associated with a series of PhD graduate fellowships, we have recruited a cohort of PhD students with an interdisciplinary interest in the theme of Indigenous Knowledge systems and scientific research. These students, along with the Center for Cross-Cultural Studies (CXCS) and the Alaska Native Knowledge Network (ANKN) faculty, are responsible for implementing a series of research initiatives that address the core themes associated with cultivating a culture of Indigenous research as applied to Indigenous Knowledge systems and related research practice in a cross-cultural context.

Both the Indigenous Knowledge systems and research initiatives are intended to offer and guide research opportunities for a cohort of current and aspiring scholars. All students are expected to participate in a common course of study associated with the broad theme of Indigenous Knowledge systems, plus each student is required to choose an area of relevant studies in which they achieve in-depth expertise through participation in related research initiatives. Coursework to achieve both the breadth and depth requirements is taken through a combination of existing and newly developed UAF and partner institution course offerings, along with special seminars, distance education programs, visiting scholars, international exchanges, internships, and Indigenous elders' academies sponsored by the participating institutions. Following are examples of the core courses that students can choose from:

- CCS 601, Documenting Indigenous Knowledge
- CCS 608, Indigenous Knowledge Systems
- CCS 610, Educational and Cultural Processes
- CCS 611, Culture, Cognition and Knowledge Acquisition
- CCS 612, Traditional Ecological Knowledge
- CCS 602, Cultural and Intelligence Property Rights
- CCS 631, Culture, Community and Curriculum

In addition to students having the opportunity to enroll in existing UAF courses through extended modes of instruction, they are also able to access expertise from cooperating partner institutions, as well as identify a scholar with whom they become associated who will serve as a mentor and member of their graduate advisory committee to help guide their research in ways that foster cross-disciplinary collaboration and comparative analysis. At the same time, students engaged in related research will be eligible to participate in UAF-sponsored programs and research initiatives with a comparable goal of promoting scholarly cross-fertilization and synergy around the Indigenous Knowledge systems and ethical research theme. Video and audio conferencing and internet-based technologies are

utilized to support an array of course offerings and joint seminars on topics of interest to an interdisciplinary audience. Such shared course offerings linking faculty and students across multiple institutions have already been implemented and the infrastructure is in place to expand to further topics.

Each partner program and institution brings a unique perspective to the research arena that serves to inform and expand the capacity of the overall effort. Other institutions or researchers beyond those directly associated with the Indigenous Knowledge research initiative are able to participate in and contribute to the initiatives as affiliates. Following is a brief description of some of the capabilities, programmatic functions and research topics that are associated with each of the participants. The key elements include building the capacity of Indigenous graduate students to create an international Indigenous graduate network in which students are challenged to become transformative knowledge mobilizers.

### **Related Resources and Initiatives**

In January 2005, the University of Alaska Fairbanks organized an international *Indigenous Knowledge Systems Research Colloquium*, which was held at the University of British Columbia (UBC), bringing together a representative group of Indigenous scholars from the United States, Canada, and New Zealand “to identify salient issues and map out a research strategy and agenda to extend our current understanding of the processes that occur within and at the intersection of diverse world views and knowledge systems.” A second gathering of Indigenous scholars took place in March 2005, focusing on the theme of “*Native Pedagogy, Power, and Place: Strengthening Mathematics and Science Education through Indigenous Knowledge and Ways of Knowing*.” The following is a list of research topics identified by the participants in these two events as warranting further elucidation as they relate to our understanding of the role of Indigenous Knowledge systems with regard to contemporary research and also to educational contexts:

Native Ways of Knowing	Indigenous Language Learning
Culture, Identity and Cognition	Ethno-mathematics
Place-based Learning/Sense of Place	Oral Tradition/Story Telling & Metaphor
Indigenous Epistemologies	Disciplinary Structures in Education
Indigenizing Research Methods	Cultural Systems and Complexity Theory
Cross-generational Learning	Ceremonies/Rites of Passage
Culturally Responsive Pedagogy	Technologically Mediated Learning
Native Science/Sense Making	Cultural & Intellectual Property Rights

Drawing on the seminal work of the distinguished scholars who participated in these gatherings, the research agenda outlined above is intended to advance our understanding of the existing knowledge base associated with Indigenous Knowledge systems. Likewise, the agenda will contribute to an emerging international body of scholarly work regarding the critical role that local knowledge can play in our understanding of global issues (Barnhardt and Kawagley 2005).

Alaska Natives have been at the forefront in bringing Indigenous perspectives into a variety of policy arenas through a wide range of research and development initiatives. In addition, Native people have formed new institutions of their own (Consortium for Alaska Native Higher Education, Alaska Native Science Commission and the First Alaskans Institute) to address some of these same issues through an indigenous lens.

One of the long-term purposes of this approach is to develop a sustainable research infrastructure that makes effective use of the rich cultural and natural environments of Indigenous Peoples in order to implement an array of intensive and comparative research, partnerships and collaborations within indigenous communities across the U.S. and around the circumpolar world. These initiatives are intended to bring together the resources of indigenous-serving institutions and the communities they serve to forge new configurations and collaborations that break through the limitations associated with conventional paradigms of scientific research. Alaska, along with each of the other participating Indigenous regions, provides a natural laboratory in which Indigenous graduate students and scholars can get first-hand experience integrating the study of Indigenous Knowledge systems and western science.

The timing of these initiatives is particularly significant as it provides a pulse of activity that capitalizes on new Indigenous-oriented academic offerings that are emerging in institutions around the world (Alaska Native Knowledge Network 2015).

While the University of Alaska Fairbanks has had a dismal track record of graduating only 15 Alaska Natives with a PhD over its entire 100-year history, there is now a strong push, due in large part to the initiative of Alaska Native students and leaders, to bring more resources to bear on this issue. This includes drawing upon programs and institutions from around the world to provide student's with an opportunity to access expertise from a variety of Indigenous settings, as well as to identify Indigenous scholars who might serve as members of their graduate advisory committees and to help guide their research in ways that foster cross-institutional, interdisciplinary and comparative analysis.

At the same time, students from partner institutions engaged in related research are eligible to participate in UAF-sponsored courses and research initiatives with a comparable goal of promoting scholarly cross-fertilization and synergy. Each partner institution brings a unique perspective to the research initiatives that serve to inform and expand the capacity of the overall effort. Close attention is also given to addressing issues associated with ethical and responsible conduct in research across cultures and nations, employing the 'Mataatua Declaration on Cultural and Intellectual Property Rights of Indigenous People,' "Principles for the Conduct of Research in the Arctic," and the "Guidelines for Respecting Cultural Knowledge" (Alaska Native Knowledge Network 2001).

### **World Indigenous Nations Higher Education Consortium**

The international partnerships associated with this endeavor are essential to its success, particularly as it relates to gaining a deeper understanding of the relationship between Indigenous Knowledge systems and western scientific research. The primary benefits to be derived from cross-institutional collaboration on research related to Indigenous Knowledge systems are the opportunities for scholars and graduate students to engage in cross-cultural analysis of data from diverse Indigenous settings to delineate what is particular to a given situation vs. what is generalizable across Indigenous populations and beyond. There are also considerable economies of scale and synergistic benefits to be gained from such collaborations, since many of the Indigenous populations are relatively small in number and thus are seldom able to engage in large-scale research endeavors on their own.

The primary vehicle by which these Indigenous collaborations are being implemented is through UAF's charter membership in the International Indigenous Graduate Education Alliance (IIGEA), which was established in 2009 under the auspices of the World Indigenous

Nations Higher Education Consortium (WINHEC). The members of IIGEA have formed an alliance which includes the following commitments:

With this Memorandum of Understanding, the participating Indigenous-serving universities agree to join with the World Indigenous Nations Higher Education Consortium in forming a partnership for exchanging information and for developing cooperative research programs and activities in the areas of graduate education, professional faculty development, and research broadly related to the education of Indigenous People.

In addition to facilitating cooperative research programs on an international scale, WINHEC has established an Indigenous accreditation process for Indigenous-serving programs and institutions, and, most recently, WINHEC has formed a World Indigenous Nations University (WINU) dedicated to the principles outlined in the *United Nations Declaration on the Rights of Indigenous Peoples*.

### **University of the Arctic**

Of particular relevance in establishing international linkages for the IKS research initiative is the long-standing association of UAF with the University of the Arctic (UArctic), which is a cooperative network of universities, colleges, and other organizations committed to higher education and research in the North. Members share resources, facilities, and expertise to build postsecondary education programs that are relevant and accessible to northern students. The overall goal is “to create a strong, sustainable circumpolar region by empowering northerners and northern communities through education and shared knowledge” (UArctic Strategic Plan, 2010). With the UArctic infrastructure already in place and with UAF serving in a leadership role across the circumpolar region, UArctic serves as a close collaborator in the implementation of the IKS research initiatives, particularly as it relates to support for Indigenous contributions to the research efforts.

In addition to the networks of institutions listed above, there are many other institutions and scholars across Alaska and beyond who have much to contribute to and gain from the work of the IKS research initiatives. Within the U.S., affiliation with organizations such as the U.S. Tribal Colleges extends the reach of the IKS networks to other cultural groups with similar interests. IKS research reaches out to potential institutional and/or individual contributors to the IKS initiatives and incorporates them in regional symposia, collaborative research endeavors, international exchanges, shared course offerings, joint seminars, etc.

### **Indigenous Knowledge Research Consortium**

Overall coordination and implementation occurs through an Indigenous Knowledge Research Consortium (IKRC) made up of representatives from participating institutions. Extensive use of telecommunications technology (e-mail, listserv, web, teleconference) provides the essential communication and dissemination links among the various partners, supplemented by meetings that bring all the partners together in a face-to-face context to facilitate planning collaboration, cross-fertilization and dissemination of initiatives. Given the scope of the research agenda and support activities associated with the Indigenous Knowledge systems research initiatives, the IKRC serves as the vehicle by which the various networks and research strands are linked together and coordinated.

The Indigenous Knowledge Research Consortium also provides opportunities for

graduate students engaged in Indigenous-related research to link with one another through a coordinated set of course offerings, seminars, exchanges and collaborative research endeavors that give students access to Indigenous Knowledge, resources and communities on an international scale. Through the use of distance education modalities, the internet and teleconferencing capabilities, students are able to draw on the resources of all the collaborating programs to enrich their graduate studies and research activities. UAF and participating members of the WINHEC International Indigenous Graduate Education Alliance contribute to scaling up the networking model of the Alaska Native Knowledge Network web site (<http://www.ankn.uaf.edu>), newsletter, publications, curriculum resources, etc., and apply it at an international level to serve as an all-purpose resource for information related to Indigenous cultures, communities and educational practices. Participation in the IIGEA functions as a two-way exchange with UAF students accessing resources from other institutions and participants from other institutions accessing UAF resources.

### **Doctoral Research Fellowships**

A limited number of Doctoral Research Fellowships and travel support are included in the PhD program as essential elements that provide students the opportunity to step back from day-to-day demands in their local context and immerse themselves in their graduate studies and research so they can complete a program in a reasonable timeframe. The intent is to provide support for an on-going cohort of doctoral students with each candidate receiving support for up to three years. We also welcome students from other institutions who may wish to participate in the Indigenous research program and course offerings under UAF sponsorship.

In addition to Indigenous research fellows having the opportunity to enroll in a cooperating partner institution with a strong Indigenous emphasis, they are also expected to identify an indigenous scholar from that institution who can serve as a member of the graduate advisory committee to help guide the research in ways that foster cross-institutional collaboration and comparative analysis of research issues. At the same time, students from partner institutions are engaged in related research to be eligible to attend other affiliated institutions with a comparable goal of scholarly cross-fertilization and synergy around the Indigenous research themes.

A primary emphasis in the recruitment of doctoral research fellows for the Indigenous Studies program is based on attracting Indigenous candidates from throughout all the participating cultural regions, including Alaskans, Native Americans, Native Hawaiians, Canadian First Nations, Greenlandic Inuit, Scandinavian Sami, Australian Aborigines, and others from around the Indigenous world who have in-depth experience in Indigenous settings. This is so that the Indigenous cohort represents multiple cultural perspectives which can be brought to bear on the themes of the indigenous research program outlined above. One of the key incentives for initiating the research and education program at UAF has been to address the severe shortage of Alaska Natives with advanced degrees who can assume critical faculty roles and research responsibilities throughout the state. Video and audio teleconferencing is also utilized extensively to support an array of course offerings and joint seminars on topics of interest to a cross-institutional audience. At UAF, the courses, CCS 601 (Documenting Indigenous Knowledge), CCS 602 (Cultural and Intellectual Property Rights) and CCS 690 (Seminar in Cross-Cultural Studies) address issues associated with ethical and responsible conduct in research across cultures.

## **Institutional Roles and Responsibilities**

The University of Alaska Fairbanks has adopted as one of its major strategic goals to “serve as the premiere higher educational center for Alaska Natives,” and historically has been the lead higher education institution in Alaska providing programs addressing Indigenous issues. The Center for Cross-Cultural Studies, which serves as the institutional home base for the Indigenous research initiative, was established by the University of Alaska Board of Regents in 1971 as a teaching, research, and development unit to promote programs that concentrate on the needs of Alaska’s Indigenous societies, with particular regard to educational needs and issues in rural Alaska. Accordingly, objectives of CXCS are to offer academic degree programs and coursework in cross-cultural studies; design and conduct basic and applied research projects; develop, conduct and evaluate alternative educational strategies; and disseminate findings on current Alaska research in cross-cultural studies.

In recent years, most of the work carried out under the auspices of the Center for Cross-Cultural Studies has revolved around the newly created PhD program in Indigenous Studies and the contractual work associated with the Alaska Rural Systemic Initiative. Both of these endeavors have opened up new avenues to expand our knowledge base in areas related to the study of Indigenous Knowledge systems, most significantly by attracting and preparing the first generation of Alaska Native graduate students, at least 35 of whom are now engaged in pursuing further advanced studies and research.

In addition, we have participated in numerous national and international conferences and symposia on related issues through which we have formed alliances with other programs and institutions engaged in similar endeavors, many of which have agreed to contribute to the WINHEC International Indigenous Graduate Education Alliance initiatives. Through its efforts, UAF is assuming a lead role in linking together these numerous localized endeavors to form a synergistic relationship that enhances the capacity of all the participating institutions and personnel to achieve goals we cannot achieve alone. Each of the partner institutions shares a common commitment to the overall goals of the various research initiatives, but each have also evolved in ways that adapt to the cultural and institutional milieu in which they are situated, so the partnership structure is critical to establishing the parameters and responsibilities for the implementation of each of the regional networks and research programs. In addition, the strategy for engagement of partner institutions in each region is incorporated into the planning and implementation process at the regional level, building on the research focus and strengths of each site.

## **Sustainability**

An underlying theme of these initiatives has been the need to reconstitute the relationship between Indigenous Peoples and the host societies in which they are embedded by documenting the integrity of locally situated cultural knowledge and skills and critiquing the learning processes by which that knowledge is transmitted, acquired and utilized. To overcome the long-standing estrangement between indigenous communities and the external institutions through which they have been reshaped, all parties in this endeavor (community, school, higher education, state and national agencies) need to form a true multi-lateral partnership in which mutual respect is accorded the contributions that each brings to the relationship. The key to overcoming the historical imbalance in that regard is the development of an Indigenous-driven research process that focuses on the role of Indigenous

Knowledge systems, with primary direction coming from Indigenous communities, so that Indigenous People are able to move from a passive role subject to someone else's agenda to an active leadership position with explicit authority in the construction and implementation of the research initiatives. The willingness of the partner institutions to enter into this partnership represents a significant milestone in the relationship between educational institutions and Indigenous communities around the world, and it is to insuring that it becomes a truly reciprocal relationship of mutual benefit that much of the efforts are directed.

In this context, the task of achieving sustainability hinges on our ability to demonstrate that such an undertaking has relevance and meaning in the local Indigenous contexts with which we are associated, as well as in the broader social, political, and educational arenas involved. By utilizing research strategies that link the Indigenous ways of knowing already established in the local community and culture, Indigenous People are more likely to find value in what emerges and be able to put the new insights into practice toward achieving their own ends. In turn, the knowledge gained from these efforts will have applicability in furthering our understanding of basic human processes associated with research and the transmission of knowledge in all forms. By bringing the research expertise and educational capabilities of the higher education institutions into direct involvement with Indigenous communities, the initiatives serve a capacity-building function with potential "multiplier effects" for indigenous communities in areas with disproportionate levels of underdevelopment on a range of socio-economic indices, e.g., improvements in health, education, and economic well-being.

All of the above contributes to the development of new insights that increase our understanding of how Indigenous Knowledge systems function in relation to the cultural context in which they are situated. By focusing on an interdisciplinary, cross-institutional, and cross-cultural research endeavor toward a common goal with a carefully articulated, and unified strategy, we are well positioned to ensure that the work will move forward on a pathway toward becoming self-sufficient and sustainable into the future.

### References

- Alaska Native Knowledge Network (2001). *Guidelines for respecting cultural knowledge*. Retrieved 2015, from <http://www.ankn.uaf.edu/standards/knowledge.html>
- Alaska Native Knowledge Network (2007). *Indigenous higher education*. Retrieved 2015, from <http://www.ankn.uaf.edu/IEW/ihe.html>
- Alaska Rural Systemic Initiative (2005). *AKRSI Annual Report*. Fairbanks, AK: Alaska Native Knowledge Network, University of Alaska Fairbanks.
- Barnhardt, R. and Kawagley, A.O. (2005). Indigenous knowledge systems and Alaska Native ways of knowing. *Anthropology and Education Quarterly*, 36(1), 8-23.
- Kawagley, O. (1995). *A Yupiaq world view: A pathway to ecology and spirit*. Prospect Heights, IL: Waveland Press.

Kullerud, L. (2010). *UArctic strategic plan*. Copenhagen: University of the Arctic.

Krupnik, I. and Jolly, D. (eds.) (2001). *The earth is faster now: Indigenous observations of arctic environmental change*. Fairbanks, AK: Arctic Research Consortium of the U.S.