UA Research Update: Statewide Programs and UAF for the UA Board of Regents, Academic and Student Affairs Committee
April 2014

Members of the 2013 IARC NABOS and Summer School collaborative expedition to the Arctic Ocean. (Photo by I. Colfescu)
This report is provided as an update to the “Research in the UA System” report, which was presented to the Academic and Student Affairs Committee of the UA Board of Regents in December, 2012. The reporting cycle for this quantitative research performance assessment, including peer comparisons, is two years, so the next full report will be presented in April 2015.

I. University of Alaska-Wide Programs

Alaska National Science Foundation (NSF) EPSCoR

The Experimental Program to Stimulate competitive Research (EPSCoR) is a nationwide research funding program administered by the National Science Foundation. States and territories which in recent years have received less than 0.75% of the NSF’s total national funding are eligible for EPSCoR funding. Alaska NSF EPSCoR funds basic university research and supports public education and outreach efforts. The organization is based at UAF and includes efforts at all main University of Alaska campuses and at rural and community campuses. Alaska NSF EPSCoR has been funded by the National Science Foundation since 2001 and is midway through the second year of its fourth “Track-1” award. The five-year award (2012-2017) is funded at $4 million a year from the NSF plus an $800,000 state match. The current Track-1 project, entitled “Alaskans Adapting to Changing Environments,” uses biophysical and social science approaches to examine the mechanisms by which communities adapt to environmental and social change.

The project is composed of three regional test cases focused on Berners Bay near Juneau; on communities in the Kenai River watershed; and on the North Slope village of Nuiqsut. These efforts are linked together by a statewide group that coordinates efforts, synthesizes results, and is working to establish a permanent entity to assist with adaptation decision-making in the North. During year one of the project (2012-13), EPSCoR researchers focused on identifying and recruiting local partners; deploying localized systems of biophysical sensors to supplement and enhance existing networks; collecting initial data; and creating a comprehensive system for data storage and access. In year two (2013-14) biophysical data collection is being coordinated with a ramp-up of social science activity, as research teams conduct community interviews and surveys to better understand how people perceive changes to their environments.

In September, members of the NSF EPSCoR leadership team conducted a successful presentation to a National Science Foundation review panel. The team received positive feedback and several follow-up questions that have since been addressed and submitted for review. Subsequently, the team met in Anchorage with a pair of external review panels - an External Experts Advisory Council and a Program Advisory Committee - to discuss the progress of the overall program and the continued evolution of the conceptual framework that guides EPSCoR research. Finally, Alaska NSF EPSCoR hosted a meeting in conjunction with the Sustainable Development Working Group of the international Arctic Council to discuss future connections between the science of Alaska EPSCoR and a large-scale community data portal under development by the Council.

Additionally, Alaska NSF EPSCoR recently received a 3-year (2014-16), $750,000 “Track-3” award in partnership with Alaska Upward Bound and the Alaska Center for Unmanned Aircraft Systems Integration (ACUASI); the award funds a program to use unmanned aerial vehicles as the basis for education efforts at high schools in Bethel, Nikiski, Seward, and Shishmaref. Also, in January Alaska NSF EPSCoR collaborated with Montana NSF EPSCoR to submit a 3-year, $6 million ($3 million per state)
“Track-2” proposal to the NSF. If funded, the project would use case studies of communities on the Yellowstone and Yukon rivers to examine and quantify the difference between instrument-measured environmental change and people’s perceptions of it.

**Alaska Department of Energy (DOE) EPSCoR**

Alaska’s DOE EPSCoR program has been funded since 2010 and is just beginning a 2-year renewal phase titled ‘Sustainable Village Energy: Integration of Renewable and Diesel Systems to Improve Energy Self-Reliance for Remote Rural Alaska Communities’. This program focuses primarily on engineering challenges associated with rural power systems and integrating intermittent renewables into a diesel microgrid, including power stability, energy storage, and advanced control strategies. With a new energy laboratory at UAF capable of recreating an entire village energy grid, we are able to address these challenges not only in isolation or through modeling, but also through full-power and real-world testing and analysis. DOE EPSCoR is managed through the Alaska Center for Energy and Power (ACEP, UAF). The current program includes participants from ACEP, the Institute of Northern Engineering (INE, UAF), the Institute of Social and Economic Research (ISER, UAA), and the School of Engineering (SOE, UAA). Results from the program to date include:

- **Data Management**: First systematic and comprehensive effort to manage and make readily accessible Alaska energy data through the Alaska Energy Data Gateway. This work, which is a joint effort between ISER and ACEP, is now being expanded and is receiving long-term funding support from the Alaska Energy Authority.

- **Product and systems testing**: As an outcome of DOE EPSCoR, ACEP has received several additional contracts to test and develop energy products and systems in collaboration with private industry. Examples include several industrial battery systems, new inverter technology, and a high performance flywheel. This is resulting in substantial investment in UAF and Alaska by developers and manufacturers.

- **To date, DOE EPSCoR has supported 14 students, mostly at the MS and PhD level. It has also funded 8 early career faculty members, and several visiting researchers that have helped build an internationally recognized research program. In addition, UA researchers involved with EPSCoR have visited, collaborated, and conducted research with over 40 communities and 35 industry partners throughout the state.

**Alaska NASA EPSCoR**

In the past year Alaska NASA EPSCoR completed the previous 5-year research infrastructure development (RID) grant ($700k NASA, $350k cash match UAF, $300k in-kind match). The previous RID grant supported 19 faculty through one-year seed grants, which resulted in 19 peer reviewed articles, 20 published conference proceedings, 24 conference presentations, and 1 patent application. We supported the submission of 10 NASA EPSCoR 3-year research (CAN) proposals, of which 4 were awarded (3 to UAF, 1 to UAA). Two of the funded CAN’s were developed out of RID one-year seed grants. A total of, 31 proposals were submitted for follow-on research of which 13 were funded (a 42% success rate) with an economic impact to the state of $5,349,190. Note that the follow-on funded proposals amount to a 16-fold return on cash investment!

In 2013 Alaska NASA EPSCoR Program was awarded a new 3-year RID grant ($375k). This grant focuses on supporting Alaska’s Science and Technology Research Priorities and NASA’s strategic Goals by growing research in the following three areas: (i) Earth System Science; (ii) Technologies for Space and Extreme Environments; and (iii) Aeronautics Research.
National Institutes of Health programs: IDeA Network for Biomedical Research Excellence (Alaska INBRE)

The goals of Alaska INBRE are to expand the capacity of Alaskan researchers to conduct biomedical research appropriate to Alaska. INBRE funds the development of biomedical professionals through support for university researchers, focusing on environmental agents of disease and basic cellular biology, and also supports active outreach and K-12 education efforts. INBRE is based at UAF and works at all three main UA campuses.

INBRE is in the final year of a five-year, $12.5 million NIH award, its third such award. The current award focuses on the impacts of climate change on contaminant transport and the emergence and movements of infectious pathogens at high latitudes. This includes research into molecular toxicology of subsistence species, infectious agents, zoonotic disease, and the cellular and molecular bases of disease. The Alaska INBRE network links UA biomedical research to state-wide concerns about environmental agents and disease and to translational and clinical applications. The central questions include: 1) What agents are threats to health? 2) Where are these agents and how are they dispersed? 3) How do they inflict damage? 4) What are the cellular and molecular defenses to stress and to insults from the environment? 5) How can this knowledge inform and guide local medical and public health practices in Alaska? 6) How can our Alaska experience provide models for other sites in the nation and in the circumpolar north and in the seven other Arctic nations?

UA researchers submitted a proposal for a further five-year period of NIH funding in June 2013. That proposal is still under review, but a decision is anticipated soon.

II. University of Alaska Fairbanks Research

Overview

UAF is a nationally ranked research university. UAF’s research is largely federally funded (rather than funded by state or local government or private sources), and it ranks #106 overall and #69 among public universities on that measure (The Top American Research Universities, 2012 Annual Report, The Center for Measuring University Performance, Arizona State University and the University of Massachusetts, Amherst). There are a total of about 740 U.S. colleges and universities that receive some level of federal research funding, so UAF is in the top 15% of that group. UAF is a RU/H institution (Research University, High Research Activity) according to the widely recognized Carnegie Classification of colleges and universities (http://classifications.carnegiefoundation.org/). For comparison UAA is classified (based on 2008-2010 data, before they began granting doctorates) as Master’s L: Master’s Colleges and Universities (larger programs), and UAS is classified as Master’s S: Master’s Colleges and Universities (smaller programs).

UAF’s research focus is on Alaska and the circumpolar north. UAF is the world leader in both Alaska and arctic research, in terms of publications and citations of those publications (See “America’s Arctic Experts: The University of Alaska Fairbanks”, report to the UA Board of Regents, January, 2014). Publications are a commonly used indicator of research productivity, as well as being the primary means of communicating research findings to the scientific community. From 2011 through 2013, UAF led all other single institutions (universities, research institutes and government laboratories) in the number of...
artic publications, with 380 total. UAF also led all single institutions in citations to its artic publications, with more than 1,800 in the past three years. UAF not only publishes more artic research than other institutions, but that research is used by other scientists to inform their work.

Supporting these rankings and classifications, UAF has a vibrant and diverse research enterprise. This can be seen from the list of “Top Fifty” recent research grant and contract awards on the following pages. These include projects of immediate practical interest to Alaskans, such as those seeking to develop affordable energy solutions for rural communities, discover the reasons for declining returns of Chinook salmon, or study potential treatment approaches for the sulfolane contaminated groundwaters in the North Pole area. There are also many cutting edge research projects that advance fundamental knowledge in areas such as the interactions between the nervous system and metabolism of hibernating ground squirrels; foraging and paleoenvironments at the Upward Sun River (Xaasaa Na’), a terminal Pleistocene archaeological site in central Alaska; or atmospheric turbulence in the mesosphere-lower thermosphere. UAF has particular strengths and opportunities in interdisciplinary research, for example, research on water energy, and food security in the north, which aims to build community capacity for sustainable futures. Altogether, UAF has 269 new research funding awards since Dec. 2012. UAF researchers had a total of 730 publications indexed by Science Citation Index in 2013, a 19% increase over the number in 2012.

UAF restricted research expenditures for FY13 totaled $114,487,748 (See section III). UAF research continues to be supported by a variety of federal, state, and private industry and foundation sources. As has been true for many years, the National Science Foundation (NSF) is the largest single source. The National Aeronautics and Space Administration (NASA), the U.S. Department of Interior (including the National Park Service, the U.S. Geological Survey, and the Bureau of Ocean Energy Management), and State of Alaska agencies plus capital research appropriations each provided more than $10 million in funding. Private business and industry is an increasing funding source, accounting for 7.6% of research expenditures in FY13.

UAF has experienced an $8 million (6.6%) decline in restricted research expenditures (including ICR) since the peak of $122 million in FY11. This is predominantly due to the loss of Department of Defense funding of the Arctic Region Supercomputing Center, which had restricted expenditures of $9.2 million in FY11, but only $2.1 million in FY13. The capital research expenditures that peaked in FY09 at $4 million were associated with the stimulus funding that was temporarily available under the American Recovery and Reinvestment Act (ARRA). The funds shown in the graph do not include the large ARRA capital award associated with the construction of the R/V Sikuliaq, but rather only the funds that were used similarly to operating funds, to support research projects.

For the next several years, funding is likely to be a pressing constraint on UAF research. Non-ICR unrestricted funding of research has increased at an average of about 3.7%/year for the past five years, which mainly represents the increased costs of salaries and benefits. A specific financial challenge is that it appears that we will need to reallocate internally to meet the $500K/year match commitment for operations of the R/V Sikuliaq. UAF faculty secure about 1.7X more research grant and contract $ per capita than the average of faculty at UAF’s peer institutions (Research in the UA System, report presented to the UA Board of Regents in December 2012). It will be difficult to maintain the level of research expenditures if the UAF budget and faculty numbers shrink, as appears likely. UAF research space is currently at capacity, especially in the field of engineering and the Alaska Center for Energy and Power. This could lead to difficulty in accommodating funded research if a major building, such as the...
Elvey Building, must be closed for renovations. Many of UAF’s major research facilities are in the 25-50 year age range where major renovations are needed.

Yet, there are many opportunities for UAF ahead. The arctic is a national research focus, both because of the likely major impacts of climate change and its increasing strategic importance as the polar ice cap retreats. The major U.S. investment in the ice-capable research vessel, R/V Sikuliaq, will provide a platform for a wide range of research programs in the western arctic. National funding agencies increasingly direct their funding toward interdisciplinary research, particularly in areas like impacts of climate change in northern communities. The State of Alaska has been willing to make operating and capital investments in research areas that have important payoffs for Alaska, such as energy, unmanned aerial vehicles, and fisheries, including impacts of ocean acidification. UAF intends to invest as much as possible in our areas of research strength, to remain competitive at the national level for research funding and to provide the knowledge that Alaskans need for community and economic development.

Recent Developments (since the December 2012 Research Report)

New Research Centers:

The Alaska Center for Unmanned Aircraft Systems Integration (ACUASI) is a research center at the University of Alaska, Fairbanks for small, unmanned aircraft systems, providing integration of unique payloads and supporting pathfinder missions within government and science communities, with a special emphasis on the Arctic region. It was approved by the UA Board of Regents in December 2012. In December 2013 the Federal Aviation Administration (FAA) announced that the University of Alaska will serve as one of six official unmanned aircraft system test sites. The Pan-Pacific UAS Test Range Complex will be managed by the University of Alaska Fairbanks and includes partners in Oregon and Hawaii. The complex, with its diversity in landscapes and climates, will allow equipment to be tested in the Arctic, the tropics and arid environments.

The UA Board of Regents approved the Center for the Study of Security, Hazards, Response and Preparedness (C-SSHRP) in September 2013. C-SSHRP is housed within the School of Management and works in partnership with the College of Natural Science and Mathematics (CNSM), Geophysical Institute (GI) and the International Arctic Research Center (IARC). C-SSHRP aims to create new knowledge that reduces uncertainty in decision making, provide world leading education and research opportunities, train the next generation of emergency managers, responders and policy makers, and improve resilience should a disaster occur.

Major Research Accomplishments during the Past 18 Months:

Only a few selected examples can be provided here. Each year UAF has close to 1000 active research grants or contracts, and many faculty engage in research and creative activity without external funding. The following are brief descriptions of some important activities and accomplishments.

College of Liberal Arts

Associate Professor Dr. Ben Potter of Anthropology and Archaeology received a National Science Foundation grant in the amount of $706,029 for the project titled, “Exploring Intrasisite Variability at Upward Sun River (Xaasa Na’)”. This project includes summer archaeological field school to train technicians. Political Science Professor Amy Lovecraft, IARC researchers Hajo Eiken and John Walsh
received $954,290K from the National Science Foundation for their project, “The North Slope Arctic Scenarios Project (NASP): Envisioning Desirable Futures and Strategizing Pathways for Sustainable Health Communities”. In July 2013 Anthropology Professor David Koester received over $100K from the National Science Foundation for his work on the “Comprehensive Itelmen Dictionary”.

CLA creative activities highlights include:

- BFA Student, Ian Wilkinson Exhibition titled, “Spheres of Influence”. He sold 1,200 bowls that he crafted and raised $35,000 for the Fairbanks Food Bank in April 2013.
- Annie Duffy, Art faculty member, was awarded the 2013 Rasmuson Individual Artist Fellowship.
- Art Professor David Mollett and Jessie Hedden created a stained glass installation, a Percent for Art commission, for the Margaret Murie Life Sciences Building.
- Assistant Professor of English, Dr. Jennifer Schell published her book, “A Bold and Hardy Race of Men”.
- Dr. Morris Palter, Music, performed at the Open Ears Festival in Kitchener/Waterloo and with the percussion section of the Toronto Symphony Orchestra in January and March 2013.
- Associate Professor of Music and soprano, Jaunelle Celaire, gave a recital and public master class on Negro Spirituals at the University of Manitoba Winnipeg, Canada, and performed at the Guest Faculty Recital at Texas A&M University (Amarillo) in March 2013.
- Maya Salganek, Film Studies Director, produced a theatre and full-length feature film production in Fairbanks during summer 2013: “Mining for Ruby”, in association with Lock & Monkey Productions. This was partially supported by a State of Alaska, Film Reel Alaska Mentoring Experience (FRAME) grant.

Geophysical Institute and College of Natural Science and Mathematics

- Poker Flat Research Range (PFRR) launched two sounding rocket experiments to investigate physical processes in the aurora. Mark Conde successfully launched a small rocket from PFRR to provide risk reduction for future NASA and NSF sounding rocket and satellite payloads. This new technology is owned by the GI.
- The Alaska Satellite Facility (ASF) signed a 5-year renewal contract with NASA for satellite downlink and data processing and signed a contract with Planet Labs to downlink data from their polar orbiting nanosatellites. In addition, ASF received a $3.4M gift of a 9m satellite dish.
- Bill Bristow of the Space Physics and Aeronomy Group completed installation of a NSF Superdarn radar array at the South Pole.
- The Snow, Ice and Permafrost Group (with IARC) worked with the National Research Council of the National Academies to hold a workshop on “Opportunities to use Remote Sensing in Understanding Permafrost Related Ecological Characteristics”.
- The GI worked with the National Research Council of the National Academies on a workshop entitled “Opportunities for High-Power High Frequency Transmitters to Advance Ionospheric/Thermospheric Research”, in support of the HAARP facility in Alaska.
- The Alaska Earthquake Center (ACE) and the Seismology Group received funding from the NSF EarthScope Project to provide technical assistance and outreach for a massive effort to install ~250 new seismic stations across Alaska.
- The Seismology Group hosted the largest Seismology conference ever held in Fairbanks.
• A collaboration between UAF, DGGS, and Apache Corporation was established in order to share Apache-collected seismic data in Cook Inlet. The Cook Inlet data set is collected at an unprecedented high resolution scale and provides a new opportunity for investigating earthquake processes and earth structure in Alaska.

Institute of Arctic Biology and College of Natural Science and Mathematics

Suicide prevention in Alaska Native communities through community-based participatory research, improving food security and diet quality for Alaskans using a fisheries-to-schools approach, and seeking better understanding of the movement of sulfolane contamination in North Pole groundwater formed a significant and important cluster of Alaska-centric research projects by Institute of Arctic Biology scientists in 2013 - 2014. The suicide prevention project is led by IAB and Center for Alaska Native Health Research Assistant Professor Dr. Stacy Rasmus, who along with community co-researchers Billy Charles and Tara Ford, was invited by the Alaska legislature to present their research in Juneau in February 2014. A KTVA news story reported on their research and presentation: http://www.ktva.com/culture-and-tradition-the-antidote-to-suicide/. The fisheries-to-schools USDA funded project, which seeks to incorporate high quality, culturally important foods into school meals, is led by IAB and CANHR Assistant Professor Dr. Andrea Bersamin in collaboration with UAF Cooperative Extension Service faculty member Dr. Bret Luick, Marine Advisory Program faculty member Dr. Quentin Fong, and researchers from Portland State University (OR) and Morrisville State College (NY). IAB Associate Professor Dr. Mary Beth Leigh is a co-investigator on the project investigating the movement and biodegradation potential of sulfolane contamination in North Pole groundwater, which is led by UAF Institute of Northern Engineering scientist Dr. David Barnes. Drs. Leigh and Barnes were invited to present their findings at the Fairbanks Economic Development Corporation in March 2014 and presented at a UAF URSA seminar in February 2014. Seminar video: http://bit.ly/sulfolane

The University of Alaska Fairbanks Toolik Field Station (TFS) is located in the northern foothills of the Brooks Range, 254 km north of the Arctic Circle and adjacent to the Dalton Highway. TFS is managed and operated year-round by IAB and provides housing, meals, laboratory and science support for the research and education programs of 300-400 scientists and students each year. The National Science Foundation has been funding a major capital improvement program. It includes a combination of housing, science and support facilities. Work began in summer 2013 and it is anticipated that funding will be provided over a two to four year period. Several years ago, TFS was selected as a core site for the National Ecological Observatory Network and there is a need for additional facilities for that research.

The $107 million Margaret Murie Building was completed in April, 2013 and officially dedicated in August. The state-of-the-art, energy-efficient, 100,000-square-foot structure integrates research labs and classrooms into a single building. Both biology faculty researchers and the nearly 600 graduate and undergraduate students in biological sciences now have modern facilities that are well-suited to using modern approaches and technologies, in a field that has undergone revolutionary change in the past 40 years.

Institute of Northern Engineering and College of Engineering and Mines

The Alaska Center for Energy and Power (ACEP) Pilgrim project was active in fall 2013 and continued through the winter. Pilgrim Hot Springs, located 60 miles northeast of Nome, is the hottest resource in the state not directly associated with a volcanic system. It has a long history of local use, and is currently...
Hatch Associates Consultants, Inc., and Oceana Energy Company have both contracted to test new technologies in ACEP laboratories. These are both examples of private sector testing in University labs. Hatch will be testing a fly-wheel energy storage device in the Power Systems Integration Lab and Oceana will be testing a hydrokinetic device in the Alaska Hydrokinetic Energy Center test facility in Nenana, Alaska.

Current research also includes:

- **UAF overvhelmed the competition in the National Science Foundation Arctic SEES (Science, Engineering, and Education for Sustainability) program recent funding opportunity. UAF received the majority of the awards made; two of those went to researchers with the Water and Environmental Research Center of INE.**

- **A team led by University of Alaska Fairbanks scientists, including Nicole Misarti of the Water and Environmental Research Center and Link Olson of the University of Alaska Museum of the North, has been awarded a $1.7 million National Science Foundation grant to study long-term and ongoing population trends in the Pacific walrus. The project brings together scientists with expertise in genetics, archeology, chemistry, ecology and ethnohistory.** Thousands of walrus samples, some thousands of years old, housed at the University of Alaska Museum of the North are a key resource for this work.

- **Yuri Shur of the Civil & Environmental Engineering department and Donald Walker (IAB) are working on a project titled “Cumulative Effects of Arctic Oil Development – Planning and Designing Sustainability.” Developing arctic oil and gas resources requires extensive infrastructure. The cumulative environmental and social effects of that are difficult to assess and predict, but this project aims to improve that situation.**

- **Jenny Liu with the Alaska University Transportation Center was awarded the RITA Grant for $3 million over two years. UAF is partnered with Montana State University and Washington State University. The goal is “to systematically engineer environmentally sustainable transportation infrastructures in cold climates, considering the entire life cycle of transportation planning, design, materials selection, construction, maintenance and operations, preservation, and recycling through the collaboration of academia, industry and other stakeholders.”**

- **The Petroleum Development Laboratory (PDL) established a state-of-the-art oil, gas and geothermal well cementing technology testing facility. This $300,000 facility was paid for by a grant from the US Department of Energy (2010-2013). The project leads are Santanu Khataniar, Shirish Patil, Abhijit Dandekar, and Matthew Bray.**

- **A non-disclosure agreement was signed with ConocoPhillips for conducting permafrost subsidence research. A $300K ConocoPhillips donation will be used to jump start this research by Shirish Patil, Abhijit Dandekar, Yuri Shur, and Matthew Bray.**

- **Mohabbat Ahmadi and Dare Awoleke of PDL secured a grant from the Alaska Department of Natural Resources for research in shale oil and gas development.**
International Arctic Research Center

IARC scientists have produced a new Digital Sea Ice Atlas, covering 160 years of historical data. A web-based interactive map, the first of its kind, the atlas allows users to simultaneously view multiple sources of historical sea ice data in the Beaufort, Chukchi and Bering seas. With funding from the Alaska Ocean Observing System, IARC’s John Walsh and Sarah Trainor (IARC/ACCAP) worked in partnership with the National Snow and Ice Data Center and the University of Illinois at Urbana-Champaign. IARC’s Scenarios Network for Alaska and Arctic Planning maintains the data behind the sea ice atlas. The atlas uniquely provides digitized historical sea ice data compiled from more than 10 sources, including the satellite record (1979 to present), various U.S. Navy and National Ice Center compilations (1950s to 1990s), Canadian records (1950s to 1980s), Danish and Norwegian ship records (mid-1800s to 1970s), and whaling ship reports (1850 to 1900).

IARC Nansen and Amundsen Basin Observational System (NABOS) researchers and IARC Summer School participants spent a month aboard the Russian research vessel Akademik Fedorov in the Arctic Ocean during late summer 2013, enabled by funding from the National Science Foundation. Every year since 2002, the NABOS researchers conducted expeditions in the Arctic Ocean, deploying buoys and moorings to record year-round observations that have since been used in oceanographic, atmospheric, ice, biological, and geochemical studies.

Other accomplishments, in brief, include:

• A new study published in Nature Geoscience (Nov. 2013) shows that large amounts of methane, more than twice the amount previously estimated, are escaping the East Siberian Shelf in the Arctic Ocean. The research was conducted by an international team of scientists including the lead author Natalia Shakhova and Igor Semiletov, both of IARC.

• For the first time since the 1980s the State of Alaska has started to successfully tackle creating updated and consistent maps for Alaska, and IARC’s Geographic Information Network of Alaska (GINA) is a key collaborator in this effort.

• The Geographic Information Network of Alaska (GINA) has launched Puffin Feeder. This is a website where anyone can access near real-time Arctic webcam, radar, GeoTIFF, and MODIS imagery.

• A special issue, entitled “JAMSTEC-IARC international collaboration enhancing understanding of the Arctic climate system,” a compilation of selected research conducted in the past five years, was published in the journal Polar Science 7, 2013.

• IARC’s research unit, the Scenarios Network for Alaska & Arctic Planning (SNAP), has released a new set of historical and projected research data developed for a broad scale model coupling project, the Integrated Ecosystem Model for Alaska and Northwest Canada.

• Sixteen IARC researchers and one IARC affiliate contributed to The United States National Climate Assessment: Alaska Technical Regional Report (released by the U.S. Geological Survey), one of eight regional reports that will provide input to the 2013 National Climate Assessment.

School of Fisheries and Ocean Sciences

SFOS faculty published 97 research papers for calendar year 2013 and their research was supported by over 300 active research grants from a multitude of local, regional, and national funding agencies. In addition to the research papers, faculty published books including: Fishing Peoples of the North, by Courtney Carothers, Keith Criddle, and Paula Cullenberg; King Crabs of the World, by Gordon Kruse and Stephen Jewett, and Fisheries Techniques, by Trent Sutton. Stephen Okkonen made a film about
oceanography and bowhead whales, and Andres Lopez digitized the invertebrate photo and data collections at the University of Alaska Museum of the North. SFOS researchers remain very involved in international partnerships, collaborations and working groups, including: Ecosystem Studies of Subarctic Seas, co-chair Franz Mueter; International study of trace elements in the ocean (GEOTRACES), Ana Aguilar-Islas; Arctic Council Circumpolar Biodiversity Monitoring Program, Plankton Network, Russell Hopcroft; and IASC International Arctic Science Committee Marine Working Group, Rolf Gradinger. Five SFOS faculty received awards at the annual Alaska Marine Science Gala, Alaska SeaLife Center: 2013 - Katrin Iken, Brenda Konar, Bodil Bluhm and Russell Hopcroft. For Arctic Marine Life Bio-Diversity; 2014 - Tom Weingartner for Arctic Oceanography.

SFOS research has considerable relevance to industries. For example, SFOS researchers are conducting studies of ocean circulation that will help in the containment and cleanup of any future oil spills, ecological impacts of nearshore oil development in the Arctic, and environmental impacts in the near shore environment off Nome. Industry funds some of the research, and the Pollock Conservation Cooperative research support exceeds $13 million. Also, an SFOS researcher, Alex Oliveira, recently developed commercial products, nutraceutical pollock oil supplements and salmon-based pet treats.

The ice-capable research vessel R/V Sikuliaq, which was launched in Marinette, Wisconsin in October, 2012, was completed and outfitted over the past year and has been undergoing acceptance trials for the past month. Many aspects of the vessel have operated very well, but unfortunately the A-frame failed during load testing and will require replacement. Also, one of the Z-drives failed and that will require a return to dry dock. We are looking forward to the arrival of the Sikuliaq in Alaska in 2015, following the necessary repairs and sea trials.

School of Natural Resources and Extension

- The Boreal Alaska — Learning, Adaptation and Production (BAKLAP) project researchers, led by Professor Glenn Juday, are studying the value of Alaska’s forests in meeting the demand for wood biomass energy in a changing environment. An outreach component is developing and implementing model K-12 curriculum based on hands-on inquiry learning about the Alaska boreal forest through science and art.
- Professor Pat Holloway received awards of appreciation from the Alaska Peony Growers association in Feb. 2013. The APGA honored Dr. Holloway for the research she has conducted on peonies, which has assisted the new industry. Holloway has been growing peonies at the Geogeson Botanical Garden since 2000.
- The Eighth Circumpolar Agricultural Conference and UArctic Inaugural Food Summit was held Sept. 29 - Oct. 3, 2013 in Girdwood. It brought together world leaders to discuss agricultural issues and challenges in the circumpolar north. The scientists, farmers, policymakers and others who attended will work to strengthen, support and expand food resources and northern community development. The event was hosted by the University of Alaska Fairbanks, the Circumpolar Agricultural Association, UArctic and the Organisation for Economic Cooperation and Development.
Office of Intellectual Property and Commercialization:

Commercializing University of Alaska Fairbanks’ (UAF) intellectual property is an opportunity to increase economic development for our interior Alaska communities and benefit the UAF bottom line. UAF reorganized its Office of Technology Transfer in 2010 to create the Office of Intellectual Property and Commercialization (OIPC). The goal was to create an office that would work with UAF inventors, private companies and entrepreneurs to identify, develop, market and license University inventions, proprietary software, and new technologies. That goal is being realized. The obvious first step is getting inventions identified and “disclosed” to the office. Office of Intellectual Property and Commercialization (OIPC) has implemented an aggressive outreach campaign, leading to all time high levels of engagement. In FY 2013 alone, 73 new inventions were disclosed by University faculty, staff and students. For the first time UAF is producing invention disclosures at rates greater than or equal to other universities with a similar amount of research expenditures.

In 2012, the Nanook Innovation Corporation (NIC) was created to assist UAF in getting new technologies into the hands of businesses that will develop those technologies into products. NIC is a non-profit supporting organization with a sole focus on commercializing intellectual property generated from research conducted at UAF. NIC has licensed roughly 33 pieces of intellectual property so far on behalf of the University.

Start-up companies are all different and developed with different levels of staffing and capital. For start-up companies that do not have capital to pay license fees for the technology, the lean start-up model offers a solution. This model relies on an entity to take equity in the start-up company in place of most of the license fees. To facilitate the lean start-up, the for-profit company Nanook Tech Ventures (NTV)
was created in 2013. NTV can license UAF technology in exchange for equity in a new company. Although both NIC and NTV are associated with UAF, each is a separate Alaska corporation with its own board of directors. NTV so far has taken equity in one start-up company, to which it has licensed UAF intellectual property. Two new start-ups are in the works. UAF is actively maturing its IP development and commercialization enterprise. The first revenues have been distributed to inventors and new licenses are in process.