

# Alaska EPSCoR

Alaska EPSCoR is a partnership devoted to growing Alaska's scientific research capacity, funded by the National Science Foundation and the State of Alaska.

Fall 2013



## From the PI

**Mark Myers, Principal Investigator**

Welcome to the next incarnation of Alaska EPSCoR.

There has been a great deal of progress in the organization over the last year. In July 2012 we began our fourth phase of research, an interdisciplinary, geographically-based study of the adaptive capacity of Alaskan communities. Our researchers have spent the last year building research teams, installing sensor networks, and beginning the immense task of gathering and analyzing the data needed to understand the ways in which communities respond to change.

Speaking of change, there's been some at the top. EPSCoR's previous Principal Investigator, Peter Schweitzer, has left Alaska for a position at the University of Vienna, so I've taken over as PI and as Co-Project Director along with Lil Alessa. Alaska EPSCoR's mission is an important one and I'm very excited to be a part of it.

You'll also notice some changes in the newsletter. We're taking a new approach for the next five issues, focusing the lead story in each edition on a different component of the project. This time around it's the Southeast Test Case, which

## From Glacier to Ocean Southeast Test Case focuses on Berners Bay

If water is the lifeblood of Southeast Alaska, then glaciers are its heart. But how can people respond if their heartbeat changes?

That's the question posed by Alaska EPSCoR's Southeast Test Case, which is studying glacial recession and the ways that it trickles down to impact resources like ice, estuaries and salmon - which in turn drive the actions of agencies and businesses. The ultimate goal of the project is to develop models and scenarios that will help Southeast leaders to better prepare for the ecosystem changes taking place outside their back doors.

"What we're really trying to figure out is, if the climate change effects on glaciers are affecting communities, adversely or positively," said test case researcher Brian Vander Naald. "We're trying to map those changes."

Alaska EPSCoR's current research consists of five components, each of which will be highlighted in a newsletter:

1. Southeast Test Case
2. Southcentral Test Case
3. Northern Test Case
4. CIS Working Group
5. EOD Group



photo by Tom Moran/Alaska EPSCoR

Southeast Test Case leaders meet during a research trip to Berners Bay in September 2012. L to R: David Tallmon, Eran Hood, Anne Beaudreau, Sanjay Pyare and Brian Vander Naald.

The test case will encompass multiple disciplines, from hydrology to biology to economics, in order to study the Southeast's "icefield-to-estuary" ecosystems, which transition from snowcaps to ocean over the course of just a few miles. Research will be centered on the area of Berners Bay, located about 50 miles north of Juneau past the end of the city's road system. Test Case

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# EPSCoR Launches Data Portals

There's a new door into Alaska EPSCoR.

The Alaska EPSCoR Data Portal is a newly-deployed website designed to provide easy access to data obtained by EPSCoR researchers, as well as to relevant data sets collected by other researchers and agencies. The website is centered on a simple interface that allows users to search for data from across Alaska EPSCoR's three test cases via multiple methods, including keyword searches and a map interface.

"The epscor.alaska.edu site is the central portal that brings together the three test cases' data catalogs, so it provides a central location for the EPSCoR project to search through data entries and project statuses," said Dayne Broderon of the Geographic Information Network of Alaska (GINA), a UAF-based organization that spearheaded the project. "That will be the primary place to discover and download EPSCoR-generated data sets."

The portal, which went online in September, marks the culmination of months of work by programmers at GINA and the Arctic Region Supercomputing Center (ARSC), who worked together to create the site and to populate it with its first wave of data. They also created individual portals for each of the three test cases which link directly to the main portal. Two of these portals are directly linked to existing online data collections: The Southeast Test Case site partners with the Southeast Alaska GIS Library, and the Northern Test Case portal with the North Slope Science Initiative (NSSI).

"The Southeast geospatial library is a preexisting effort that the Southeast researchers are going to be taking advantage of, and now they're going to be bringing all of that effort into the EPSCoR work," Broderon said. "The

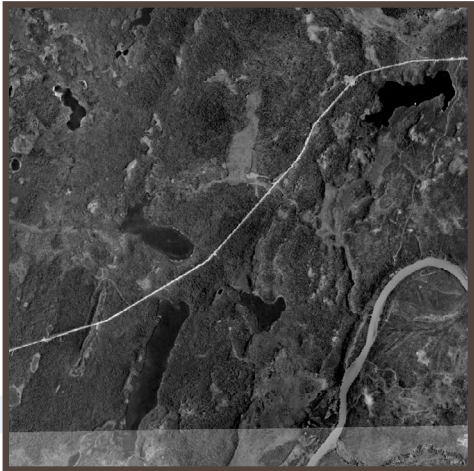
**Alaska EPSCoR Data Portals**

Main data portal: [epscor.alaska.edu](http://epscor.alaska.edu)

Southeast: [southeast.alaska.epscor.edu](http://southeast.alaska.epscor.edu)

Southcentral: [southcentral.epscor.alaska.edu](http://southcentral.epscor.alaska.edu)

Northern: [northern.epscor.alaska.edu](http://northern.epscor.alaska.edu)



Some of the mapping imagery now available to EPSCoR researchers: (t to b) Sterling, Alaska in 1950 (3-meter resolution), 1980 (1m) and 2010 (1m).

NSSI catalog will be expanded by the Northern Test Case efforts, which are providing great overlap."

The portal is only part of a concerted effort by EPSCoR to collect, organize and store data from its test cases. One particular focus is mapping: Alaska EPSCoR's focus on landscape and hydrologic change over time requires the collection of high-resolution maps dating back decades. GINA has assisted in this by creating the Alaska High Resolution Satellite Imagery Archive to hold EPSCoR and other imagery, and by compiling key sets of aerial imagery across the three test case sites. These include high-altitude photos circa 1980, U.S. Geological Survey mapping photos circa 1950, maps from the Statewide Digital Mapping Initiative from 2010-2013, very high-resolution digital imagery of the test case areas from 2001-present from the University of Minnesota's Polar Geospatial Center, and two new sets of maps commissioned by Alaska EPSCoR: LIDAR imagery for the Colville River Delta on the North Slope, and new aerial photos of the Kenai River watershed.

GINA and ARSC are also working to bolster EPSCoR's data storage capabilities, including purchasing and installing new storage nodes in each test case site and integrating them into the local UA network so researchers have desktop access. Broderon said the additional capacity has already been a boon to EPSCoR researchers, particularly in Southeast.

"That's a pretty awesome cyberinfrastructure capacity that EPSCoR's brought," enthused Broderon. "This has already expanded the Southeast geospatial library and test case infrastructure capacity to spin off the next-generation geospatial tools they're using for their project." ●

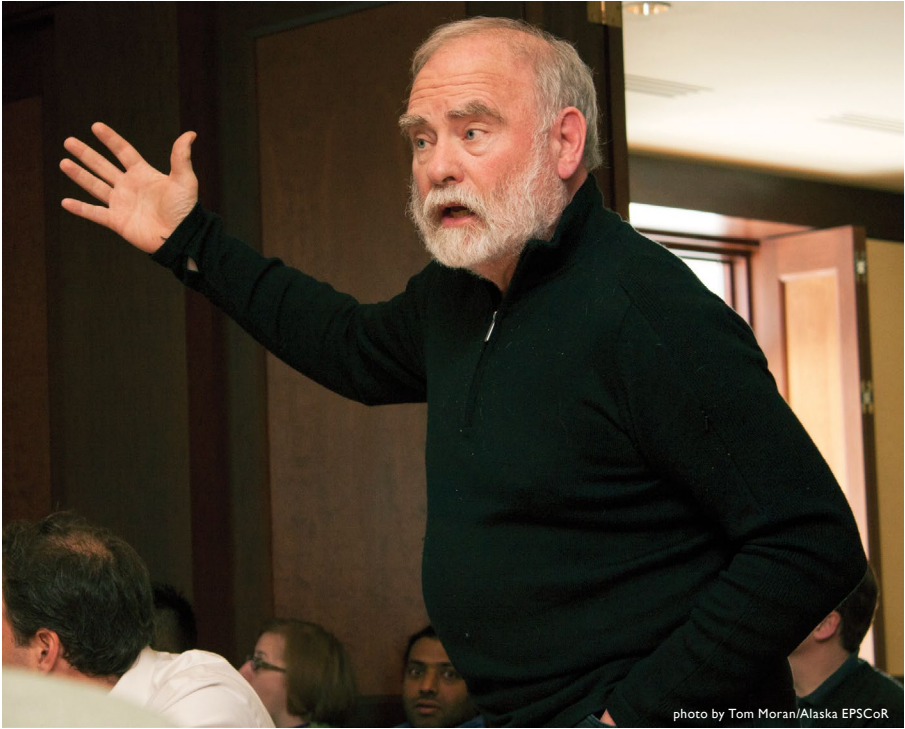
# An Adaptation Convocation

How much can we learn from the past?

That was the question on everyone's mind in February, when Alaska EPSCoR leaders met with researchers from the Global Human Ecodynamics Alliance (GHEA) for

the Southwest," said GHEA member George Halmbrecht, an Assistant Professor of Anthropology at the University of Maryland. "Basically we're looking at examples in these two regions and looking at different responses and results in the face of climactic and social hazards, and seeing what factors are the most important in either surviving them or being vulnerable to them."

The workshop began with GHEA members presenting on their own research. The roughly 25 EPSCoR attendees learned how indigenous populations have reacted to drought, storms, temperature fluctuations, and other environmental changes by adjusting their diets, community organization, and farming practices, forging new connections to other populations, or descending into violence and depopulation, among other responses. This was followed by presentations by EPSCoR researchers, who discussed their research into the present-day adaptive capacity of communities in Southeast, Southcentral and Northern Alaska, and also provided information on the historical background of Alaska's indigenous people.



UAA Anthropology Professor Stephen Langdon speaks at the GHEA-Alaska EPSCoR workshop in February 2013.

a two-day workshop in Girdwood. Whereas EPSCoR studies modern-day adaptation to climate change, GHEA examines the same topic from a paleological perspective, and the two groups wanted to see how their approaches could inform each other.

"The purpose of this workshop was to understand if there were some common lessons learned from deep history, going back tens of thousands of years, that we can apply to today's struggles with trying to achieve thriving," said Alaska EPSCoR co-Project Director Lil Alessa.

Alaska EPSCoR's approach to climate change combines contemporary sensor and survey data with Alaskan historical data, which generally extends back 50 years or less. GHEA scientists, on the other hand, study the archeological and anthropological record to understand how historic and prehistoric populations adjusted to changing climactic conditions, focused specifically on peoples of the North Atlantic and the American Southwest.

"The idea that we're basically testing is that climactic hazards occurring at timescales outside of human memory offer the greatest challenges to people, and this is something that we've seen in the North Atlantic and they've also seen in

Alessa said the workshop helped confirm for her that patterns of historic resilience and adaptability are relevant to what's happening today. "It was validation to hear over and over just some very fundamental, simple rules for being more resilient or moving toward thriving, and they're fundamentally simple things we can do as a society," she said. "I found that really exciting just to hear that really strongly expressed in many different settings all around the world."

Former EPSCoR Project Director Peter Schweitzer, who arranged for the workshop, said the event has encouraged EPSCoR researchers to find ways to extend the timescales of their research. And he and Halmbrecht both said the many contacts made during the workshop have the potential to spur further collaboration between the two organizations.

"For GHEA's purposes, (the purpose of the workshop) was definitely to exchange ideas and hopefully in the future to maybe develop collaborations with EPSCoR," Halmbrecht said. "EPSCoR really is dealing with many of the same issues that we're dealing with in the present day, and we're doing it in the historical record - and we feel that the historical record deeply informs the way you perceive the present day."◆

# Southeast Test Case

Continued from page 1

Lead Sanjay Pyare said the bay offers the best of both worlds for social-ecological study: it's a relatively undisturbed ecosystem, but still sees a lot of use by a nearby population.

"It's basically a lab, a learning lab without all the complications of an urbanized system," Pyare said. "At the same time there is a certain amount of use that goes on from people in Berners Bay. Berners Bay is really important for people's sense of aesthetics, they really view Berners Bay as their backyard."

Test case researchers will track changes in glacial discharge into Berners Bay and monitor how this affects seven key ecosystem services that provide direct or indirect benefits to the people of the Juneau area: ice, freshwater, forests, salmon, wetlands, estuaries, and plankton. Changes to basic environmental variables (temperature, water levels, productivity, etc.) will be monitored both through existing agency sensors in the area and through a new set of sensors that was installed by the test case over the summer.

"Icefield-to-estuary includes the icefield, it includes streams that are associated with these glaciers and icefields, it includes the terrestrial or the forest component, the wetland component, it also includes the nearshore component, the estuaries and part of the marine food web as well," explained Pyare. "And we



Petroglyph Beach in Berners Bay.

really want to understand what it means if you perturb one part of the system, for example, what happens if you turn up the air temperature two degrees? What does that mean for the temperature of water or the productivity associated with phytoplankton in these estuaries? In order to do that we need a whole stream of sensors."

By combining this sensor data with existing records, test case researchers will be able to build a longer-term set of physical and biological data. The next question is how these changes affect plant and animal populations. Salmon are an especially important consideration due to their central role in local livelihoods, noted test case researcher Anne Beaudreau. "Changes in glaciers are going to have downstream impacts on organisms, and there are certain organisms that are really valuable to the human community," she said. "Salmon populations would be a really good example of that."

Vander Naald noted that climate changes have already substantially affected the timing of salmon migrations in recent years. He said another example of a local impact of climate change could be ecotourism, including helicopter tours that rely on glacier landings. Through surveys and interactions with the local business community, Vander Naald and other researchers will attach values, both monetary and non-monetary, to the

## Southeast Test Case Leadership Team

Sanjay Pyare, UAS Associate Professor of GIS and Landscape Ecology  
Anne Beaudreau, UAF Assistant Professor of Fisheries  
Eran Hood, UAS Associate Professor of Environmental Science  
David Tallmon, UAS Associate Professor of Biology  
Brian Vander Naald, UAS Assistant Professor of Economics

services provided through the Berners Bay ecosystem, and thus better quantify the impacts of these changes on the Juneau community.

The final step will be to work with land management agencies and businesses in the Juneau area in order to better understand how they anticipate and respond to change, and to use this feedback to build models and scenarios that will enable them to better incorporate environmental change into their planning processes. These in turn will figure into the overall goal of the five-year Alaska EPSCoR project, which is to understand how Alaska communities can maximize their ability to adapt to change.

"One of the interesting comparative statistics that we can possibly get out of this is current resource use rates versus optimal resource use rates," said Vander Naald. "So it could inform policymakers and resource managers in the kinds of quotas that they distribute for salmon fishing, or the number of permits that they hand out to helicopter operators to take people up to the icefields."

Southeast researchers have been spending 2012-13 assembling a team of faculty and student researchers, gathering retrospective data, and beginning to install the Berners Bay sensor network. They also established relationships with a number of community partners, including the Juneau Economic Development Corporation, the Alaska Coastal Rainforest Center, and the Scenarios Network for Alaska and Arctic Planning at UAF. "Those three entities are going to be really important for engagement of the community," Pyare said.♦

## Buma is First Alaska ACE Hire



Brian Buma

The Southeast Test Case got a boost this summer with the arrival of ecologist Brian Buma. Buma, who begins work at UAS in August as an Assistant Professor of Forest Ecosystem Ecology, is the first of eight UA faculty hires to be made over the five years of Alaska EPSCoR's current research project.

Buma holds a B.S. in Biology and an M.A. in Teaching from Western Washington University, and a Ph.D in Ecology and Evolutionary Biology from the University of Colorado at Boulder. His dissertation dealt with the ways that multiple disturbances interact with each other to impact forests. Forests will also be his focus at UAS, with his major role in the Southeast Test Case to study the woodlands of Berners Bay.

Buma has been in Juneau since July and has already made multiple visits to the test site by car and boat. He said he's looking forward to diving into EPSCoR research, and especially welcomes the interdisciplinary nature of the project. "I'm really hoping to work collaboratively," he said. "The questions are more interesting when you do it that way."♦

# Icefield-to-Estuary-to-Educators

Call it a doppelglacier.

Southeast Test Case leaders wanted to expose a group of local teachers to the research they're doing on icefield-to-estuary ecosystems, but their study site, Berners Bay, is past the end of Juneau's road system. So they found something closer to home: Herbert Glacier, which rests at the end of an easy hiking trail about 30 miles out of town.

"If we're going to expose people to the type of research we're doing, it's imperative that we have something that's pretty accessible," said test case lead Sanjay Pyare. "In one system, in about four miles, we have a way to travel from the base of the glacier to a very productive estuary."

On June 10, eight Juneau K-12 educators joined EPSCoR researchers and personnel to hike the trail from the road to the glacier. Along the way, scientists gave presentations on physical, biological and social characteristics of the area, such as glacial outflow, forest succession, and salmon numbers. Following the hike the attendees drove to the estuary at the mouth of the Herbert River to learn about estuarine and marine environments.

Pyare said the main purpose of the event was to scope out the ways local educators could be involved in the test case. "I wouldn't call this a formal educational event," he offered. "It's more of a focus group." Pyare said he was able to talk individually with all of the teachers and is considering several possibilities for further outreach, such as



UAF Assistant Professor of Fisheries Anne Beaudreau addresses Juneau teachers during the Icefield-to-Estuary hike in June 2013.

expanding the event into a multi-day workshop teachers could take for continuing education credit, or starting a Research Experience for Teachers program that would enable educators to spend time in the field assisting in test case efforts.

"One of the things we're really interested in, and the National Science Foundation is really interested in, is not just doing interesting science, but also what the implications of the science are," Pyare said. "How are you delivering the science, how does it get into the community, how does it help educate the general public? And so that's very much what we're here for today."♦

# Nome Again

## WAISC Returns to Bering Sea Town

Waste disposal. Reindeer herding. Remote camp energy solutions.

Nome is not your average town, and – as the above presentation topics suggest – the Western Alaska Interdisciplinary Science Conference (WAISC) is not your average research symposium. In March 2013 the annual event was held in Nome for a second time, bringing with it a unique opportunity for researchers and local residents to discuss the issues most important to their lives and livelihoods.

“Most of the topics that flutter in will be the ones that are relevant and important at our region, for example at this conference we had a big session on waste management,” said Claudia Ihl, an Assistant Professor of Biology at the University of Alaska Fairbanks (UAF) Northwest Campus in Nome and a chief organizer of the 2013 WAISC. “And that’s just a big topic in rural communities, what do we do with our garbage? It may not be of interest at some big fancy science conference, but that’s what people here talk about.”

WAISC is structured not around disciplines but geography: the event is held at rotating sites across Western Alaska, with each conference attracting researchers and residents focused on local topics. Major session themes in Nome this year included subsistence foods, climate and health, marine science, solid waste management, fisheries, water quality, alternative energy, and reindeer production. The event was also preceded by a one-day workshop put on by the Supporting and Advancing Geoscience Education (SAGE) program, which focused on ways to transition two-year college students into full degree programs.

In addition to presentations by researchers, two local teachers arranged talks by their K-12 students, and other Nome residents were in evidence throughout the

conference as both presenters and attendees. “Science conferences are often held in some fancy resort up on the hill and the local people really aren’t there at all,” noted Ihl. “So we’re trying to get the community more involved.”

Alaska EPSCoR supports WAISC every year, principally by providing travel grants for students and faculty members to attend the conference. EPSCoR funded seven people to travel to Nome, including four UAF students, one UAF research fellow, one UAF faculty member, and one University of Washington student. EPSCoR-funded attendees spoke on topics such as community adaptation to climate change; Russian sea mammal hunting; historic reindeer herding, walrus diet, and electric snowmobiles.

One EPSCoR presenter, UAF postdoctoral fellow Amber Lincoln, said she did her dissertation research on reindeer herding on the Seward Peninsula and was grateful for the opportunity to both present her research and to hear from present-day herders. “That herding session was amazing,” she said, “to hear not just the research, but what herders are doing right now.”

Since its inception in 2008, WAISCs have been held in the towns of Dillingham, Nome, Dutch Harbor and Bethel. The 2014 conference will be held in Kotzebue for the first time, presenting an opportunity to focus on an entirely new spectrum of local color. “What’s great about this conference is that it takes on the issues, the flavor of the community that it’s in,” said WAISC founder Todd Radenbaugh, an Assistant Professor of Environmental Science at the UAF campus in Dillingham. “And the main thing we want to do is we want people to feel very comfortable in expressing themselves, expressing their solutions to local problems, and sharing the knowledge they’ve learned.”



University of Alaska Fairbanks reindeer researcher Greg Finstad presents during the 2013 WAISC in Nome.

# EPSCoR Briefs

## Alaska hosts NSF communication workshop

More than 100 people from across Alaska were in attendance at UAF on July 17 for the National Science Foundation's "Science: Becoming the Messenger" science communication workshop. A panel of media professionals taught attendees how to construct messages and tailor them to their audiences, including working with elevator pitches, video, Twitter, blogs, and other media platforms. A selected group of applicants also participated in a follow-up workshop the next day.



Panelists at the NSF "Becoming the Messenger" workshop.

The workshop was put on by the national NSF EPSCoR office as part of a series of such events across the country designed to improve communication skills across the research community.

## Alaska EPSCoR supports campus speakers

EPSCoR provided financial and logistical support for three science speakers to present on UA campuses in the past academic year. Speakers included Debra Rolison, head of the Advanced Electrochemical Materials Section at the U.S. Naval Research Laboratory, who spoke on "Creating change in scientific institutions through subversion, revolution, and climate change;" Lindsay Correa of the California Delta Science Program, who spoke twice in Anchorage in March on "Integrating science, management and policy to achieve competing goals in the California delta;" and Colin Murrell, director of the Earth and Life Systems Alliance at the University of East Anglia in England, who spoke in Fairbanks and Anchorage in April on "Fighting climate change with microbiology."

## EPSCoR offering video content on Mediasite

Alaska EPSCoR has begun to broadcast and record a variety of events using Mediasite, a new media platform that enables the viewer to simultaneously watch a presentation and its accompanying slideshow. EPSCoR has contributed to the purchase and use of Mediasite packages across the UA system and also provided support for a UA staff member to record EPSCoR events.

Three different Alaska EPSCoR-sponsored events are now available for viewing at mediasite.alaska.edu: Alaska EPSCoR Education Outreach Director Elena Sparrow speaking on "Outreach Education: To Do or Not to Do;" a presentation by EPSCoR Outreach Director Tania Clucas on "Funding Opportunities for Science Education Programs;" and the Colin Murrell lecture noted above.

## State of Alaska issues S&T Plan

The Alaska State Committee on Research (SCoR) has released a draft of its Science and Technology Plan, which highlights state priorities in scientific research and development. Alaska EPSCoR was heavily involved in drafting the plan and EPSCoR research is prominently cited within the document. The plan can be found on the Alaska EPSCoR website at [www.alaska.edu/epscor](http://www.alaska.edu/epscor).

## Director's Letter *Continued from page 1*

is taking full advantage of Juneau's surroundings and UAS' growing research capacity to study the literal and figurative trickle-down effects of glacial recession.

The new newsletter format is part of a constantly evolving outreach strategy, combining printed matter with more video content and social media. Look for further changes and developments as we progress through the five years of the current Alaska EPSCoR project. ♦

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## EPSCoR funds cyber upgrades

**T**hanks to a \$1 million Alaska EPSCoR award, both the UAA and UAF campuses now have faster internet connections and UAA Planetarium-goers are enjoying improved graphics.

Alaska EPSCoR began administering an NSF Research Infrastructure Improvement Cyberconnectivity (RII C2) award in 2011 and completed it in July. The award money went toward four separate projects designed to speed up internet connections and to improve visualization capabilities at the UA, as well as to build a new EPSCoR data portal and to provide web content for rural Alaskans.

The award funded the following work:

- Ten research buildings on the UAF West Ridge had their network connections to the UAF core system upgraded from 1 to 10 gigabits per second (gbps). This has greatly improved the ability of West Ridge researchers to collaborate and to make available very large and complex data sets for analysis, and to make use of the supercomputers located in the Butrovich Building.
- Connectivity to the Integrated Science Building (ISB) on the UAA campus was also upgraded from 1 to 10 gbps, improving access for the many researchers in the

ISB and also for the UAA Planetarium and Visualization Theatre (PVT). Hardware and software upgrades were also made to the PVT, which – combined with the faster connection – enable the facility to smoothly run simulations which can

be manipulated in real time.

- The award funded development of two new websites by the Arctic Region Supercomputing Center (ARSC) to improve data storage and access: Alaska Data Central, which is designed to serve as a central access point for data and meta-data from across the University of Alaska

system; and Scholarworks, an institutional repository holding UA library materials, theses and dissertations, meeting minutes, scientific posters, and archival footage and images.

- The award funded a UAF employee to compile interdisciplinary educational items for Alaska's Digital Sandbox, a sharable online repository of educational materials for students and teachers across the state. In addition to being available online, the items will be downloaded onto portable netbooks and made available to rural Alaska residents as part of "Bridging the E-Skills Gap," a federal program to encourage broadband adoption in Alaska. ♦



The UAA Integrated Science Building, which benefited from EPSCoR cyber upgrades.