



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

Getting the Word Out

Spotlight on EPSCoR Education, Outreach and Diversity

There's one key reason why Alaska EPSCoR devotes so much time and energy to connecting with the public: Because the public pays the bills.

"We are accountable for what we are doing using tax money," noted EPSCoR Education Outreach Director Elena Sparrow. "We can't isolate ourselves from the general public because we are directly connected through funding."

But that's far from the only motivation behind EPSCoR's Education, Outreach and Diversity (EOD) component. EPSCoR's educational activities help to prepare the next generation of scientists, its outreach keeps Alaska's communities aware of and involved in the research taking place in their backyards, and its



Kenai Peninsula College Professor of Anthropology Alan Boraas leads a field trip as part of the Kenaitze Tribe's 2015 Janteh Science Camp, which was supported by Alaska EPSCoR.

diversity initiatives broaden scientific inquiry by incorporating wider perspectives. All of these efforts contribute to increasing Alaska's research capacity, which is the principal goal of the EPSCoR program. And they entail outreach staff and researchers working together to ensure that Alaskans understand what EPSCoR is doing and how it pertains to them.

"If we're able to work with the public and translate what we're doing in academic research and demonstrate how it's relevant in people's everyday lives, that gives them a greater appreciation for what we do," noted EPSCoR Education, Outreach and Diversity Manager Tania Clucas. "And also, they can be on-the-ground advocates for the value of basic and applied research."



From the PI

**Anupma Prakash,
Principal Investigator**

If you're reading this, there's a good chance I've met you by now.

One of my main goals in my first year as Alaska EPSCoR Principal Investigator has been to pay personal visits to EPSCoR faculty, staff and students across the state. These personal interactions with the many faces of Alaska EPSCoR laid a foundation of understanding, trust, and a real sense of a shared mission. I feel connected to the team as we move forward with optimism and enthusiasm into the final year and a half of this current award.

As we move ahead, new possibilities are presenting themselves. Alaska will be eligible to apply for another phase of the EPSCoR program, and we've begun to prepare for this opportunity. Our proposed project, which would begin

Education, Outreach and Diversity

Continued from page 1

Education

EPSCoR's flagship K-12 education effort is also its oldest. The Alaska GLOBE (Global Learning and Observations to Benefit the Environment) program has been around since 1996 and has been an EPSCoR component since 2001, the year Alaska EPSCoR came into existence. The program brings teachers from across the state together for an annual workshop to learn scientific measurement protocols, which they use to teach their students about research by having them make detailed observations of their local environments.

"The idea is not just to do the measurements but to engage the students in investigations," said Sparrow, who is in charge of Alaska GLOBE. "How do you engage your students in inquiry, how do you teach them about the scientific method?"

GLOBE students primarily measure biophysical variables, ranging from air temperature to phenology to the pH and dissolved oxygen content of water. But the program has changed with the times, and now also incorporates social science in keeping with the current EPSCoR focus on social-ecological system studies. "The social science measurements are surveys or interviews," explained Sparrow. "For example, they have asked elders questions about what they know in terms of weather and climate and changes they have seen, as well as impacts of these changes on their lives."

EPSCoR's most visible K-12 education tools are its three augmented-reality sandboxes, which use boxes full of sand and overhead projectors to create interactive topographic maps. While the devices (based on a design by faculty at the University of Cali-

fornia-Davis) have been very popular outreach tools for over a year and a half, it's only recently that EPSCoR has completed an educational curriculum to go with them, comprised of a lesson about water and two about topography. "We're using it to talk about the basics of how to read and use a contour map," explained Clucas. "It's a good way to translate that over, and then build from there to doing some hydrology and landscape change examples."



Alaska EPSCoR Education Director Elena Sparrow (l) directs a GLOBE teacher training exercise at Ballaine Lake at UAF in June 2015.

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EPSCoR also offers other educational

Outreach

One of EPSCoR's prime outreach products is sitting in your hands. In addition to these newsletters, EPSCoR works to keep the public informed about its research through social media, guest speakers (including support for the popular Science in Alaska lecture series), and producing short videos about EPSCoR research and outreach, which are available in Fairbanks on KUAC-TV and can also be found on YouTube. "I think we're doing a much better job in this latest phase of EPSCoR than we've ever done before in reaching adult audiences," Sparrow noted.

Sparrow said outreach to Alaskans is based on a "cultural learning pathway" paradigm, which holds that exposing people to topics of social and environmental change has a snowball effect.

Education, Outreach and Diversity Leadership Team

Elena Sparrow, Education Director

Tania Clucas, Education, Outreach and Diversity Manager

Tom Moran, Communications Manager

Courtney Breest, University of Alaska Anchorage Outreach Coordinator

Suzie Teerlink, University of Alaska Southeast Outreach Coordinator

Christine Butcher, Education and Outreach Assistant

“The more adults learn about and identify with the changes and the issues that we’re studying, then the more involved they are and the more they want to learn.”

While some outreach is aimed broadly at Alaskans and the academic community, EPSCoR also focuses on making connections with individuals and organizations within its specific research areas: the Kenai Peninsula; Juneau; and the North Slope village of Nuiqsut. These have come in the forms of stakeholder workshops, community meetings, local newsletters, and other approaches to keeping local residents informed of and involved with the research in their backyards. “I think it’s a lot about giving back to the communities that we’re researching, and I think that’s incredibly important, not to just swoop in and swoop out,” noted Courtney Breest, EPSCoR’s outreach coordinator at the University of Alaska Anchorage.

Local outreach is also key for another

reason: local feedback means researchers can better incorporate an area’s needs and concerns into their work. “Involving your locals in your research and education in your communities

Alaska EPSCoR’s current project 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. EOD Group
5. CIS Working Group

is also a way to have a more thorough and robust research model, because as locals they’re familiar with what’s happening in the region,” noted Clucas.

Diversity

EPSCoR supports a number of programs to improve diversity at the University of Alaska. It partners with the Alaska chapter of the Association for Women in Science to give small cash prizes to female winners at Alaskan

science fairs, and also brings a female academic speaker to UA each year. EPSCoR efforts also focus on Alaska Natives, including support for programs like the Alaska Native Science and Engineering Program and Upward Bound.

But these only represent one aspect of diversity. The term also incorporates geographic, institutional and disciplinary diversity, all of which EPSCoR incorporates with its statewide reach and the widely varied disciplines of its researchers. As Clucas notes, incorporating this diversity is more than just checking a box for the NSF.

“In a lot of ways diversity is actually important to having a more rigorous scientific approach,” she said. “Because you’re getting people with a diversity of exposures, a diversity of viewpoints, and a diversity of backgrounds, and you don’t end up with an echo chamber of people who’ve all been brought up intellectually and academically in the same way.”

Lending an Ear to Kenaitze Youth



Kenaitze youths (l to r) Laurel, Haley and Kate help pick up trash at the tribe’s Education Fisheries Site.

An Alaska EPSCoR-supported effort gave the youth of the Kenaitze Indian Tribe a voice, and a book to go with it.

The “Kenaitze Youth Speak” project engaged students from the Kenai Peninsula tribe in conversations and interviews about the importance and role of traditional places; salmon fishing; the health of the Kenai River; and local effects of climate change. Led by Kenai Peninsula College Anthropology Professor Alan Boraas, Kenaitze Environmental Coordinator Brenda Trefon, and a pair of tribal interns, the students compiled their comments and photos into a hardcover book, which was distributed to local schools and libraries and members of the tribe.

“The youth discovered common ties in their comments and frustrations of the changes in the Kenai River landscape, and immeasurable pride in seeing their ideas formed into a book,” noted Trefon.

The multifaceted project explored the students’ relationship with the land and river through multiple events. Students were brought to areas important to the tribe and asked to reflect on what they saw. At the Kenai River estuary, they noticed how many signs had been put up, and how some visitors had paid little respect to the site. During one event, the students were left to explore a nearby beach on their own, at which point they began to spontaneously clear the beach of garbage. “It’s our beach,” one student noted. “If we don’t clean it, no one will.”

The students were also interviewed about the importance of salmon in their lives, and what they would like the river and surrounding areas to be like in 10 years. Students took pictures showing their own perspective of the Kenai landscape, including images like trash in a ditch alongside caribou at the estuary. The final book combines landscape observations, art, and even facsimiles of post-it notes with observations of the environment written on them.

An EPSCoR Primer for Tour Guides

How do you spread the word about your research to thousands of visitors to Alaska? In the case of EPSCoR's Southeast Test Case, you reach out to their tour guides.

On May 1, test case researchers held a one-day "Stakeholder Engagement Workshop" at the Mendenhall Glacier

Southeast Test Case, which focuses on glacial changes in Berners Bay near Juneau and the effects they have on the local icefield-to-estuary ecosystem and to downstream user groups. Researchers gave presentations on the likely effects of climate change on Juneau's glaciers; the ways glacial runoff can change

them be talked at," Teerlink noted. "So we had a panel discussion which was really great and lively, and we pulled in a lot of people on it."

Teerlink said the attendees were keenly interested in the discussion, especially when the topic turned to climate change. "That actually ended up being the central point of our entire discussion, and that was the most fascinating part, was how do people deal with it," Teerlink said. "Because they can't do tours without talking about climate change, they're on glaciers."

The test case plans to follow up with operators to see if and how their materials and information have been expanded and improved as a result of the workshop. "Ultimately, if we can really understand what are the most important messages to share with the public and package these messages in simple and digestible ways, then we can reach out to an enormous audience," Teerlink noted.

The Test Case has also adopted another method of disseminating its results across Juneau: it distributed more than 150 posters featuring a detailed graphic of an icefield-to-estuary ecosystem. Designed by former EPSCoR graduate student Kristin Timm, the poster won the People's Choice award in the poster category in the NSF's 2014 "Vizzie" awards. The idea is for tour boat and helitour operators to display the graphics on their vessels or to make them otherwise available during tours.



A crowd of Juneau-area tour guides and interpreters take part in the Southeast Test Case's May 2015 Stakeholder Engagement Workshop at the Mendenhall Glacier Visitor Center.

Visitor Center at which they presented on their studies and findings to a crowd of local tour guides and interpreters, with a focus on helicopter tour operators. "I feel like it's such an important group to outreach to, they're a lot of bang for your buck," said EPSCoR University of Alaska Southeast (UAS) Outreach Coordinator Suzie Teerlink, who organized the event. "They're communicating with so many people."

About 60 tour operators and interpreters attended the workshop, which was modeled on the Marine Naturalist Symposium, an annual science event for Juneau water-based tour operators. The day began with an overview of the

downstream freshwater systems, salmon run timing, and estuaries; and the resulting implications for marine and icefield tours. "It included EPSCoR and UAS scientists and the information was good, because it wasn't stuff they could look up in a book. It was 'this is what current research looks like, this is what we have the ability to do and this is what we are doing.'"

The morning's program was followed by a roundtable discussion of ways that scientific information can better be communicated to tourists. "We set up this stakeholder workshop to have more back and forth and engage the audience more than just having

Making Learning an Adventure

Shouldn't learning about science be exciting?

That was the idea behind an "Adventure Learning" workshop held in Cooper Landing in October, in which high school science teachers from across the Kenai Peninsula learned ways they can engage their students in outdoor educational activities.

"Its purpose was to get teachers out into the field to basically experience what it's like to be a researcher, and to take those experiences into their classrooms so that their students can be more engaged and excited about science," explained Courtney Breest, EPSCoR's University of Alaska Anchorage outreach coordinator and the organizer of the event.

Breest based the project on an effort by the EPSCoR program in Idaho, which focuses on watershed science and involves students in activities like visiting aquatic restoration sites and making observations while hiking and biking through local natural areas. This summer, she attended a weeklong teacher training event in Coeur D'Alene to learn more about the program. "I was mostly tuning in to what was really engaging these teachers, and what I could mimic in Alaska," she said.

With help from Southcentral Test Case researchers and individuals involved in the Idaho program, Breest then put on a pilot Adventure Learning workshop for five high school science teachers from Anchorage, Kenai, Soldotna and Homer. The group began with a hike to Russian River Falls, where EPSCoR faculty Dan Rinella gave a presentation on salmon ecology. "The teachers just started painting him with questions," Breest noted. "Since we had such an expert in this field he was able to respond, to go in depth as much or as little as they wanted." The teachers followed that up with a water quality assessment activity in the river and a tour of the Kenaitze Tribe's K'Beq' interpretive site, led by a youth of the tribe and by Kenai Peninsula College anthropologist Alan Boraas.

On the second day, researchers demonstrated technology for the teachers, including displaying EPSCoR's Augment-

ed-Reality Sandbox and its SalmonSim visualization program. "A lot of this workshop was giving as many resources as possible to these teachers, trying to inspire them so they can come tap us and we can help them facilitate these things in their classrooms," Breest noted. A partner from the Kenai Watershed Forum also presented on local resources, and the



Attendees at the Southcentral Test Case's Adventure Learning Workshop look out over the Russian River.

day concluded with a visit to Exit Glacier and a presentation by an expert on glacial recession and climate change.

Breest said the workshop served as a first step for teachers to create adventure learning lesson plans for their own curricula. She is already planning ways that EPSCoR can work with these teachers in the future, including working with Homer students on a sediment-coring project in January 2016, and taking the sandbox to the teachers in Anchorage and Kenai schools. She also said Idaho and Alaska EPSCoR are working together on a grant proposal to fund further teacher training, based on the enthusiastic response they received from the teachers.

"They kept saying over and over again, my students need this. My students need to see how the real world is affecting their real lives," Breest said. "When you're just in a classroom talking about science day in and day out, the message isn't getting through."

Research in Miniature

Big discoveries can come in small packages – and no one is more acutely aware of that than University of Alaska Fairbanks Assistant Professor of Education Carie Green. This summer Green conducted an Alaska EPSCoR-supported research project entitled “Engaging Young Children as Active Researchers,” in which a gaggle of 3- to 7-year-olds from the Bunnell House Early Learning Lab School turned a patch of woods on the UAF campus into an informal laboratory. “The idea for this whole project is that children would be the researchers, so the active participants in the process,” explained Green.

In this case, research began by equipping children with GoPro cameras and observing their interests as they roamed the small forest on the UAF campus. Based on the videos and discussion, the children picked four themes to further explore: rose bushes; “x marks the spot;” forts, castles and houses; and bugs. They then came up with ways they could document their



Two children gather materials from a patch of forest on the UAF campus as part of the “Engaging Young Children as Active Researchers” project.

explorations, which Green turned into “data collection centers” where they recorded their experiences through paintings, models made out of rocks and sticks, and costumed role-playing.

“In research with young children, research methods look a lot different than with adults, partly because they’re not as verbally articulate, so they need multiple means to represent their understanding,” Green said. “These are our efforts to have the kids collect the data.”

Green then worked with the children to interpret their findings, which they turned into a simple book and discussed in a public presentation. “By posing them questions about what they noticed, and inviting them to describe what it means to them, we’re trying to get them to also be the interpreters of the data.”

Green said the project served several purposes. First, it contributed data to her studies of how children develop their identities through interactions with the natural world. Second, it provided evidence of some of the ways children’s perspectives and the methods by which they create culture differ sharply from those of adults. And third, they enabled Green to experiment with having children conduct active and interpretive research, a process she said is important given their unique points of view.

“What I hope to take away is that it is possible to engage children as active researchers,” she said. “It takes a lot more time, but I think it’s worth the effort because I view children as active agents of change - and that their perspective matters and makes a difference.”



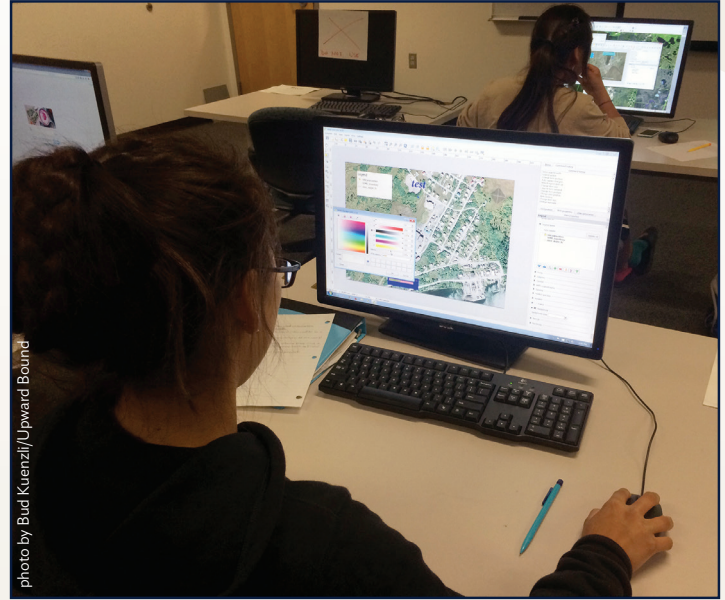
Carie Green attaches a GoPro camera to a child as part of the “Engaging Young Children as Active Researchers” project.

A Solid Grounding in QGIS

In summer 2014 Alaska Upward Bound students took to the air, thanks to EPSCoR support of an unmanned aerial vehicle (UAV)-based educational program. In summer 2015, they came back down to the ground.

Upward Bound students from a group of five rural Alaskan high schools spent the summer on the UAF campus learning about quantum geographic information systems (QGIS), which they used to georeference UAV images of local landmarks and to stitch them into small maps.

“We’ve taught them about QGIS, at the same time we’ve



An Upward Bound student working with mapping software.



Upward Bound student Steve Nash works on a QGIS mapping exercise on the UAF campus.

taken them outside, taught them about mapping, taught them about geotagging, taught them how to use GPSes (Global Positioning Systems),” said instructor Patrick Steckman. “They did georeferencing as well, they talked about map products, how to make it a professional-looking map product.”

The QGIS class consisted of six Upward Bound students drawn from the communities of Bethel, Chefornak, Nikiski, Seward and Shishmaref. A dozen other students took part

in UAV training, funded through Alaska EPSCoR’s “Modern Blanket Toss” educational program. Students combined to gather and georeference aerial imagery of several Fairbanks locations, including Chena Lakes, the Dog Musher’s Hall, and the Ken Kunkel soccer fields, then to put together basic maps. Steckman said he hopes to further the process with 2016 students. “What I’m hoping to do, hopefully next summer, is for students to actually take the images, turn them into a mosaic, and then georeference that mosaic.”

The idea behind the UAV and QGIS programs is to excite students about science, technology, engineering and math careers through training in UAVs and assorted technologies. “The main goal is for them to take this information, learn from it, use it to have an impact on their community, and hopefully, in this process, they realize this is something really cool to get a degree in.”

As part of the three-year Modern Blanket Toss program, students are using hexcopter UAVs – which have been supplied to their individual schools – and GIS skills as the basis for projects to help their communities. Tasks range from studying riverine methane emissions to charting hazardous winter river conditions, summer flood routes, and storm erosion.

“The point of them learning the GIS stuff was so that when they went back, they could make those final products to present to their communities,” noted Christine Butcher, another QGIS instructor. “So the ones that we made were just purely for them to go through the whole process.”

Drawing Crowds on Kachemak Bay

One of Alaska EPSCoR's central outreach efforts takes place at the end of the road.

For the past three years, researchers and staff from EPSCoR's Southcentral Test Case have partnered with Homer's Kachemak Bay Research Reserve to present a series of hands-on "Discovery

capacity of local communities to adapt to change, with a special emphasis on salmon fisheries. Some of the tables have featured sediment cores for students to examine through microscopes; a salmon board game with accompanying videos from EPSCoR's "SalmonSim" visualization program; craft materials

Reserve – previously a unit of the Alaska Department of Fish and Game, now under UAA – in 2013. Each summer EPSCoR and the Reserve collaborate to put on multiple public labs at Homer's Islands and Oceans Visitor Center, which attract both locals and visitors.

"It's Homer in the summer and there's a good amount of tourism, so sometimes we were talking to people about salmon for the first time," Breest said. "Or sometimes they're really pleasantly surprised to learn about research being conducted in Alaska in a general sense."

In addition to the public labs – which feature eight separate tables, manned by a combination of EPSCoR and Reserve personnel – EPSCoR and the Reserve also have local school groups visit the center in late spring, where students shuttle between three tables. The labs are also packed up and taken on the road – or rather, off the road – each year for visits to the remote communities of Seldovia, Nanwalek and Port Graham.

The Reserve also conducts Discovery Labs with many other local organizations and partners, Field said, but noted that EPSCoR is unique in the degree to which EPSCoR staff and researchers help put together the content of the events. She also said the local relevance of Southcentral Test Case research makes it a natural fit for the labs.

"We want students to understand how the science they are learning is relevant to them," she noted. "It's easy to do with EPSCoR because a lot of that involves fish and fishing, and pretty much everybody is tied to that around here."

to make salmon life cycle bracelets; and a snow cone maker, which was used to teach students about ancient underground food storage methods – using ice, fruit leather and Swedish fish to substitute for moss, bark and salmon.

"We try to have something hands-on at every station, whether it's something that the public can touch, or something that they can manipulate, or something that they can play with, with the assistance of an expert at that station," explained Carmen Field, an Aquatic Education Specialist with the Reserve who helps organize the labs.

EPSCoR began working with the



Homer students learn about sediment cores from Kachemak Bay Research Reserve volunteer Susan Clardy at an April 2015 Discovery Lab at the Homer Island and Oceans Visitors Center.

Labs" to local schools and members of the public.

"We're lucky enough to partner with the Reserve in that they help us to reach a broader community than we do on our own," said Courtney Breest, EPSCoR's University of Alaska Anchorage (UAA) Outreach Coordinator. "What they do is help us get our research and the information we want out to the public."

Each EPSCoR Discovery Lab features multiple tables of hands-on activities designed to teach people of all ages about EPSCoR's science efforts on the Kenai Peninsula, which focus on the

Marking the Spot in Nuiqsut

To most of us, Nuiqsut sits on the edge of the map. But an Alaska EPSCoR outreach program is showing Nuiqsut middle school students how to put it square in the center.

EPSCoR Education and Outreach Assistant Christine Butcher has been making regular trips to Nuiqsut over the last two years to administer a program called MapTEACH (Mapping Technology Experiences with Alaska's Community Heritage), in which students use Global Positioning System (GPS) devices and maps to better understand their local landscape.

"It's a good program because it helps the kids to understand more about the GPSes that they use when they go hunting," Butcher said. "It helps them to understand more about their community."

During Butcher's visits to Nuiqsut - a mixed-subsistence community near the Arctic Ocean that is also the focus of EPSCoR's Northern Test Case - students learn about basic mapping through activities like drawing maps of their route from bed to the school. They then learn how to use GPSes through in-class exercises, geocaching expeditions, and other activities such as geotagging the village's brightly painted Dumpsters.

"They went from learning how to collect data, to learning how to enter data that they collected, and then progressed to entering data that others collected," Butcher noted.



MapTEACH students take part in a GPS activity in Nuiqsut in May 2014.

es (such as slope erosion, wildlife patterns, and seasonal changes), with their results collated and used to help guide further EPSCoR research. University of Alaska Fairbanks Assistant Professor of Wildlife Ecology Todd Brinkman, who spearheaded the project, said having the students work with the data is educational for them and also invests them in the research.

"It provides them with education on what the hunters are doing on the landscape, what they're out taking pictures of and why these images might be important," Brinkman said. "It's a way to get them involved."

Butcher said working with data from the hunters - two of whom are students' relatives - clearly increased the students' level of excitement about the activity. She noted that the students learned a significant amount about local environmental change through the exercise, as evidenced by pre- and post-activity surveys which showed a greatly heightened awareness of the changes affecting the local landscape.

Brinkman said the Story Maps created by the students will be augmented by researchers and then presented to the Nuiqsut community.



A MapTEACH student builds an online Story Map in October 2015.

That last category includes the most recent activity, in which students created interactive online Story Maps out of data collected by local hunters as part of an EPSCoR research project. Hunters had been given camera-enabled GPSes and asked to photograph spots where they saw significant chang-

EPSCoR People

Drew is Final Faculty Hire

Alaska EPSCoR is pleased to welcome its newest faculty hire, Elaine Drew. Drew, an applied medical anthropologist, has begun work with the University of Alaska Fairbanks Department of Anthropology. She was previously an Assistant Professor at the Medical College of Wisconsin, where she worked with indigenous, ethnic minority, and underserved communities using a community-based participatory research approach. She is the sixth and final UA faculty hire made through the current Alaska EPSCoR research program.

EPSCoR Funds ANSEP Students

Alaska EPSCoR's Southeast Test Case worked with the Alaska Native Science and Engineering Program to provide summer research opportunities to Alaska Native undergraduates. Four students participated in the program in 2015: Annaliese Moll assisted in sculpin and humpback whale research; Nate Hietala worked on GIS analyses and a sea otter distribution project; Reed McWilliams administered social surveys; and Danny Cooper assisted in research into yellow cedar trees.

RAP Externships

EPSCoR provided funds for two UAF Resilience and Adaptation Program (RAP) students to pursue summer externships. Jenell Larsen worked with the U.S. Fish and Wildlife Service and the Eskimo Walrus Commission to assess reproductive changes to Pacific female walrus in the Bering Sea. Tracie Curry interned with the Wainwright Traditional Council and the Aklak School, collecting, collating and posting past research related to local social-ecological change.

Liljedahl, Brinkman, Sparrow awards

Alaska EPSCoR Northern Test Case faculty Anna Liljedahl and Todd Brinkman have both received significant research awards. Liljedahl, a Research Assistant Professor with the UAF Water and Environmental Research Center, was awarded \$2 million from the National Science Foundation to study methane release from arctic lakes. Brinkman, a UAF Assistant Professor of Wildlife Ecology, received two NASA Arctic Boreal Vulnerability Experiment (ABOVE) awards. He is principal investigator on a project to work with rural residents to map and study environmental disturbances that impact their access to subsistence resources, and is co-PI on a project (led by Northern Test Case affiliate Laura Prugh) to study the effect of changing alpine vegetation and snow conditions on Dall sheep.

In addition, EPSCoR Education Director Elena Sparrow received a NASA award to continue working with the GLOBE program, entitled "Impacts and Feedbacks of a Warming Arctic: Engaging Learners in STEM using NASA and GLOBE Assets."

EPSCoR Briefs

Decision Theater and UAA Planetarium Updates

Construction is complete on Decision Theater North. The new UAF West Ridge facility, which will be officially opened in early 2016, contains seven high-definition monitors offering up to 60 million pixels of resolution, and is designed to use large-scale visualizations as the foundation for decision-making, education and research by organizations, communities, and academics. EPSCoR has also funded improvements to UAA's Planetarium and Visualization Theater, which will improve that facility's capacity to use large-scale interactive imagery as the basis for decision-making.

Data to Decision Awards

Congratulations to the four recipients of our Data to Decision Visualization Mini-Grants. These \$20,000 awards will go to create visualizations for use in UAF's Decision Theater North and/or in the UAA Planetarium and Visualization Theater. Grantees are:

- UAF Professor of Biology Gary Kofinas, for "Industrial Immersion: A Graphic Approach to Communicating Complexity."
- UAF Geophysical Institute Research Associate Olivia Lee, for "Visualizing Scenarios of Resource Development on the North Slope, Alaska."
- UAF Research Assistant Professor Dmitry Nicolksy, for "Tsunami Science to Inform Decision-Making in Alaska Communities."
- UAA Assistant Professor of Computer Science and Engineering Frank Witmer, for "Discovery of Environmental Change in the Kenai Watershed through Immersive Visualization."

Adaptation Portal Available Online

The Arctic Adaptation Exchange Portal is now online at arcticadaptationexchange.com. Alaska EPSCoR helped to develop and to host the portal, a project by the Arctic Council's Sustainable Development Working Group to make adaptation information available to researchers and northern communities across the globe. The portal has been featured in the U.S. government's Arctic Climate Resilience Toolkit, which was unveiled during the GLACIER conference, part of President Obama's Alaska visit.

Publications Posted on Website

All peer-reviewed publications produced by Alaska EPSCoR researchers in the current research project as of March 31 are now listed on the main EPSCoR website at alaska.edu/epscor/publications. Fifty-four publications are listed on the site, including links to the actual articles wherever possible.

in 2017, will address the question: How can we understand regime shifts and tipping points in large-scale ecosystems in Alaska? We'll address the issue by focusing on themes of Coastal Margins and Marine Living Resources; and Forests and Wildfires. We solicited white papers from across the UA system addressing these topics, and received 54 of them. We're in the process of selecting the best, after which we will work together on a proposal to submit to the NSF in August 2016.

Even as we look to the future, we're moving full bore with our current research. We've completed much of our data collection efforts and are fully engaged in analyzing data and generating our final products. These include items like indices that quantify the vulnerability of water supplies in our test case communities; maps that contrast local perception of environmental change with instrumented change; agent-

based models and scenarios; other maps and models; and visualization products for use in the new Decision Theater North facility at UAF and in the UAA Planetarium and Visualization Theater.

There'll be a lot more information about these products in our next newsletter, which will focus on our statewide Coordination, Integration and Synthesis (CIS) Group. But this edition concentrates on our outreach arm – because as exciting as these research products are, they aren't much use if we don't get them in the hands of Alaskans. Our faculty, staff and students have been doing a great job communicating our progress to students and the public, and this will only continue as we move toward the end of the current project and have more and more findings to report. Great achievements still lie ahead, and we've put a fine team together to let people know about them.

New Maps Aid Time Series Research

Alaska's researchers now have a powerful new tool to track landscape change over time.

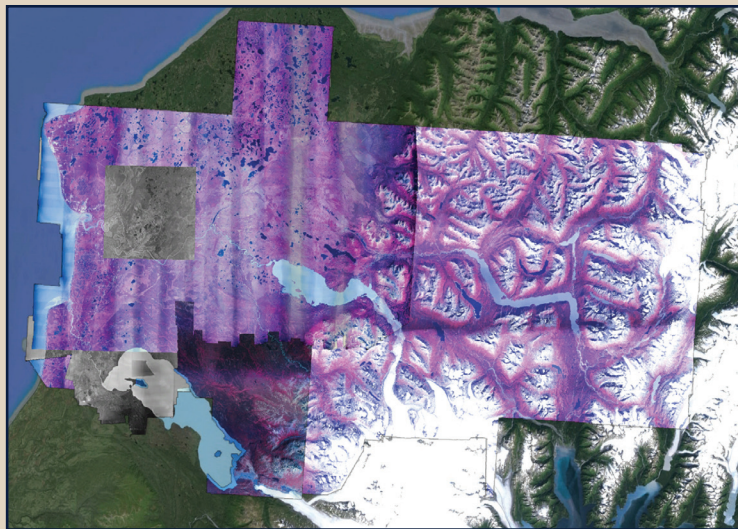
Technicians at the Alaska Satellite Facility (ASF) and Geographic Information Network of Alaska (GINA) have wrapped up months of work orthorectifying aerial photography collected in the 1950's and 1980's. The process entailed stitching together sets of disparate two-dimensional images into 3-D models viewable via Geographic Information Systems (GIS) applications.

"For anybody who's interested in time-series analysis, in how the landscape - either the natural landscape or the man-made landscape - is changing over time, these datasets would be useful and would allow you to better understand that time series," Said Scott Arko, Deputy Director of ASF and head of the project.

Arko said the imagery had all been saved in different formats, which were sometimes inaccurate and generally not searchable by GIS. The 1950's images were computer scans of military black-and-white aerial photography, and the 1980's data consisted of scans of 1.5-meter color infrared photos taken through the Alaska High-Altitude Aerial Photography (AHAP) program. Arko and Rick Guritz, also of ASF, ran the imagery through Agisoft Photoscan software that enabled them to stitch the images into coherent three-dimensional maps indexed by exact latitude, longitude and altitude. Researchers can now easily compare the historic data to contemporary imagery to study change to locations over time.

"It's in a geographically aware format," Arko noted, "so that you can load it into a GIS and the things in it are properly located. So you can compare items from the 1950's and 1978 and the 2000's."

The image processing covers the three EPSCoR test case areas, around Juneau, Nuiqsut and the Kenai Peninsula. The imagery is available to the public via EPSCoR's data portals, formatted as a Web Mapping Service (WMS) for use with GIS applications.



An orthomosaic of the Kenai River watershed, including imagery from 1950, 1978, 1980 and the present day.

Image courtesy Geographic Information Network of Alaska

Alaska EPSCoR: Experimental Program to Stimulate Competitive Research

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EPSCoR Supports Interior Alaska Hackathon

In October, Alaska EPSCoR helped some Fairbanks programmers try to catch the aurora in a bottle.

The “aurora design visualization,” which would create large-scale computer imagery of an artificial aurora based on scientific data, was one of three programs to emerge from the 2015 Interior Alaska Hackathon, which brought together volunteer coders to build software and applications to fill local needs.

“It’s part of our workforce development, working on the EPSCoR mission for capacity-building,” said EPSCoR EOD Manager Tania Clucas, who took the lead in organizing the event. “To make sure we’re building Alaska’s STEM capacity, not just in the public sector, but in the private sector as well.”

About 15 people showed up for the Hackathon, ensconcing themselves in UAF classroom space for a weekend as they tackled three projects: the aurora visualization; an application that enables people to report power outages and other utility failures on a Google Maps interface; and a program to display Landsat imagery of the same location over time across the



UAA student Matti Dupre leads discussion at the 2015 Fairbanks Hackathon.

seven screens of UAF’s Decision Theater North. The utility app was judged the most promising of the lot, and its programmers received \$500 and free entry into both the UAF School of Management’s Arctic Innovation Competition and the Fairbanks Economic Development Corporation’s 2015 Fairbanks Startup Weekend. It went on to win the latter competition.

“It’s a much more efficient and accurate way to notify your utility about what’s going on, rather than having to make a phone call on a landline,” noted Clucas a week after the event. “Given that Fairbanks just had a snowstorm that pretty much shut down all of our electrical grid, it seems kind of prescient.”

EPSCoR also co-sponsored an “Inventor’s Forum” at UAF in June as well as the Fairbanks Startup Weekend, which helps local entrepreneurs to get their ideas off the ground. In addition to these activities, EPSCoR provides funds to the Alaska Technology Research and Development Center (Alaska TREND) at UAA, which awards small grants to Alaskan startup businesses to help them apply for larger federal funding. In 2015 TREND has awarded seven grants totaling \$35,000.