Before the
DEPARTMENT OF COMMERCE
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
Washington, D.C. 20230

In the Matter of	)
Telecommunications Assessment of the	) Docket No. 140925800-4800-01
Arctic Region	)
	)

COMMENTS OF THE UNIVERSITY OF ALASKA

THE UNIVERSITY OF ALASKA ("UA"), hereby submits comments in response to the National Telecommunications and Information Administration's ("NTIA's") Notice of Inquiry ("NOI") in the above-referenced proceeding: Telecommunications Assessment of the Arctic Region.[1]

The University of Alaska appreciates the opportunity to highlight the vital nature of education and research in the arctic and the critical role that robust telecommunications infrastructure plays in UA's ability to both learn from and teach to indigenous communities throughout arctic and subarctic Alaska.

The University supports the guiding principles outlined in the strategy and implementation plan for the arctic which aim to:

- Safeguard Peace and Stability

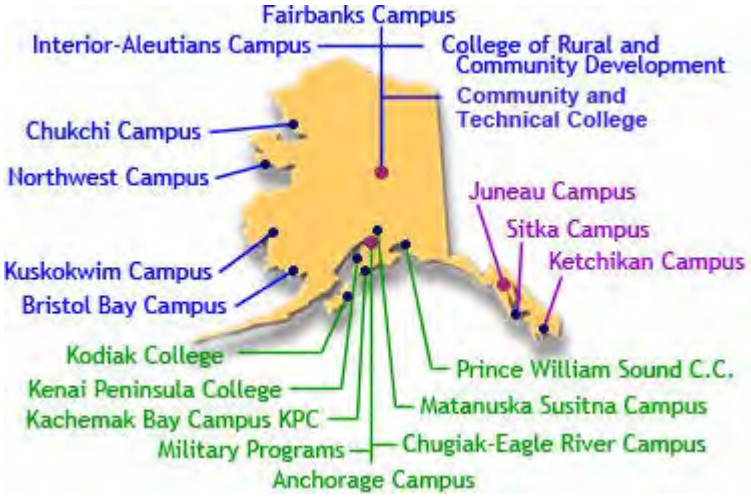
[1] Notice of Inquiry, Telecommunications Assessment of the Arctic Region, Federal Register, Vol. 79, No. 192, 59746-59750 ("NOI").

- Make Decisions Using the Best Available Information
- Pursue Innovative Arrangements
- Consult and Coordinate with Alaska Natives
- Foster Partnerships with Arctic Stakeholders
- Coordinate and Integrate Activities across the Federal Government

The University of Alaska, as America's Arctic University, has the resources and expertise to support and enhance these principles through our knowledge, teaching, research and understanding of arctic issues.

Overview of University of Alaska System

The University of Alaska system has a unique mission from traditional community college and workforce development programs, through associate and baccalaureate degrees, to graduate and doctoral degrees. In addition, UA provides education and outreach through the Cooperative Extension Service and Marine Advisory Programs. UA is made up of 17 campus locations throughout Alaska.



Alaska presents a formidable landscape for a university system: a land mass one-fifth the size of the continental United States,campuses thousands of miles apart and

weather that would shut down most Lower 48 schools. But this vast environment of rainforest, tundra, coastal shores and mountains is home to the University of Alaska system, established in 1917.

The university is uniquely poised as America's Arctic University. The University of Alaska's involvement in the University of the Arctic [2] makes UA a global collaborator in arctic research and education and the University of Alaska Fairbanks campus the most cited on issues pertaining to the arctic.

University of Alaska's Role in Safety and Security

The University of Alaska Fairbanks plays a key role in providing monitoring and alert services for volcanic and tectonic events through the Alaska Volcano Observatory[3] and Alaska Earthquake Information Center.[4] These centers provide critical warnings on earthquakes and tsunamis in partnership with NOAA and USGS.

The University of Alaska Fairbanks is also the only University in the United States with an operating rocket launch facility: Poker Flats. Poker Flats is the largest land-based rocket research range in the world and the only high-latitude rocket range in the United States. Poker Flat launches scientific sounding rockets, performs satellite tracking and is home to a growing fleet of unmanned aircraft.

[2] http://www.uarctic.org/about-uarctic/
[3] http://avo.alaska.edu/
[4] http://www.aeic.alaska.edu/

The Alaska Center for Unmanned Aircraft Systems Integration[5], or ACUSAI, was established in December 2012 by the University of Alaska Board of Regents in recognition of the importance and growth of the unmanned aircraft program. It was established under the University of Alaska Fairbanks in the Geophysical Institute where it originated but was given the role of leading all unmanned aircraft programs for the entire system. It was also tasked to pursue opportunities with the FAA, such as the FAA test sites. The program originated in 2001, and over the years had expanded its scope, the equipment it operated, and the variety and complexity of research projects it executed. In 2013 ACUASI submitted its proposal to the FAA for one of the six test sites established by the 2012 FAA Modernization and Reform Act, and in December 2013 the FAA announced that the university had been selected. The Pan Pacific UAS Test Range Complex reports to the ACUASI, but also includes principal partners in Oregon and Hawaii as well as 56 non-state partners located all over the US and internationally. Ranges are located in the three states as well as in Iceland, our key international partner.

Importance of Adequate Telecommunications Infrastructure

Communications infrastructure is the key resource that will allow the University of Alaska to participate as a global collaborator in arctic research and education. The provision of adequate telecommunications and infrastructure to support research, education, outreach, security, commerce and finance throughout the arctic region of the

[5] http://acuasi.alaska.edu/

U.S. will ensure that the U.S. sovereignty and interests in the arctic are preserved. International obligations to shipping, commerce, tourism and research are supported as are national and international efforts for navigation and search and rescue response.

While advances are being made, arctic communities are severely lacking in adequate telecommunications infrastructure on par with that in urban areas of Alaska or with that available in the Lower 48. The State of Alaska's Broadband Task Force issued a Blueprint for Alaska's Broadband Future[6] in October of 2014 in which it indicates that "Some 21,000 households in Alaska currently are not served by broadband, and more than half of the nation's anchor institutions (hospitals, schools, libraries, municipal or borough governments, etc.) with insufficient [emphasis added] broadband capabilities are in Alaska." Many of UA's community campuses and learning centers are anchor institutions included in those statistics.

UA supports the comments filed by Internet2 regarding the importance of Research & Education (R&E) networks. [7] In summary, they state:

> "Given the unique challenges of deploying communications infrastructure in Alaska, Internet2 urges NTIA to prioritize funding for communications networks that will be future proof. In addition, NTIA should prioritize investments in the Arctic region in networks that offer bandwidth abundance and that are designed to support

[6] http://www.bbtaskforce.com

[7] Comments tof Internet2, BEFORE THE DEPARTMENT OF COMMERCE, NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, DOCKET NO. 140925800-4800-01, filed November 3, 2014, http://www.ntia.doc.gov/files/ntia/internet2_arctic_noi_comments.pdf

the data-intensive research that will be necessary to address climate change.

Alaska is geographically and demographically unique, presenting unparalleled challenges in deploying, maintaining, and operating modern communications networks. Alaska has not only a small population spread over enormous distances, but also an extremely harsh climate and short construction season. For these reasons, Alaska, particularly in the rural areas and above the arctic circle, lacks the basic communications and other infrastructure present in the Lower 48 states. Indeed, the regulatory commission of Alaska stated in the Federal Communications Commission's ("FCC") Connect America Fund proceeding that Alaska's lack of roads, small population, and extreme arctic weather conditions make providing telecommunications services challenging and expensive.

Satellite middle-mile transport – which is what exists today for rural Alaska and the arctic region – is very expensive, has limited throughput capacity, and simply cannot economically keep up with bandwidth demand. NOAA and the U.S. Geological Service, for example, have satellite downlink in Fairbanks but are resource constrained when it comes to getting access to data from the Lower 48 states. Moreover, even if affordable satellite middle-mile capacity emerged... many Internet applications are latency sensitive. The only way to eliminate inherent satellite latency is to switch to terrestrial middle-mile service. Further, there simply is not enough satellite capacity to provide even adequate backhaul to support basic speeds of 4 Mbps download and 1 Mbps upload."

Research and Scholarly Activity

Arctic research[8] and scholarly activity are the heart and soul of UA. University of Alaska Fairbanks Chancellor, Brian Rogers, states this best,

"The University of Alaska Fairbanks is America's Arctic University and the world's Arctic University. The north is our home, workplace and playground. Some of our students, staff, faculty and researchers have ancestors who have called Alaska home for millennia. Others are more

[8] see interactive Arctic Research map at http://research.uaf.edu/research-map

> recent arrivals. But we all have this in common: Life in the north defines us. It drives us to explore, to push beyond what we know and to work with each other so we all benefit. This spirit of exploration and collaboration is inherent in all the research we undertake, and it will be crucial in the coming decades. As the arctic continues to open, more and more governments and industries are taking an active interest and active role in the circumpolar north.
>
> UAF's scientists and scholars are world leaders in arctic research. Their work is cited by their peers more than any other institution's. We have been a world leader in research-based information on the arctic for decades and will continue to be a world leader for decades to come." (See Appendix A: University of Alaska Arctic Research)

The conduct of research in the 21st century requires vast amounts of data; transmitting that data requires a robust telecommunications system capable of handling and manipulating large data sets. Bandwidth to, from and within Alaska is expensive. Our peer universities throughout the Pacific Northwest are interconnected by networks that operate at speeds of 100Gbps while the University of Alaska connects to the Lower 48 via 1.5Gbps.

The cost of connecting to research institutions in the Lower 48 at those higher speeds is one of the UA's major challenges. UA has scientific expertise, supercomputing resources and modeling capacity, however the greatest obstacle to partnering with other universities to utilize this expertise is affordable bandwidth to and from Alaska.

Teaching, Learning and Outreach

Given the vast distances between Alaska's communities and the lack of a road system and transportation infrastructure to many of them, e-Learning and online education is key to UA's mission with over 1600 courses delivered via e-Learning in academic year 2013-14. (see Appendix B: University of Alaska 2014 e-Learning Report)

Community campuses in Fairbanks, Bethel, Dillingham, Nome, Kotzebue, Sitka, Ketchikan, Kodiak, Kenai, Homer, Valdez and learning centers in Galena, Ft. Yukon, Tok, Unalaska, McGrath, Shishmaref, Unalakleet, Togiak, King Salmon, Glenallen and Delta reach over 160 communities statewide. The lack of roads and infrastructure compel our faculty and staff to be creative and innovative in course design and delivery. Courses are available across the State. UA faculty rely on the availability of telecommunications infrastructure to deliver a quality learning experience. However, the learning experience is vastly different in communities with little or no broadband services and only teleconference capability versus those with access to broadband and the capacity to participate via interactive video and modern learning technologies.

In academic year 2013-14 (AY14) , one-third of the UA system's distinct degree, certificate and endorsement programs could be completed at least 50 percent via e-Learning. Of these, slightly under half (45 percent) are available completely via e-Learning. Growth in e-Learning continues for the University of Alaska system. UA universities delivered almost 1,650 distinct e-Learning courses in AY14, 26 percent

more (+335) than in AY10, and 3 percent more (+52) than in AY13. In AY14, 41 percent of students (20,700 of 50,100) took at least one e-Learning course, compared to 38 percent in AY13, and 34 percent in AY10. More than four out of ten students taking for-credit classes and more than one in ten students taking non-credit classes took one or more of those courses via e-Learning; this reflects a slight increase from the previous year.

There is a dichotomy in access to communications in Alaska – with adequate communications provided to cities and towns below the arctic circle and in urban areas, but not to remote communities in arctic and rural Alaska. (See Appendix C: University of Alaska Rural Campus Broadband)

The United States and the State of Alaska must bring service parity to arctic residents. Part of the national strategy for the arctic should include a comprehensive strategy for connecting all Arctic communities to an adequate telecommunications infrastructure that supports those services outlined above. It should commit to service parity across those communities commensurate with service available in the Lower 48.

This strategy could be accomplished through strategic investment and targeting of existing funding sources, such as funds through the USDA Rural Utility Service or the Universal Service Fund -- targeted specifically to connecting arctic communities in support of the national strategy and national best interests.

Arctic Opportunities--Possibility of Cable Connections by Quintillion and Arctic Fibre

Quintillion LLC's [9] proposal to extend Arctic Fibre's[10] high-speed cable connections to arctic Alaska's coastal communities, will bring increased competition and alternate means of broadband connectivity and would provide an opportunity to diversify Alaska's financial, commercial, healthcare and high-tech markets in the arctic.

Currently the State of Alaska and the U.S. are not poised to take advantage of this possibility. We encourage the State of Alaska and the U.S. to plan jointly to make arctic broadband connectivity a priority during the U.S. Chairmanship of the Arctic Council.

Effect of Global Warming on Security of the Arctic

Development of adequate communications infrastructure will be important to meeting to security goals of the national strategy for the arctic from many perspectives.

In particular, today's military, when deployed on a rotational basis in support of sovereignty issues, has come to expect a certain level of connectivity-- that during the evening one can talk to or Skype with one's family. This is the new norm. Without adequate telecommunications infrastructure in the Arctic, this becomes a difficult and costly experience, one that may not be thought of when planning for such deployments.

[9] http://quintillionnetworks.com/
[10] http://arcticfibre.com/

Summary Recommendations:

A. The U.S. should invest directly in broadband infrastructure in the arctic to bring parity arctic communities. It is in the nation's best interest to have reliable, affordable and abundant broadband infrastructure in the Arctic to support and defend our nation's borders and interests in the arctic, to monitor and expand its knowledge of the arctic environment and its resources, to educate a local workforce able to integrate and apply traditional and western knowledge in support of an opening arctic region, to support navigational and search and rescue operations with opening of the northwest passage.

B. The U.S. should convene a special taskforce of arctic stakeholders to contribute to a U.S. arctic broadband infrastructure plan in support of broader arctic-wide telecommunications networks as outlined in the implementation plan. The University of Alaska and its partners in the University of the Arctic are uniquely positioned to lead such an effort.

C. The U.S., through its agencies, should target specific funding opportunities to support research and develop plans for responsible arctic development as outlined in the implementation plan.

D. NTIA should develop a framework for investing in scalable, fiber-based communications infrastructure in arctic Alaska that will not only be future proof, but can also support connecting community anchor institutions throughout Alaska that are currently unserved or underserved as currently advocated in comments filed by Internet2.

E. NTIA should prioritize communications infrastructure investment that supports research and education in the arctic.

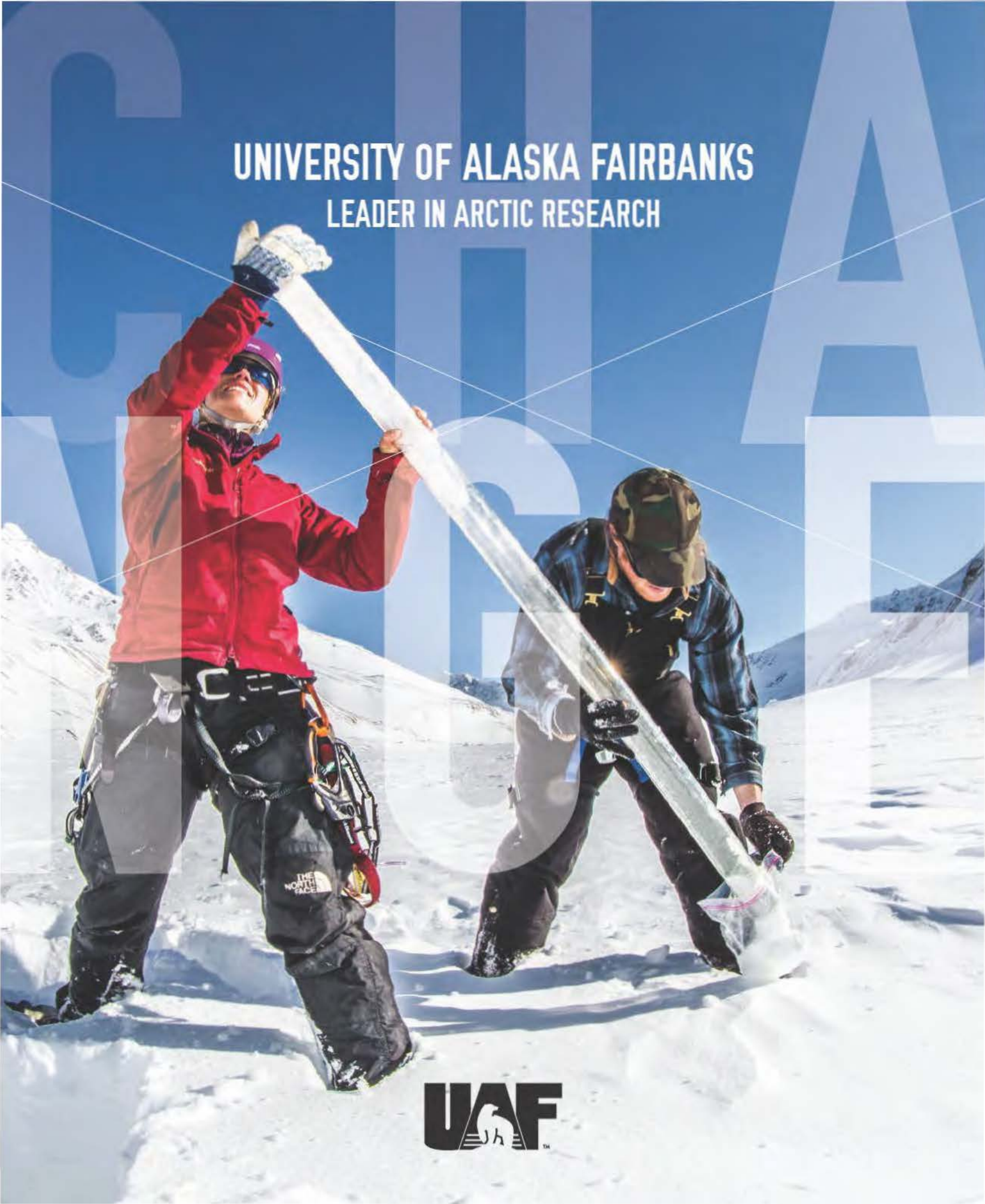
Respectfully submitted,

DocuSigned by:
By: _____
162EEC2DA99E43F...

Karl Kowalski
Chief Information Technology Officer
University of Alaska
910 Yukon Drive
Fairbanks, Alaska 99775

UNIVERSITY OF ALASKA FAIRBANKS

LEADER IN ARCTIC RESEARCH



UAF

The University of Alaska Fairbanks is America's Arctic university and the world's Arctic university. The North is our home, workplace and playground. Some of our students, staff, faculty and researchers have ancestors who have called Alaska home for millennia. Others are more recent arrivals. But we all have this in common: Life in the North defines us. It drives us to explore, to push beyond what we know and to work with each other so we all benefit. This spirit of exploration and collaboration is inherent in all the research we undertake, and it will be crucial in the coming decades. As the Arctic continues to open, more and more governments and industries are taking an active interest and active role in the circumpolar North.

UAF's scientists and scholars are world leaders in Arctic research. Their work is cited by their peers more than any other institution's. We have been a world leader in research-based information on the Arctic for decades and will continue to be a world leader for decades to come.

No single report could capture the vast and intricate work being done in UAF's 60 research units and labs. Instead, these pages contain highlights of just some of the complex, necessary and innovative research we conduct at UAF. Eighteen stories, hundreds of experts, millions of data sets — and there's still much more to do.

Learn more at **www.research.uaf.edu**.

Brian Rogers
Chancellor
University of Alaska Fairbanks

TABLE OF CONTENTS

The University of Alaska Fairbanks is accredited by the Northwest Commission on Colleges and Universities. UAF is an affirmative action/equal opportunity employer and educational institution. Produced by UAF Marketing and Communications. 10/2014

ALL POINTS NORTH

We divide the globe into states, countries and regions, but the planet ignores our political and cultural boundaries. Its geographies and ecosystems overlap, separate and merge again. The Arctic is a vital part of Earth's ever-changing composition.

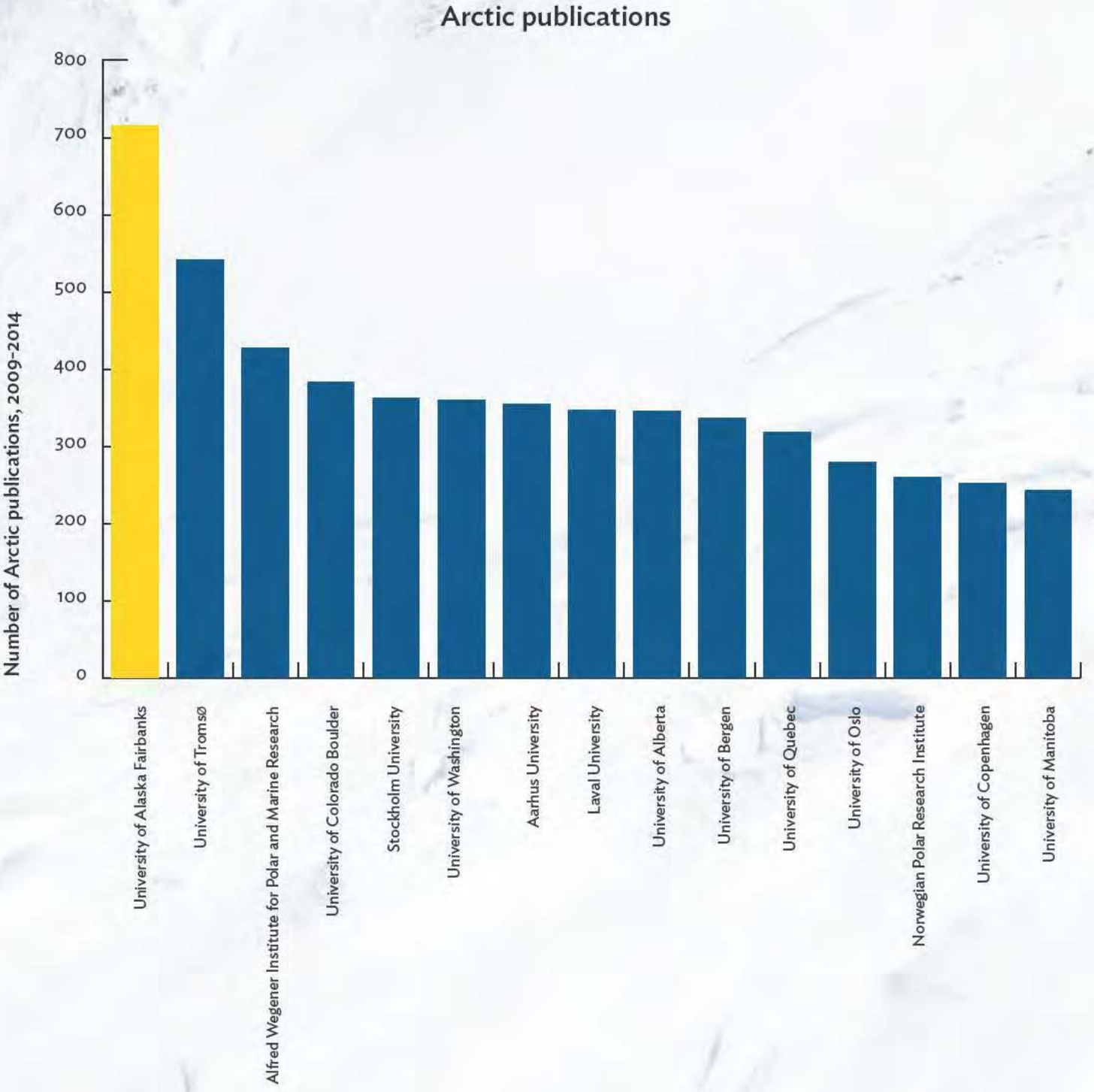
Like the Arctic, universities are also ever changing, as experts, students and the public meet to understand the past, study the present and prepare for the future. Research conducted at the University of Alaska Fairbanks and other institutions has revealed critically important processes and properties that are shaping the evolution of the Arctic and its growing links with the rest of the world. Policymakers, government officials and industry leaders of today and tomorrow rely on data-driven information that research universities like UAF provide.

The University of Alaska Fairbanks operates at the forefront of climate change in the Arctic. Our scientists and students conduct research and collect and analyze data to help us understand and respond to the rapid and dynamic changes occurring in the North.

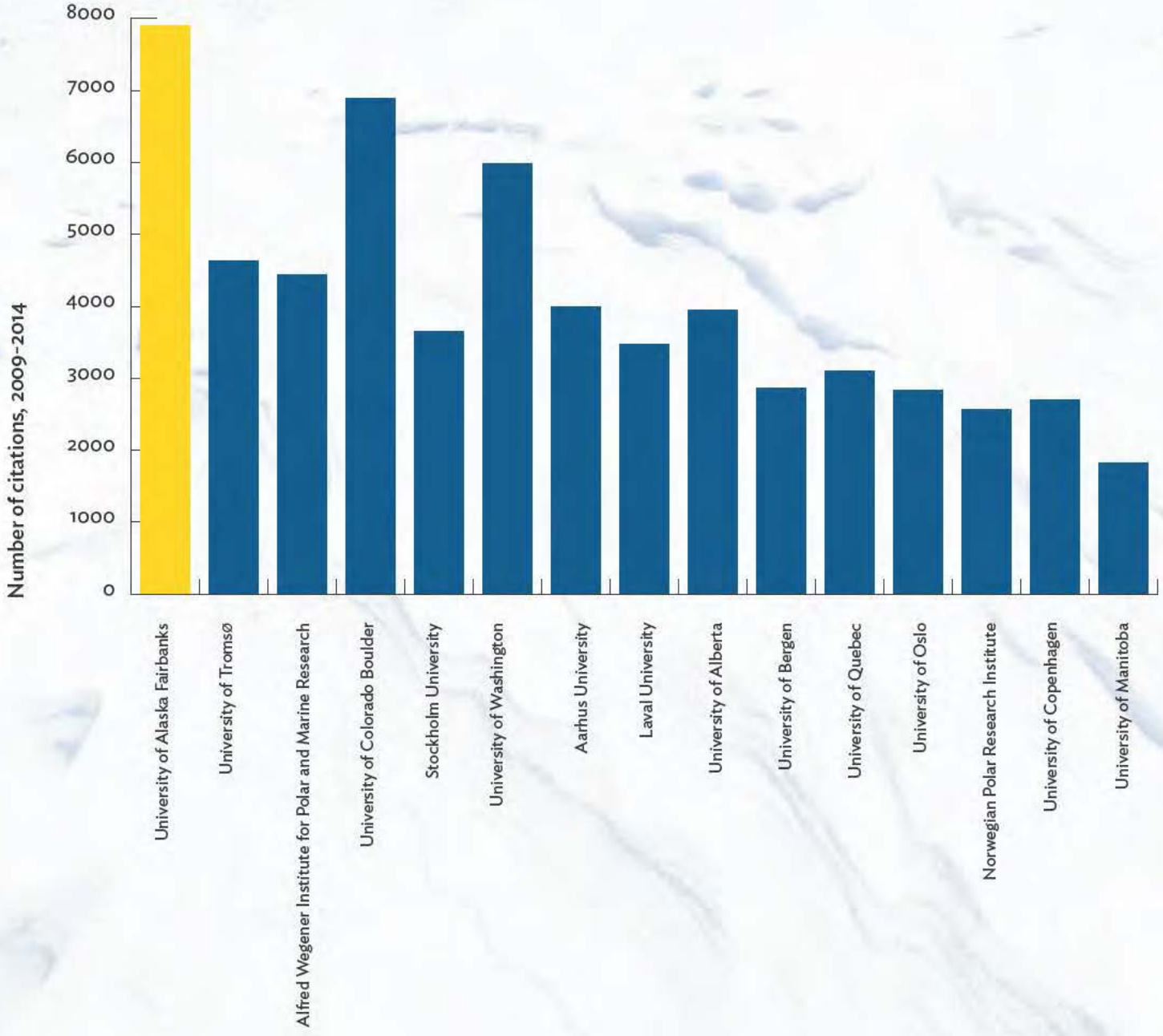
ARCTIC RESEARCH PUBLICATIONS AND CITATIONS

UAF leads all other single institutions in the number of publications and in the number of citations of its publications.

Source: *Web of Science* (Thompson Reuters), search word "Arctic," sceince and social sciences index, 2009-2014.



Citations of UAF Arctic publications



CHANGING TECHNOLOGIES

Satellites in space, underwater gliders, sensors deep in the Earth — new tools and technologies give UAF researchers and data specialists more information about our changing world faster and in greater detail and variety than ever before.

SO NEAR YET SO FAR
Remote sensing shows minute detail of distant places

"New and innovative approaches to remote sensing give UAF researchers powerful tools for studying some of the planet's most inaccessible, and most rapidly changing, features," says Mark Myers, UAF vice chancellor for research.

Recent remote-sensing highlights at UAF include detection of Arctic marine mammals by satellite-controlled, underwater gliders that identify the animals by their calls and measure properties of the water; a newly GIS-compatible satellite radar data set that maps the dramatic decline in Arctic Ocean sea ice from 1995 to 2012; maps of the changing extents and flow speeds of glaciers, derived from radar and optical imagery; data on aurora from rockets launched at UAF's land-based rocket research range, which draws scientists from around the world; and insights on seabirds from activity sensors attached to the birds.

SHIFTING GROUND
Radar advances permafrost studies

UAF is internationally recognized for its comprehensive approach to permafrost science. As climate change alters permafrost in ways that are both globally and locally significant, UAF geophysicists, engineers and biologists study the impact of thawing permafrost on the carbon cycle, vegetation, wildlife, infrastructure and more.

At its most basic, permafrost change is about temperature. UAF researchers have been recording steadily increasing permafrost temperatures for more than 35 years. In some Alaska locations, the increase is more than 3 degrees Celsius.

The most promising advances in permafrost research involve remote sensing, which UAF permafrost scientist Vladimir Romanovsky calls "the future of studying permafrost." Most permafrost research has taken place in locations that are essentially dots on a landscape. Remote sensing offers ways to study permafrost change on both large and small scales. One example is interferometric synthetic aperture radar — InSAR — which measures movement by combining radar images, yielding surface-deformation measurements from space that are accurate to within centimeters. In one dramatic case, UAF researchers are using InSAR to gauge the movement of a massive frozen debris lobe that is inching its way downhill toward Alaska's oil pipeline and the only road to the North Slope.

TRACKING OIL SPILLS
Underwater gliders

Terrible storms rocked the *Norseman II* for 20 days on the Chukchi Sea. "We were being tossed around on the ship like we were in a washer and dryer," says UAF oceanographer Peter Winsor. He and colleagues from UAF and Rutgers University were using three underwater gliders, satellite-tracked surface drifters and a tow-behind sensor to follow a scarlet dye they'd poured into the water to simulate a small oil spill. They wanted to see how well their instruments could identify the dye's location and spreading, and how well they could relay their real-time information to emergency responders like the National Oceanic and Atmospheric Administration.

Gliders are nonpropelled, autonomous underwater vehicles that slip through the ocean quietly and slowly. They can run for up to four months, longer than most ships can be out, and are controlled via satellites that can immediately send the glider's information anywhere in the world. As oil drilling and ship traffic increases in the Arctic, responding quickly to marine oil spills will be crucial for the volatile North. "Gliders don't care about weather," Winsor says of the storms. "If we had used traditional instruments we'd have had to lower and retrieve over the side, we wouldn't have been able to do it. This new technology is improving our ability to sample the oceans."

FISH FINDER
Chemical analysis identifies salmon's home waters

Chinook salmon grow to adults in the ocean but return to spawn in the streams where they hatched. PhD student Sean Brennan has helped develop a way to match individual salmon to their home streams long before they return. He uses markers created in salmon bones by the chemistry of the waters in which the salmon hatch and grow. His research at UAF's School of Fisheries and Ocean Sciences provides an important tool that could eventually be used in all salmon hatching and rearing locations.

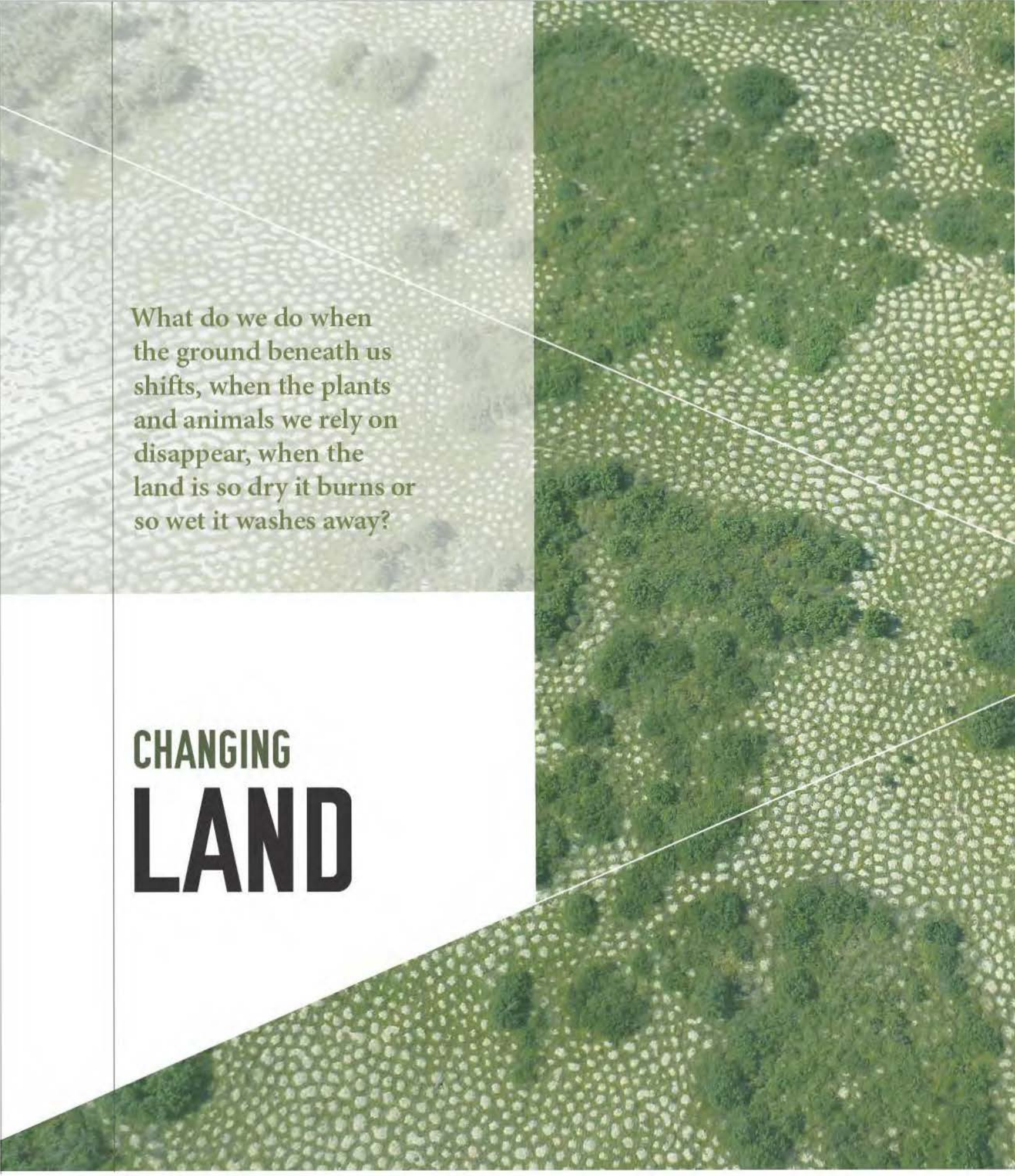
The tool is the ratio of two isotopes of strontium, a natural chemical element in the Earth. Differences in rocks create variations in the strontium isotopes picked up by water that flows across the rocks. The unique strontium ratio of a stream is captured in the auditory structures, called otoliths, of young salmon.

Otoliths grow in rings, similar to trees, where the center rings represent the fish's younger life. By matching the isotope ratios in the inner rings with ratios in rivers and streams, Brennan can pinpoint the region and sometimes the tributary where each salmon was born.

Brennan did his isotope analysis at the University of Utah, which has the necessary laboratory. UAF's new engineering facility will house its own lab capable of measuring strontium isotopes.

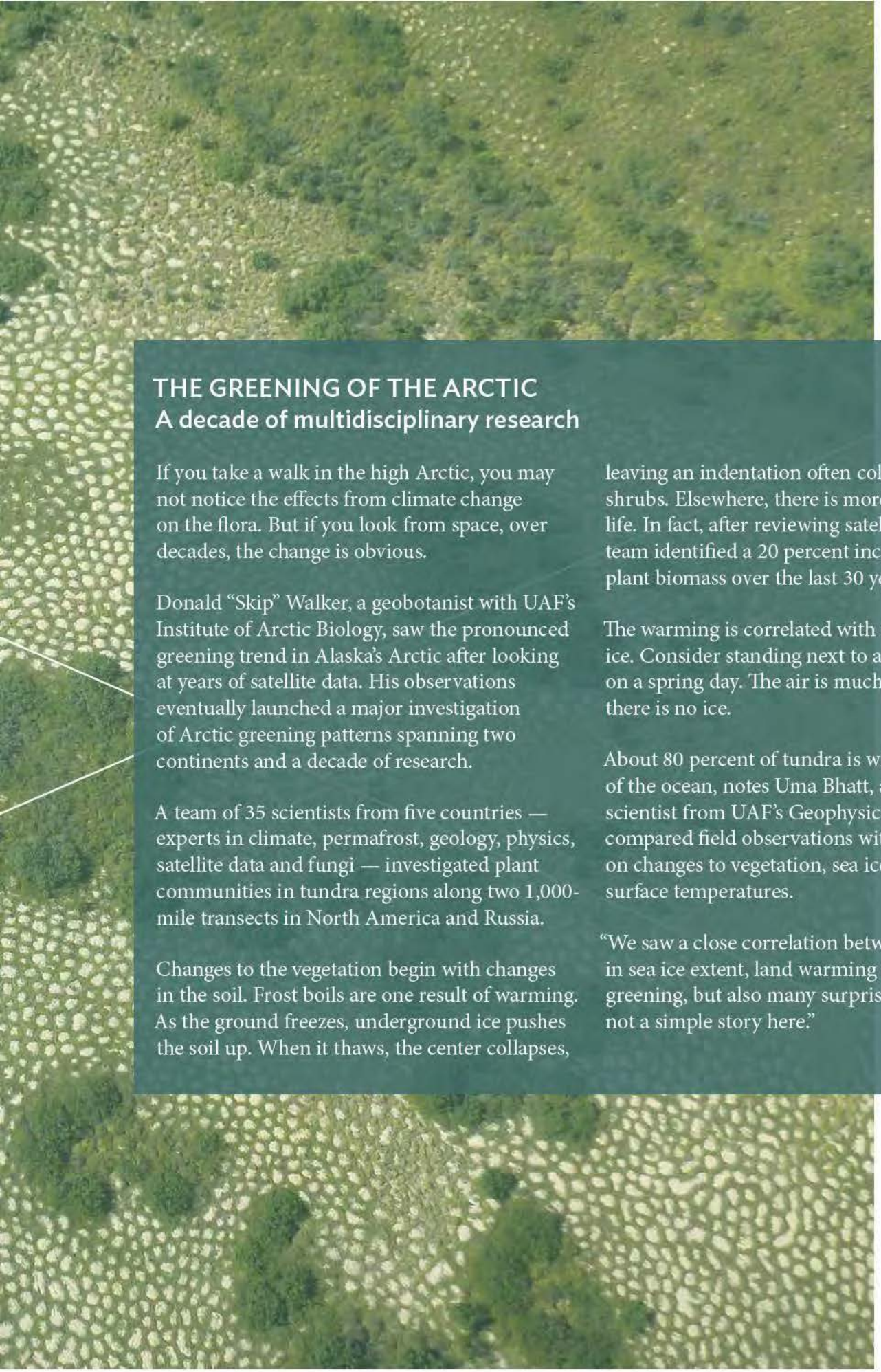
ALTERNATIVE CURRENTS
Alaska Center for Energy and Power

The sky-high cost of oil makes generating electricity a daunting expense in rural Alaska. Staff at the Alaska Center for Energy and Power are testing turbines that generate electricity from river currents. "Rivers are a persistent and exploitable energy source," says ACEP's Jeremy Kasper. Oceana Energy Co. wants to make affordable turbines for smaller communities throughout the world, which is why company president Dan Power contracted with ACEP to run tests in the Tanana River near the Interior Alaska village of Nenana. "There's no one else who has the talent and expertise." Eventually, the turbines could provide inexpensive, environmentally responsible energy to villages on rivers throughout Alaska and the world.



What do we do when the ground beneath us shifts, when the plants and animals we rely on disappear, when the land is so dry it burns or so wet it washes away?

CHANGING LAND



THE GREENING OF THE ARCTIC
A decade of multidisciplinary research

If you take a walk in the high Arctic, you may not notice the effects from climate change on the flora. But if you look from space, over decades, the change is obvious.

Donald "Skip" Walker, a geobotanist with UAF's Institute of Arctic Biology, saw the pronounced greening trend in Alaska's Arctic after looking at years of satellite data. His observations eventually launched a major investigation of Arctic greening patterns spanning two continents and a decade of research.

A team of 35 scientists from five countries — experts in climate, permafrost, geology, physics, satellite data and fungi — investigated plant communities in tundra regions along two 1,000-mile transects in North America and Russia.

Changes to the vegetation begin with changes in the soil. Frost boils are one result of warming. As the ground freezes, underground ice pushes the soil up. When it thaws, the center collapses, leaving an indentation often colonized by shrubs. Elsewhere, there is more, smaller plant life. In fact, after reviewing satellite imagery, the team identified a 20 percent increase in Arctic plant biomass over the last 30 years.

The warming is correlated with disappearing sea ice. Consider standing next to an ice-bound lake on a spring day. The air is much colder than if there is no ice.

About 80 percent of tundra is within 60 miles of the ocean, notes Uma Bhatt, an atmospheric scientist from UAF's Geophysical Institute. She compared field observations with satellite data on changes to vegetation, sea ice and land-surface temperatures.

"We saw a close correlation between changes in sea ice extent, land warming and patterns of greening, but also many surprises," she says. "It's not a simple story here."

FIRE FROM THE SKY
Unmanned aircraft monitor wildfires

The increasing number and intensity of wildland fires is a worrisome issue in the North. Firefighters need reliable information about a fire's behavior. UAF's Alaska Center for Unmanned Aircraft Systems Integration is developing new techniques to aid in firefighting operations. The May 2014 Funny River fire near Kenai, Alaska, proved an excellent example of unmanned aircraft capabilities. The unmanned aircrafts can fly at night, at lower altitudes and more efficiently than manned aircraft. When UASs are equipped with infrared cameras, this increased flexibility leads to more precise mapping of fire boundaries and hotspots. The ACUASI team is working closely with FAA officials and air traffic controllers to establish guidelines, making unmanned aircraft a safer, more viable option for emergency officials.

MODEL PLANS
Forecasting future ecosystems

"How will Alaska's landscapes change?" That is a question resource managers are asking as climate change affects vegetation, hydrology, permafrost, wildfire intensity and frequency, and pest-pathogen outbreaks across Arctic and boreal landscapes. Managers need to understand how climate change will affect resources, but until recently there haven't been scientific models that help them assess these interconnected changes. By integrating and linking existing fire, vegetation and permafrost models, UAF scientists have created the Integrated Ecosystem Model, giving managers forecasts of how ecosystems might change, which they can then relate to the resources they manage.

GOING, GOING, GONE
Tracking Alaska's disappearing glaciers

Alaska has some of the fastest-changing glaciers on Earth, and UAF researchers are at the forefront of documenting glacier coverage and rates of loss. Using satellites, ground-based surveys, small aircraft and computer models, UAF researchers have found that in the past decade Alaska's glaciers have lost approximately 40–70 gigatons of mass each year. This addition of surplus fresh water to sea level rise from Alaska glaciers is approximately 8 percent of ice melt worldwide. Runoff from glaciers is cold and rich in minerals and organic material, so studies are also looking at the ways glacier water supports the marine food chain and healthy salmon habitat. Calculating the amount of glacier ice and the rate it is melting is essential for understanding how changes in glaciers will impact Alaska's ecosystems and society.

SURFACE READINGS
Radar maps ocean currents for safety, research

Two tall white poles stand as sentinels on the treeless shoreline of Point Barrow, Alaska, the product of collaboration between UAF, Native communities, federal agencies and corporations. The antennae use high-frequency radar to generate hourly maps of ocean surface currents up to 100 miles offshore. Combined with three other units installed at Cape Simpson and in the villages of Point Lay and Wainwright, the network of radars monitors about 18,000 square miles of the northern Chukchi and western Beaufort seas.

The data contribute to the scientific work of UAF oceanographer Thomas Weingartner, but with increasing human activities in the Arctic, the radars are proving useful for security and safety applications as well. The equipment can detect vessels 45 feet or larger out to a distance of about 50 miles.

"It can be handy for search and rescue application, or oil spill response, or somebody just going out and choosing a particular route depending on the currents that day," Weingartner says of the real-time data. "You don't need a trained oceanographer to interpret that map."

The units run off of grid power if available, or they can be deployed in remote areas with a module, designed by Weingartner's team, that provides power from renewable sources. "This allows us to expand the radar coverage to virtually anywhere."

CHANGING OCEANS

Life on land is not possible without oceans. Oceans affect climate. They provide food, jobs and transportation. And they are changing.

ACID OCEANS
Ocean Acidification Research Center

"Ocean acidification is a global problem that could threaten marine life around the world," says Jeremy Mathis, director of the UAF Ocean Acidification Research Center. "But it could be an especially big problem in waters vital to Alaska's commercial fisheries and traditional subsistence way of life."

Ocean acidification occurs as water absorbs increasing amounts of carbon dioxide from the atmosphere. The loss of sea ice and the addition of more freshwater mean that Arctic oceans are experiencing some of the most rapid and extensive acidification on the planet. "These changes could disrupt important fisheries, but the data we're collecting will help fisheries managers and stakeholders plan for the years ahead."

RISING FROM THE DEEP
Studies reveal extensive seafloor methane release

The seafloor off the coast of northern Siberia is releasing more than twice the amount of methane as previously estimated. The findings are part of an ongoing international research project led by Natalia Shakhova and Igor Semiletov, both researchers at the UAF International Arctic Research Center.

Their twice-yearly Arctic expeditions have revealed that the subsea permafrost in the area has thawed much more extensively than previously thought, in part due to warming water near the bottom of the ocean. The warming has created conditions that allow the subsea methane to escape in much greater amounts than their earlier models estimated. Frequent storms in the area hasten its release into the atmosphere, much in the same way stirring a soda releases the carbonation more quickly.

"It is now on par with the methane being released from the Arctic tundra, which is considered to be one of the major sources of methane in the Northern Hemisphere," says Shakhova. "Increased methane releases in this area are a possible new climate-change-driven factor that will strengthen over time."

The recently completed 2014 expedition, which included Shakhova and on which Semiletov was a chief scientist, involved Swedish, Russian and American researchers who studied methane in permafrost and gas hydrates in the East Siberian shelf seas. They also studied the role of Arctic clouds in the climate system.

THE RESEARCH VESSEL *SIKULIAQ*
Expanding research in northern waters

"The *Sikuliaq* will expand our reach into the Arctic," says Michael Castellini, dean of the UAF School of Fisheries and Ocean Sciences. The *Sikuliaq* is a 261-foot research vessel owned by the National Science Foundation and operated by UAF. It can break through ice up to 2½ feet thick and is expected to begin science operations in the Arctic in 2015. "The ship will transport researchers examining the biology, chemistry and physics of the ocean. It will take them to places we couldn't study before and at times of the year that used to be off-limits."

HAZARDOUS ICE
Building the Sea Ice Prediction Network

With climate change causing the Arctic ice pack to melt, northern waters are increasingly open to shipping each summer. Sea ice in the region is a major hazard, warns Hajo Eicken, a geophysicist and sea ice expert at UAF's Geophysical Institute and International Arctic Research Center. Eicken says better forecasts are urgently needed and will require a new network to manage and distribute sea ice data.

As the planet warms, sea ice is becoming more variable and mobile. Tracking changing ice is difficult. Surface meltwater can confuse satellite data interpretation, causing delays of up to several days in recognizing low-resolution images from space. Local knowledge is needed and is being supplied by citizen scientists from indigenous communities as well as by academic, industry and government experts. But these types of Arctic observations are not being coordinated or disseminated widely.

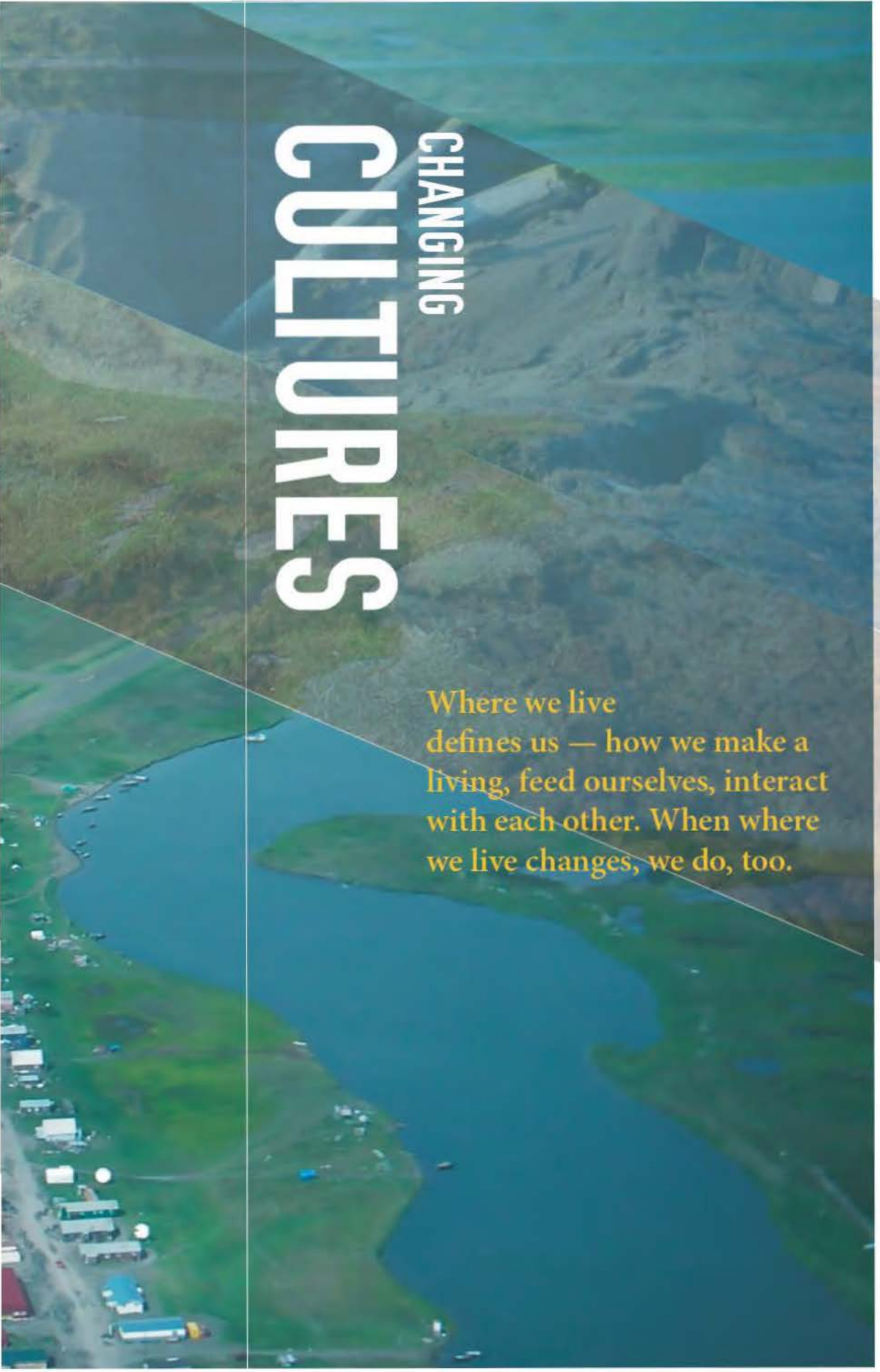
Now UAF is leading the newly formed Sea Ice Prediction Network, which is bringing researchers together to improve forecasts. In March 2016, UAF will host the Arctic Science Summit Week and the Arctic Observing Summit. Those events are part of an international effort to help coordinate research activities throughout the Arctic and will include a strong element of improving sea ice forecasts.

CLIMATE REFUGEES

Residents of coastal Alaska may be among the first climate refugees. Climate change affects coastal communities in many ways, but two of the greatest threats are flooding and erosion. Sea ice along the shore buffers against waves, but as sea ice forms later in the year, coastlines are left vulnerable to powerful fall storms. Land loss has led many communities to consider relocation.

Shaktoolik is one such village in western Alaska, home to 250 people of Yup'ik and Iñupiat descent. Not only would relocating the village cost tens of millions of dollars, but it would force residents to give up their homes and culture. An adaptation plan developed by the community with help from UAF explores ways to preserve the community of Shaktoolik, including an evacuation road, an emergency shelter, and a berm to absorb wave energy and reduce flood levels.

Shaktoolik photo by Douglas Vaught, V3 Energy, LLC



CHANGING CULTURES

Where we live defines us — how we make a living, feed ourselves, interact with each other. When where we live changes, we do, too.

FOOD FOR NOW, FOOD FOR THE FUTURE

The changing climate is altering Alaskans' access to subsistence resources, and UAF researchers are helping communities adapt. Changes in wildfire, forest structure, permafrost, and river and sea ice have made hunting and fishing conditions more challenging and less predictable. By merging climate models with local observations, UAF biologists and their community collaborators have a clearer picture of the future environment and subsistence resources. UAF is also linking climate interactions with the effects of rising fuel costs for a more complete understanding of food security in the Arctic.

Increasing food security and improving dietary quality in Alaska communities are two goals of the fisheries-to-schools project led by UAF's Center for Alaska Native Health Research in partnership with community members. The program connects public K–12 schools with local fish businesses, strengthening regional markets for sustainably harvested fish and encouraging use of nutritious, traditional foods in school meals.

MOVING TOWARD WELLNESS
A community takes action

When elders and community leaders of Alakanuk came together to take action against a spirit of suicide that had come to pass over their community, they determined it would take great power and a collective effort to protect the youth and move the people toward wellness. They were joined in their efforts by UAF researchers from the Center for Alaska Native Health Research. Together they created the Qungasvik (kung-az-vik), or tool kit (at right), containing "tools" of individual, family and community strengths and successes against alcohol and substance abuse and suicide.

The successful Qungasvik project now includes four additional communities in the Yukon-Kuskokwim region, with communities deciding which tools to use and how to use them based on local resources and the advice of their elders.

Courtesy of the University of Alaska Museum of the North.

WORDS TO LIVE BY
The Iñupiaq to English Dictionary

Edna MacLean, an Inupiaq speaker originally from Barrow, began work in the 1970s on the Iñupiatun Uqaluit Taniktun Sivuniŋit/Iñupiaq to English Dictionary at the request of her students. Some 40 years later, it was completed and published by the University of Alaska Press in 2014. With more than 19,000 individual entries, it's also a detailed description of how the Inupiaq language works and how it's used.

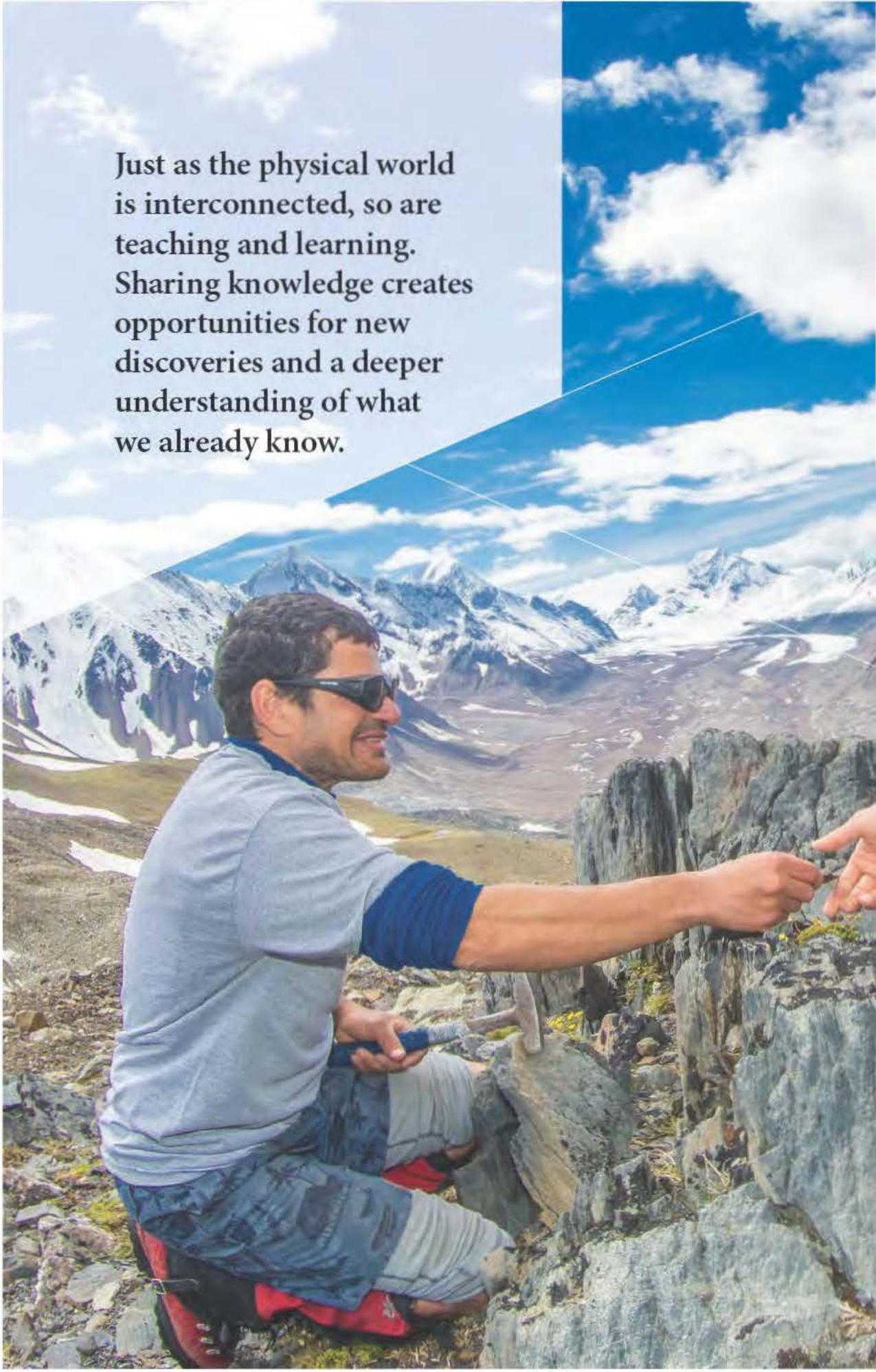
"I became fascinated with the structure of the language and spent hours and hours, maybe sometimes until 4 o'clock in the morning, doing research at home before I would teach the next day," MacLean says of her early days as an instructor at UAF. At a blackboard, she and her students, many of whom also were native speakers, would work out the forms of Inupiaq words and grammar.

MacLean, now a professor emeritus, and others with UAF's Alaska Native Language Center spent decades talking to Inupiaq speakers, collecting words and refining their understanding of the language's complex form.

The Inupiaq dictionary joins several others created by linguists at the center. Director Larry Kaplan says colleagues tell him the center has a top-tier reputation for such work. "We do some of the best Native American dictionary work in the country," he says.

ARCTIC RESEARCH
COLLABORATION AND OUTREACH

Just as the physical world is interconnected, so are teaching and learning. Sharing knowledge creates opportunities for new discoveries and a deeper understanding of what we already know.



UARCTIC

UAF is a member of UArctic, a network of universities, research centers and other organizations committed to higher education and research in the North.

UArctic institutions share resources, facilities and expertise with students, researchers and northern communities. Some 150 students have gone on exchange between UAF and other UArctic institutions through the north2north program, while through UArctic's research networks, UAF scientists participate in many collaborative projects.

UNDERGRADUATE RESEARCH AND SCHOLARLY ACTIVITY

Glacial melt from rock debris. Tracking halibut by satellite. An Alaska Native oral history. These are just three of dozens of student projects supported by UAF's Undergraduate Research and Scholarly Activity program. Depending on the project, students receive mentoring and funding to help them buy equipment or materials, or to pay for travel to professional conferences.

Through URSA, students participate in practical, real-world, hands-on work. They are at the heart of UAF as a student-centered research university.

SOUND JUDGMENT

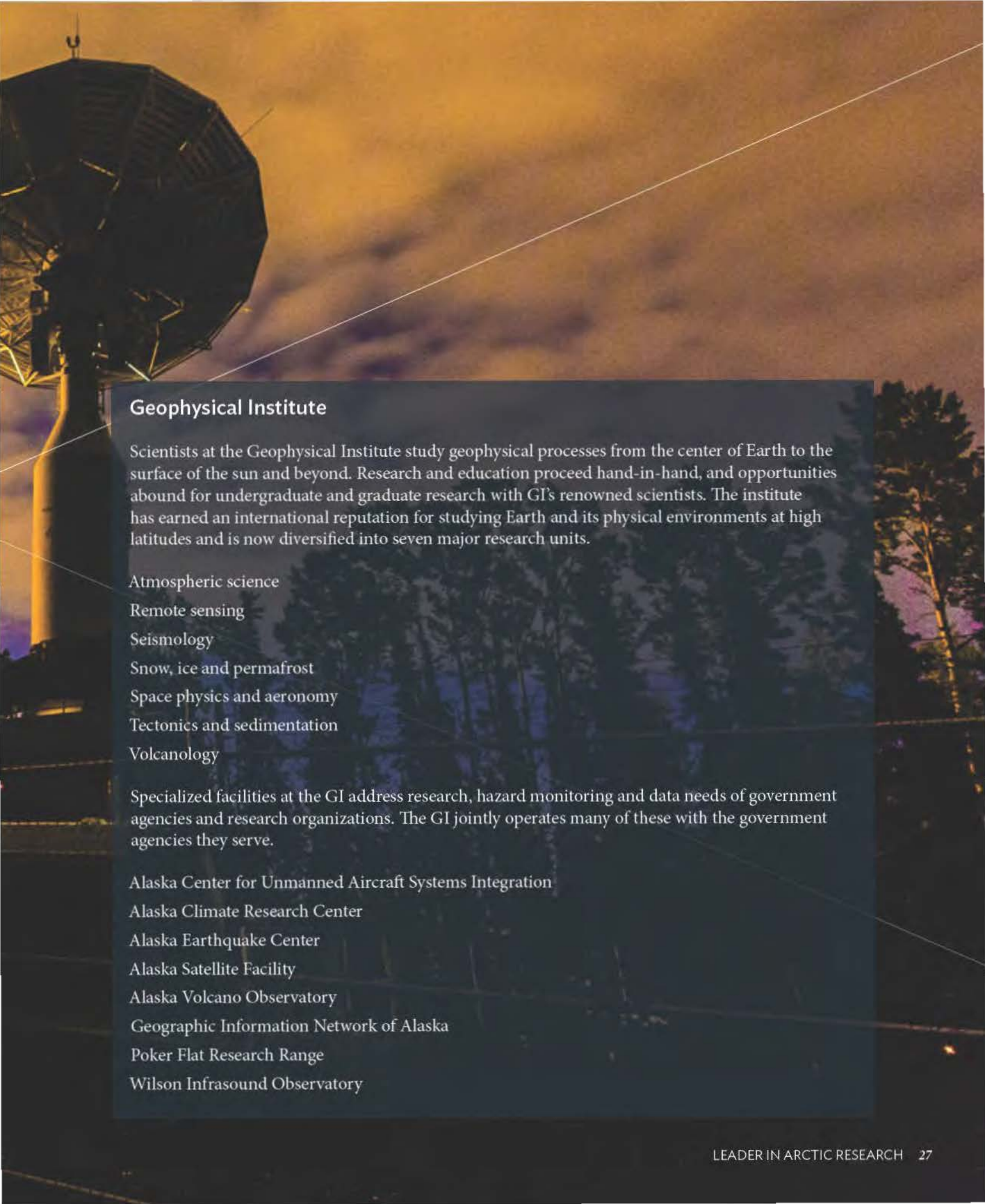
UAF scientists and officials serve as advisors and consultants for national and international organizations and projects, including the Arctic Council, the U.S. State Department and the European Union. UAF will also welcome the northern research community when it hosts the 2016 Arctic Science Summit Week March 12–20.

LEADING THE RESEARCH

UAF is a world leader in research on, in and about the Arctic. UAF's scientists and students delve deeply into a vast array of issues and fields that directly affect the North and that indirectly but substantially affect the rest of the world. More than 40 research centers are involved in basic and applied research. What follows are overviews of some of the programs highlighted in this publication.

Alaska Native Language Center, Alaska Native Languages Program and Applied Linguistics

The Alaska Native Language Center is internationally known as the major center in the U.S. for the study of Inuit-Yupik (Eskimo-Aleut) and northern Dené/Athabascan languages. ANLC researchers have developed an archival collection of more than 15,000 items comprising virtually everything written in or about Alaska Native languages. Much of the collection is digitized and available online. The center raises public awareness of the rapid loss of languages worldwide, particularly in the North. UAF offers courses in Alaska Native languages, leading to certificates and degrees that help qualify graduates to teach the languages.



Geophysical Institute

Scientists at the Geophysical Institute study geophysical processes from the center of Earth to the surface of the sun and beyond. Research and education proceed hand-in-hand, and opportunities abound for undergraduate and graduate research with GI's renowned scientists. The institute has earned an international reputation for studying Earth and its physical environments at high latitudes and is now diversified into seven major research units.

Atmospheric science

Remote sensing

Seismology

Snow, ice and permafrost

Space physics and aeronomy

Tectonics and sedimentation

Volcanology

Specialized facilities at the GI address research, hazard monitoring and data needs of government agencies and research organizations. The GI jointly operates many of these with the government agencies they serve.

Alaska Center for Unmanned Aircraft Systems Integration

Alaska Climate Research Center

Alaska Earthquake Center

Alaska Satellite Facility

Alaska Volcano Observatory

Geographic Information Network of Alaska

Poker Flat Research Range

Wilson Infrasound Observatory

Institute of Arctic Biology

Institute of Arctic Biology scientists, students and staff — along with state, national and international collaborators — conduct research in wildlife, climate change, ecology and ecosystems, physiology, genetics, biomedicine, human health and e volutionary biology. IAB supports research facilities that investigate a range of biological and social issues related to the changing Arctic.

Alaska Cooperative Fish and Wildlife Research Unit

Bonanza Creek Long-term Ecological Research program

Center for Alaska Native Health Research

Toolik Field Station

Institute of Northern Engineering

Research at the Institute of Northern Engineering spans the engineering disciplines, offering expertise and practical solutions for energy production and hydrology as well as infrastructure, mining and petroleum development. INE has five formal centers.

Alaska Center for Energy and Power

Alaska University Transportation Center

Mineral Industry Research Laboratory

Petroleum Development Laboratory

Water and Environmental Research Center

International Arctic Research Center

The International Arctic Research Center helps northern nations and communities understand, prepare for and adapt to the pan-Arctic impacts of climate change. Predicting change and planning for it requires sophisticated process studies, rigorous numerical analyses and reliable models. The IARC team works as collaborators and partners across disciplines and borders toward an understanding of the Arctic as an integrated whole. In addition to its core research scientists, IARC has six specialized research centers.

Alaska Center for Climate Assessment and Policy

Alaska Climate Science Center

Alaska Fire Science Consortium

Center for Global Change and Arctic System Research

Cooperative Institute for Alaska Research

Scenarios Network for Alaska and Arctic Planning

School of Fisheries and Ocean Sciences

Work conducted by scientists with the School of Fisheries and Ocean Sciences includes exploring the physics, chemistry, biology and ecology of marine and freshwater systems and the diverse organisms that live there. Research provides crucial data for assessing marine resources, developing management plans for living marine resources, and preparing for energy resource development in Arctic waters. SFOS is also instrumental in gathering and analyzing real-time oceanographic data experts need to determine resource development, respond to maritime emergencies such as oil spills, and plan for and conduct research.

Alaska Sea Grant

Institute of Marine Science

Lena Point Fisheries Facility

Kasitsna Bay Laboratory

Kodiak Seafood and Marine Science Center

Ocean Acidification Research Center

Research Vessel *Sikuliaq*

UAF research institutes, centers and programs

Throughout Alaska and around the globe, UAF research encompasses the human and physical aspects of life in the North. ***www.research.uaf.edu***

Advanced Instrumentation Laboratory
Advanced System Security Education, Research and Training Center
Agricultural and Forestry Experiment Station
Alaska Basic Neuroscience Program
Alaska Center for Climate Assessment and Policy
Alaska Center for Energy and Power
Alaska Center for Unmanned Aircraft Systems Integration
Alaska Climate Research Center
Alaska Climate Science Center
Alaska Cooperative Fish and Wildlife Research Unit
Alaska Earthquake Center
Alaska Fire Science Consortium
Alaska Experimental Program to Stimulate Competitive Research
Alaska Geobotany Center
Alaska Native Language Center
Alaska Quaternary Center
Alaska Satellite Facility
Alaska Sea Grant
Alaska University Transportation Center
Alaska Volcano Observatory
Animal Resources Center
Arctic Region Supercomputing Center
Bonanza Creek Long-term Ecological Research
Center for Alaska Native Health Research
Center for Global Change and Arctic System Research
Center for the Study of Security, Hazards, Response and Preparedness
Coastal Marine Institute
College of Natural Science and Mathematics Division of Research ***www.cdr.alaska.edu***
Cooperative Institute for Alaska Research
Core Facility for Nucleic Acid Analysis
Georgeson Botanical Garden
Geographic Information Network of Alaska
Geophysical Institute ***http://gi.alaska.edu***
Emergency Management and Homeland Security Program
IDeA Network of Biomedical Research Excellence
Institute of Arctic Biology ***www.iab.uaf.edu***
Institute of Arctic Biology Research Greenhouse
Institute of Marine Science ***www.ims.uaf.edu***
Institute of Northern Engineering ***http://ine.uaf.edu***
International Arctic Research Center ***www.iarc.uaf.edu***
Kasitsna Bay Laboratory
Kodiak Seafood and Marine Science Center
Large Animal Research Station
Lena Point Fisheries Facility
Mineral Industry Research Laboratory
Natural Resources and Extension ***www.uaf.edu/snre/***
National Center for Island, Maritime and Extreme Environment Security
Northern Leadership Center
Ocean Acidification Research Center
Office of Intellectual Property and Commercialization
Petroleum Development Laboratory
Poker Flat Research Range
Pollock Conservation Cooperative Research Center
Research Vessel *Sikuliaq*
Scenarios Network for Alaska and Arctic Planning
School of Fisheries and Ocean Sciences ***www.sfos.uaf.edu***
Toolik Field Station
University of Alaska Museum of the North
Water and Environmental Research Center
Wilson Infrasound Observatory

Units in boldface denote major research divisions.

Service and cooperation

UAF experts and officials serve on a vast number of Arctic-related boards, organizations and committees, including the following.

Alaska Arctic Policy Commission
Alaska Oceans Observing System
American Meteorological Society Polar Committee
Arctic Council
Arctic Gravity Project
Arctic Institute of North America
Arctic Landscape Conservation Cooperative
Arctic Marine Biodiversity Observing Network
Arctic Observing Summit 2016
Arctic Science Summit Week 2016
Arctic Vegetation Archive
Arctic Yearbook, Northern Research Forum Editorial Board
Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative
Association of Polar Early Career Scientists
Biogeochemical Exchange Processes at Sea-ice Interfaces
Bureau of Ocean Energy Management Science Steering Committee
Canadian Changing Cold Regions Network
CircumArctic Rangifer Monitoring and Assessment Network
Circumpolar Agriculture Association
Circumpolar Agriculture Conference
Circumpolar Biodiversity Monitoring Program
Circumpolar Conference on Indigenous Education
Climate and Cryosphere World Climate Research Program
Conservation of Arctic Flora and Fauna
Cryosphere Arctic Sea Ice Working Group
Department of Energy Arctic Next Generation Ecosystem Experiment
Economic Forum Global Agenda Council on the Arctic
Ecosystem Studies of the SubArctic Seas Program
European Union Arctic Climate Change, Energy and Society project
Gathering of Speakers of the Itelmen Language
Hoover Institution/Stanford University Arctic Security Initiative
Icelandic Research Council
Institute of the North
International Arctic Science Committee
International Arctic Social Sciences Association
International Bathymetric Chart of the Arctic Ocean project
International Boreal Forest Research Association
International Congress of Arctic Social Scientists
International Council for Science
International Glaciological Society
International Network for Terristrial Research and Monitoring in the Arctic
International Permafrost Association
International Siberian Shelf Study
International Study of Arctic Change
International Union of Soil Science Cryosol Working Group
Japan Consortium for Arctic Environmental Research
Juneau Icefield Research Program
Korea Polar Research Institute
Marine Exchange of Alaska
NASA Snow Working Group for Remote Sensing
National Academy of Science Polar Research Board
National Academy of Science, Workshop Committee on Remote Sensing of Permafrost
National Petroleum Council Arctic Research Study
National Research Council Committee on the Arctic in the Anthropocene: Emerging Research Questions
National Science Foundation Interagency Arctic Research Policy Committee
Native American and Indigenous Studies Association
Native American and Indigenous Studies Association Conference
NOAA Ecosystem Sciences and Management Working Group on the Arctic
NOAA Hydrographic Services Review Panel
North Pacific Fishery Management Council
North Pacific Marine Science Organization
North Pacific Research Board
North Slope Borough-Shell Baseline Studies Program
Oil Spill Recovery Institute
Peregrine Fund
Polar Educators International
Polar Geography
Polar Prediction Working Group
Polar Research, Norwegian Polar Institute
Russian-American Long-term Census of the Arctic
Scandinavian Historians Society
Scientific Committee on Oceanic Research
Scott Polar Research Institute, Cambridge University
Sea Ice for Walrus Outlook
Society for the Advancement of Scandinavian Study
Study of Environmental Arctic Change
Symposium on Indigenous Rights and Workshop on Collaboration and Comparative Research in the North
Synthesis of Arctic Research
Tundra Conservation Network
U.S. Arctic Research Commission
U.S.-Canada Transboundary Project
U.S. Delegation to the International Maritime Organization Polar Code Working Group
U.S. State Department
U.S.-Russia Polar Bear Commission
UArctic (University of the Arctic)
Western Alaska Area Maritime Security Committee, U.S. Coast Guard Sector
Western Alaska Salmon Stock Identification Program
World Climate Research Program

The Arctic system

The Arctic system comprises a highly complex interplay of physical, chemical, biological and social processes that interact and change daily.

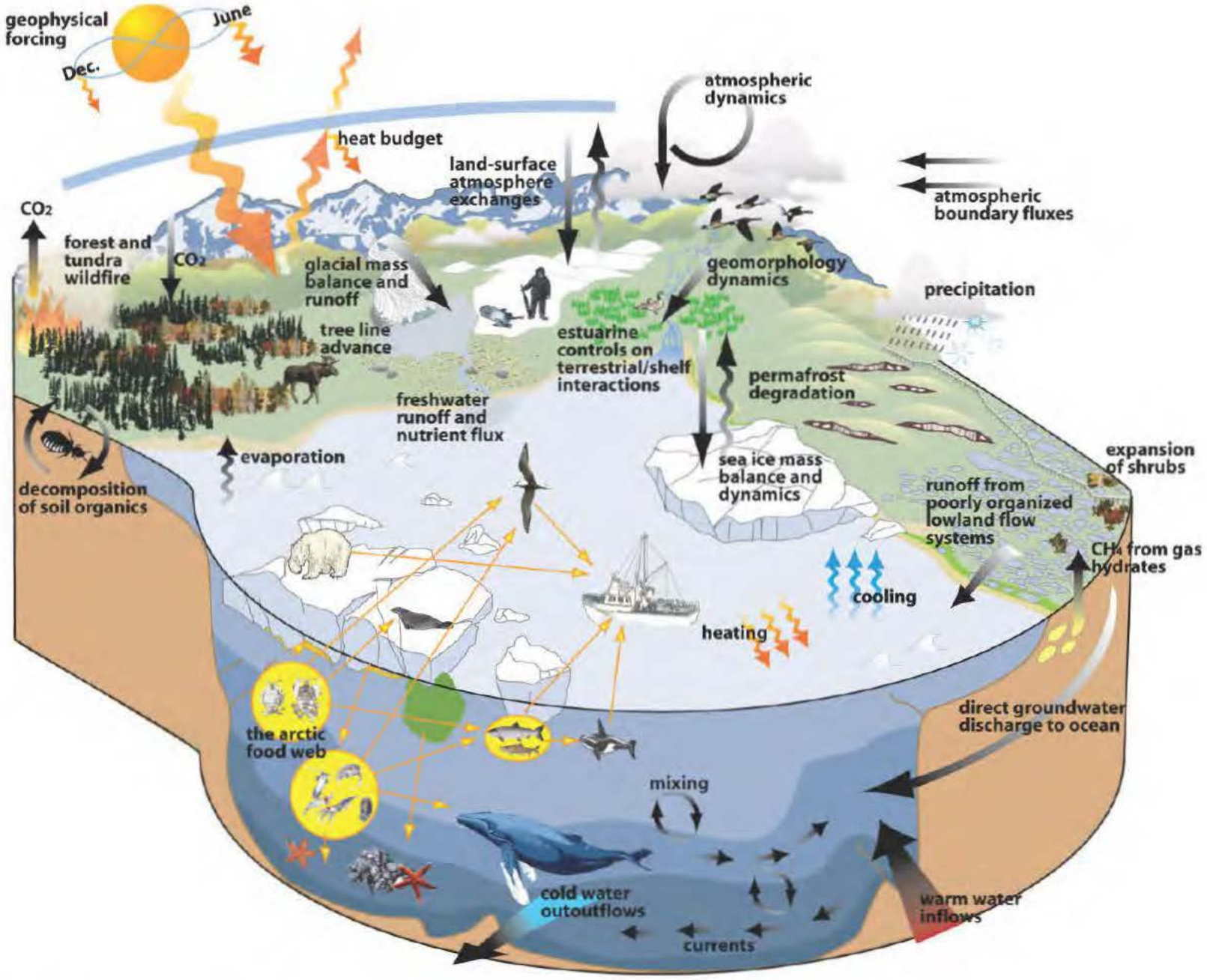


Image courtesy of the International Arctic Research Center.


UAF research sites* around the North
*Map may not reflect all current sites.

Contributors
Alaska Center for Climate Assessment and Policy
Alaska Satellite Facility
Geophysical Institute
Institute of Arctic Biology
International Arctic Research Center
School of Fisheries and Ocean Sciences
School of Natural Resources and Extension
Scenarios Network for Alaska and Arctic Planning

Photo credits
UAF photos by Todd Paris unless otherwise noted.
pp. 6–7, U.S. Geological Survey
p. 8, iStock
pp. 10–11, Gerald Frost
pp. 12–13, pp. 16–17 iStock
pp. 20–21, Val Ihde, UAF
p. 22, Douglas Vaught, V3 Energy, LLC
p. 25, Tool box, UA64-64-18AB, photo credit: Angela J. Linn/University of Alaska Museum of the North
interior back cover, iStock

UAF
UNIVERSITY OF ALASKA FAIRBANKS

www.research.uaf.edu

Report on University of Alaska e-Learning

Board of Regents Meeting, Academic and Student Affairs Committee
December 11-12, 2014 Anchorage, Alaska

Executive Summary

Recent, system wide cooperation and process simplification efforts in alignment with Shaping Alaska's Future are anticipated to have a sustained, significant positive impact on student experiences and educational outcomes in relation to e-Learning across UA. These include the online distance learning portal, common calendar, course transferability, common learning management system, and the Alaska's Learning Network (AKLN).

Universities in the UA system delivered 26 percent more courses via e-Learning in FY14 than in FY10. The proportion of students taking at least one e-Learning course during a fiscal year grew from 34 percent in FY10 to more than 41 percent by FY14. Students who choose e-Learning courses tend to be a little older, with those 25 years of age or older making up 63 percent of e-Learning students and slightly more than half of all students. UA students who came from out-of-state or another country were more likely to take one or more e-Learning courses than students who originated in Alaska.

UA has greatly expanded the menu of general education and core courses available to students via e-Learning. This intentional, strategic effort has increased access to higher education across the state and enabled students to stay on track for timely graduation. About 60 percent of students who attend full-time take a majority of their courses via e-Learning in a given year.

Each institution is focused toward intentional expansion of cohesive e-Learning degree and certificate programs. The University of Alaska offers a total of 211 distinct degree, certificate and endorsement programs by hybrid or distance delivery. Seventeen different programs were offered by hybrid or distance delivery for the first time in FY14.

UA efforts to assess and improve e-Learning quality fall within two broad functional areas. The Online Learning Consortium Quality Scorecard focuses on institutional support of e-Learning programs and learners while the Quality Matters and OLC Teaching Online Certificate programs assess the quality of course design and support high-quality instructional practices. e-Learning Faculty development continues to grow, and collaborative sharing of resources with programs such as iTeach involve faculty from two or more institutions. Ensuring adequate faculty support in instructional design and technical resources is important to further strengthening e-Learning at UA.

Alaska collaboration efforts with other states are starting to address changes in how postsecondary academic achievement is recognized. The Western Interstate Commission for Higher Education Internet Course Exchange and Interstate Passport initiatives, as well as the State Authorization and Reciprocity Agreement (SARA) are examples of multi-state agreement agreements and efforts. Badges, credentials, certifications and degrees are becoming more interchangeable and more accessible for students desiring recognition for their skills, abilities and education.

Bandwidth is the upload/download capacity and latency is the delay experienced waiting for data to transfer. Depending on the technology used to deliver an e-Learning course as well as the location(s) of the delivering campus and enrolled students, Internet bandwidth and latency can be limiting factors for success. See the Appendix on page 15 for more information.

Shaping Alaska's Future

Recent, system wide cooperation and process simplification efforts in alignment with Shaping Alaska's Future *Theme V: Accountability to the People of Alaska* are anticipated to have a sustained, significant positive impact on student experiences and educational outcomes in relation to e-Learning across UA. At the same time, e-Learning and distance education are being used as a strategic means to achieving effects identified in *Theme II: Productive Partnerships with Alaska's Schools*.

Online Distance Learning Portal: A new, comprehensive web portal for distance learning has been created, providing prospective students information about each university's e-Learning program offerings and resources, all in one spot. See http://distance.alaska.edu/

Common Calendar: The UA Common Calendar Advisory Task Force is developing recommendations for potential unified start and end dates for Academic Year 2016-2017, with an eye toward appropriately accommodating synchronous e-Learning and other types of course and program sharing across the UA system.

Transferability: The Summit Team recommended that UA take part in the Western Interstate Commission for Higher Education (WICHE) Interstate Passport Initiative in January 2014, which streamlines the transfer of course credits earned at WICHE institutions into the University of Alaska. Each university's faculty senate is considering participation in the initiative, which is intended to streamline transfer pathways to graduation across western states. Adoption of common general education and developmental/preparatory learning outcomes and requirements is also anticipated to optimize course transfers and course sharing among UAA, UAF and UAS.

Common Learning Management System: The Summit Team directed UA to establish a common learning management system across all campuses and ensure that any future changes are aligned across the system. Implementation of a common learning management system is scheduled for fall semester 2016.

Alaska's Learning Network (AKLN), acquired by UAS in fall 2013 from the Department of Education and Early Development, is an online coalition network partnered with every Alaska school district across the state. AKLN supports each district in providing college and career ready coursework that may not be available otherwise to high school students, and also provides expanded, high-quality online professional development for Alaskan teachers and para-professionals at the post-secondary level. The coalition currently makes UAF health tech prep courses and the UAS mining career pathway available to high school students, in addition to providing Advanced Placement coursework and a Future Educators of Alaska tech prep course funded through a Perkins grant. These efforts directly support productive partnerships with Alaska's schools by supporting college-readiness of high school graduates and providing a path for more Alaskans to become educators.

Recent Trends in UA e-Learning

Updated annual written reports for UAA, UAF, UAS are available for review online[1]. The University of Alaska has defined e-Learning as planned learning that predominantly occurs in situations where a student is not required to be in a predetermined location[2]. e-Learning courses require a different course design and development, different pedagogical techniques, and communication through instructional technologies. e-Learning courses are delivered in many forms, including video conference, audio conference, tele-courses, satellite telecasts, courses available via the Internet, CD-ROM, video/audio tape, etc. For standard reporting purposes, a course delivered entirely via e-Learning is referred to as a distance course, while a course delivered predominantly via e-Learning with a lesser traditional component is referred to as a hybrid course. Unlike traditional course offerings, specific delivery methods for e-Learning course that require a minimum level of bandwidth capacity may not be practical to deliver to some areas of the state. The appendix contains more information on this topic.

While in-state competition from other institutions continues to grow, e-Learning participation at the University of Alaska has also increased as a result of efforts to increase capacity to serve students. This report considers student participation in e-Learning during the course of a fiscal year in both credit and non-credit courses. Considering summer 2013, fall 2013, spring 2014 and year-long course participation during FY14, more than 50,100 different people took at least one course (for-credit or non-credit; traditional or e-Learning) from UA in FY14. Four out of ten students taking for-credit classes and one in ten students taking non-credit classes took one or more courses via e-Learning course in FY14. The proportion of students taking at least one e-Learning course during a fiscal year grew from 34 percent in FY10 to more than 41 percent by FY14.

The demographic profile of UA's e-Learning students has been relatively stable over time. Students taking these types of courses are generally representative of the University of Alaska's overall race and ethnicity distribution, with about 15 percent self-identifying as Alaska Native or American Indian, and 25 percent self-identifying as having any minority background. Students who choose e-Learning courses tend to be a little older, with those 25 years of age or older making up 63 percent of e-Learning students and slightly more than half of all students. UA students who came from out-of-state or another country were more likely to take one or more e-Learning courses than students who originated in Alaska.

e-Learning Courses

It recent years, UA has greatly expanded the menu of general education and core courses available to students via e-Learning. This intentional, strategic effort has increased access to higher education across the state and enabled students to stay on track for timely graduation. The distribution of FY14 course sections by delivery method is similar to that observed in FY13, with about 3 percent of course sections delivered by hybrid e-Learning and approximately 19 percent of course sections delivered without any location-based component. The remaining 78 percent of course sections were delivered by traditional means. Approximately 30 percent of all UA courses were available via e-Learning in FY14. Tools used to deliver instruction and coursework include Blackboard, eLive, Collaborate, Google docs, ePortfolio, and audio, among many others.

Universities in the UA system delivered about 26 percent more courses via e-Learning in FY14 than in FY10, as displayed in Figure 1. Of the unique courses each university delivered by e-Learning in FY14, approximately half were developmental and lower division, with the remainder split evenly between upper

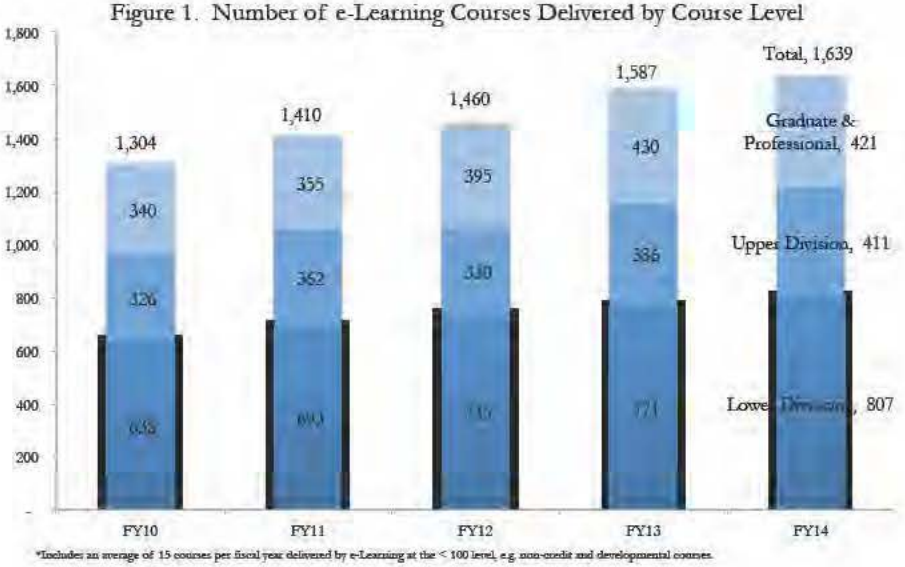
[1] UAA's report available online at: http://www uaa alaska edu/institutionaleffectiveness/upload/eLearning-at-UAA-2013-2014 pdf
UAF's report available online at: http://elearning uaf edu/go/unit-report-2014
UAS's report available online at: http://www uas alaska edu/provost/ie/

[2] University of Alaska reporting definitions for e-Learning courses and programs are available online at: http://www alaska edu/swbir/ir/data-guidelines/

division and professional and graduate level courses; these proportions reflect little change from FY13. The overall number of courses available via e-Learning increased by slightly more than 3 percent from FY13 to FY14; the majority of this growth was in developmental and lower division courses available via e-Learning, which increased by 5 percent (36 courses) over the last year.

Table 1 shows the distribution of e-Learning courses delivered in FY14 by university and level. More than half of e-Learning courses offered below 100 level were developmental math courses. A complete listing of 208 courses offered for the first time in FY14 via e-Learning is provided in Reference A.

Figure 1. Number of e-Learning Courses Delivered by Course Level



*Includes an average of 15 courses per fiscal year delivered by e-Learning at the < 100 level, e.g. non-credit and developmental courses.

Table 1. e-Learning Courses Delivered by Course Level and University, FY14

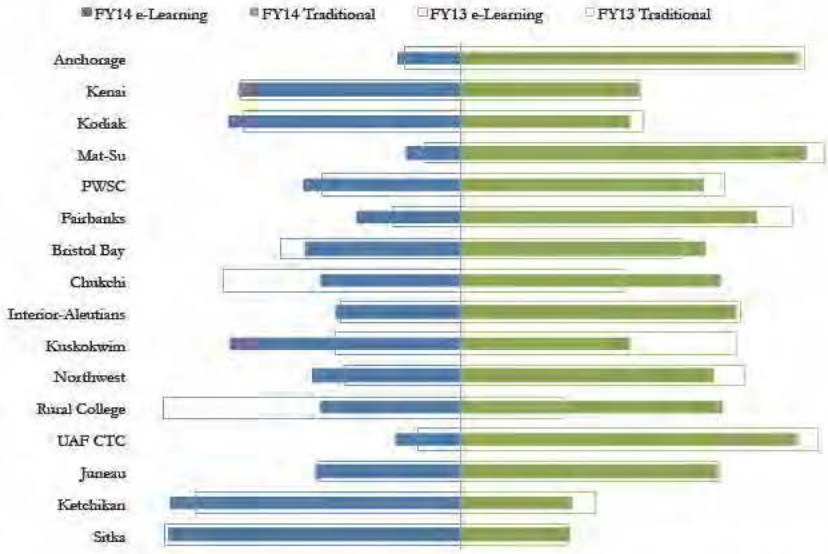
Course Level	UAA	UAF	UAS	Total
Lower Division*	409	255	143	807
Upper Division	146	174	91	411
Graduate & Professional	157	185	79	421
Total	712	614	313	1,639

Table 2. Proportion of Student Credit Hours by Course Level Delivered by e-Learning, FY14

Course Level	UAA	UAF	UAS	Total
Lower Division*	21%	22%	42%	23%
Upper Division	18%	24%	57%	24%
Graduate & Professional	29%	50%	59%	42%
Total	21%	26%	48%	25%

There are differences among UA institutions in the distribution of student credit hours delivered by e-Learning at each course level, driven by unique mission and student populations (Table 2). A higher proportion of graduate level student credit hours are classified as e-Learning because research and thesis credits are typically not location-based courses. About one-fifth of UAA student credit hours were delivered via e-Learning, compared to about one-quarter for UAF and almost half of UAS's student credit hours. UAA delivered almost half of all e-Learning credits across the UA system in FY14, UAF about one-third, and UAS just under one-fifth. These patterns have been consistent over the last several fiscal years. Figure 2 illustrates the proportion of student credit hours delivered by e-Learning versus traditional classroom methods in FY13 and FY14, for each campus in the university system.

Figure 2. Proportion of Student Credit Hours by Delivery Method FY13-FY14



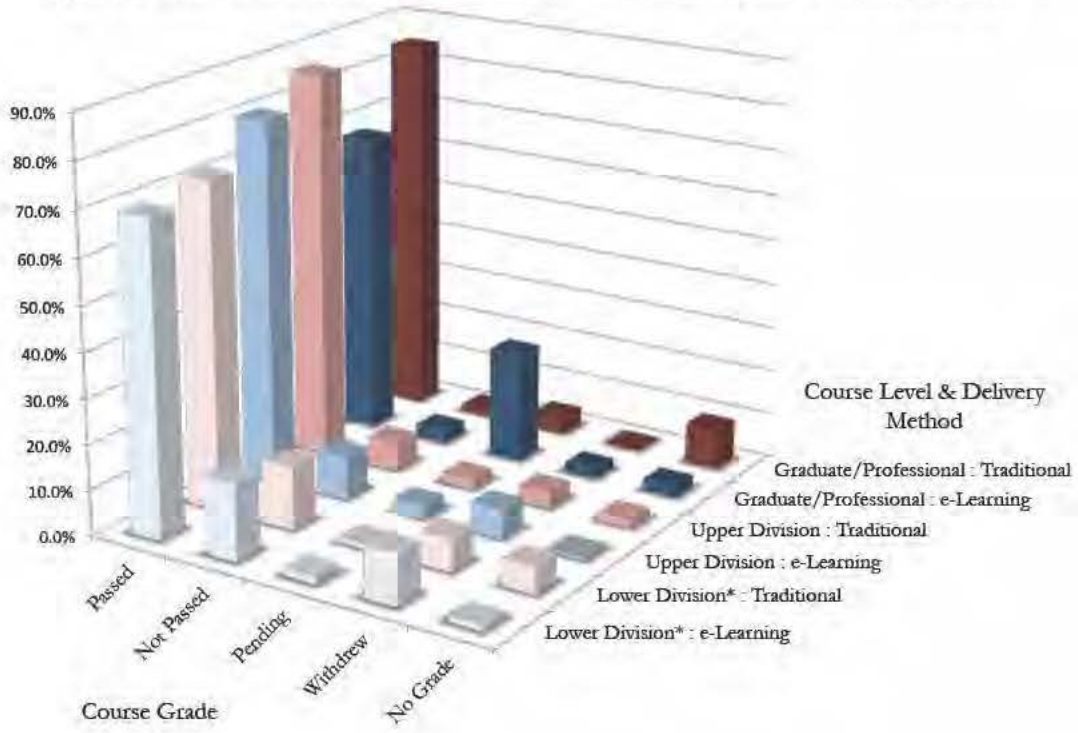
While there is some natural variation over time in each campus' credit hour delivery distribution, four campuses consistently deliver more than half of all annual student credit hours by e-Learning: Kenai, Kodiak, Ketchikan and Sitka. Other campuses with notable increases in the proportion of student credit hours attributable to e-Learning courses are: Mat-Su, which more than doubled from 6 to 14 percent of student credit hours delivered between FY12 and FY14; and Kuskokwim, which increased from 32 to 58 percent of student credit hours delivered in FY14. Conversely, the proportion of Chukchi and Bristol Bay campus credit hours delivered by e-Learning declined from 47 to 35 percent, and from 51 percent to 39 percent over this time, respectively. Proportionally large year-to-year increases and decreases are not unusual for smaller campus operations, due to cyclical demand for courses and other factors. Bristol Bay delivered 1 percent and Chukchi delivered 0.4 percent of UA's total e-Learning student credit hours in FY14.

Student success is always a high priority, regardless of the way a course is delivered. The rate of student success, as defined by a grade of C or higher for undergraduate courses and a grade of B or higher for graduate and professional courses, or a P grade for either level, are generally comparable on the whole between e-Learning and traditionally delivered courses. A slightly higher proportion of students (3 percent on average) withdrew from, or did not pass, e-Learning courses than traditional courses, at any given course level (Figure 3). About 4 percent more traditional course attempts received passing grades, on average across course levels, than e-Learning course attempts. About one-quarter of graduate/professional level e-Learning courses have an outcome of Pending due to grade deferral, a relatively common practice for graduate level Research and Thesis course credits. These types of independent study, graduate level courses are not location dependent, therefore are categorized as e-Learning. Roughly 10 percent of traditionally

delivered graduate/professional courses are professional, 500-level courses[3] with an expected outcome of No Grade.

Determining whether there is a significant correlation between the delivery method for a given course and student outcomes can be challenging because students self-select for e-Learning versus traditionally delivered sections of a particular course. A recent statistical analysis, controlling for student characteristics, of course outcomes for English 111 by delivery method indicated UA first-time freshmen who took English 111 by traditional, face-to-face methods were 2.3 times more likely to succeed than first-time freshmen who took the same course via e-Learning. The probability of success for any English 111 e-Learning course attempt was associated with high school grade point average; the higher a student's high school GPA was, the more likely a student was to succeed in the course. The only other variable deemed significantly related to course success for first-time freshman who took English 111 via e-Learning was receipt of financial aid. Technical resources required to easily participate in e-Learning courses may be a financial burden that some students cannot afford, e.g. a personal computer, high-speed internet access off-campus[4]. Further investigation in this area may be useful to inform university advising and course placement practices, to help individual students consider whether choosing a certain delivery method for a particular course could maximize success.

Figure 3. Course Outcome Distribution by Course Level and Delivery Method



[3] Passed includes letter grades of C or higher for undergraduate courses, B or higher for graduate and professional level courses, or a grade of Pass for any course. Not Passed includes any letter grade of C- or lower for undergraduate courses, B- or lower for graduate and professional courses, or a grade of Fail, No Pass or No Basis for any course. Pending indicates that a student hasn't yet passed the course by the end of the semester, however still has the capability to successfully pass the course, e.g. a grade of Deferred or Incomplete has been recorded. Withdrew represents course withdrawals initiated by either the teacher or the student after the add/drop period for the given term. The No Grade category captures courses for which grades are not available, and include grades of Not Submitted, Non-Graded (labs and other non-GPA eligible courses), and null.

[4] C. McGinness, 2013, *Analysis of UA First-time Freshmen Success in English 111 by Course Delivery Type*, available online at: http://www.alaska.edu/swbir/ir/publications/AnalysisOfFTFSuccessEng1112013APR17.pdf.

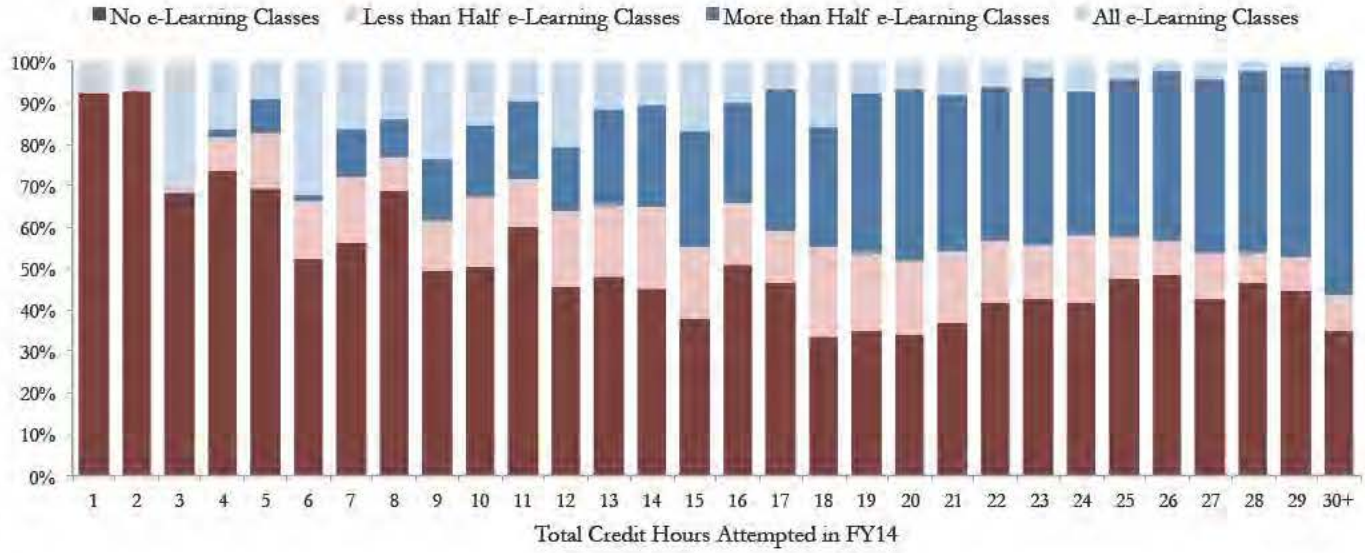
Table 3 provides a comparison of the top 20 student credit hour generating e-Learning courses with the traditionally delivered counterpart. These top 20 courses accounted for 15 percent of total e-Learning credit hours delivered across UA in FY14. Of these, 85 percent apply toward baccalaureate general education requirements[5] at UAA, UAF or UAS. One course, UAA Mathematics A105, Intermediate Algebra, meets general education requirement for Associate of Arts degree seekers, and is considered a developmental course for Bachelor's degree seekers, and UAA Mathematics A055, Elementary Algebra, is a developmental level course for any degree seeker. There are some differences in the pass rate for students who take a traditional section versus an e-Learning section of a course, however there isn't a clear pattern. The percent of students who pass a traditionally delivered section of English 111 is 6 to 10 percent higher than for e-Learning sections. For Econ 201, the pass rate for students in traditional sections is 27 percent higher than for students in e-Learning sections. On the flip side, pass rates for students taking traditional sections of general education courses in Psychology, History and Anthropology are about 10 percent below pass rates in e-Learning sections of the same courses. While there are sometimes differences of 25 or more students in the average section size between e-Learning and traditional sections of the same course, typically driven by the type of technology used for e-Learning course sections and classroom size for traditional course sections, the overall average section size for either category across all courses is very similar.

Table 3. Top 20 Student Credit Hour Generating e-Learning Courses, With Comparison to Traditional Sections of Same Course, FY14

University	Subject	Course Number	Course Title	e-Learning SCH	e-Learning Students Enrolled	e-Learning Course Sections Delivered	Average Section Size		Proportion of Course Attempts Passed	
							e-Learning	Traditional	e-Learning	Traditional
UAA	English	A212	*Technical Writing	3,147	1,050	52	20 2	18 9	87%	91%
UAA	English	A111	*Meth of Written Communication	2,271	759	42	18 1	19 1	74%	80%
UAA	Psychology	A111	*General Psychology	1,653	554	10	55 4	31 0	80%	70%
UAA	Psychology	A150	*Lifespan Development	1,191	397	13	30 5	29 8	83%	82%
UAF	History	F100X	Modern World History	1,125	375	12	31 3	45 0	88%	77%
UAA	Business Administration	A151	*Introduction to Business	1,122	375	11	34 1	25 9	90%	80%
UAA	Mathematics	A105	Intermediate Algebra	1,119	376	18	20 9	26 2	69%	72%
UAA	History	A101	*Western Civilization I	1,071	358	13	27 5	26 5	84%	79%
UAA	Communication	A237	*Interpersonal Communication	990	330	16	20 6	17 0	81%	91%
UAA	Economics	A201	*Prin of Macroeconomics	921	308	7	44 0	42 9	59%	86%
UAA	Philosophy	A101	*Intro to Logic	909	304	12	25 3	26 8	87%	80%
UAA	Biology	A102	*Introductory Biology	897	300	9	33 3	37 4	72%	74%
UAS	Biology	S111	*Human Anatomy & Phys I	848	212	10	21 2	9 4	79%	79%
UAA	Anthropology	A101	*Intro to Anthropology	837	279	8	34 9	40 2	83%	73%
UAA	Music	A121	*Music Appreciation	807	269	9	29 9	37 4	90%	81%
UAA	History	A102	*Western Civilization II	804	268	11	24 4	24 5	75%	81%
UAF	English	F111X	Intro to Academic Writing	792	265	17	15 6	17 1	68%	78%
UAF	English	F200X	World Literature	759	253	11	23 0	25 2	87%	93%
UAA	Mathematics	A055	Elementary Algebra	750	251	12	20 9	24 0	73%	66%
UAA	Dietetics & Nutrition	A203	Nutrition for Health Sciences	711	237	7	33 9	26 2	91%	93%
					Average Section Size		25 1	25 2		

The delivery method of the courses chosen by each student is associated with the total number of credits each student attempts over the course of a year (Figure 4). For students attempting 30 or more credit hours per fiscal year, the minimum amount needed to stay on track toward timely graduation, almost 60 percent do so by choosing to enroll in a majority of courses via e-Learning. Those who enroll part-time over a fiscal year are more likely to take all or none of their courses via e-Learning, in part by virtue of taking fewer courses overall. This pattern has been relatively consistent since FY12, and suggests that utilization of e-Learning courses may be a good strategy to support on-time completion of degrees and credentials.

Figure 4. Mix of Course Type(s) Utilized versus Total Credits Attempted by UA Students, FY14



e-Learning Certificate and Degree Programs

Beyond course offerings, the University of Alaska offers degree programs that can be completed partially, or entirely, via e-Learning. UA programs have been categorized into hybrid delivery or distance delivery categories, based on the ability to complete 50-99 percent, or 100 percent of program course requirements by e-Learning, respectively. Programs that do not provide for at least half of the required courses to be completed by e-Learning are classified as traditionally delivered for reporting.

Many of the university's programs, such as the Associate of Applied Science in Nursing and a variety of Teacher Education programs, have been successfully developed and implemented from the start to be available at a distance. Some UA programs are possible to complete partially or fully online, however it is not always the case that a delivering academic department actively intends to deliver a particular degree online - at least half of the courses required for a degree may simply be available via e-Learning primarily as a result of the broad availability of required, general education courses. Each university is intentionally focusing on the expansion and marketing of cohesive online degree programs. Information on how many programs are hybrid or distance delivered was collected from UAA, UAF and UAS for the first time three years ago, in response to federal reporting requirements. Each university continues to evaluate and refine the classification of programs into these categories, with 5 degree programs that were categorized as hybrid or distance delivered in FY13 being re-categorized as traditional in FY14. The University of Alaska offers a total of 211 distinct degree, certificate and endorsement programs by hybrid (Table 4) or distance delivery (Table 5). Almost half of these are full distance degree programs. See Reference B for a complete listing. Seventeen different programs were offered by hybrid or distance delivery for the first time in FY14 (Table 6).

Table 4. Programs available by Hybrid (50-99%) Delivery in FY14

	UAA	UAF	UAS	Total
Occupational Endorsement	4			4
Certificate	8	4		12
Associate	8	4	2	14
Baccalaureate	8	41	4	53
Endorsement/Licensure	5	1	6	12
Master's	8	6	6	20
Doctoral		1		1
Total	41	57	18	116

Table 5. Programs available by Distance (100%) Delivery in FY14

	UAA	UAF	UAS	Total
Occupational Endorsement	9	4	7	20
Certificate	3	9	8	20
Associate	3	9	4	16
Baccalaureate		6	6	12
Endorsement/Licensure	4	3	1	8
Master's	5	7	5	17
Doctoral		2		2
Total	24	40	31	95

Table 6. Programs Newly Available via e-Learning in FY14

University	Major	Degree	Delivery Type
UAA	Archit and Engr Technology	Associate of Applied Science	Hybrid (50-99%)
UAA	Architectural Drafting	Certificate	Hybrid (50-99%)
UAA	CAD for Building Construction	Occupational Endorsement Cert	Hybrid (50-99%)
UAA	Creat Writing and Lit Arts	Master of Fine Arts	Hybrid (50-99%)
UAA	Family Nurse Practitioner	Graduate Certificate	Distance (100%)
UAA	History	Bachelor of Arts	Hybrid (50-99%)
UAA	Mech and Elect Drafting	Certificate	Hybrid (50-99%)
UAA	Psychia and Mentl Hlth Nur Pra	Graduate Certificate	Distance (100%)
UAA	Psychology	Bachelor of Arts	Hybrid (50-99%)
UAA	Psychology	Bachelor of Science	Hybrid (50-99%)
UAA	Structural Drafting	Certificate	Hybrid (50-99%)
UAF	Design and Construction Mgmt	Graduate Certificate	Distance (100%)
UAF	Homeland Security Emerg Mgmt	Bach of Emergency Management	Hybrid (50-99%)
UAF	Interdisciplinary Studies	Associate of Applied Science	Hybrid (50-99%)
UAF	Secondary Education	Bachelor of Arts	Hybrid (50-99%)
UAS	Associate of Science	Associate of Science	Hybrid (50-99%)
UAS	Network Support and Administrn	Occupational Endorsement Cert	Distance (100%)

Faculty Development for e-Learning

Faculty support for developing and offering e-Learning courses and programs varies among universities in the system. Ensuring adequate faculty support in instructional design and technical resources is important to further strengthening e-Learning at UA. The Office of the Vice President of Academic Affairs and Research provides annual financial support for each university to deliver faculty distance education technology training and technical support.

Across the system, collaborative sharing of resources with programs such as iTeach involve faculty from two or more institutions. For example, UAA's Academic Innovations & e-Learning Instructional Designer Team hosted the second annual Statewide iDesign Event in June 2014 for all UA instructional designers, to hone skills and collaborate on projects. A total of 40 instructional designers attended this year's two-day event. This statewide collaboration is preparing to release a video feature for the UA statewide office initiative "Shaping Alaska's Future."

A quantification of e-Learning Faculty development and substantial changes by each university in this area are described below. Trend information is presented for UAF and UAS; UAA will define general, high level groupings for different types of faculty development and training activities over the next year, providing the capability to categorize and report trend information for this activity over time.

UAA: In January 2014 the UAA Faculty Technology Center officially changed its name to Academic Innovations & e-Learning. Its mission is to support the UAA learning environment by fostering quality instructional practices, innovations, and technologies. The department has reorganized into three teams focusing on: Faculty/Staff technology-related professional development, Instructional Design Services, and Student e-Learning Services, providing full service distance education support for faculty and students. During FY14, the Center offered 85 workshops, which were attended by 359 faculty. Topics included Blackboard, Collaborate, Online teaching, Google docs, Lecture capture, Gamification and ePortfolio.

UAA Offered Special Events:

- Open iTeach provided a week-long, blended intensive training to eight faculty and staff on course design and e-Learning concepts in August.
- Fall Technology Bookcamp and Webinar Workshops in August included 15 course and tools-based workshops for 71 attendees.
- Learning Technologies at UAA: Academic Innovations & e-Learning team members presented 15, 30-minute presentations to new UAA students during "Howl Days" in August.
- Faculty Development Evaluation Planning: Academic Innovations & e-Learning and the Center for Advancing Faculty Excellence hosted Susan Hines, an expert on professional development evaluations from St. Mary's University in Minnesota, to consult on this topic.

Anchorage Campus

- 85 Professional Development Workshops – 359 participants
- iTeach Intensive – 9 participants
- Sloan-C 1 Week Course – 25 participants
- Sloan-C 9 Week Teaching Intensive – 15 participants
- UAA Technology Fellows – 10 participants

Kenai Peninsula

- Excellence in e-Learning workshop held in August – 15 participants
- Faculty Support – 59 participants

- Quality Matters Training – 8 participants
- Echo 36 Training – 21 Participants

Kodiak
- Quality Matters Training – 5 participants
- Fall and Spring Teaching Forums (October and March) – 42 participants
- Workshops and Events – 174 participants
- Individual Assistance with Instructional Design and Technology – 154 hours

Mat-Su
- Peer Mentoring – 11 participants
- Workshops and Events – 24 participants
- Individual Assistance with Instructional Design and Technology – 150 hours

Prince William Sound
- Professional Development Week – 2 participants
- UAA Technology Fellows – 3 participants

UAF: The first Chancellor's Innovators in Technology and E-Learning (CITE) Fellows cohort completed its first year working with UAF e-Learning on projects including an international engineering prize, research into eye-tracking, a documentary film institute, and classroom gamification and rapid feedback. During FY13, individual instructional designers spent 365 hours working with CITE Fellows to develop their projects. The UAF e-Learning instructional design team collaborated with UAA and UAS on the annual iDesign Summit, which reinforces collaboration and consistency across all three Universities' instructional design staff supporting UA faculty. Four UAF e-Learning instructional designers (with two pending) became Google Certified Trainers, meaning they can offer official faculty development for UA Google Apps. UAF e-Learning, as a unit, plans to become a Google Certified Training Center in FY 15. UAF OIT's training and outreach has been fruitful, with a record high number of UAF instructors (57 percent) and courses (38 percent) using the Blackboard learning management system in Spring 2014. UAF provided additional asynchronous, resource-based development opportunities in support of e-Learning during the last year including a revised iTeachU faculty development self-help site serving 24,906 unique visitors as well as weekly Teaching Tips48 weekly tips distributed to ~1000 faculty and approximately 1,200 staff.

Table 7. UAF Faculty Development in Support of e-Learning

	FY13		FY14	
	Participants	Person Hours	Participants	Person Hours
iTeach/Intensive Clinics	86	1,680	57	1,896
UAF Hosted Webinars	35	53	301	452
Workshops*	160	240	499	956
Facilitated Discussions	9	14	51	77
Consultation/Individual Training	not recorded	not recorded	41	240
Total	290	1,986	949	3,620

*does not include OIT workshops delivered in FY13, due to data quality

UAS: Faculty development for e-Learning consists of a variety of options, including iTeach, webinars, workshops, individual trainings, and conferences.

Table 8. UAS Faculty Development in Support of e-Learning

	FY10	FY11	FY12	FY13	FY14
iTeach	10	11	18	16	22
Webinars			54	53	48
Workshop and Individual Training			165	123	165
Conferences		3	2		3
Total Faculty Development Occurences	10	14	239	192	238

Academic Quality

UA efforts to assess and improve e-Learning quality fall within two broad functional areas: the quality of administrative support, such as appropriate governance, technology and advising infrastructure, for e-Learning programs and the quality of course curricula and instruction. The Online Learning Consortium Quality Scorecard discussed under A) below focuses on institutional support of e-Learning programs and learners while the Quality Matters and OLC Teaching Online Certificate programs discussed under B) below assess the quality of course design and support high-quality instructional practices.

A) Administrative Program Support: Online Learning Consortium (formerly SLOAN-C) Quality Scorecard. The Online Learning Consortium Quality Scorecard v2 is a newly released, peer-reviewed rubric for evaluating online education programs using 75 different criteria across different key categories including institutional and technology support, course design, engagement, student support, and assessment. The scorecard is an easy-to-use process for measuring and quantifying elements of quality within online programs in higher education. By evaluating each of the respective quality indicators within the established categories, an administrator of online programs can determine strengths and weaknesses.

UAA: The 2014-2016 Tech Fellows (7 faculty and 3 staff) are focusing on online student engagement and interaction. Tech Fellows have the opportunity to participate in the Online Learning Consortium Online Teaching Certification program. Key learning opportunities included a foundation course, three selected electives and a capstone application of key certification concepts and skills. To date, five UAA faculty and staff have been awarded the certification and another 14 are currently in the program. UAA's Academic Innovations and e-Learning Director Dr. David Dannenberg is a participant in this year's Institute for Engaged Leadership in Online Learning (IELOL) 2014. As part of this experience Dr. Dannenberg will evaluate UAA distance education services against the Online Learning Consortium's Quality Scorecard 2014: Criteria for Excellence in the Administration of Online Programs.

UAF: The university has begun applying the Scorecard to its e-Learning operations, the results of which are not only valuable for improving online course design, development, and support, but also provide an objective assessment report for accrediting bodies and other states with which UAF shares students. While completing the evaluation, UAF e-Learning is investigating the possibility of using it to become a recognized "Online Learning Consortium Exemplary Program" and collaborate further with the Online Learning Consortium through its other partnerships and programs.

UAS: The UAS Teaching, Learning, and Technology Roundtable continues to engage faculty in the evaluation of tools and rubrics in the face of dynamic and evolving online learning paradigms. While there is

a general desire for standardization in assessment methodology, UAS recognizes that the best fit may vary with the needs, designs, and assessment reporting requirements of its different programs. A number of quality control and assessment tools are in use or under consideration, including the LiveText portfolio system and Sloan-C Scorecard rubrics to facilitate assessment of e-Learning programs.

B) Curriculum and Instruction: Quality Matters and Online Learning Consortium Teaching Online Certificate Program. Quality Matters is designed to improve quality and consistency in online course design with the use of a rubric and peer review process. The rubric is research based and is updated every three years.

UAA: In AY14, UAA's Anchorage campus joined Kenai Peninsula College and Kodiak College in adopting the Quality Matters framework to ensure quality in distance education. Together with the University of Alaska Southeast, all now are subscribers to the Alaska Statewide Quality Matters Consortium. Academic Innovations & e-Learning is offering orientation sessions and online training for Quality Matters regularly in the coming year. Kenai Peninsula College and Kodiak College previously adopted Quality Matters and have offered training sessions throughout last year and this year. At Kodiak College, 47 individuals have been trained, 12 courses have been certified with one under review and three more pending review. At Kenai Peninsula College, a total of 92 faculty members received Quality Matters training, 12 went on to become Peer Reviewers, two became Master Reviewers. A total of 13 courses have been submitted for review, 9 of which received Quality Matters certification.

UAF: For the past decade, UAF e-Learning has used a continually evolving custom course quality rubric and related materials, initially developed in consultation with faculty and other experts from across the state, fusing ideas from Quality Matters and a host of other rubrics and contemporary educational research findings. In conjunction with a long-term Quality Improvement initiative, the general success rate for asynchronous online courses has risen dramatically. The next phase, recognizing the broad latitude of academic freedom, is to facilitate peer review, using the Quality Matters framework and others, in a way that best suits the needs of UAF faculty, works with existing faculty development initiatives, and meshes with the existing quality framework that has yielded such positive results.

UAS: Peer review for UAS course improvement—including e-Learning courses—is guided by a Committee for Course Improvement. This committee helped develop a framework for peer review that is loosely based on Quality Matters, the Blackboard Catalyst rubric, and the Rubric for Online Instruction. Additionally, all faculty who want to participate as peer reviewers must take the Quality Matters Applying the Rubric course as a pre-requisite and all faculty are encouraged to take this course to better understand how the peer review process works and how to provide valuable feedback during the peer review process. Details of the process are available online at: http://www.uas.alaska.edu/idc/fac/peer

Collaboration Across States

Many innovations in online course delivery are changing how postsecondary academic achievement is recognized. These include competency-based certifications for both credit and non-credit options. Badges, credentials, certifications and degrees are becoming more interchangeable and more accessible for students desiring recognition for their skills, abilities and education.

One example is the Western Interstate Commission for Higher Education (WICHE) Internet Course Exchange (ICE). The ICE course seat exchange is a marketplace where institutions with surplus seats in an online course can sell them to an institution that has demand for them. By selling the otherwise idle seats at a discounted wholesale rate, the Teaching Institution creates a new revenue stream. By buying the seats, the Enrolling Institution creates capacity that helps satisfy student demand for particular online course seats. The

key to the exchange of course seats is that the Enrolling Institution can buy these excess seats at a price that is more cost-effective than attempting to create its own. Faculty and administrators from various programs at institutions in several WICHE states (Idaho, Montana, New Mexico, Oregon, Wyoming, and Alaska) met this fall to discuss ways to could use WICHE ICE to make more online courses in four different content areas available to their students. The group explored interests in sharing extra capacity in existing online courses as well as collaborating in the development of future certificates and concentrations to be offered online. The WICHE Interstate Passport initiative is another cross-state collaboration discussed in the Shaping Alaska's Future section at the beginning of this report.

Another collaboration in the area of e-Learning is the State Authorization and Reciprocity Agreement (SARA). UAF and UAS have recently been approved as participating institutions in SARA. For purposes of consumer protection, federal regulations require states to approve higher education institutions that operate in their state. However, it has been left to the discretion of each state to define "operate" and these definitions vary widely between states. Over the past few years, state authorization for the delivery of distance education has become a challenging and complex issue. In 2013, a national council was formed, creating a voluntary method for states and postsecondary institutions to address the complexities of state authorization through reciprocal agreements. SARA is administered by the four regional higher-education compacts (WICHE, MHEC, NEBHE, and SREB). In May of this year, Alaska became one of the first member states of SARA. As of November 1, 2014, twelve states have been approved and four more have applied for SARA membership. State reciprocity through SARA establishes common definitions and common processes for consumer complaint resolution. Most importantly, it simplifies the process of offering distance education to students in other member states by eliminating the need to apply to each of these states individually. Our participation in SARA opens the door for more active recruitment of online students from SARA-member states.

Appendix

A 2013 report by the Statewide Broadband Taskforce identified connectivity standards to support the ability of Alaskans to be competitive in the global community with respect education, economic development and other areas. The Taskforce report cites Alaska as ranking 41st of 56 states, territories, and districts in the number of households with broadband Internet in 2011, and set a goal of every Alaskan household having 100Mb per second of connectivity by 2020[6], including latency speeds of 20 milliseconds or less for terrestrial connections.

Bandwidth is the upload/download capacity and latency is the delay experienced waiting for data to transfer. Depending on the technology used to deliver an e-Learning course as well as the location(s) of the delivering campus and enrolled students, bandwidth and latency can be limiting factors for success.

Bandwidth demands to UA's rural campuses increased from 256 Kb in 2007 to 5 Mb in 2012, a nineteen-fold increase. It is anticipated that the demand for high quality, high-speed videoconferencing, e-Learning, and resource access will only continue to grow as the university competes to deliver excellence in its educational programs.

Infrastructure Capacity for e-Learning Delivery by Campus and Location

University	Campus-Location	Bandwidth (Mb)	Latency (ms)	Proportion of e-Learning Student Credit Hours Delivered, FY14
UAA	Anchorage	200	8	31.2%
	Kenai	50	24	12.1%
	Kodiak	50	20	3.4%
	Mat-Su	50	12	2.6%
	PWSC - Valdez, Cordova, Copper River	45	18 - 500	1.9%
UAF	Fairbanks - Fairbanks Campus, CTC, Interior-Aleutians	200	4	28.2%
	Interior-Aleutians - Rural Centers	0.256 to 3	13 to 600	
	Bristol Bay - Dillingham	5	552	1.0%
	Chukchi - Kotzebue	5	600	0.4%
	Kuskokwim - Bethel	10	550	1.9%
	Northwest - Nome	5	552	0.5%
UAS	Juneau	200	27	8.6%
	Ketchikan	50	32	3.4%
	Sitka	50	32	4.8%
UA Total				100%

Bandwidth and latency speeds by location provided by UA OIT, November 2014

[6] Available online at: http://www.alaska.edu/files/oit/bbtaskforce/2013-08-AK-Broadband-Task-Force-Report|A-Blueprint-for-Alaska's-Broadband-Future.pdf

Reference A Courses Offered for the First Time via e-Learning, 2014

Courses include those offered by e-Learning in FY14, and only offered via Traditional delivery methods or never offered during any prior term between FY08 and FY13.

Source: Data supplied by UAA, UAF and UAS via UA Information Systems: UA Decision Support Database (RPTP.DSDMGR) FY08-FY14.

Broad Subject Area	University	Subject	Course Number	Course Title	Total Student Credit Hours Delivered
Agriculture, Agriculture Operations, and Related Sciences	UAF	High Latitude Range Mgmt	F120	Hist Domesticated AK Ungulates	7
Area, Ethnic, Cultural, and Gender Studies	UAA	Alaska Native Studies	A109D	Alutiiq Orthography	28
	UAA	Alaska Native Studies	A294	AK Native Lng Apprenticeship I	8
	UAF	Northern Studies	F662	Alaska Government & Politics	6
	UAF	Rural Development	F245	Fisheries Devlpmnt in Rural AK	9
	UAF	Rural Development	F430	Indigenous Econ Dev/Entrepren	18
	UAF	Women's and Gender Studies	F348	Native North American Women	3
Basic Skills and Developmental/Remedial Education	UAF	Developmental Studies	F052	Reading Enhancement	39
Biological and Biomedical Sciences	UAA	Biology	A178	*Fundamentals of Oceanography	39
	UAF	Biology	F193	Intro to Aquatic Biology	36
	UAF	Biology	F213X	Human Anatomy & Physiology I	112
	UAF	Biology	F214X	Human Anatomy & Physiology II	40
	UAF	Biology	F469	Landscape Ecology/WLF Habitat	3
	UAF	Biology	F669	Landscape Ecology/WLF Habitat	3
Business, Management, Marketing, and Related Support	UAA	Accounting	V201	Princ of Financial Accounting	21
Services	UAF	Applied Business	F273	Managing Small Business	69
	UAA	Business Administration	A266	Retailing Management	36
	UAA	Business Administration	A426	Financial Institutions	93
	UAA	Business Administration	A641	Advanced Consumer Behavior	15
	UAF	Business Administration	F491	Current Topic:Sports Marketing	105
	UAS	Business Administration	S491	Intrn: Role in Human Resources	3
	UAA	Computer Info & Office Systems	A101	Keyboarding	126
	UAA	Computer Info & Office Systems	A201A	Document Processing	6
	UAA	Computer Info & Office Systems	A207	Machine Transcription	1
	UAA	Computer Info & Office Systems	A208	Medical Transcription	3
	UAA	Computer Info & Office Systems	V276A	Independent Project	1
	UAA	Construction Management	A101	Fund of CADD for Bldg Constr	4
	UAA	Construction Management	A142	Mechanical & Electrical Tech	4
	UAA	Construction Management	A231	Structural Technology	4
	UAA	Logistics Operations	A110	Logistics Info Syst Cust Serv	141
	UAF	Master Business Admin	F602	Accounting for Managers	6
	UAF	Master Business Admin	F605	Contemporary Topics/Accounting	36
	UAF	Master Business Admin	F617	Organizational Theory/Managers	96
	UAF	Master Business Admin	F652	Fundamentals of Business	3
	UAF	Master Business Admin	F675	Quantitat Methods for Managers	15
Communication, Journalism, and Related Programs	UAF	Communication	F495	Management Communication	63
	UAF	Journalism	F393	Special Topics	30
Computer and Information Sciences and Support Services	UAF	Computer & Info Tech Systems	F281	Professional Practices in IT	63
	UAA	Computer Science	A110	Java Programming	60
	UAF	Computer Science	F671	Advanced Software Engineering	24
Construction Trades	UAA	Architect Engineering Tech	A111	Civil Drafting	6
	UAA	Architect Engineering Tech	A131	Structural Drafting	24
	UAA	Architect Engineering Tech	A142	Mechanical & Electrical Tech	32
	UAA	Architect Engineering Tech	A143	Mech & Electrical Drafting	24
	UAA	Architect Engineering Tech	A213	Civil Technology	12
	UAA	Architect Engineering Tech	A231	Structural Technology	32
	UAA	Architect Engineering Tech	A286	Design Project	16
	UAF	Construction Trades Technology	F130	DS: Intro to Facilities Maint	1
	UAF	Construction Trades Technology	F131	DS: Interior Repairs	1
	UAF	Construction Trades Technology	F132	DS: Flooring Installation	1
Education	UAF	Early Childhood Education	F229	Found in Nutr & Phys Wellness	138
	UAF	Early Childhood Education	F304	Attachment and Soc Development	12
	UAF	Early Childhood Education	F472	Clinical Pract: Classrm Resear	21
	UAF	Early Childhood Education	F480	Child Dev and Fam St Portfolio	2
	UAA	ED: Counselor Education	A624	Group Counseling	42
	UAA	ED: Early Childhood	A407	Early Childhood Observ & Doc	56
	UAS	ED: Educational Technology	S674	Virtual Teaching and Learning	51
	UAA	ED: Elementary Education	A495A	Elem Ed Prct II: Env/Math/Sci	6
	UAA	ED: Elementary Education	A495B	Elementary Ed Internship	27
	UAA	ED: Foundations	A645	Cult Sustain Lit P-6 ELL	45
	UAA	ED: Foundations	A646	Cult Sust Inst STEAM ELL Clsrm	51
	UAA	ED: Foundations	A689	Action Research ELL in P-6	51
	UAA	ED: Special Education	A490	Comm, Early Lit & Play	18
	UAA	ED: Special Education	A573V	Neural Processes for Speech	39
	UAF	ED: Special Education	F316	Intro to Spec Ed for Elem Tchr	15
	UAF	ED: Special Education	F320	Adap/Accom Instr Stu w/Disab	15
	UAF	ED: Special Education	F495	FASD:Diagnosis, Interv & Strat	3
	UAF	ED: Special Education	F678	Spec Educ Clin Prac: Initial	6
	UAF	ED: Special Education	F695	Inst Infants/Toddlrs/Preschool	27

Courses include those offered by e-Learning in FY14, and only offered via Traditional delivery methods or never offered during any prior term between FY08 and FY13.

Source: Data supplied by UAA, UAF and UAS via UA Information Systems: UA Decision Support Database (RPTP.DSDMGR) FY08-FY14.

Broad Subject Area	University	Subject	Course Number	Course Title	Total Student Credit Hours Delivered
	UAS	ED: Special Education	S492	Seminar: Special Education	6
	UAS	ED: Special Education	S697	IS: Etiology of Emot/Behav Dis	3
	UAS	Educ: Mathematics Education	S693	ST: STEM in the K-8 Clssrm	36
	UAF	Education	F476	Assessment of Literacy Dev	8
	UAF	Education	F613	AK Stnds/Cultr Respnsv Schools	54
	UAF	Education	F659	Multimedia Tools for Teachers	9
	UAF	Education	F682	Rethink Multicultrl Education	12
	UAF	Education	F687	Alaska:Rsorcs/People/Perspectv	78
	UAF	Education: Secondary Education	F443	Tech Appl in Education II	2
	UAF	Education: Secondary Education	F643	Tech Appl in Education II	8
Engineering	UAA	Computer Systems Engineering	A205	Intro to C Prog for Engineers	66
	UAF	Engineering & Science Mgmt	F698	Non-thesis Research/Project	1
	UAA	Project Management	A651	Adv Construction Project Mgmt	9
	UAA	Project Management	A694T	Proj Definitn & Rsrch Methods	9
Engineering Technologies and Engineering-Related Fields	UAA	Computer & Networking Tech	A290	VOIP Foundations	32
	UAA	Marine Technology	V151	F/V Oilspill Trng Lvl I	27
	UAS	Marine Technology	S225	Able Seaman	26
	UAS	Marine Technology	S241	Tow Apprentice Upgrade	5
	UAA	Process Technology	A160	Oil & Gas Explor &Production I	78
	UAA	Process Technology	A230	Process Tech II: Systems	116
	UAA	Process Technology	A230L	Process Tech II: Systems Lab	0
English Language and Literature/Letters	UAA	Creative Writing & Lit Arts	A262	Intro Creative Writing: Poetry	18
	UAA	English	A109	Intro Writing Academic Contxts	84
	UAA	English	A120	Critical Thinking	69
	UAA	English	A343	Modern and Contemporary Lit	66
	UAA	English	A440	Metaphysical Detective Story	66
	UAA	English	A476	*History of English Language	75
	UAA	English	V091	Improving Reading Skills	3
	UAA	English	V092	Improving Writing Skills	9
	UAA	English	V260	Intro To Creative Writing	6
	UAF	English	F218	Themes in Literature	39
	UAS	English	S499	Thesis	3
Foreign Languages, Literatures, and Linguistics	UAS	Alaska Languages	S103	Tlingit I	7
	UAS	Alaska Languages	S207	Intermed Haida I	28
	UAS	Alaska Languages	S208	Intermed Haida II	24
	UAS	Alaska Languages	S393	ST: Tlingit Oral Literature	9
	UAF	Eskimo	F205	Regaining Fluency in Yup'ik	18
	UAF	Eskimo	F206	Regaining Fluency in Yup'ik II	24
	UAA	French	V101	Elementary French I	8
	UAF	Linguistics	F631	Field Mthds Descriptive Ling I	3
	UAA	Spanish	A101	*Elementary Spanish I	40
Health Professions and Related Programs	UAA	Diagnostic Medical Sonography	A221	Pediatric Sonography	9
	UAA	Diagnostic Medical Sonography	A392	Pathophysiology Seminar	16
	UAA	Dietetics & Nutrition	V203	Nutrition for Health Sciences	72
	UAF	Emergency Medical Services	F283	Paramedic Internship	168
	UAA	Health Science	A210	Intro Environmental Health	45
	UAA	Health Science	V203	Normal Nutrition	3
	UAA	Nursing Science	A490	Selected Topics	99
	UAA	Paramedical Technology	A242	Clinical Rotation I	44
History	UAA	History	A261	Russian History	27
	UAA	History	A424	Imperial Russian History	60
Homeland Security, Law Enforcement, Firefighting and	UAA	Fire Science	A221	Principles of Fire & ES Safety	51
Related Protective Services	UAA	Fire Science	A230	Fire Dept Org Theory/Behavior	24
Legal Professions and Studies	UAA	Legal Studies	A485	Tribal Courts & AK Natv Rights	3
Liberal Arts and Sciences, General Studies and Humanities	UAF	Liberal Arts & Science	F692	SEM: Arctic Policy	6
	UAA	Liberal Studies Social Science	V111	Cultural Foundations Behavior	42
	UAF	UG Research & Scholar Activity	F488	UG Resrch & Creative Sch II	6
Mathematics and Statistics	UAF	Developmental Math	F093	Special Topics	139
	UAF	Developmental Math	F094	Mathematical Literacy	90
	UAA	Mathematics	A520	Selected Topics	28
	UAS	Mathematics	S397	IS: Invstgtng Sequences/Generl	1
Natural Resources and Conservation	UAF	Environmental Studies	F120	Home Energy Basics	19
	UAF	Fisheries	F498	Senior Thesis Proposal	2
	UAF	Natural Resources Management	F395	Nutrition & Aging	60
	UAF	Natural Resources Management	F595	Permaculture Design Practicum	6
	UAF	Wildlife	F469	Landscape Ecology/WLF Habitat	21
	UAF	Wildlife	F669	Landscape Ecology/WLF Habitat	3
Other	UAA	Computer Sci & Computer Eng	A311	Data Structures and Algorithms	72
	UAA	Computer Sci & Computer Eng	A365	Computer Networks	57
	UAA	Computer Sci & Computer Eng	A465	Computer & Network Security	21
	UAA	Computer Sci & Computer Eng	A485	Computer and Machine Vision	30
	UAS	University	S101	College Success Skills	33

Courses include those offered by e-Learning in FY14, and only offered via Traditional delivery methods or never offered during any prior term between FY08 and FY13.

Source: Data supplied by UAA, UAF and UAS via UA Information Systems: UA Decision Support Database (RPTP.DSDMGR) FY08-FY14.

Broad Subject Area	University	Subject	Course Number	Course Title	Total Student Credit Hours Delivered
Parks, Recreation, Leisure, and Fitness Studies	UAA	Outdoor Studies	V167	Intro to Study Adv Filmmaking	15
	UAA	Outdoor Studies	V293	ST: ODS Adventure Filmmaking	30
	UAA	Physical Ed Professional	A464	Outdr Recreation Admin	12
Personal and Culinary Services	UAF	Culinary Arts/Hospitality	F199	Culinary Arts Externship	20
Philosophy and Religious Studies	UAA	Philosophy	A304	Business Ethics	75
	UAA	Philosophy	A305	*Professional Ethics	99
	UAA	Philosophy	V211	History of Philosophy I	12
Physical Sciences	UAA	Astronomy	V103	Solar System Astronomy	156
	UAF	Atmospheric Science	F488	Undergraduate Research	1
	UAA	Chemistry	A332	Physical Chemistry II	9
	UAA	Geology	A115L	*Environmental Geology Lab	4
	UAA	Geology	A320	Volcanology	153
	UAF	Geology and Geophysics	F380	Geological Hazards	75
Psychology	UAF	Counseling	F686	Internship II - Elementary	12
	UAA	Guidance	V192	First-Year Seminar	3
	UAA	Psychology	A329	Positive Psychology	117
	UAA	Psychology	A442	Psychopathol of Child & Adol	228
	UAA	Psychology	V243	Death & Dying	6
	UAS	Psychology	S406	Personality Theories	27
Public Administration and Social Service Professions	UAA	Human Services	A155	Human Relations in Workplace	21
	UAA	Human Services	A461	Crisis Intervention	78
	UAA	Human Services	A610	Program Evaluation	15
	UAA	Human Services	A630	Family and Community Systems	3
	UAA	Human Services	A640	Contemporary Issues in Rehab	15
	UAF	Human Services	F264	Culture/Chem Dep & AK Natives	19
	UAS	Public Administration	S639	Adaptive Management	51
	UAF	Rural Human Services	F285	Case Management	44
	UAF	Rural Human Services	F297	Practicum	4
	UAA	Social Work	A685	SWK Services in Schools	15
	UAA	Social Work	A686	SWK Services in AK Schools	5
Science Technologies/Technicians	UAA	Geographic Information Systems	A370	GIS/Remote Sensing Nat Res	30
Social Sciences	UAA	Economics	A435	Natural Resource Economics	15
	UAA	Economics	V201	Princ Of Macroeconomics	36
	UAS	Economics	S393	ST:Financial Crisis	12
	UAA	Justice	A384	Contemporary Corrections	30
	UAA	Justice	A485	Tribal Courts & AK Natv Rights	3
	UAA	Justice	V110	Introduction to Justice	6
	UAA	Justice	V112	Criminal Investigation	12
	UAF	Justice	F201	Dispute Resol & Restrtve Prac	45
	UAF	Justice	F302	Dispute Systems Design	33
	UAF	Justice	F352	Criminal Law	60
	UAF	Justice	F401	Crs Cult Conflict Anay & Inter	27
	UAF	Justice	F403	Law and Science of Arbitration	18
	UAF	Justice	F453	Comparative Criminology	93
	UAF	Justice	F495	Clinic Mediatin/Conf/Crcle Pra	30
	UAS	Justice	S110	Intro to Law Enforcement	33
	UAS	Justice	S121	Policing in the Community	33
	UAS	Justice	S125	Intro to Addictions	36
	UAS	Justice	S131	Rural Justice in Alaska	27
	UAA	Political Science	A342	The American Presidency	42
	UAF	Political Science	F212	Intro to Public Administration	18
	UAF	Political Science	F447	US Environmental Politics	30
	UAS	Social Science	S101	Self, Culture, and Society	27
	UAS	Social Science	S300	DS:Research Methods/ Soc Sci	3
	UAA	Sociology	A202	*Social Institutions	69
	UAF	Sociology	F498	Research	3
	UAS	Sociology	S497	IS:Anticrimin Efts Immgt Comm	3
Transportation and Materials Moving	UAA	Aviation Tech/Admin/Mgmt	A490	Aviation Psychology	36
Visual and Performing Arts	UAA	Art	A213	Beginning Painting	27
	UAF	Art	F161	Two-Dimensional Design	102
	UAF	Film	F298	Undergraduate Research	3
	UAF	Film	F334	Movies and Films	51
	UAF	Film	F498	Undergraduate Research	9
	UAA	Music	A111	Fundamentals of Music	18
	UAA	Music	V221	Music History I	9
	UAA	Music	V222	Music History II	12
	UAF	Music Education	F310	Practicum Elementary Mus Mthds	6

Reference B. UA Degree, Certificate, and Endorsement Programs Available via Hybrid or Distance Delivery, FY14

University	Major	Degree	Delivery Method
UAS	Accountant Endorsement	Occupational Endorsement Cert	Distance (100%)
UAA	Accounting	Associate of Applied Science	Hybrid (50-99%)
UAF	Accounting Technician	Certificate	Distance (100%)
UAS	Accounting Technician	Certificate	Distance (100%)
UAS	Admin Office Supp	Occupational Endorsement Cert	Distance (100%)
UAF	Administration of Justice	Master of Arts	Distance (100%)
UAS	AK Native Lang and Studies	Bachelor of Liberal Arts	Hybrid (50-99%)
UAF	Alaska Native Studies	Bachelor of Arts	Distance (100%)
UAF	Anthropology	Bachelor of Arts	Hybrid (50-99%)
UAF	Applied Accounting	Associate of Applied Science	Distance (100%)
UAF	Applied Business	Associate of Applied Science	Distance (100%)
UAF	Applied Business Mgmt	Certificate	Distance (100%)
UAA	Archit and Engr Technology	Associate of Applied Science	Hybrid (50-99%)
UAA	Architectural Drafting	Certificate	Hybrid (50-99%)
UAA	Arctic Engineering	Master of Science	Distance (100%)
UAF	Art	Bachelor of Arts	Hybrid (50-99%)
UAF	Art	Bachelor of Fine Arts	Hybrid (50-99%)
UAF	Arts and Sciences	Bachelor of Arts and Sciences	Hybrid (50-99%)
UAF	Associate of Science	Associate of Science	Distance (100%)
UAS	Associate of Science	Associate of Science	Hybrid (50-99%)
UAF	Biological Sciences	Bachelor of Arts	Hybrid (50-99%)
UAA	Bookkeeping Support	Occupational Endorsement Cert	Distance (100%)
UAS	Business Administration	Associate of Applied Science	Distance (100%)
UAF	Business Administration	Bachelor of Business Admin.	Hybrid (50-99%)
UAF	Business Administration	Bachelor of Business Admin.	Hybrid (50-99%)
UAS	Business Administration	Bachelor of Business Admin.	Distance (100%)
UAF	Business Administration	Master of Business Admin.	Hybrid (50-99%)
UAA	CAD for Building Construction	Occupational Endorsement Cert	Hybrid (50-99%)
UAA	Career and Technical Education	Graduate Certificate	Hybrid (50-99%)
UAA	Career and Technical Education	Master of Science	Hybrid (50-99%)
UAF	Chemistry	Bachelor of Arts	Hybrid (50-99%)
UAF	Chemistry	Bachelor of Science	Hybrid (50-99%)
UAF	Child Develop Family Studies	Bachelor of Arts	Distance (100%)
UAA	Childrens Behavioral Health	Occupational Endorsement Cert	Distance (100%)
UAA	Civil Drafting	Certificate	Hybrid (50-99%)
UAA	Clinical Assistant	Occupational Endorsement Cert	Hybrid (50-99%)
UAF	Communication	Bachelor of Arts	Hybrid (50-99%)
UAF	Community Health	Associate of Applied Science	Distance (100%)
UAF	Community Health	Certificate	Distance (100%)
UAA	Computer Info Office Systems	Associate of Applied Science	Hybrid (50-99%)
UAS	Computer Info Office Systems	Associate of Applied Science	Hybrid (50-99%)
UAA	Computer Info Office Systems	Certificate	Distance (100%)
UAS	Computer Info Office Systems	Certificate	Distance (100%)
UAA	Computer Info Office Systems	Occupational Endorsement Cert	Distance (100%)
UAS	Computer Information Systems	Bachelor of Science	Hybrid (50-99%)
UAF	Computer Science	Bachelor of Science	Hybrid (50-99%)
UAF	Computer Science	Bachelor of Science	Hybrid (50-99%)
UAS	Construction Technology	Occupational Endorsement Cert	Distance (100%)
UAA	Corrections	Certificate	Distance (100%)
UAA	Corrections	Occupational Endorsement Cert	Distance (100%)
UAF	Counseling	Master of Education	Distance (100%)
UAA	Counselor Education	Master of Education	Hybrid (50-99%)
UAA	Creat Writing and Lit Arts	Master of Fine Arts	Hybrid (50-99%)
UAA	Creative Writing	Master of Fine Arts	Hybrid (50-99%)

University	Major	Degree	Delivery Method
UAF	Cross Cultural Studies	Master of Arts	Distance (100%)
UAF	Design and Construction Mgmt	Graduate Certificate	Distance (100%)
UAA	Dietetics	Bachelor of Science	Hybrid (50-99%)
UAA	Digital Art	Associate of Applied Science	Distance (100%)
UAA	Direct Services Specialist	Occupational Endorsement Cert	Distance (100%)
UAA	Disability Services	Associate of Applied Science	Hybrid (50-99%)
UAA	Disability Services	Certificate	Distance (100%)
UAA	Early Childhood	Bachelor of Arts	Hybrid (50-99%)
UAA	Early Childhood	Post Baccalaureate Cert	Hybrid (50-99%)
UAA	Early Childhood Development	Associate of Applied Science	Hybrid (50-99%)
UAA	Early Childhood Development	Certificate	Hybrid (50-99%)
UAF	Early Childhood Education	Associate of Applied Science	Distance (100%)
UAA	Early Childhood Education	Bachelor of Arts	Hybrid (50-99%)
UAF	Early Childhood Education	Certificate	Distance (100%)
UAA	Early Childhood Spec Educ	Master of Education	Distance (100%)
UAF	Earth Science	Bachelor of Arts	Hybrid (50-99%)
UAF	Economics	Bachelor of Arts	Hybrid (50-99%)
UAF	Economics	Bachelor of Business Admin.	Hybrid (50-99%)
UAS	Ed Cert Education Technology	Graduate Licensure Program	Hybrid (50-99%)
UAS	Ed Cert Elementary Education	Graduate Licensure Program	Hybrid (50-99%)
UAS	Ed Cert Mathematics K 5	Graduate Licensure Program	Hybrid (50-99%)
UAS	Ed Cert Mathematics K 8	Graduate Licensure Program	Hybrid (50-99%)
UAS	Ed Cert Reading	Graduate Licensure Program	Hybrid (50-99%)
UAS	Ed Cert Special Education	Graduate Licensure Program	Distance (100%)
UAA	Education	Master of Arts in Teaching	Hybrid (50-99%)
UAS	Education	Master of Arts in Teaching	Distance (100%)
UAF	Education	Master of Education	Distance (100%)
UAS	Education	Master of Education	Distance (100%)
UAA	Educational Leadership	Master of Education	Distance (100%)
UAS	Educational Leadership	Master of Education	Hybrid (50-99%)
UAS	Educational Technology	Master of Education	Hybrid (50-99%)
UAF	Educator Para Professional	Associate of Applied Science	Distance (100%)
UAF	Educator Para Professional	Certificate	Distance (100%)
UAA	Elementary Ed K 6	Post Baccalaureate Cert	Hybrid (50-99%)
UAA	Elementary Education	Bachelor of Arts	Hybrid (50-99%)
UAF	Elementary Education	Bachelor of Arts	Distance (100%)
UAS	Elementary Education	Bachelor of Arts	Distance (100%)
UAS	Elementary Education K 8	Licensure Program	Hybrid (50-99%)
UAF	Emergency Management	Bach of Emergency Management	Hybrid (50-99%)
UAF	English	Bachelor of Arts	Hybrid (50-99%)
UAS	English	Bachelor of Arts	Hybrid (50-99%)
UAF	Environmental Quality Science	Master of Science	Hybrid (50-99%)
UAF	Environmental Studies	Certificate	Hybrid (50-99%)
UAF	Ethnobotany	Certificate	Hybrid (50-99%)
UAA	Family Nurse Practitioner	Graduate Certificate	Distance (100%)
UAF	Film	Bachelor of Arts	Hybrid (50-99%)
UAF	Fisheries	Bachelor of Arts	Hybrid (50-99%)
UAF	Fisheries	Master of Science	Hybrid (50-99%)
UAF	Foreign Languages	Bachelor of Arts	Hybrid (50-99%)
UAA	General Business	Associate of Applied Science	Hybrid (50-99%)
UAA	General Program	Associate of Arts	Distance (100%)
UAF	General Program	Associate of Arts	Distance (100%)
UAS	General Program	Associate of Arts	Distance (100%)
UAF	General Science	Bachelor of Science	Hybrid (50-99%)
UAF	Geography	Bachelor of Arts	Hybrid (50-99%)
UAF	Health Care Reimbursement	Certificate	Distance (100%)
UAS	Health Info Mgt Coding Spec	Certificate	Distance (100%)

University	Major	Degree	Delivery Method
UAS	Health Information Mgt	Associate of Applied Science	Distance (100%)
UAS	Health Information Mgt	Certificate	Distance (100%)
UAS	Health Science	Associate of Applied Science	Distance (100%)
UAS	Healthcare Information Tech	Occupational Endorsement Cert	Distance (100%)
UAS	Healthcare Privacy Security	Certificate	Distance (100%)
UAA	History	Bachelor of Arts	Hybrid (50-99%)
UAF	History	Bachelor of Arts	Hybrid (50-99%)
UAF	Homeland Security Emerg Mgmt	Bach of Emergency Management	Hybrid (50-99%)
UAF	Human Services	Associate of Applied Science	Hybrid (50-99%)
UAS	Independent Design	Bachelor of Liberal Arts	Distance (100%)
UAF	Indigenous Studies	Doctor of Philosophy	Distance (100%)
UAA	Indust Safety Program Support	Certificate	Hybrid (50-99%)
UAA	Industrial Technology	Associate of Applied Science	Hybrid (50-99%)
UAA	Industrial Technology	Certificate	Hybrid (50-99%)
UAF	Info Technology Specialist	Associate of Applied Science	Distance (100%)
UAF	Info Technology Specialist	Certificate	Distance (100%)
UAF	Interdisciplinary Studies	Associate of Applied Science	Hybrid (50-99%)
UAS	Interdisciplinary Studies	Bachelor of Liberal Arts	Distance (100%)
UAF	Inupiaq Eskimo	Bachelor of Arts	Hybrid (50-99%)
UAF	Japanese Studies	Bachelor of Arts	Hybrid (50-99%)
UAF	Journalism	Bachelor of Arts	Hybrid (50-99%)
UAF	Justice	Bachelor of Arts	Distance (100%)
UAS	Language Arts	Bachelor of Liberal Arts	Hybrid (50-99%)
UAA	Language Education	Graduate Certificate	Hybrid (50-99%)
UAA	Limited Radiography	Occupational Endorsement Cert	Hybrid (50-99%)
UAF	Linguistics	Bachelor of Arts	Hybrid (50-99%)
UAF	Marine Biology	Doctor of Philosophy	Hybrid (50-99%)
UAF	Marine Biology	Master of Science	Hybrid (50-99%)
UAF	Mathematics	Bachelor of Arts	Hybrid (50-99%)
UAS	Mathematics Education	Master of Education	Hybrid (50-99%)
UAA	Mech and Elect Drafting	Certificate	Hybrid (50-99%)
UAF	Medical Assistant	Associate of Applied Science	Hybrid (50-99%)
UAF	Medical Assistant	Certificate	Hybrid (50-99%)
UAF	Medical Billing	Occupational Endorsement Cert	Distance (100%)
UAF	Medical Coding	Occupational Endorsement Cert	Distance (100%)
UAF	Medical Dental Reception	Certificate	Distance (100%)
UAA	Medical Office Coding	Occupational Endorsement Cert	Distance (100%)
UAF	Medical Office Reception	Occupational Endorsement Cert	Distance (100%)
UAF	Natural Res Mgmt and Geog	Masters of Nat Res Mgmt Geog	Hybrid (50-99%)
UAF	Natural Resources Management	Bachelor of Science	Hybrid (50-99%)
UAF	Natural Resources Management	Master of Science	Hybrid (50-99%)
UAS	Network and System Administrat	Occupational Endorsement Cert	Distance (100%)
UAS	Network Support and Administrn	Occupational Endorsement Cert	Distance (100%)
UAF	Northern Studies	Bachelor of Arts	Hybrid (50-99%)
UAF	Nurse Aide	Occupational Endorsement Cert	Distance (100%)
UAS	Nursing	Certificate	Distance (100%)
UAA	Nursing Science	Master of Science	Hybrid (50-99%)
UAA	Occupational Safety and Health	Associate of Applied Science	Distance (100%)
UAF	Oceanography	Doctor of Philosophy	Distance (100%)
UAF	Oceanography	Master of Science	Distance (100%)
UAA	Office Foundations	Occupational Endorsement Cert	Distance (100%)
UAA	Office Support	Occupational Endorsement Cert	Distance (100%)
UAA	Petroleum Technology	Certificate	Hybrid (50-99%)
UAA	Pharmacy Technology	Occupational Endorsement Cert	Distance (100%)
UAA	Phlebotomist	Occupational Endorsement Cert	Hybrid (50-99%)
UAF	Physics	Bachelor of Arts	Hybrid (50-99%)
UAF	Political Science	Bachelor of Arts	Hybrid (50-99%)

University	Major	Degree	Delivery Method
UAF	Post Bacc K 12 Spec Ed Lic Prg	Graduate Licensure Program	Distance (100%)
UAF	Pre Nursing Qualifications	Certificate	Hybrid (50-99%)
UAS	Pre Radiologic Technology	Certificate	Distance (100%)
UAA	Principal	Graduate Certificate	Hybrid (50-99%)
UAA	Process Technology	Associate of Applied Science	Hybrid (50-99%)
UAA	Project Management	Master of Science	Hybrid (50-99%)
UAA	Psychia and Mentl Hlth Nur Pra	Graduate Certificate	Distance (100%)
UAA	Psychology	Bachelor of Arts	Hybrid (50-99%)
UAF	Psychology	Bachelor of Arts	Hybrid (50-99%)
UAA	Psychology	Bachelor of Science	Hybrid (50-99%)
UAF	Psychology	Bachelor of Science	Hybrid (50-99%)
UAS	Public Administration	Master of Public Admin	Distance (100%)
UAA	Public Health Practice	Master of Public Health	Distance (100%)
UAS	Reading Specialist	Master of Education	Hybrid (50-99%)
UAF	Renewable Resources	Associate of Applied Science	Hybrid (50-99%)
UAF	Rural Development	Bachelor of Arts	Distance (100%)
UAF	Rural Development	Master of Arts	Distance (100%)
UAF	Russian Studies	Bachelor of Arts	Hybrid (50-99%)
UAF	Secondary Education	Bachelor of Arts	Hybrid (50-99%)
UAF	Secondary Education	Graduate Licensure Program	Distance (100%)
UAS	Secondary Education	Master of Arts in Teaching	Hybrid (50-99%)
UAS	Service Management	Master of Business Admin.	Distance (100%)
UAS	Small Business Mgmt	Certificate	Distance (100%)
UAS	Social Science	Bachelor of Arts	Distance (100%)
UAF	Social Work	Bachelor of Arts	Distance (100%)
UAA	Social Work	Master of Social Work	Hybrid (50-99%)
UAF	Sociology	Bachelor of Arts	Hybrid (50-99%)
UAS	Special Education	Bachelor of Arts	Distance (100%)
UAA	Special Education	Graduate Certificate	Distance (100%)
UAS	Special Education	Master of Arts in Teaching	Hybrid (50-99%)
UAA	Special Education	Master of Education	Distance (100%)
UAF	Special Education	Master of Education	Distance (100%)
UAS	Special Education	Master of Education	Distance (100%)
UAA	Structural Drafting	Certificate	Hybrid (50-99%)
UAA	Superintendent	Graduate Certificate	Distance (100%)
UAF	Teach Cred Sec Ed	Undergrad Licensure Program	Hybrid (50-99%)
UAA	Technology	Bachelor of Science	Hybrid (50-99%)
UAF	Theatre	Bachelor of Arts	Hybrid (50-99%)
UAF	Tribal Management	Associate of Applied Science	Distance (100%)
UAF	Tribal Management	Certificate	Distance (100%)
UAS	Web Development and Administra	Occupational Endorsement Cert	Distance (100%)
UAF	Yupik Eskimo	Bachelor of Arts	Hybrid (50-99%)
UAF	Yupik Language and Culture	Bachelor of Arts	Hybrid (50-99%)

University of Alaska Rural Campus Broadband

10/01/2014

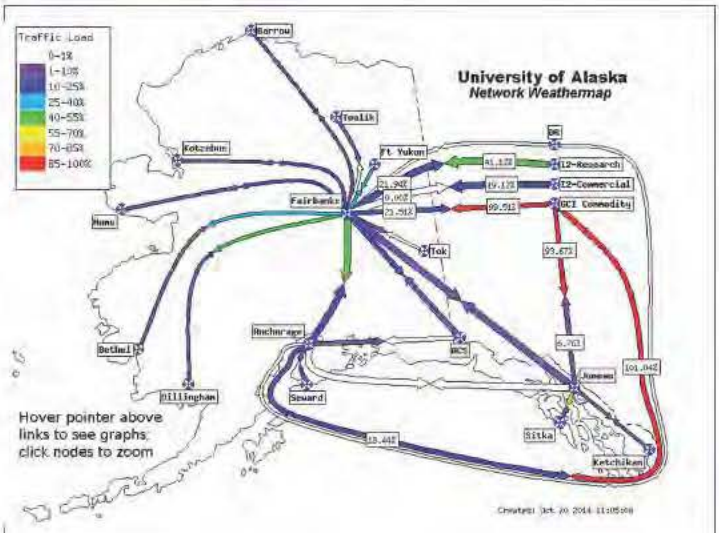
What is Broadband?

The term "Broadband" commonly refers to high-speed Internet access that is always on and faster than the traditional dial-up access. In telecommunications, broadband is wide bandwidth data transmission with an ability to simultaneously transport multiple signals and traffic types.

The FCC has set the minimum performance expectation at 4 megabits per second (4 Mbps) download and 1 megabit per second (1 Mbps) upload and is currently debating an increase to a 10 Mbps minimum.

The National Broadband Plan established a national goal for 100 million U.S. homes to have affordable access to actual download speeds of at least 100 Mbps and upload speeds of at least 50 Mbps by 2020.

The Alaska Broadband Taskforce (ATB) chose 100 Mbps for both download and upload as the goal for Alaska. The FCC says: ***Alaska ranks at the bottom in the percentage of households with access to broadband at 100 Mbps.***
(National Broadband Map, http://www.broadbandmap.gov)



UA network weather map tracks the performance and history of network use live at: http://weathermap.sw.alaska.edu

The ATB is charged with making recommendations to the Department of Commerce and the Governor on the status of and recommendations for improving broadband availability throughout Alaska. The UA Chief Information Technology Officer is a member of the ATB representing the University of Alaska.

Challenges: Many of the frustrations of rural Internet users are beyond the borders of the University of Alaska network. Community Internet, provided by local rural carriers, varies greatly throughout the state. The amount of bandwidth in a community, the level available to the home, whether or not it is shared, the age and capacity of the home computer, whether or not anti-virus is up-to-date are all factors that play into a home user's ability to participate in e-Learning opportunities.
Lower bandwidth options such as web-based courses, Blackboard Learn and eLive create much better experiences than options involving advanced multi-media, simulations, modeling or high-definition videoconferencing.

AS14.03.127. Funding for telecommunications or Internet services. In recognition of the high cost and importance of broadband services for education, the Alaska Legislature approved additional funding in 2014 for K-12 schools to offset the high cost of broadband connectivity. This provides funding for that percentage not covered by the Federal eRate Program for connections up to 10 Mbps per school.

Ongoing Developments: In 2011, GCI completed work on a massive undertaking to provide terrestrial broadband access to rural Alaska. TERRA Southwest comprises 400 miles of submarine, lakebed and buried fiber-optic cable stretching from Homer to Levelock where this new network connects to the existing DeltaNet microwave towers in and around Bethel. In 2013, GCI completed its expansion of TERRA Northwest to Nome and will complete its extension to Kotzebue in 2014.

Annual Network Costs

FY14 UA Wide Area Network Telecommunications Costs

Interstate	
Internet2 Fees	$303,000
Commodity Internet	$597,000
Interstate Total	$900,000
Intrastate	
Community Campuses (rural & urban)	$1,848,000
Core WAN services	$1,277,000
Intrastate Total	$3,125,000
Grand Total Inter and Intrastate	$4,026,000

UNIVERSITY of ALASKA
Many Traditions One Alaska

For more information, contact Associate Vice President Chris Christensen at 907-786-1689 (ANC), 907-463-3086 (JNU) or visit www.alaska.edu/state

Arctic Fibre/Quintillion: A major international fiber optic cable project promises to bring alternate fiber routes to Alaska via the Northwest Passage. With additional routes will come capacity, increased competition and the hope of lower rates for terrestrial broadband. Plans include connections to communities along the North Slope, Northwest Arctic and Nome Regions.

Terrestrial v. Satellite: A terrestrial network provides a much faster network experience than geostationary satellite. Low-orbit satellite service is improving, but not yet available throughout Alaska. Traditional satellite technologies introduce about a 600 millisecond (ms) latency, or response time. The terrestrial network reduces that to about 40ms. This allows for much greater response rate from remote programs that are sensitive to delays in signal such as simulations, high definition videoconferencing, eLabs and remote control applications.

Terrestrial based network service is now available in four communities where UA has rural campuses: Dillingham, Kuskokwim (Bethel), Northwest (Nome) and Chukchi (Kotzebue), but are **not** utilized at this time.

Benefits of Increased Bandwidth to Rural Campuses
As e-Learning and high definition videoconferencing increases, additional bandwidth will facilitate increased eLearning capacity. It will allow for multiple videoconferences, two-way simulation activities for rural health programs and telemedicine training, nursing, aviation and eLaboratories. It will allow for advanced telecommunications capacity such as Voice over IP (VoIP) and unified communications. Students and faculty can participate in community-based research involving larger data sets and remote-sensing imagery.

General Benefits of Wide Area Network
Prospective Students—Obtain information about degree programs, research, student activities, employment opportunities and/or financial aid via the network about UA.

Enrolled Students—Register for classes, complete financial aid applications, find housing assignments, access progression to degree and course information, access distance education via video conferencing or Blackboard tools, access social networks and correspond with other UA students.

Faculty—Administer academic video conferences for distance education (i.e. UAF/UAA Joint Psychology PhD, Nursing, School of Education, School of Fisheries and Ocean Sciences, etc.), record lectures live for later use by students, enable online access 24x7 via Blackboard and iTunesU.

Mobile Telemedicine Cart

Researchers—Collect, store an analyze research data, access and transfer to global research partners.

Staff— Provide data analytics, deliver and receive training and staff development, perform human resource and finance transactions and support general administration of UA programs.

Current UA Bandwidth Availability and Annualized Operating Costs

Location	Type	Curr BW in mbps	Annual Cost	Bandwidth increase to next level	Annual cost of increase
Ketchikan	Terrestrial	45	$148,698.00		
Sitka	Terrestrial	45	$128,052.00		
Kodiak(campus)	Terrestrial	45	$ 77,102.00		
Homer(campus)	Terrestrial	45	$ 74,660.00		
Kenai	Terrestrial	45	$ 74,656.00		
Mat-Su (campus)	Terrestrial	45	$ 72,510.00		
Valdez	Terrestrial	45	$ 74,656.00		
Seward	Terrestrial	45	$ 72,510.00		
Kodiak (fish tech)	Terrestrial	45	$ 77,102.00		
Mat-Su (AFES)	Terrestrial	45	$ 72,510.00		
Toolik Lake	Terrestrial	45	$ 90,683.00		
Tok	Terrestrial	1	$ 22,469.00	4	$44,693.00
Homer (GI trailer)	Terrestrial	1	$ 8,180.00	4	$20,131.00
King Salmon	Satellite	1	$ 50,213.00	4	$81,822.00
Fort Yukon	Satellite	3	$ 44,693.00	8	$117,908.00
Barrow	Satellite	5	$117,908.00	10	$117,908.00
Dillingham	Satellite	5	$105,194.00	10	$105,194.00
Kotzebue	Satellite	5	$138,885.00	10	$138,885.00
Nome	Satellite	5	$108,954.00	10	$108,954.00
Bethel	Satellite	10	$218,746.00	15	$109,373.00
Optional Network Method:					
Terrestrial Option Annual Contract Basis					
Dillingham	Terrestrial		$1,140,480.00	10	$1,035,286.00
Bethel	Terrestrial		$1,140,480.00	10	$921,734.00
Nome	Terrestrial		$1,140,480.00	10	$1,031,526.00
Kotzebue	Terrestrial		$1,140,480.00	10	$1,001,595.00
			Total Annual Operating Cost Increase of Upgrades: Satellite		$844,868.00
			Total Annual Operating Cost Increase of Upgrades: Terrestrial		$4,352,472.00