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 2012

From the Director

Peter Schweitzer

Finally, it is a go. After some false starts, the fourth phase of Alaska EPSCoR, "Alaska Adapting to Changing Environments" – or "Alaska ACE" for short – is a reality. On July 1, the new five-year award commenced and is entering the implementation phase as you are reading this.

This means plenty of work is to be done. We have met repeatedly to hammer out details of test case work plans, sensor deployment, and outreach integration. In late September, we will hold a Strategic Planning meeting to map out our specific goals, timelines, and deliverables for the next five years.

I am playing a key role in getting Alaska ACE off to a successful start – however, my long-term involvement will be limited. That is because I have accepted a faculty position at the University of Vienna and will be leaving the country in December. After that, I will continue to be involved with Alaska EPSCoR in an advisory capacity, while UAF Vice-Chancellor for Research Mark Myers will take over as Principal Investigator. Myers will also serve as Co-Project Director along with UAA Biology Professor Lilian Alessa.

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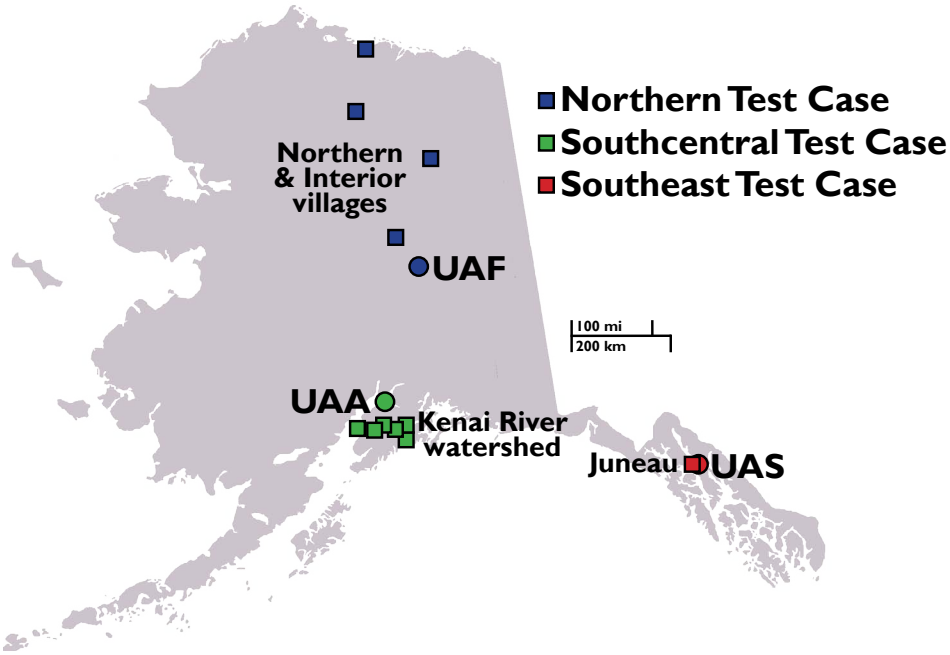
Alaska EPSCoR Enters New Phase

$20 million NSF award to fund 5-year research project

Alaska is changing, and so is Alaska EPSCoR.

The National Science Foundation has awarded the organization $20 million to fund a new five-year project entitled "Alaska Adapting to Changing Environments (Alaska ACE)." ACE research will focus on the adaptive capacity of different Alaskan communities: that is, the elements of communities' makeup that enable them to weather environmental and social change.

Alaska is an excellent laboratory for studying the ways in which communities respond to a changing environment, noted UAF Professor of Anthropology Peter Schweitzer, principal investigator for the project. "On the one hand we



A map of the regional organization of the Alaska ACE project.

see the results of climate changes more readily in the North than elsewhere, and secondarily in a place like Alaska we have a much tighter connection to the natural environment than elsewhere," he said. "A very large proportion of the state, indigenous and non-indigenous, gains its livelihood from so-called ecosystem services, for example through subsistence or commercial fishing, so the coupling between our livelihoods and the ecosystem is very tight."

The ACE project centers on three regional test cases that will study elements of adaptive capacity in specific towns and villages across Northern, South-

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PACMAN FEVER

From a climate standpoint, Alaska and Hawaii don't have much in common. But one asset they do share – a border on the Pacific Ocean – was the basis for a $6 million National Science Foundation grant to improve climate monitoring and modeling in both states and over the stretch of water in between.

"To the extent that there's a unifying theme of the PACMAN (Pacific Area Climate Monitoring and Analysis Network) grant, it's water," said Arctic Region Supercomputing Center Director Greg Newby, principal investigator of the award. "It's monitoring water regime change, the idea that if winds shift a little bit then suddenly an area that was dry will become more moist."

PACMAN originated with UAF International Arctic Research Center scientist Xiangdong Zhang, who wrote a pioneering study linking diminished Arctic sea ice with a heavier monsoon season in China. His findings provided the impetus for a study of how changes in North Pacific weather could affect precipitation on land. "That really was the seed of the whole PACMAN grant," Newby said.

Based on Zhang's findings, EPSCoRs in the 49th and 50th states jointly applied for the NSF funding, which was awarded in 2009 and ran through August 30 of this year. Hawaii focused on deploying local sensors and on working with schools and a community organization in a critical Big Island watershed. Alaska's part of the award primarily went toward funding ARSC computing resources and improving and expanding Alaska's weather stations.

Most significantly, the PACMAN grant paid for Pacman, a 2784-processor Penguin supercomputer with over 30 teraflops (30 trillion calculations a second) of computing power, as well as an expansion of ARSC's archival storage. Pacman provided 20 million CPU hours last academic year for users across the UA system, and it proved to be a crucial addition to ARSC, as it maintained and expanded the center's computing capacity at a time when it was losing major Defense Department funding. "The fact that we had the PACMAN grant before things were starting to look problematic with the Department of Defense was pretty important," Newby said.

ARSC Network Systems Analyst Tom Bachert displays part of the Pacman supercomputer in the machine room of the Butrovich Building on the UAF campus.

Pacman's computing power, in combination with upgrades to remote weather stations on the Seward Peninsula and the North Slope, is enabling UA researchers to improve the resolution of their hydrology and climate research and is also providing valuable information for local subsistence hunters and fishers. "They put them strategically to fill gaps in areas where they have interesting weather but they didn't have observations," Newby said.

A team in the UAF Institute of Northern Engineering has also used PACMAN support to develop an airplane-based set of sensors called "Tinman," which has been used to collect detailed hydrological data on the Seward Peninsula, in the Fairbanks area, in the Minto Flats, and at other locations. Another PACMAN-related project is based out of the University of Alaska Anchorage, where postdoc Kalb Stevenson and professors Andy Kliskey and Lil Alessa are working with coastal indigenous communities in both Alaska and Hawaii to document traditional ecological knowledge (TEK) about climate and seasonal change. Meanwhile, Zhang and UAF Atmospheric Sciences graduate student Cecilia Borries have been using Pacman to study how the Pacific Decadal Oscillation affects moisture transport in the North Pacific.

"If we can get solid information about the connections or correlations between PDO and moisture transport and how it varies the precipitation over Alaska and Hawaii, maybe we can make a projection to know how water resources will change in the future," Zhang explained. "That's quite important for policy decisions."◊

EPSCoR Briefs

EPSCoR office moves

Alaska EPSCoR's main offices are now located in the UAF West Ridge Research Building. Visitors should seek out Outreach Manager Tania Clucas in WRRB 208. Project Administrator Pips Veazey is next door at WRRB 206 and Communications Director Tom Moran is around the corner at WRBB 201. Principal Investigator Peter Schweitzer remains in his faculty office at 304A Eielson. Mailing and e-mail addresses and phone numbers remain the same.

Now on Facebook!

Alaska EPSCoR's new Facebook page is located at facebook.com/AKEPSCoR, and we have established a Twitter feed at twitter.com/akepscor. Both are accessible from our updated website at alaska.edu/epscor.

EPSCoR awards

A number of Alaska EPSCoR-supported students and faculty have recently won awards at the university, local and national levels:

Alaska EPSCoR grantee Michael Golub won $15,000 in the 2011 Alaska Marketplace Competition, which rewards entrepreneurs whose products or businesses benefit rural Alaska. Golub, a graduate student in mechanical engineering at UAF, won for "RevUp: Electric Car Instruction," through which he teaches students in rural areas how to convert gas cars to electricity.

The UAF Electric Snowmobile Team took first place overall in the zero-emissions category at the 2012 Society of Automobile Engineers Clean Snowmobile Challenge, held in Houghton, Michigan in March. They also captured awards for best design, most improved snowmobile and the best paper on designing hybrid snowmobiles, and also won the weight pull competition. Team members included Golub and fellow Alaska EPSCoR grantee Isaac Thompson.


Golub


Yoshikawa

EPSCoR-funded UAF undergraduate student Sayde Ridling won a pair of student awards in spring 2012: the Brina Kessel Award for Excellence in Science, and the Outstanding Undergraduate Student Award for the UAF Department of Biology and Wildlife. Ridling has received multiple EPSCOR grants to study insect life on Kasatochi Island in the Aleutians.

Alaska EPSCoR-supported UAF faculty member Kenji Yoshikawa was awarded the 2012 Emil Usibelli Distinguished Service Award, the foremost service award bestowed upon UAF faculty. Yoshikawa, a Professor of Water Resources in the Institute of Northern Engineering, has received multiple awards from Alaska EPSCoR.

Seven Mt. Edgecumbe High School students in the EPSCoR-supported Alaska Rural Research Partnership program attended the Alaska Statewide High School Science Symposium in March 2012 in Fairbanks. All seven students placed in their individual categories, while student Abigayle Fisher did best of all, taking home first place in the Microbiology and Molecular Biology session and winning the Best Microbiology Project award. Two adults associated with the program also took home awards: Chohla Moll was selected as Teacher of the Year and Kitty LaBounty as Mentor of the Year.◊

☑ A New Angle on the Ballot Box ☑

Forget about red and blue states. Kyle Dexter's question is, what gender is your precinct?

Dexter, who recently graduated from UAF with a bachelor's degree in psychology, spent the spring of 2012 working on an Alaska EPSCoR-supported project to apply a unique Alaska Native concept of "gendered geography" to state election results.

The Tlingit Natives of Southeast Alaska, Dexter explained, have historically separated landscapes into male and female areas. The distinction mainly has to with what sort of work was done in each region: male or "dry" areas are places where traditionally male work, such as cutting down trees, took place. Female or "wet" sites correspond to areas of traditional woman's work, such as collecting shellfish.

photo by Tom Morán

Kyle Dexter examines State of Alaska Division of Elections records.

On a suggestion from Tim Lower, an Assistant Professor of Psychology at UAF, Dexter initiated a novel project to apply this Tlingit system to voting records. "We were trying to integrate the Western idea of voting districts with a Tlingit theory and to see what would happen," Dexter said. Based on evidence that women tend to be stronger supporters of the Democratic Party than men, he theorized that "wet" or "female" districts may lean more Democratic than "dry," "male" ones.

He took Alaska State House election results from 2006, '08 and '10 and ran a chi-square statistical analysis on them, classifying each of Alaska's 40 house districts into female and male categories based on their proximity to water. Those results turned out not to be statistically significant, so Dexter increased his level of detail, classifying each one of Alaska's 400-plus voting precincts. But the results of that analysis also were not conclusive enough to indicate a significant correlation between election results and geography.

But Dexter wrote in his final report that the approach still shows promise, noting that "the exploratory nature of the study seems to indicate that future analyses with additional data sets could yield statistically significant results." And he also stresses the importance of the ideas behind the study. "Even if the results of our project weren't statistically significant, it's just bringing light to the fact that there are additional and alternative epistemologies or ontologies that predate perhaps Western culture, and at the very least can actually work in harmony or inform Western culture," he said.

Moreover, Dexter noted, the project has had a major impact on his career trajectory. He gained experience working both with Lower and with a psychology graduate student, and was able to present his work at the 2012 Western Psychological Association convention in San Francisco. More significantly, he said the work - and EPSCoR's support - helped to earn him acceptance into the UAF-UAA Joint Ph.D. Program in Clinical-Community Psychology.

"If the idea behind funding undergraduate research is to build the experience and to fall in love with the process of research, then I would say that this opportunity EPSCoR has given me has definitely done that," he said. "As far as collaborating with a mentor, doing a literature review, running statistical analyses, collecting data, working with other students and going through the process, I've learned so much … if nothing else I've developed a passion for research, and developed a passion for indigenous cultures here in Alaska."◊

Testing the Waters

As a skier, Edda Mutter strove for gold. As a UAF graduate student, she's much more concerned with chromium, zinc and aluminum.

Mutter, who competed for Germany in the women's slalom in the Lillehammer Olympics, came to Alaska to join the UAA ski team and stayed to earn both her bachelor's and master's degrees. She's now working on an interdisciplinary Ph.D in Environmental Engineering at UAF, centered on an ambitious project to determine whether Alaskan village landfills and sewage lagoons are leaching potentially harmful metals or bacteria.

"There's no hard-core science data available of what is coming off these landfills," Mutter said. "The microbial and the metal runoff have never really been examined. What is coming off and what is getting absorbed by the soil and vegetation? Is it really bad? Is the system sufficient?"


photo by Holly McQuinn

Edda Mutter at work in UAA's Applied Science, Engineering and Technology Laboratory.

Mutter said she became interested in the subject after rural students in an anatomy course she was teaching related concerns about the landfills, which are often poorly designed and monitored and sited close to villages. For the study, Mutter identified five rural villages in Interior, Western and Southwest Alaska with different types of landscapes and landfill designs, then set her research goals by consulting residents about their concerns.

"One part of my study that was for me always important was the input from the community," she said. "The communities are pretty concerned about the microbial contaminants, especially E. coli … they're also very concerned about heavy metals. If there are some metals leaching off the landfills during snowmelt or precipitation events these could affect shallow drinking water wells or surface water."

Mutter spent two years conducting fieldwork in the villages with support from the Environmental Protection Agency, the U.S. Geological Survey, and Alaska EPSCoR, which has provided her with graduate fellowships and travel funding. Her diligent methods involve sampling water and soil from various points in, above and below the landfills, and running the samples through tests for bacteria as well as for both inorganic contaminants (i.e. heavy metals) and organic ones (i.e. pharmaceuticals and surfactants). Her fieldwork is complete and she's now engaged in chemical analysis, primarily working out of UAA's Applied Science, Engineering and Technology Lab.

Mutter said her preliminary results have been significant but not alarming. Levels of indicator organisms for E. coli and Enterococcus bacteria have been significantly higher in soil and water samples from the landfills, but there's no evidence contamination has spread downstream. Mutter has also detected a general trend of enriched metals in samples from the landfills, with the most significant spikes in chromium, zinc and aluminum, but has yet to determine how far these metals are being transported in surface and subsurface waters.

Mutter doesn't expect her work to necessarily raise any alarm bells about current landfills. Her end goal, she said, is to help craft recommendations for future landfill construction and use. She said that relatively straightforward changes, such as keeping electrical waste out of landfills, separating degraded from new waste, applying soil covers, and most importantly keeping landfills separate from the water system, can all help minimize the possibility of health hazards from leachates. "I don't think the regulations will change drastically for landfill construction in rural Alaska," she said. "But the communities on their own can do certain things."◊

Alaska EPSCoR Awards 2012 Student, Faculty Funding

In spring 2012 Alaska EPSCoR awarded 18 graduate student research stipends, seven undergraduate stipends, and six Integrative Faculty Development Awards. Awards were given in EPSCoR's traditional disciplinary components and also in interdisciplinary themes of Ecosystem Services, Mobilities, Human-Hydrological Systems, and Systems Modeling. Here are the recipients:

Graduate Student Research Stipends

Physical Science/Water

Charles Jones, Ph.D candidate, UAF
Advisor: Larry Hinzman
Focus: Variability of groundwater in the Tanana Valley.

Edda Mutter, Ph.D candidate, UAF
Advisor: Bill Schnabel
Focus: Landfill impacts on surface water quality.

Dustin Ray, M.S. candidate, UAF
Advisor: Debendra Das
Focus: Use of nanofluids for building heating.

Caitlin Rodriguez, M.S. candidate, UAA
Advisor: Aaron Dotson
Focus: Removal of ammonia from wastewater.

Biology/Ecosystem Services

Alain Beauparlant, M.A. candidate, UAA
Advisor: Stephen Langdon
Focus: Effects of climate change on subsistence in Point Lay, Alaska.

Ginger Cooley, M.A. candidate, UAA
Advisor: David Yesner
Focus: Levels of lead in bones of the Porcupine Caribou Herd.

Rebecca Hewitt, Ph.D candidate, UAF
Advisor: Terry Chapin
Focus: The role of fungi in tree line advance.

Kim Jochum, Ph.D candidate, UAA
Advisor: Lilian Alessa
Focus: Human-bear interactions in Alaska and Russia.

Mary-Cathrine Leewis, M.S. candidate, UAF
Advisor: Mary Beth Leigh
Focus: Microbial communities in contaminated and non-contaminated soils.

Joshua Ream, Ph.D candidate, UAF(Juneau)
Advisor: Andres Lopez
Focus: Amphibian populations in Southeast Alaska.

EPSCoR graduate student awardee Mary-Cathrine Leewis.

Yoko Kugo, M.A. candidate, UAA
Advisor: Jennifer Burns
Focus: Freshwater seals in lake Iliamna.

Social Science/Mobilities

Heidi Hatcher, M.S. candidate, UAF
Advisor: Peter Fix
Focus: Wolf trapping as rural predator control.

Corrine Knapp, Ph.D candidate, UAF
Advisor: Terry Chapin
Focus: Adaptation plans for subsistence communities.

Matthew O'Dell, M.S. candidate, UAA
Advisor: Jeff Welker
Focus: Mulchatna Caribou Herd population dynamics.

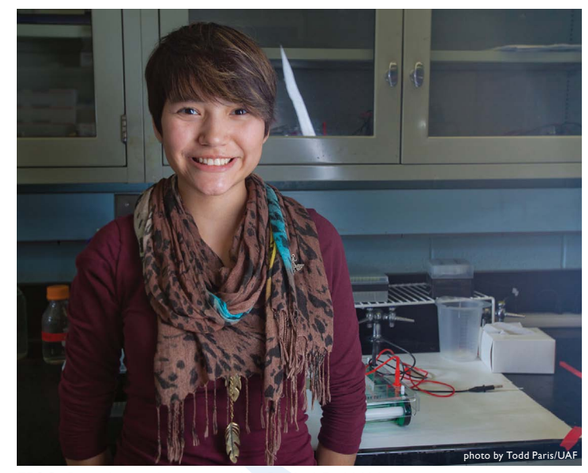
Julie Raymond-Yakoubian, Ph.D candidate, UAF
Advisor: Peter Schweitzer
Focus: Connections between fish resources and the cultural identity of Northwest Alaska Natives.

Rebecca Sawyer, M.S. candidate, UAA
Advisor: Douglas Causey
Focus: Genetics and blood parasite loads in Alaskan brown and black bears.

Integration/Systems Modeling

Winslow Hansen, M.S. candidate, UAF
Advisors: Scott Rupp and Terry Chapin
Focus: Spruce bark beetle infestation and wildfires on the Kenai Peninsula.

Erik Woelber, M.S. candidate, UAA
Advisor: Lilian Alessa
Focus: GIS mapping of distances to community resources in Northwest Alaska.



EPSCoR undergraduate awardee Rachel DeWilde.

Undergraduate Student Research Stipends

Jonathan Cason, Biological Sciences major, UAA
Advisor: Andrew Kliskey
Focus: Social-ecological hotspots mapping of an urban green space.

Rachel DeWilde, Biological Sciences major, UAF
Advisor: Andres Lopez
Focus: Genetic structuring of Beringian blackfish.

Kyle Dexter, Psychology major, UAF
Advisor: Tim Lower
Focus: Applying Tlingit "gendered geography" to election returns.

Brendon Fuhs, Mathematics major, UAF
Advisor: Mark Sicoli
Focus: Mathematical modeling of the origin of a set of Alaska Native languages.

Kyoko Okano, Biological Sciences major, UAF
Advisor: Syndonia Bret-Harte
Focus: Effects of warming and competition on white spruce seedlings in Denali National Park.

Sayde Ridling, Biological Sciences major, UAF
Advisor: Derek Sikes
Focus: Arthropods on Kasatochi Island.

Isaac Thompson, Electrical Engineering major, UAF
Advisor: Denise Thorsen
Focus: Improving efficiency of electric snowmachines.

Integrative Faculty Development Awards

Physical Science/Water

Jifeng Peng, Assistant Professor of Mechanical Engineering, UAF
Focus: Ocean plankton distribution in the Gulf of Alaska and Bering Sea.

Biology/Ecosystem Services

Douglas Causey, Professor of Ornithology and Conservation Biology, UAA
Collaborator: Jeffrey Welker
Focus: Patterns of subsistence hunting and abundance of Arctic waterfowl.

Mary Beth Leigh, Associate Professor of Microbiology, UAF
Collaborators: D. Lee Taylor, William Schnabel, Mary-Cathrine Leewis, Robert Burgess
Focus: Soil remediation in remote communities using native Alaskan plants.

David Tallmon, Associate Professor of Biology, UAS
Collaborators: Sanjay Pyare
Focus: Effects of glaciers and climate change on salmon run timing and abundance.

Social Science/Mobilities

Claudia Ihl, Assistant Professor of Biology, UAF-Northwest Campus
Collaborator: Julie Raymond-Yakoubian
Focus: Muskoxen hunting practices.

Andres Lopez, Assistant Professor of Fisheries, UAF
Collaborators: Patricia Heiser, John Bailey
Focus: A web platform for gathering data about Alaskan freshwater fish.◊

Southern Exposure

When you're writing a thesis about fire disturbances, where better to go than the Land of Fire?

That line of thinking led UAF Biological Sciences graduate student Rebecca Hewitt to spend six weeks conducting research in Tierra Del Fuego, the southernmost tip of South America. Hewitt's doctoral thesis examines the ways in which fires affect interactions between trees and symbiotic fungi at treeline, testing (and so far, potentially disproving) the theory that fires tend to limit expansion by killing key mycorrhizal fungi. "What I'm trying to figure out is how critical are these microbial partners to the ability for trees to establish successfully at and beyond current treeline," she said.

Rebecca Hewitt in the field in Chile.

It's a topic equally applicable to the world's southern treeline, which led Hewitt to apply for an NSF International Research Experiences for Students grant (as well as Alaska EPSCoR travel funding) to travel to South America to undertake a comparative study of Alaska and Tierra Del Fuego. "They have a really interesting and long human-induced fire history on the landscape," said Hewitt, a two-time Alaska EPSCoR graduate fellow. "The idea was to do a comparison of the northernmost and southernmost fire systems that have this fire history, even though one of them is human-caused and one is not."

Hewitt spent 1 1/2 months in January and February working out of a research facility near the Beagle Channel at the very tip of southern Argentina. She spent most of the time doing fieldwork and processing samples, driving for hours through the mountains and rangelands of Argentina to gather seedlings and root samples from both primary and disturbed forests.

However, Hewitt had to modify her research focus: instead of studying soils disturbed by fire, she focused on ones affected by logging. This was mostly a result of the research priorities of the facility where she worked, and wasn't helped by the fact that – ironically enough – major wildfires limited her access to prime research areas. "What we ended up looking at instead was logging disturbance, which has some strong parallels with fire disturbances, but there are some pretty sharp contrasts as well."

As a result, Hewitt said her studies south of the Equator likely won't figure prominently in her thesis, though they will be submitted for publication. But she said the experience was still worthwhile for multiple reasons. She was able to spend time mentoring a local graduate student in research techniques. She worked to help strengthen ties between UAF and the South American research program, which she said could lead to formalized student exchanges in the future. She was even able to meet with the Environment, Science and Technology advisor to the U.S. Ambassador to Argentina.

And most importantly, Hewitt said the journey broadened her perspective, as she was able to witness a different ecosystem – and research climate – firsthand. "I learned how the Argentine system works," she said. "And I just have a much better idea of what the ecosystem is actually like, which means that the hypotheses that I propose will have a stronger foundation because I've actually stood in those forests."◊

Double Duty for Dillingham

Dillingham is Alaska's 20th-largest community and sits about 250 miles from the road system. But twice in the past academic year, the Southwest Alaska fishing town has been the center of the universe for Alaskan science.

In September 2011, the AAAS (American Association for the Advancement of Science) Arctic Science Conference was held in Dillingham for the first time. Six months later, scientists again flooded town for the 2012 Western Alaska Interdisciplinary Science Conference (WAISC). "This is the largest conference, I think, Dillingham has ever had," WAISC organizer Todd Radenbaugh said of the latter event. "It's certainly the largest science conference."

UAF-Bristol Bay Campus technician Chet Chambers displays a cross-section of insulation inside the campus' experimental passive office during the 2011 Arctic AAAS meeting.

Dillingham's newfound popularity as a conference venue stems from 2008, when Radenbaugh, an Assistant Professor of Environmental Science at the University of Alaska Fairbanks Bristol Bay Campus, helped to stage the first WAISC there. Subsequent WAISCs were held in Nome, Unalaska and Bethel before returning to Dillingham for 2012. It was the success of the initial Dillingham conference that led Arctic AAAS Executive Secretary Larry Duffy to propose holding the 2011 AAAS meeting there. "The first WAISC proved that a rural community could hold a large and relevant science conference," noted Radenbaugh.

Dillingham's appeal has been heightened by the town's proximity to the site of the proposed Pebble gold mine. Pebble was a key topic at both the 2008 and 2012 WAISCs and at the AAAS meeting, and the latter two conferences both had special sessions entirely devoted to the controversial project. But Radenbaugh noted that Pebble discussions did not sit at the center of the 2012 symposium. "The big event at the first WAISC was a mining session," he noted. "The big topics in 2012, I would say, were indigenous knowledge and subsistence science."

The AAAS and WAISC conferences are designed to be highly interdisciplinary, and presenters at both covered a huge range of fields and topics, from salmon fisheries to sustainable rural energy to education and traditional ecological knowledge. Radenbaugh said the 2012 WAISC was especially noteworthy for the number of local residents who participated, including students and elders who attended sessions and who served as presenters. "I think what made this a little more interesting was the emphasis on things like subsistence foods and our whole subsistence session, and our traditional local knowledge session, and how many individuals from the Dillingham region wanted to share," he said.

Alaska EPSCoR has provided travel support for all five WAISCs and also assisted in travel for the AAAS conference. EPSCoR funding enabled three UA students to attend the 2011 AAAS conference and eight UA students and faculty and one Outside student to attend the 2012 WAISC.◊

Five-Year Award

Continued from page 1

central, and Southeast Alaska. Using sensor arrays and on-the-ground community research, EPSCoR scientists will gather data on changing environments, the consequences of these changes to people, and the variables that affect communities' ability to adapt.

NSF Program Officer Dr. Uma Venkateswaran discusses the national EPSCoR program at the 2012 Alaska EPSCoR All-Hands Meeting.

The Northern test case will study how permafrost thaw and land cover change affect subsistence activities in North Slope and Interior villages. The Southcentral test case will look at effects of landcover and precipitation changes on fisheries and tourism along the Kenai River. And Southeast test case researchers will study the ramifications of glacial melt on the ecosystem and in turn on resource management in the Juneau area. Findings from the test cases will be used by a statewide Coordination, Integration and Synthesis Working Group to answer larger scientific questions and to craft new decision-support tools for lawmakers and land managers.

"The test cases are situated in very different natural environments," noted Schweitzer. "And the human communities, the human populations that we're dealing with are very different and give us a comparative framework."

The ACE award runs from July 1, 2012 through June 30, 2017 and represents a fourth phase of research for Alaska EPSCoR, which has enjoyed NSF support since 2001. It builds on data, techniques and connections created during the recently-concluded Phase III, which laid the groundwork for Alaska ACE through its pioneering integration of social and biophysical sciences. In addition to research, a significant portion of the ACE award will go toward efforts aimed at engaging K-12 and university students and members of the public in science, such as the Permafrost Outreach Project and the Global Learning and Observations to Benefit the Environment (GLOBE) program. Outreach and education activities will be specifically focused on the test case areas and designed to complement research done under the grant, noted Alaska EPSCoR Outreach Manager Tania Clucas.

"The major new outreach initiative in ACE is the effort to integrate the outreach efforts into the test cases at the different sites, and especially to make sure that the local communities and the regions are aware of what is going on in their vicinity," she said.

UAF Vice-Chancellor for Research Mark Myers will serve as ACE Co-Project Director and will take over as Principal Investigator after December, when Schweitzer is stepping down to begin a new position out-of-state. The other Co-Project Director is Lilian Alessa, leader of the Resilience and Adaptive Management (RAM) Group at UAA; Alessa also serves as Co-Principal Investigator along with Sanjay Pyare, head of the Environmental Sciences program at UAS. Alessa and Schweitzer lead the CIS Group. Gary Kofinas of the UAF Institute of Arctic Biology leads the Northern test case, Andrew Kliskey of the RAM Group the Southcentral case, and Pyare the Southeast case.

Mark Myers

Peter Schweitzer

Lilian Alessa

Sanjay Pyare

The award entails eight new faculty hires and will also support the work of at least 10 UA faculty members. At least 20 more UA faculty will actively participate in the project, which will also work with numerous community partners such as state and federal agencies, economic development corporations, and Native organizations. ACE is headquartered at UAF but will also extensively engage students and faculty at UAA, UAS, and at rural campuses across the state.♠

Major Activities of Alaska ACE

Initiatives under the ACE Project include:

- 4 UAF tenure-track faculty hires: a computational social scientist, a structured decision-making faculty member, a spatial social-ecological systems modeler, and an environmental engineer
- 3 UAA tenure-track faculty hires: a computational social scientist, a systems modeler, and a landscape modeler
- 1 UAS tenure-track faculty hire: a forest ecohydrologist
- More than 10 supported faculty
- More than 20 participating faculty
- Five postdoctoral fellows (2 UAF, 2 UAA, 1 UAS)
- A total of 60 funded graduate students
- A total of 60 funded undergraduates
- 4 annual $30,000 seed grants for faculty research projects
- 4 public seminars per year on adaptation-related topics
- 3 grant-writing workshops for UA students and faculty
- 8 Alaska Native Engagement Grants awarded to UA faculty
- Annual Rural Outreach Workshops in each Test Case region
- Travel funding for the annual Western Alaska Interdisciplinary Science Conference and Arctic AAAS Conference

UAF-Bristol Bay Campus Associate Professor Mike Davis discusses the remains of a traditional Bristol Bay fishing boat during a field trip at the 2011 Arctic AAAS meeting. Alaska ACE will fund travel to future Arctic AAAS meetings.

- Support for K-12 education programs, including the Alaska Rural Research Partnership, the IPY Global Learning and Observations to Benefit the Environment (GLOBE) program, the TRIO program and the Permafrost Outreach Program
- A new Alaska Native Corporation internship program
- UAF Resilience and Adaptation Program internships
- An annual UAF Methods of Interdisciplinary Research course
- Support for Alaska TREND, a small business incubator at UAA

Director's Letter

Continued from page 1

I will leave behind an organization that, while preparing for new endeavors, has successfully completed its five-year effort to establish interdisciplinary and intercampus research activities as the norm at the University of Alaska. In 2011-12, despite limited funding, Phase III of Alaska EPSCoR made a significant contribution to research at the UA, funding 18 graduate students, seven undergraduates and five faculty research teams, as well as almost 50 travel awards.

Alaska ACE, meanwhile, represents an exciting new direction for science in Alaska, using place-based research to understand the adaptive capacity of Alaskan communities. The effort is very much in line with NSF priorities - as evidenced by its new Science, Engineering and Education for Sustainability (SEES) program - and with the leading edge of sustainability study across the globe. This is more than an academic exercise but an effort to use science to increase our capacity to adapt to enormous changes on the horizon.

I want to thank everyone who has contributed to Alaska EPSCoR during my time with the program. I am confident that I am leaving the organization in good hands, and it is up to you to turn the promise of Alaska ACE into a successful project that benefits all of Alaska.♠

Alaska EPSCoR:
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Talking to Kilimanjaro

Students in Alaska and across the world learned about biomes, shrinking glaciers and scientific exploration through a pair of teleconferences with teachers atop Mt. Kilimanjaro in September 2011.

More than 6,500 students and teachers at 116 sites in 10 countries – including three Alaska schools - listened in on the teleconferences, which were coordinated by the GLOBE (Global Learning and Observations to Benefit the Environment) Seasons and Biomes program. GLOBE is an Alaska-EPSCoR-supported project that teaches students in Alaska and worldwide how to use scientific methods to study climate change and seasonality.

Everett, Washington elementary school teacher Barney Peterson during the 2011 IPY GLOBE ascent of Mount Kilimanjaro.

Mt. Kilimanjaro is an especially fertile spot to teach about climate because it encompasses six different biomes: cultivated land; rainforest; heathland; moorland; alpine desert; and glaciers and snow. "It's one of the most unique places on earth," noted expedition member Barney Peterson. "It's like walking from the Equator to the North Pole."

The 2011 expedition included two teachers, Mike O'Toole from Colorado and Peterson from Washington state, who participated in a pair of teleconferences from Crater Camp, 18,340 feet up the mountain. The calls were routed through Fairbanks, Alaska and most listeners were K-12 classrooms. O'Toole and Peterson described their hikes up the mountain and their surroundings, then answered questions from moderators and directly from students. Students asked about the expedition itself – the food they ate, personal hygiene, the lack of oxygen – and also about the local environment. Questions ranged from the weather, to the soil composition, to the story of a fossilized elephant skull they had seen along the trail.

One popular question concerned the mountain's ice cap, which has lost 80% of its mass in the last century. O'Toole said likely causes of the shrinkage are either climate change brought on by deforestation, or a shift in monsoon patterns. He also noted that another goal of the expedition was to retrieve records from dataloggers left by previous GLOBE treks, and that the retrieved data served to discount another theory – that warming of the ground from volcanic activity could be causing the shrinkage.

"We've been able to prove that there is in fact permafrost, or frozen ground, underneath the glaciers," explained O'Toole. "And due to that, we can sort of rule out that theory. That's one thing that we're very excited about, to have our GLOBE students assist with finding that out."