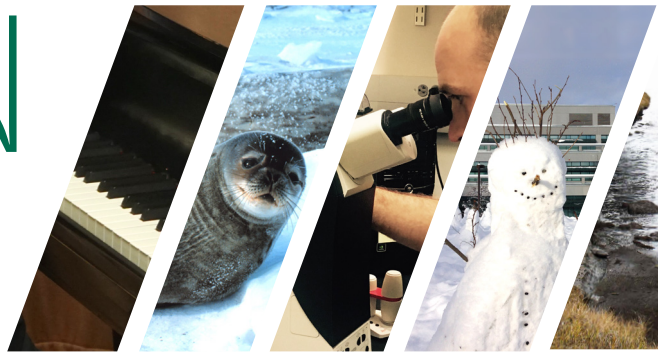
UAA

the INNOVATION FRONTIER



VOLUME 2 /// FALL 2017

MESSAGE FROM THE VICE PROVOST

for Research & Graduate Studies & Dean of the Graduate School

Located at the heart of The Last Frontier, this is where natural wonder inspires the human mind. Where innovation is born and incredible discoveries made.

Welcome to an exciting edition of "The Innovation Frontier," which illustrates the tremendous growth in research, creative works, and commercialization at UAA since the previous edition. It features many significant accomplishments with impacts that benefit the welfare of society regionally, nationally and globally — from medical therapies to engineering and scientific advances, and the arts.

Immunotherapy is a groundbreaking treatment for cancer by training the immune system to target cancer cells. Our research team developed an innovative antigen delivery system for immunotherapy using nanoparticles for a more effective treatment. We are investigating vertebrates that are able to survive for long periods of time in the complete absence of oxygen that can offer insights into cardiac pacemaking in conditions of low oxygen pertinent to human pathology.

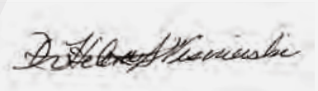
Multi-disciplinary collaborations among the Colleges of Engineering, Business and Public Policy, and Arts and Sciences have been formed. A Professor of Music teamed with faculty in Computer Science and Business to develop a computer system that assesses a pianist's skill at sight reading music. Another included the Departments of Theatre and Dance, Psychology, and Art, and community organizations. The project presented a haunting play about child sexual abuse in Alaska, with an empowering conversation between the public, cast members, and counselors to encourage healing.

Capitalizing on its location, UAA is developing solutions to challenges caused by the dynamically changing Arctic environment as it impacts current and future ecosystems and villages. These include models to forecast future erosion rates and shoreline change. Road tests are underway to test a suitable concrete mixture for Arctic roads that is flexible and yet maintains its strength in extreme cold. Work in Antarctica studies the impact of environmental conditions on the physiology and behavior of polar marine mammals.

Universities are a key source for new technology critical to the United States maintaining its lead in innovation and economic development. UAA's patent portfolio has dramatically increased since FY11, including the launch of start-up companies — one was awarded a "Best University Start-Up" in a national competition. To encourage innovation, UAA established the "Patent Wall of Fame," and organized and hosted the first World IP Day in Alaska.

UAA is the largest university in the University of Alaska System with 18,000 students. It is a doctoral granting institution, and Alaska's Health University. UAA's research expenditures continue to increase, and external funding had increased by 23% from 2013 to 2016. The Innovate Awards have reached a 6:1 return on research investment through external federal funding. A major award from DHS for the Arctic Domain Awareness Center, made it the first time that an institution in Alaska was chosen to lead a DHS Center of Excellence. Our excellent infrastructure supports our research growth and includes the new state-of-the-art Engineering Building.

I hope this new edition of "The Innovation Frontier" will stimulate you to learn more about UAA's research, creative activities, and technology commercialization and inspire you to consider some joint collaborative efforts.



Dr. Helena Wisniewski — Vice Provost for Research and Graduate Studies and Dean of the Graduate School

UNIVERSITY OF ALASKA ANCHORAGE

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TICKLING THE IVORIES WITH MATHEMATICS:

USING MACHINE LEARNING AND EYE TRACKING TO ASSESS PIANO PLAYERS' SKILLS

Musicians are often required to play a piece at first sight or with only a 1-2 minute preview; this ability is called sight reading. Sight reading is a difficult yet necessary skill for pianists. It is more challenging than reading text, as it involves simultaneously reading and playing two vertical groups of notes (chords on staffs), keeping the tempo, and playing the instrument, all at the same time. Much of the sight reading ability hinges on efficient eye movements enabling the pianist to read ahead, absorb information at a steady pace, and move on after making an error.

So how can someone assess a person's skill to sight read and improve their skill? Currently such evaluation is performed by the piano teacher, sitting next to the piano player. Could a computer with a device that can track the player's eyes achieve the same goal? Eye tracking devices are becoming increasingly widespread, expanding from the initial uses in psychology and advertising into user interface design, education, security and medical applications. The devices include a camera and a processing computer. The camera is pointed at the user's eye, and the computer processes the video images to infer what the user is viewing, either on a computer screen or at the surrounding environment. Professor Timothy Smith, a noted concert pianist, heard about a patented invention by colleagues at UAA that used eye tracking and iris scanning for biometric user identification and wondered if the technology could also aid in assessing sight reading skills. An unusual collaboration resulted in 2012 that investigated using new eye tracking technology to assist students in mastering this skill. Dr. Timothy Smith, Professor and Associate Dean of the College of Arts and Sciences, Dr. Kenrick Mock, Professor of Computer Science, and Dr. Bogdan Hoanca, Professor and Interim Dean of the College of Business

and Public Policy, created a system to evaluate the piano player's gaze metrics and compare them with a human user's expert evaluation.

The professors adapted available technology specifically for the experiment. The resulting system uses an eye tracker system to capture the piano player's gaze. A computer processes the gaze, extracting key metrics of the gaze patterns with the goal of evaluating the sight reading habits and abilities of piano students in great detail. The equipment provides audio and video playback of a music reading session, with a plot of a detailed gaze path. Available to the student and instructor is a video recording of the time evolution of the gaze path, or eye tracking, across the entire musical score. As the piano player's gaze alternates between the two music staffs from measure to measure, the smoothness of the resultant "saw tooth" graph differs depending upon the performer's skill. While an observer can visually evaluate the smoothness of the saw tooth path, the computer processing will extract objective metrics of the path, providing a numerical evaluation of the sight reading performance.

As the experiment unfolded, it became clear that the metrics extracted by the machine-learning code were highly correlated with the human expert's conclusions. Both low-level metrics and an overall score of the piano player's sight reading abilities can be extracted via machine-learning algorithms from the eye tracking data. This opened up the possibility that a machine learning based system using an eye tracker could be designed and built to allow piano players to gain feedback on their sight reading abilities without the need of a human expert.

The initial work was done using a top-of-the-line research-grade eye tracker, a highly accurate and costly device. Subsequent phases of the research involved experimenting with low-cost consumer-grade eye tracking devices, with the idea of creating an educational product that evaluates reading skills with a price tag accessible to piano teachers. Research continues on methods to evaluate actual musical performances for note accuracy through MIDI sequencing analysis. Based on experiments performed, the use of an automated scheme to evaluate sight reading performance based on eye tracking data looks feasible. There is an excellent correlation between: low-level task-related metrics (both machine-extracted and human-extracted) and the overall human-determined score, as well as between any pairs of machine-extracted and human-extracted metrics (correlation above 0.405). There was even better correlation between related machine-extracted and human-extracted metrics (e.g., human and machine extracted tempo), correlation above 0.68.

Next steps include determining optimal metrics (best correlation with human), and researching ways to improve sight reading performance. Dr. Smith is also interested in expanding the scope of the current study to find other ways of improving the sight reading skills of students.

The trio of faculty currently have a patent pending, entitled Methods and Systems for Evaluating Performance, U.S. 14/633,392. There is also the possibility that new smartphone designs will include eye tracking capabilities, creating a path for a smartphone app with this functionality. With a low-cost eye tracker, the system could be offered for sale to the general public at an affordable price and be utilized by both professional and non-professional pianists alike.

ABOUT DR. BOGDAN HOANCA

Bogdan Hoanca is Interim Dean in the College of Business and Public Policy at the University of Alaska Anchorage and a Professor of Information Systems and Decision Sciences. Before he started teaching at UAA in 2002, he co-founded, started up, and sold a company that builds components for fiber optic communications. He also helped start and consulted with a number of other start-up companies in optical fiber communications. Interim Dean Hoanca received a PhD in Electrical Engineering from the University of Southern California, a MS in Electrical Engineering from Syracuse University and an Electronics Engineer diploma from the Polytechnic Institute of Bucharest, in Romania. Along with several co-authors, he has published more than 70 journal papers, book chapters, conference papers and case studies. He is a co-inventor on three U.S. patents (a fourth one pending).

ABOUT DR. TIMOTHY SMITH

Dr. Timothy Smith, who has been described as "A pianist who interlaces grace with bursts of power and color" by the "Philadelphia Inquirer," and "an excellent pianist" by "Vers l'Avenir" (Belgium) has won major prizes in international competitions, including the Robert Casadesus, Gina Bachauer and others. Smith has performed across the U.S. and has given over 60 concerts in Asia. He performed with the China National Symphony Orchestra in Beijing, which was broadcast nationally over China Central Television and also in Norway. Smith toured China in the summer of 2011, performing in six cities: Lanzhou, Guangzhou, Suzhou, Dongying, Qingdao and Chongqing. The tour was held in commemoration of the 200th birthday of Franz Liszt. In Chongqing, both Smith and his wife Rumi were invited to give master classes at the Chongqing School for the Arts at the school's first ever International Piano Festival. Smith has also performed at the Xi'an Conservatory of Music.

Smith is currently working on a research project that involves the use of Tobii eye tracking technology to evaluate sightreading habits and abilities of pianists. The UAA research team has a patent pending relating to the technology. He recently adjudicated piano competitions in Northern California (for MTAC) and in Honolulu (for the Aloha International Piano Competition). This past summer Smith was invited to teach at the American Piano Forum which was held at West Chester University in Pennsylvania.

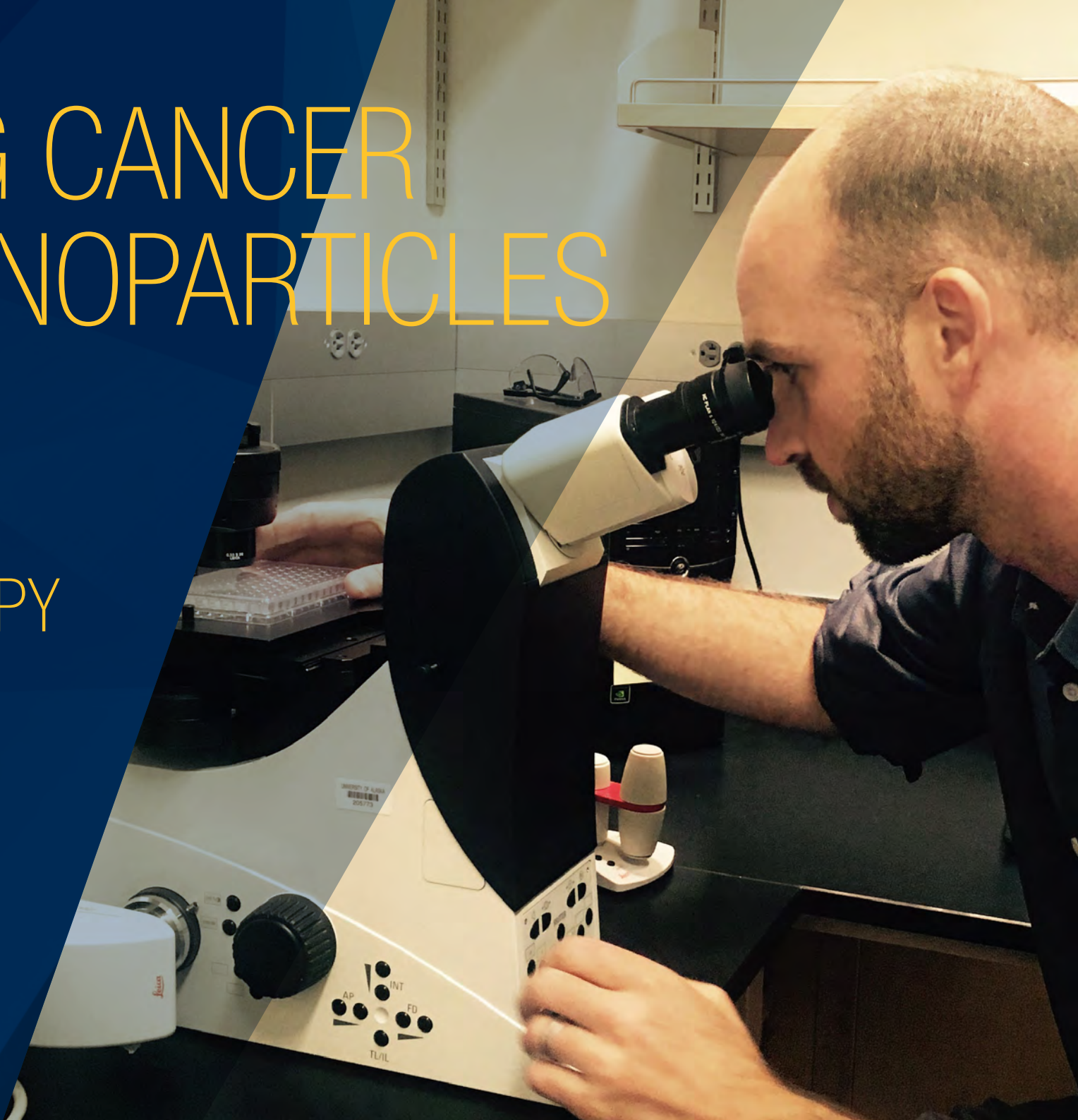
Timothy Smith is a Steinway concert artist, and is Professor of Piano and Associate Dean for the Fine Arts and Humanities at the University of Alaska Anchorage.

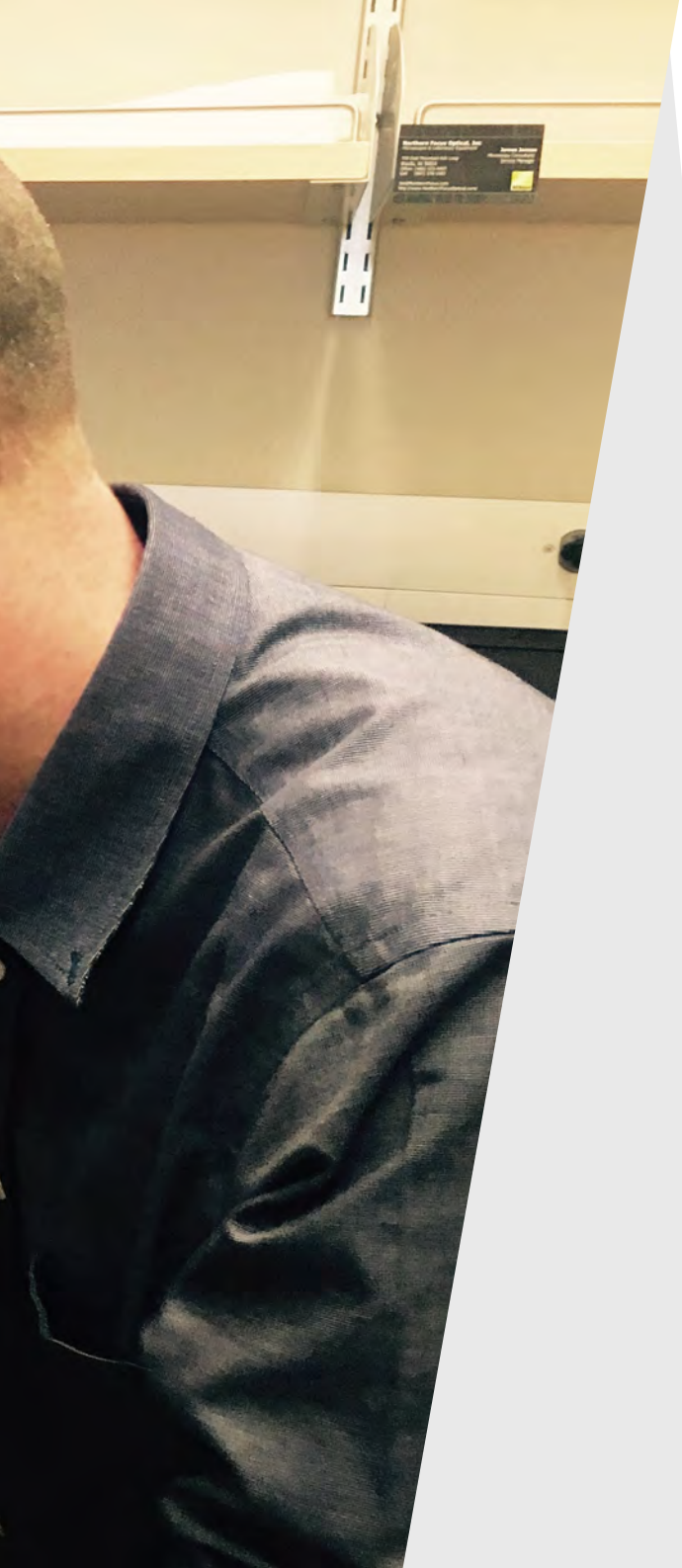
ABOUT DR. KENRICK MOCK

Dr. Kenrick Mock is a Professor of Computer Science and currently chair of the Department of Computer Science & Engineering. He received his BS in Computer Science & Engineering and his MS and PhD in Computer Science from the University of California, Davis. Before coming to UAA he was a research scientist at Intel and CTO of a technology start-up developing recommendation systems. His research is in artificial intelligence, games and gamification, complex systems, computer security, eye tracking, systems modeling and computer science education. A co-author of several books on computer programming, Dr. Mock has more than 30 years of experience developing software systems.

FIGHTING CANCER WITH NANOPARTICLES AT UAA:

PROGRESS IN IMMUNOTHERAPY





The goal of cancer immunotherapy is to elicit a disease fighting response from a patient's own immune system. In recent years, the application of immunotherapy has become a *leading edge* tool with a notable case of success being the cure of former President Jimmy Carter from brain cancer in 2015. Here at the University of Alaska Anchorage, Dr. Max Kullberg, Assistant Professor with the WWAMI School of Medical Education is creating cancer immunotherapies, using nanoparticles. This nanoparticle delivery system could play an important role in future cancer immunotherapies.

Until recently, chemotherapy and radiation have been the non-surgical treatment option for most cancers. Unfortunately, these treatments result in severe side effects because of their tendency to kill normal cells in addition to the malignant ones. With the development of cancer immunotherapy, there is finally a treatment option with higher specificity. When the immune system is activated, it can specifically target and kill cancer cells even if they have spread throughout the patient. Cancer immunotherapy trains the immune system to recognize the cancer cells and, when successful, results in a complete elimination of cancer with minimal toxicity.

Cancer cells arise from mutations in DNA, which lead to changes in the proteins that make up a cell. These changed proteins are called tumor antigens and can be targeted by the patient's immune system. However, as a cancer grows, it acquires the ability to evade the immune system. Dr. Kullberg's lab is reactivating the immune system by delivering tumor antigen and immune activating compounds to immune cells using nanoparticles.

Nanoparticles encapsulate therapeutic agents and can be targeted to specific cells in the body. Recently, Dr. Kullberg's lab has developed a nanoparticle system that, for the first time, targets certain immune cells which are vital to fighting cancer. These immune cells are called antigen presenting cells (APCs) and are the first responders against an infection or cancer. The nanoparticles developed in Dr. Kullberg's lab bind a protein in the blood called complement C3, using a method that currently has a patent pending. Once they are coated with C3, the nanoparticles are swallowed by APCs as if they were a bacteria or virus.

When tumor antigen is loaded into the nanoparticles, the immune system is activated against the tumor antigen and begins to kill the cancer cells. Recently, a PhD student in Dr. Kullberg's lab, Alex Francian, ran experiments testing the effectiveness of their nanoparticle immunotherapy in mice that had tumors. Injection of just tumor antigen without nanoparticles was not able to curb the cancer in mice that were part of control groups. However, when tumor antigen was encapsulated in nanoparticles and targeted to APCs, the tumors started to shrink in all three mice. By the end of the study, two of the mice eliminated the cancer all together. Still more exciting, even though the mice were only treated in one location with nanoparticles, metastatic tumors in a different location were also eliminated, showing the full body response of the immune system. This nanoparticle delivery system represents a significant step forward in tumor antigen delivery and could play an important role in future cancer immunotherapies.

The development of this delivery system has been supported by grants from the Innovate Award, Alaska INBRE and the Alaska Run for Women. In 2003, the Alaska Run for Women awarded a grant that drove the early work of this project. The Alaska Run for Women is still a primary contributor to the Kullberg lab today, and during race day, you will find most of the lab members either running the race or showing scientific posters that describes the research made possible by the race participants.

ABOUT DR. MAX KULLBERG

Dr. Max Kullberg is an Assistant Professor with the WWAMI School of Medical Education at the University of Alaska Anchorage. He received a BS in physics from Caltech and his PhD in biochemistry from UAA/UAF. Born in Alaska, Dr. Kullberg, considers it a privilege to teach medical students and study nanoparticle cancer immunotherapy in this great state.

FREE AS THE AIR THEY BREATHE?

THE PHYSIOLOGICAL ECOLOGY OF POLAR MARINE MAMMALS

ABOUT DR. JENNIFER M. BURNS

Dr. Burns received her BA in Zoology with a minor in English Literature from the University of California Berkeley, her MS from the School of Fisheries and Ocean Sciences at the University of Washington, and her PhD In Marine Biology from the University of Alaska Fairbanks. Her dissertation focused on the development of diving behavior and physiology in young Weddell seals in the Antarctic, and her research has never strayed far from that origin. Work in her lab has focused largely on the physiological ecology of marine mammals found in polar waters, with extensive work over the last decade in Antarctica studying the same population of seals on which she conducted her doctoral work. During 2017 – 2018 Dr. Burns will be a program manager for the Antarctic Integrated System Science Program at the National Science Foundation (NSF) in Washington, DC. She will return to UAA following the completion of her work at NSF.

Seals, sea lions, sea otters, and whales are all examples of air-breathing mammals evolved from terrestrial ancestors. These aquatic predators are most abundant in highly productive ocean waters where food is predictable. High latitude waters found around Alaska and the Antarctic sustain many marine mammal species due to this abundance. However, a warming climate and increasing impacts of human activities, including overfishing and pollution, have the potential to reduce habitat quality, and consequently marine mammal populations. Unravelling the synergy of environmental conditions and marine mammal physiology and behavior is the focus of Dr. Jennifer Burns' research.

Dr. Burns' early work focused on questions about how juvenile Weddell seals, *Leptonychotes weddellii*, developed the ability to forage underwater. Weddell seals are remarkable divers inhabiting one of the most extreme locations on earth — the fast-ice covered waters that surround the Antarctic continent. Scientists have been studying the local population for more than 40 years, and now most of the seals are of known age and reproductive history. Researchers can walk up to these large wild animals and easily capture and handle adults and their pups without causing much disturbance, which makes this species an excellent one with which to address many questions about adaptation.

1970s tagging and isolated-hole diving studies on Weddell seals developed an understanding of how diving mammals exploit underwater habitat efficiently. This research revealed that, contrary to early expectations, seals rely primarily on aerobic respiration when diving, and only use anaerobic metabolism under unusual circumstances. Follow-up work on many species over the next several decades revealed that how long an animal could remain underwater was largely determined by two factors: how much oxygen they started their dive with, and how fast they used that oxygen up while swimming underwater (their diving metabolic rate). Not surprisingly, marine mammals have adaptations in both these areas — with the best divers having extremely large O_2 stores in blood and muscle and very low diving metabolic rates. To be able to start a dive with large O_2 stores, marine mammals have two to three times more blood than humans, and their blood contains many more red blood cells with high concentrations of hemoglobin. In addition, their muscles have high myoglobin levels, which allows them to store up to twenty times more O_2 per kg of muscle than terrestrial species. In addition, when diving and chasing prey, their heart rates are quite low, and blood flow is directed only to critical tissues, thus allowing their diving metabolic rates to remain as low as if they were resting on the beach. It is the combination of these two adaptations that permit elite divers such as the Weddell seal to make dives longer than 20 minutes regularly and repeatedly.

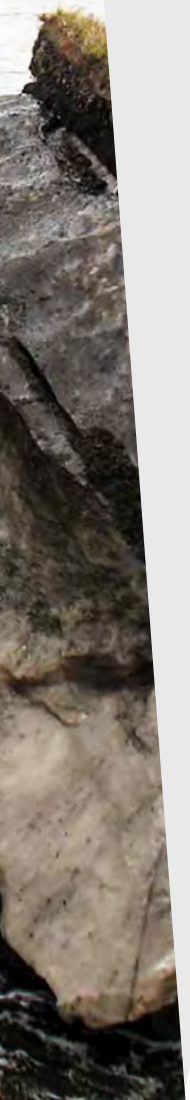
Beginning with a master's research on harbor seals, Dr. Burns became interested in how young pups make the transition to an aquatic world. Marine mammals give birth to one offspring per year, with births occurring during the season that is most conducive to both maternal and offspring survival i.e., mild weather and abundant prey. This is important for young animals because lactation periods are often quite short (days to months) and, once weaned, pups must learn to forage on their own before starving or being eaten. The transition can be harsh; first year survival rates are rarely > 50%. In 1993, Dr. Burns began to study diving in young Weddell seal pups, and has now spent 12 seasons working in the Antarctic. Her doctoral research demonstrated young Weddell seals' dove much shorter and shallower than adults, in part because they could not store as much O_2 in blood or muscle. Subsequent work on other species by Dr. Burns and her graduate students has demonstrated that the rate at which oxygen stores develop correlates closely to the length of lactation, but that young pups have stores that are only two-thirds of those of adults. Not only are O_2 stores reduced, but juveniles use the O_2 faster as they less ably regulate diving heart and metabolic rates. Thus, one reason for lower survival rates, is that juveniles cannot dive as long or as deep as adults, and therefore do not have access to the same prey. In addition to work in the Antarctic, Dr. Burns' graduate students have explored how these differences in physiology and behavior contribute to declines in Steller sea lions and harbor seals in Alaska.

For long-lived marine mammals, adult survival and reproductive rates have a significant impact on population abundance and health. Since 2009, Dr. Burns has studied factors influencing reproductive success for Weddell seals. This work has supported several MS and PhD students, as well as post-doctoral researchers. UAA undergraduates are able to participate through summer internships by analyzing samples returned from the field. Initially this work examined the movement and foraging patterns of females during the long Antarctic winter, which coincides with their active gestation period. Weddell seals gained much less mass and energy during the winter than expected based on studies in other species, perhaps because winter dives were long and deep. Not all females were able to sustain pregnancy over the winter, and those that did spent more effort diving than those that did not, again suggesting that foraging in winter darkness under the ice poses a significant challenge. In contrast, Burns has determined that females rapidly recover the mass they lose during lactation during the late summer, likely because the prey are more abundant and are in shallower waters.

Recent research has focused on the impact of health and condition on pregnancy using non-invasive ultrasound technology. An early finding was that Weddell seals have an unusually short embryonic diapause period, likely to reduce daily energetic cost of pregnancy by spreading it over a longer gestation. In addition, studies of the endocrine regulation of pregnancy have linked variation in hormones involved in stress and metabolic rate regulation to the probability that pregnancy continues to term. Efforts are underway to determine how changes in prey availability and foraging success during both summer and winter impact subsequent reproductive outcomes and long term population health.

GOODBYE ALASKA:

ARCTIC COASTAL EROSION MODELING AND FORECASTING



Alaska has the most expansive ocean coastline of any state in the U.S. In fact, at 33,904 miles, its total coastal length equals more than half of the combined total for the remaining United States. Of course, this is a good thing considering the recreational and commercial value of a littoral zone. However, it also means that Alaska is very vulnerable to coastal hazards including coastal erosion and flooding, and that vulnerability can be costly. The cost for relocating a single coastal village in Alaska due to coastal erosion and flooding can exceed $200 million. The U.S. Air Force recently spent $47 million to defend the Cape Lisburne Long Range Radar Site against erosion of the runway. Yet, relatively little effort has been spent to understand and quantify the changes or identify ways to adapt to and manage these forces. Now Dr. Thomas Ravens, Professor of Civil Engineering at UAA, is leading research to understand the processes and mechanisms contributing to coastal erosion in Arctic settings and is developing tools to forecast coastal change. These tools will be invaluable for Alaska communities, industry, and governmental agencies who are faced with billion-dollar decisions about how to plan and adapt for a future with increasing coastal hazards and risks.

Arctic coastal erosion differs from non-Arctic erosion because of the importance of thermal processes, in addition to mechanical factors. The Arctic contains permanently frozen soil — permafrost — as well as soil and sediments that freeze seasonally. Thawing of the coastal permafrost and seasonally frozen soils must happen before mechanical processes can remove those soils resulting in coastal erosion. Thus, the warming environment has caused coastal erosion in the Arctic to accelerate. In addition, when the coastal permafrost thaws, subsidence can occur, which lowers the land surface and makes it more vulnerable to waves and currents. Warming has also reduced sea ice concentrations, allowing for the generation of larger waves and increasing the open water period in which erosion occurs.

Dr. Ravens and his research team have approached Arctic coastal erosion research on multiple fronts. First, they are identifying geologic "controls" or factors that determine the dominant erosion mechanism in Arctic Alaska. The two prominent coastal erosion mechanisms affecting the coastal bluffs on the north coast of Alaska are (a) niche erosion / block collapse and (b) bluff face thaw / slump (Ravens and Peterson, in press). Niche erosion / block collapse, which is responsible for the highest rates of erosion in Arctic Alaska (up to 30 m/yr.), is driven by the thermal and mechanical erosion of a niche at the base of the bluff during surges, followed by block collapse and the erosion of the fallen block. The mechanism is dominant where there is a lack of coarse materials (sand and gravel) in the bluffs (specifically, coarse sediment aerial density < 80 g/cm 2), as the absence of these materials translates to a low elevation beach and frequent contact between the sea and bluff. At locations where significant amounts of coarse material are present (sediment aerial density > 120 g/cm 2), the beach elevation is higher, leading to infrequent contact between sea and bluff. Here, erosion is controlled by the bluff face thaw / slump mechanism. This mechanism features the aerial thaw and slump of bluff face sediment, which deposits on the beach face and is transported offshore by storms. Erosion rates in Arctic Alaska where the bluff face thaw / slump mechanism is dominant are significantly less.

The team has developed and validated process-based, coastal erosion models of a number of these erosion mechanisms. Notably, Dr. Ravens and collaborators developed and validated a predictive, process-based erosion model for Drew Point, Alaska, where the niche erosion / block collapse mechanism is dominant. Currently, the team is developing a general purpose process-based coastal erosion model that can be applied throughout Arctic Alaska. The model is based on the open source, state-of-the-art, coastal geomorphic change model, Xbeach. Xbeach provides the potential geomorphic change (i.e., coastal erosion) due to the hydrodynamic environment — waves, currents and water surface elevation. Dr. Ravens and his team have added heat transfer algorithms to determine the temperature and phase — frozen or thawed — of the sediments. The new "Xbeach model," referred to as Arctic Xbeach, and other supporting algorithms will be used to forecast erosion rates and shoreline position change into the future for various greenhouse gas emissions scenarios. Besides being a tool for predicting the coastal zone of the future, the Arctic Xbeach model also serves as a design platform for efforts to control coastal erosion. For example, current efforts are focused on the inclusion of algorithms to model the effect of passive and active efforts to control erosion through supercooling the permafrost. In preliminary work, thermal siphon systems have been simulated, and researchers are now working on active cooling systems powered by solar energy or natural gas.

The coastal erosion modeling and forecasting effort is currently funded by a ConocoPhillips Arctic Science and Engineering grant. Previously, related work was funded by the USGS, the Western Alaska Landscape Conservation Cooperative, the Arctic Domain Awareness Center — a DHS Center of Excellence, and by a Chancellor's Fund grant.

ABOUT DR. TOM RAVENS

Dr. Ravens is a Professor of Civil Engineering. He earned a BA, BE, and ME in Engineering Sciences from Dartmouth College and a PhD in Civil and Environmental Engineering from the Massachusetts Institute of Technology. His current research focuses on numerical modeling of coastal erosion, coastal flooding and oil spills in Arctic settings.

SHRINK-WRAPPED CRITTERS:

LIFE IN THE ABSENCE OF OXYGEN

ABOUT DR. JONATHAN STECYK

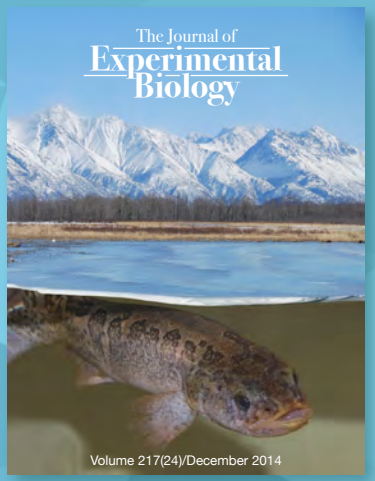
Dr. Jonathan Stecyk is an Associate Professor of Biological Sciences. He received his B.Sc. (with distinction) from Augustana University College, his MS from Simon Fraser University, his PhD from the University of British Columbia (the dissertation was awarded the 2008 Cameron Award by the Canadian Society of Zoologists for the best Canadian zoology thesis), and conducted post-doctoral research at the University of Oslo prior to commencing his faculty position at UAA in 2012. Dr. Stecyk is a comparative cardiac physiologist and has investigated cardiac function in a range of species, including tropical coral reef fishes in Papua New Guinea and Australia, a goby that lives in toxic hydrogen sulfide saturated mud off the coast of Namibia, the crucian carp, which spends half its life without oxygen, and the Alaska blackfish, the only known air-breathing fish in the Arctic. His current NSF-funded research investigates how the heart of one of the vertebrate champions of surviving without oxygen, the red-eared slider turtle, can continue to beat rhythmically during days to weeks of oxygen deprivation.

People understand that oxygen is necessary for them to live. Death quickly ensues from lack of oxygen triggering the failure of organs — including the heart — which require a constant supply of oxygen to create the metabolic energy necessary to support their continued function. However, Dr. Jonathan Stecyk, a Professor of Biological Sciences at UAA, is studying a rare vertebrate species that has evolved the remarkable ability to survive for prolonged periods in the complete absence of oxygen or anoxia. This work will provide important insights into cardiac pacemaking in conditions of low oxygen and temperature that have pertinence to human pathology,

Dr. Stecyk's current research (NSF-funded Award #1557818) was facilitated by a 2013 UAA Innovate Award with which he collected the necessary preliminary data for the successful research proposal. His team studies how the heart of one of the vertebrate champions of anoxia survival, the red-eared slider turtle (*Trachemys scripta*), can continue to beat rhythmically during anoxia. Dr. Stecyk's previous research revealed that the intrinsic rate at which the turtle heart beats during anoxia slows by up to 50%. However, the mechanisms by which intrinsic heart rate is suppressed by anoxia remains unknown. In the vertebrate heart, intrinsic heart rate is determined by cells located in a specialized region of the heart, termed the cardiac pacemaker. The pacemaker cells initiate cardiac contraction by producing electrical impulses called pacemaker action potentials. The rate at which the action potentials are generated sets the intrinsic heart rate.

Dr. Stecyk assembled a multi-disciplinary and multi-tiered team of post-doctoral researchers and talented undergraduate students to investigate the physiological mechanisms by which anoxia and low temperature modulates turtle pacemaker rate. Dr. Svetlana Tapilina is utilizing patch-clamping and other electrophysiological techniques to record pacemaker currents and action potentials from isolated turtle cardiac pacemaker myocytes. Dr. Christine Couturier is investigating how the subunits of one of the main ion channels believed to be involved in cardiac pacemaking, the hyperpolarization-activated cyclic nucleotide-gated channel (HCN, pacemaker or If channel), differ in their affinity for cyclic nucleotides, which are important regulators of HCN channel activity. Undergraduate Shannon Royal is utilizing spontaneously-contracting right atrium preparations to pharmacologically elucidate cellular mechanisms of pacemaking, and undergraduates Rhiannon Pattison, Theresa Cho and Angela Vogt have utilized real-time RT-PCR to investigate how the gene expression of various ion channels involved in cardiac pacemaking are affected by low temperature and anoxia.

Ultimately, probing how a vertebrate heart can continue to beat in the absence of oxygen will lead to a deeper understanding of the connections between oxygen, metabolism and electrical excitation, which are a crucial aspect of basic cardiac biology. In addition, the important insights into cardiac pacemaking in conditions of low oxygen and temperature have pertinence to human pathology, and the anoxic turtle provides a remarkable model of how these processes persist in conditions of substantial stress.



Dr. Stecyk's work branches into different species, and a paper co-authored by Dr. Stecyk entitled "Air breathing in the Arctic: influence of temperature, hypoxia, activity and restricted air access on respiratory physiology of Alaska blackfish *Dallia pectoralis*," was featured on the cover of the "Journal of Experimental Biology" in 2014. Subsequent work on the Alaska blackfish was funded by an Innovate Award in 2016.

PLASMA CAGE:
A TRAP FOR THE FOURTH STATE OF MATTER

"The Plasma Science & Engineering Laboratory brings together researchers and students across many disciplines at UAA."

Our universe is teeming with plasma. Known as the fourth state of matter, plasma occurs when atoms have their electrons stripped away (e.g. by extreme heat) and is akin to electrically charged gas. It makes up over 99.99% of the normal matter in the cosmos, including stars, nebulae, and the intergalactic medium. Closer to home, the solar wind plasma interacting with the Earth's magnetic field causes the aurora borealis that we are so fortunate to enjoy here in Alaska. Lightning bolts, welding torches, and fluorescent lighting are other common plasma phenomena.

Dr. Nathaniel Hicks, Assistant Professor of Physics at UAA, has dedicated his career to understanding the plasma state of matter and applying this knowledge to tackle scientific questions facing society. Much of Dr. Hicks' work to date has focused on the plasma physics of fusion energy: when hydrogen plasma is heated to high temperatures and confined at high density, hydrogen nuclei can fuse together at a sufficient rate to produce abundant, clean electricity that could go a long way toward solving some of the world's energy and environmental challenges. In his doctoral work at UCLA, Dr. Hicks produced the first symmetric neutralized ion beam, designed for applications that heat and diagnose fusion reactor plasma. As a post-doc at the Max-Planck-Institut, Dr. Hicks worked to implement some of the first real-time measurements and stabilization of magnetic islands that can cause fusion reactor plasma to disrupt. While in a U.S. Department of Energy research fellowship at the University of Washington, Dr. Hicks designed a new kind of plasma polarimeter to measure the magnetic field inside a spheromak device.

Dr. Hicks' collective research accomplishments allowed him to set his sights on creating a new experimental research program at UAA in Plasma Science & Engineering. He sought to synthesize his expertise in ion sources, beams, and accelerators, magnetically confined fusion plasma physics, radio-frequency and microwave plasma interactions, and computational plasma modeling techniques to conceive of and explore a completely new approach to trapping and studying plasma: Plasma Confinement by Alternating Gradient Electrodes, or "PCAGE" for short. In PCAGE, electrodes surrounding a plasma have radio-frequency (RF) alternating voltage applied to them, such that plasma particles oscillate in space, but experience a net focusing force toward the center of the device. The amplitude and frequency of the applied voltage can be chosen such that the negatively charged electrons are strongly trapped, but the heavier, positively charged ions are not affected by the RF. The positive ions are, however, attracted to the cloud of trapped electrons, and in this manner, the plasma as a whole is collectively confined. A patent application for this technology is in process.

The PCAGE research was initially funded by $10k from UAA's Innovate Awards, which helped Dr. Hicks receive a $100k NSF-DOE grant for studies of fundamental plasma physics in the PCAGE device. The focus of this grant is to perform detailed computer simulations of the plasma trapping and dependences on various trap parameters. This will lead to a follow-on phase that focuses on experimental demonstration and investigation of the effect, using the ultrahigh vacuum chamber and diagnostic equipment in Dr. Hicks' laboratory — a unique facility in Alaska. Looking ahead to that phase of the research, Dr. Hicks is currently the lead investigator on a $25k UAA Innovate Award Multidisciplinary project to develop a new plasma source that will feed the PCAGE device as well as other experiments. This "helicon" plasma source is a state-of-the-art means of coupling RF power into a column of gas, such that high density, highly ionized plasma is produced. It can also be used to perform experiments on spacecraft propulsion, a topic for which Dr. Hicks' students have won NASA/Alaska Space Grant research fellowships and will pursue.

Dr. Hicks is currently receiving funding from NASA/Alaska Space Grant to develop a Plasma Science and Engineering teaching laboratory at UAA, in particular because of many exciting new plasma applications that span other disciplines. For example, in his present Innovate Award research, Dr. Hicks is working with colleagues and students in Biological Sciences and the College of Engineering to explore how Atmospheric Pressure Plasma may be used in a variety of ways from sterilizing bacteria to treating cancer in human subjects.

Dr. Hicks also hopes to inspire the next generation of Alaskan scientists, engineers, and future UAA students, and with his students he has constructed a portable Planeterrella auroral simulator experiment (funded by a UAA Faculty Development Grant, with additional funding to begin this summer from NSF/American Physical Society). This device is designed to travel to schools and events, and showcase the wonders of plasma and the spirit of curiosity at UAA. Dr. Hicks is very pleased to be a part of the UAA community, where the culture of innovation and cross-disciplinary collaboration is a perfect fit for advancing his work in plasma science and engineering.

ABOUT DR. NATHANIEL HICKS

Dr. Nathaniel Hicks is an Assistant Professor in the Department of Physics & Astronomy at UAA. He received his PhD and MS. in physics from UCLA, and his BS in physics from Washington State University. Before coming to UAA, he held research positions at the University of Washington and the Max-Planck-Institut für Plasmaphysik in Germany. Dr. Hicks' research focuses on innovations in fusion energy science, basic plasma physics and diagnostics, and interdisciplinary plasma science and engineering. His work is presently receiving funding from NSF, the U.S. Dept. of Energy, NASA and UAA Innovate.

VARIETY IS THE SPICE OF LIFE:

AN EXPERIMENTAL ANALYSIS OF REINFORCER EFFECTIVENESS

Operant conditioning is a form of learning where the frequency of a behavior is controlled by its consequences. The term operant is the combination of two common terms: operate and environment. Thus, the term operant refers to a special class of behavior that operates on the environment to produce consequences. Consequences, such as reinforcers, increase the frequency of behavior. Punishers decrease the frequency of behavior. Operant conditioning methods are important for understanding complex behavior. For example, the paradigm is often used to determine the variables that govern drug abuse and how animals, including humans, make choices. Operant conditioning techniques are the primary type of therapy used in the treatment of intellectual and developmental disabilities, such as autism.

Dr. Eric Murphy studies operant conditioning in nonhuman animals, including rats, pigeons and hamsters. The goal of his research is to illuminate fundamental principles of behavior that apply across many species. One thread of his research explores how reinforcers change in their effectiveness with their repeated presentation. A rat, for example, is placed in an operant conditioning apparatus (i.e., "Skinner box") and is allowed to engage in lever pressing (a learned behavior that is easily quantifiable) that is maintained by the periodic delivery of a food pellet (i.e., reinforcer). One important finding is that rate of lever pressing is not constant within an experimental session even when the conditions of reinforcement are constant across that session. Instead, at rates of reinforcement often used in operant experiments (e.g., 60 reinforcers/hr), response rate often increases and then decreases across the course of, say, a 60-minute experimental session. The decrease in response rates may also occur without the increase and vice versa. Decreasing response rates are usually observed when high rates of reinforcement (e.g., 240 reinforcers/hr), and when no reinforcers (extinction), are provided. Response rate may be constant across the session at low rates of reinforcement (e.g., 6 reinforcers/hr). These within-session changes in responding are large and occur in steady state behavior. That is, they are not acquisition curves. They are highly general, occurring for many species (e.g., rats, pigeons, & humans), procedures (e.g., free operant & discrete trials) and reinforcers (e.g., food, drugs, lights, & conditioned reinforcers), and they have been reported by several laboratories.

Murphy and his colleague, Dr. Fran McSweeney, believe these within-session patterns of responding are due to changes in the effectiveness of the reinforcer and are mainly produced by sensitization and habituation to the sensory properties of the reinforcer. Within-session changes were not produced by the intuitively-more-popular variable, satiation to the reinforcer. Habituation is a decrease in responsiveness to a stimulus that is presented repeatedly or for a prolonged time. Sensitization, the companion process of habituation, is an increase in responsiveness to a repeatedly-presented stimulus (Groves and Thompson, 1970). Sensitization often, but not always, precedes habituation.

One property of behavior undergoing sensitization and habituation is variety effects. Variety effects refers to the finding that habituation occurs more slowly to stimuli presented in a variable, rather than a fixed, manner. Murphy has extensively studied this property with food and alcohol reinforcers in rats and has discovered that when reinforcers are delivered in a variable (unpredictable) manner, more operant behavior is maintained than when it is presented in a fixed (predictable) manner. In a series of experiments, Murphy and his students manipulated the interreinforcer interval (i.e., fixed 7.5 s vs. variable 7.5 s), reinforcer delay (10 s vs. variable 10 s), and reinforcer amount (fixed 5 food pellets vs. variable 5 food pellets) and found that his rats were more motivated (i.e., higher rates of lever pressing) when the reinforcer was presented in a variable manner.

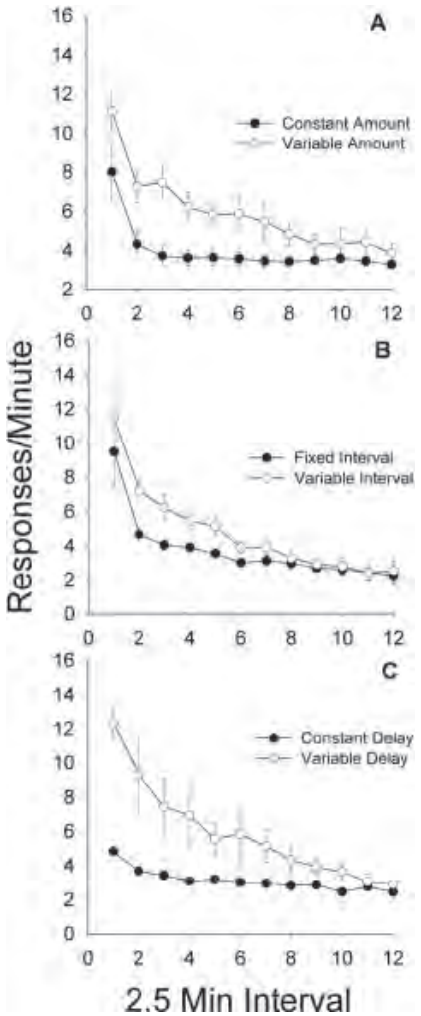


Fig 1. Rates of responding (responses/min) during the constant (closed circles) and variable (open circles) conditions during successive 2.5-min intervals for amount (A), schedule (B), and delay experiments. Each function is the mean of all rats (N=8) food-reinforced lever pressing during the last five sessions of each condition. Error bars represent ±1 standard error of the mean.

Murphy's research findings have implications for using operant conditioning techniques in applied settings. For example, applied behavior analysts sometimes need to strengthen a reinforcer that is too weak to maintain appropriate behavior. For example, repeatedly-presented food may eventually lose its ability to reinforce the behavior of a child with autism. Other times, behavior analysts wish to weaken a reinforcer that is maintaining too much behavior. For example, food reinforcers may maintain too much eating for obese clients. Murphy's findings suggest that the behavior analyst working with the child with autism could maintain the strength of food by decreasing habituation and/or increasing sensitization to those reinforcers. The behavior analyst working with an obese client could weaken the strength of food as a reinforcer by increasing habituation and/or decreasing sensitization to food. Variety effects imply that introducing variability in the delivery of the reinforcer from the start of the session should also help to maintain its effectiveness. For example, the frequent choice of M&M's (or Skittles) as reinforcers in applied work may not be accidental. Instead, changing the color of the candy from reinforcer to reinforcer may itself help to maintain reinforcer effectiveness through variety. In addition, a behavior analyst who wishes to maintain the effectiveness of candy as a reinforcer might sometimes provide M&M's, sometimes Snickers, sometimes Butterfingers, etc. as the reinforcer for the behavior of a child with autism. In contrast, a behavior analyst trying to weaken the effectiveness of food as a reinforcer for an obese client should urge the client to avoid buffets. People should consume more food when eating at buffets than when eating a standard meal because the buffet provides an alternative each time the effectiveness of one food wanes through its consumption.

Murphy also has research interests in impulsivity (with Dr. Gwen Lupfer), the biological substrates of learning (with Dr. Jay Wright), and the potential role of redox defense compounds found in Alaska Bog Blueberries on enhancing the memory of aged rats (with Dr. Colin McGill). His collaborative work with Dr. McGill was funded by UAA's Innovate Awards and resulted in a non-provisional patent and the formation of Cogniceutics, UAA's third start-up company.

Laboratory rat presses lever to receive reward in reinforcement exercise.

ABOUT DR. ERIC MURPHY

Dr. Eric S. Murphy is Professor of Psychology at the University of Alaska Anchorage (UAA). He received his BA from UAA and MS. and PhD degrees in experimental psychology from Washington State University. Dr. Murphy has research and teaching interests in operant conditioning and behavioral neuroscience. He and his students are currently studying the variables that regulate operant behavior in laboratory rats. He is co-founder and Chief Technology Officer of Cogniceutic Solutions, a division of Seawolf Holdings.

FILLETS, HEADS AND TAILS:
ALASKA SALMON MIGRATING TO CHINA

Being a Chinese economist and an Alaskan resident, Dr. Zheng has always been interested in the connection between Alaska and China.

Dr. Zheng conducted a research project Consumer Preference and Market Potential for Alaska Salmon in China with support from a 2015 Innovate Award. The goal of the project was to assess the emerging demand and market potentials for Alaska salmon in the China market, better understand Chinese consumers' preference for salmon and its attributes, and assess their perceptions of Alaska wild salmon.

Dr. Zheng and her co-investigators designed a consumer survey and conducted it in Beijing, Shanghai and Guangzhou during Summer 2015. The survey included questions on consumers' purchase patterns and preference for seafood, their salmon consumption habits and preference for salmon attributes, their perceptions of and attitudes toward Alaska salmon, their willingness to purchase Alaska salmon fillet and heads/bones, etc.

The results show promise that Chinese consumers would be willing to choose Alaska salmon because it is caught wild and harvested sustainably, which indicates potential for increasing sales of Alaska salmon in China. Consumers also stated willingness to purchase Alaska fish heads and bones if they are available at an acceptable price. In the US, most salmon consumers only eat the fillet. Even though other parts of the fish are for sale in the market from time to time, the prices for these are usually lower. In contrast, Chinese culinary traditions include the cooking of fish heads, tails and bones for various soups and stews that are considered healthy meals. As a result, these seemingly low-value parts, considered waste to most US consumers, can potentially carry significant economic value as seafood products to be exported to China.

The collected information is helpful so seafood producers in Alaska can achieve maximum penetration into the Chinese market and increase the competitiveness of the Alaska seafood industry in the international marketplace. Besides publishing journal articles and extension papers for this project, Dr. Zheng also talked to various media outlets to share the research findings with fishing industry and local communities.

China is currently Alaska's biggest export market. Growing Chinese demand offers huge potential for Alaska economic growth through expanded trade. In addition to her research, Dr. Zheng is dedicated to exposing her students to Chinese culture, economy and business. In 2015, she designed a study abroad course "Globalization and China Economy and Business" and brought nine UAA students to visit China. They travelled by overnight trains, buses, and planes for two weeks to Beijing, Xi'an, Chongqing, Wuhan, and Shanghai to visit firms, markets, export agencies, and universities and also to communicate and connect with business executives and college students. The itinerary was designed to provide students with opportunities to learn and build their international human and social capital. Students explored Chinese culture and history and learned about China's economy and business models and development under a globalization framework.

Dr. Zheng and her business class in China.

ABOUT DR. ANGIE ZHENG

Dr. Qiujie "Angie" Zheng is an Associate Professor of Quantitative Methods and Economics at the University of Alaska Anchorage. She has been conducting research on agricultural production supply, consumer choice and preference, risks and experimental economics. Dr. Zheng has published several research articles in peer-reviewed journals and in conference proceedings. Before joining the Department of Economics and Public Policy at the university, Dr. Zheng had worked as Senior Risk Analyst in JPMorgan Chase & Co. for two years after obtaining her PhD degree in economics and MS degree in Statistics from the Washington State University in 2010.

ARCTIC ROADS:

THE ROAD LESS TRAVELED - NOT

MOOSE, STUDDED SNOW TIRES, ICE EVERYWHERE.

These are the facts of life for drivers in the Arctic. Residents of Alaska are familiar with the hazards of (real) winter driving, and fortunately, the engineers are keeping up. One leader is Dr. Osama Abaza, a professor of civil engineering at UAA who specializes in cold region transportation and traffic safety issues including the use of steel fiber-reinforced rubberized concrete for roadway/intersection rutting mitigation, and the calibration of National Highway Safety Manual for cold regions applications. He is also involved in the frequency and potential severity of red light running, and accident reduction factors relating to moose-vehicle collision. Dr. Abaza's research includes pavement engineering applications, material engineering as it relates to transportation engineering, material sustainability, traffic operation and control, security and survivability of transportation networks, and highway and traffic safety.

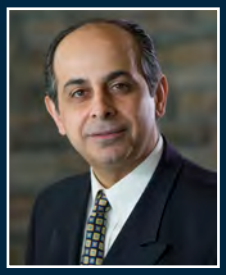
Dr. Abaza's goal as a professor has been to continue a balanced and sustainable professional program that integrates teaching, scholarship activities, and university and professional services. His goal is to enhance student success and attainment, develop partnerships with the local community through public entities and private industries, and research and development, all in pursuit of a better quality of life for our community and, beyond that, all human beings.

His recent work with Steel Fiber Reinforced Rubberized Concrete (SFRRC) is on the cutting edge of cold weather material engineering to overcome harsh weather in cold regions like Alaska. Alaska has one of the longest seasons for permitted stud tire use in the U.S.; the season begins as early as mid-September and ends on April 30. With the increased abrasion of studded vehicles, deterioration of asphalt pavement roadways in Alaska is extensive. Steel Fiber Reinforced Rubberized Concrete (SFRRC) is a concrete mixture that included both crumb rubber to induce flexibility and steel fibers to increase the strength. Laboratory testing has shown that the freeze-thaw resistance, flexibility, and toughness of standard Portland cement concrete is greatly increased with the introduction of crumb rubber and steel fibers to overcome harsh weather in cold regions like Alaska. Dr. Abaza is currently overseeing a 150-ft test section that uses SFRRC on Abbott Road between Elmore Road and Lake Otis Parkway in Anchorage, Alaska.

In addition to his work on SFRRC, Dr. Abaza's research focuses on a number of safety issues facing transportation engineering in cold regions. Efforts to reduce fatal and severe injury crashes on highways are one of the top priorities of transportation agencies in the United States, including the Alaska Department of Transportation and Public Facilities (DOT&PF). Dr. Abaza's research includes the use of a video detection system to record red light-running violations, calibrating the Highway Safety Manual for cold weather, and evaluation of Highway Patrol investments and crash outcomes.

Ultimately, his work integrates a large field of engineering topics to address the concerns of the DOT&PF in cold weather environments, making transportation safer and more reliable. Along with his work at DOT&PF, Dr. Abaza has expanded his research work to include other local, state and national agencies. The Alaska Department of Fish and Game, Anchorage Water and Wastewater Utilities, Alaska State Troopers, and National Cooperative Highway Research Program are among his research collaborators. Dr. Abaza has successfully generated $1.2 million in external research funds over a two-year period.

Dr. Abaza's research revolutionizes cold weather transportation engineering and provides safer, more reliable roads in Alaska. Specific deliverables and outcomes of Dr. Abaza's research include published articles and presentations, and can be found on his ePortfolio at www.osamaabaza.com.



ABOUT DR. OSAMA ABAZA

Dr. Osama Abaza is a Professor of Civil Engineering at the University of Alaska Anchorage (UAA). He is a graduate of Brigham Young University for his doctorate degree and University of Toledo/Ohio for his master's and undergraduate degrees. He worked in the academic circles and industry for the last 33 years in the field of civil/transportation engineering as it relates to pavement structures, pavement management, highway engineering and materials and traffic engineering. He has served in the academic field as a Department Chair, Dean of College of Engineering and a Vice President for Administrative Affairs. He worked in the industry as registered professional engineer and a CEO of a consulting firm for 15 years.

Dr. Abaza is a member of Institute of Transportation Engineers, (ITE), American Society of Civil Engineers (ASCE), American Concrete Institute (ACI), ASTM and other national and international professional organizations.

THE FUTURE FOR YOUTH IN THE CIRCUMPOLAR ARCTIC

"We cannot always build the future for our youth, but we can build our youth for the future."

— Franklin D. Roosevelt, September 20, 1940, address at the University of Pennsylvania.

While it may seem clichéd, it is true that youth represent the future. And yet across the circumpolar north, many youth, especially indigenous young people, face significant challenges as they prepare for the future.

Diane Hirshberg has been studying education issues in Alaska for over 20 years, and in recent years has expanded her focus to include youth and education issues across the Arctic. Along with colleagues at the Institute of Social and Economic Research (ISER) and the Center for Alaska Education Policy Research (CAEPR) at ISER, she has explored the past, present, and future of schooling for youth in Alaska: from the boarding school experiences of Alaska Native students prior to the Molly Hootch case, to issues around high teacher turnover in rural Alaska, and how much teachers should be compensated. She has also evaluated numerous federally funded efforts to improve teacher education and student learning across the state, especially for Alaska Native students, and examined barriers to indigenous self-determination in education within Alaska.

Development of a research program around circumpolar education issues began in earnest when Dr. Hirshberg and Dr. Andrey Petrov, University of Northern Iowa, began working on the education chapter for the 2014 "Arctic Human Development Report II" (AHDR II). They found that the educational challenges in Alaska are mirrored in many other northern regions. Alaska as a state has among the lowest high school graduation rates and lowest college-going rates in the nation. Likewise there are gaps in achievement and school completion rates between students living in northern and remote regions of other Arctic nations and those in the southern and more urban areas, as well as between indigenous and non-indigenous students. There is also a growing gender gap in most Arctic regions, in which women are graduating from high school and attending college at higher rates than men. Other common challenges across the north include providing local education to small, remote communities. School closures and consolidation affect not only rural Alaska but also the northern regions of the Nordic countries and the Russian Federation. Most Arctic communities experience difficulties in recruiting and retaining teachers and are overly reliant on teachers from outside the region, who are much less likely to stay than teachers from those communities. Finally, there are issues around which languages and cultures should be the basis for and subject of formal schooling. While more heritage languages are being taught in primary and secondary schools, there are also threats to indigenous languages due to the limitations for postsecondary education in many languages.

Now the focus is on the future for youth across the north, the role education plays in sustainable development, and determining how we build a sustainable future for young people. This final issue is the focus of a new study in which Dr. Hirshberg is engaged, along with co-leads Drs. Joan Nymand Larsen and Jon Haukur Ingimundarson, colleagues from the Stefansson Institute in Iceland. The study is funded by the Nordic Council of Ministers. Arctic Youth-Sustainable Futures is a follow up to the AHDR II to address gaps in knowledge about youth and their aspirations, and the issues and challenges facing them in a time of rapid social, economic, and environmental change. The researchers are conducting focus groups with youth across the Arctic nations as well as gathering new research and indicators data to develop a greater understanding of how young people view a sustainable future and how to measure progress toward this. This work is already leading to new collaborations for research on changing Arctic youth identities, and how young people are negotiating new multi-racial and multi-cultural identities in an increasingly complex social and political environment. Through her work, Dr. Hirshberg looks forward to building UAA's Arctic research profile and a greater understanding of how to create the best possible futures for both Alaska's youth and youth from across the Arctic.

ABOUT DR. DIANE HIRSHBERG

Diane Hirshberg is Professor of Education Policy at the Institute of Social and Economic Research and founding director of the Center for Alaska Education Policy Research. She also serves as Advisor to the UAA Chancellor on Arctic Research and Education. Dr. Hirshberg has a PhD in Education from UCLA, a Master of Public Administration from Columbia University and a bachelor's degree from UC Berkeley. Her research interests include education policy analysis, indigenous education, circumpolar education issues, and the role of education in supporting sustainable development and Arctic governance.

CONFRONTING SEXUAL ABUSE THROUGH COMMUNITY-ENGAGED THEATRE: STALKING THE BOGEYMAN PROJECT

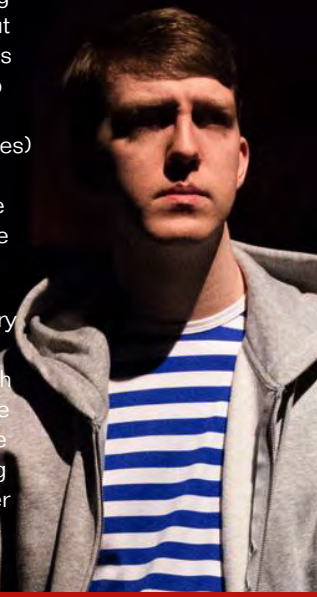
Every eight minutes a child is sexually assaulted in the U.S., and 93 percent know the perpetrator. Alaska has one of the highest rates of childhood sexual assault in the nation; approximately one in three girls and one in five boys in Alaska will be sexually abused before age 18.

Embracing the power of interdisciplinary and community partnerships to deepen and expand understanding and discussion of child sexual abuse in Alaska, in Spring 2016, the University of Alaska Anchorage (UAA) Department of Theatre and Dance partnered with the UAA Departments of Psychology and Art and a number of community organizations to present Stalking the Bogeyman (STB). STB is a haunting play based on the true account of Alaskan journalist David Holthouse, who was brutally raped as a 7-year old boy. The play spans several decades, following Holthouse from the time of the rape through early adulthood, when he planned the murder of his attacker. The play was adapted for stage by Holthouse and Markus Potter from an article first published in the "Denver Westword" in 2004 by Holthouse. This powerful play held its world premiere in North Carolina in 2013, an off-Broadway production in 2014, a new production opened in London in 2016, and the West Coast premiere was at UAA.

The STB production at UAA was directed by Dr. Brian Cook. As it dealt with child sexual abuse and its aftermath, the actors confronted extremely challenging stage situations, many for the first time. The Department of Theatre and Dance faculty chose the show to provide an experience of socially-engaged theatre that was valuable to the students as both learners and artists. The project centered around the performance of the play, augmented by mental health support for the cast, crew, and audience by Psychology faculty and graduate students, community talkbacks with the cast, faculty, and service partner representatives, research and scholarship by UAA doctoral students, and interactive art responses. In addition to Cook, UAA faculty members Dan Anteau and Jill Flanders Crosby of Theatre and Dance, and Drs. Claudia Lampman and Rebecca Robinson of Psychology spearheaded the project, joined by Dr. Herminia Din of Art. The STB Steering Committee was chaired by UAA alum Priscilla Hensley-Holthouse, who helped draw together the university team and community partners including Standing Together Against Rape (STAR), Alaska Children's Trust and the Alaska Native Tribal Health Consortium.

One important aspect of the project was to support and protect the well-being of all involved in this intense production, including cast, crew and audience. Open meetings were held prior to casting to clarify exactly what the roles in the show would entail. A member of the Psychology support team was present at that meeting and at every rehearsal and performance from then on, acting as a safety net in case anyone should need to talk about their experience. A few simple but effective mechanisms were implemented during rehearsals, including warm-up exercises aimed at making everyone feel comfortable, always using character names (not the actors' real names) in the rehearsal room, and everyone playing some silly games together at the end of every rehearsal to restore equilibrium. Dr. Robinson assembled and supervised the clinical support team on the project.

In addition to the mental health support available at every performance, the audience also had the opportunity to process their feelings through a post-show talkback with the cast and a special guest, often a steering committee member or someone from the community. The audience could interact with several evolving art projects, offering a more tactile expression of thoughts or feelings: for her piece "Words in the Light," Din acquired plastic puzzle-



ABOUT DR. DANIEL J. ANTEAU

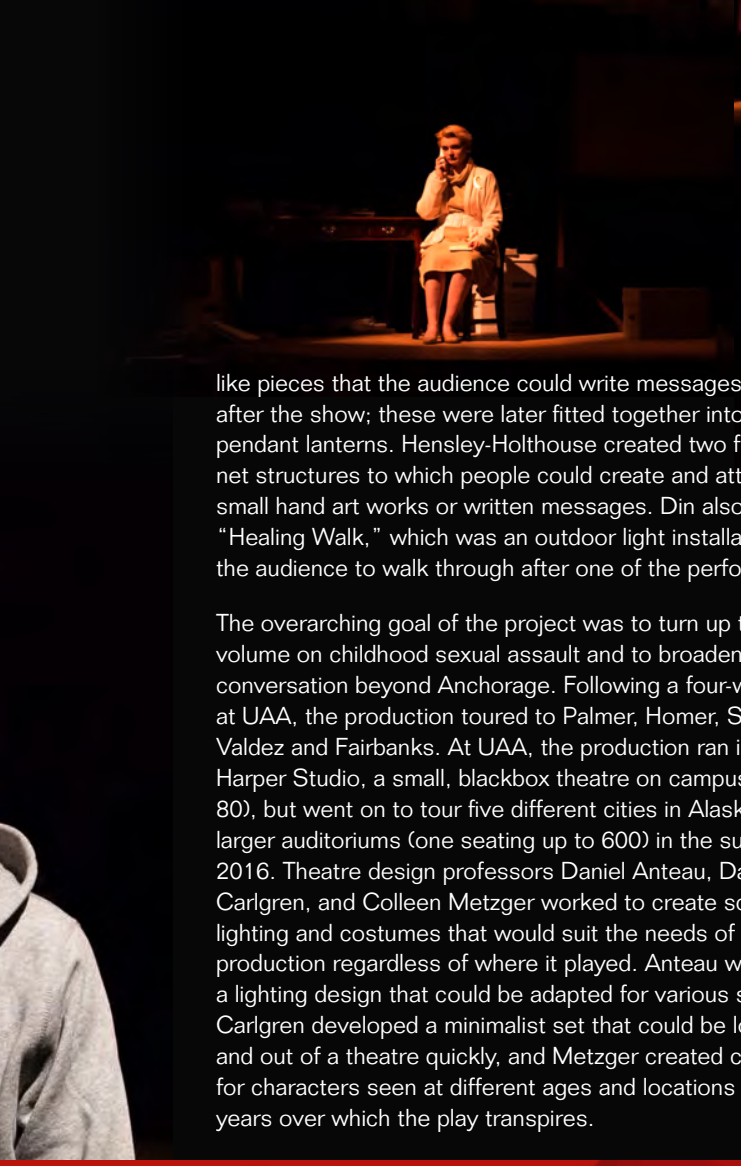
Dr. Daniel J. Anteau is a Professor of Lighting Design and Chair of the Department of Theatre and Dance at the University of Alaska Anchorage. He has served on the steering committee for the Stalking the Bogeyman Project as well as the Lighting Designer for the Anchorage production and the tour.

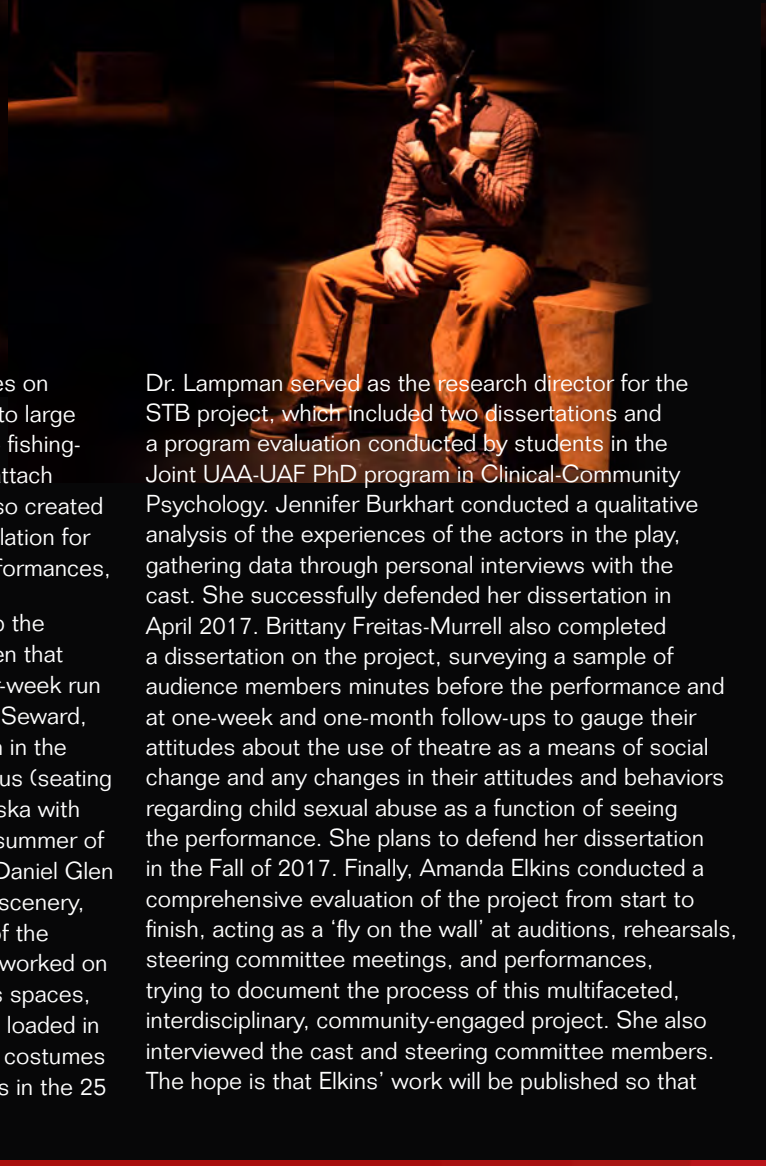
ABOUT DR. BRIAN COOK

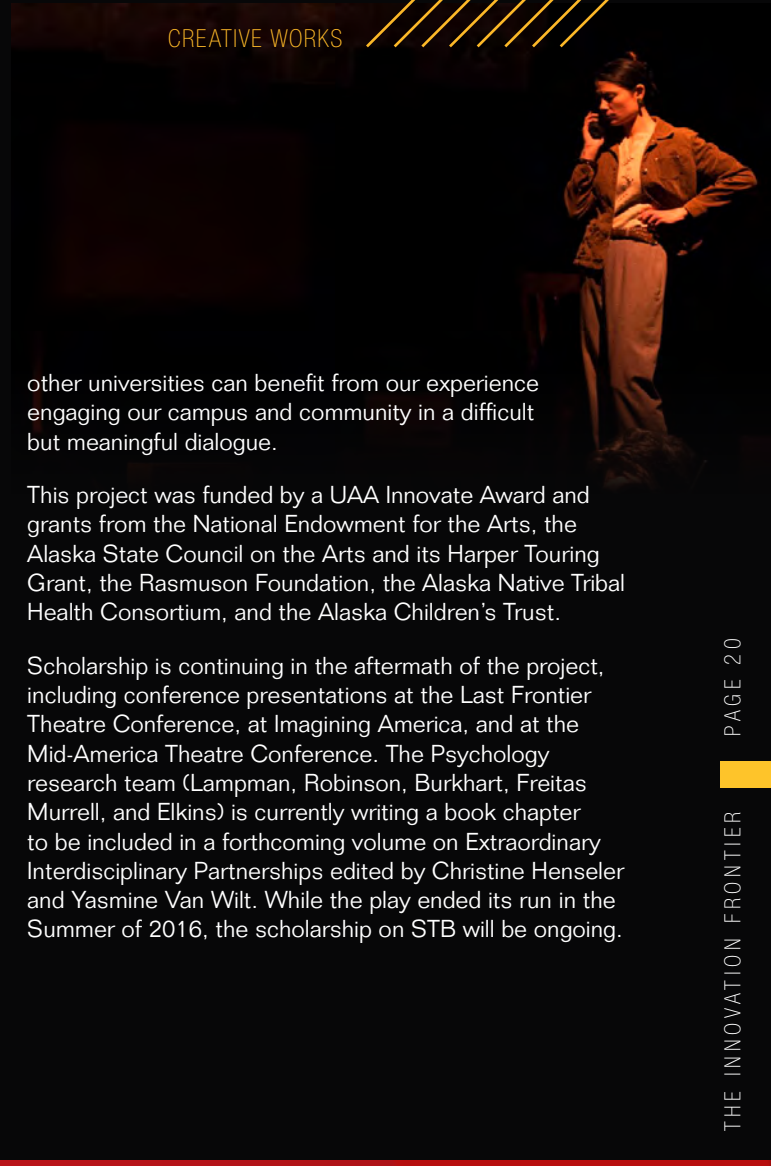
Dr. Brian Cook received his PhD from the University of Oregon, and his MA from King's College and the Royal Academy of Dramatic Arts in London. He directs productions and teaches theatre history, dramaturgy, and directing at UAA. His research work is in political theatre (usually British), and he is currently working on a special edited section for Theatre History Studies on "Rousing Experiences" in theatre.

ABOUT DR. JILL FLANDERS CROSBY

Dr. Jill Flanders Crosby is a Professor in UAA's Department of Theatre and Dance. In addition to helping with Theatre and Dance productions, she researches religious dance forms in Ghana and Cuba. She spearheaded a collaborative art installation inspired by her Ghanaian and Cuban fieldwork that premiered in Havana, Cuba, and showed in Ghana and San Francisco. She researches jazz dance and is currently examining Cook Islands dance.







like pieces that the audience could write messages on after the show; these were later fitted together into large pendant lanterns. Hensley-Holthouse created two fishing-net structures to which people could create and attach small hand art works or written messages. Din also created "Healing Walk," which was an outdoor light installation for the audience to walk through after one of the performances,

The overarching goal of the project was to turn up the volume on childhood sexual assault and to broaden that conversation beyond Anchorage. Following a four-week run at UAA, the production toured to Palmer, Homer, Seward, Valdez and Fairbanks. At UAA, the production ran in the Harper Studio, a small, blackbox theatre on campus (seating 80), but went on to tour five different cities in Alaska with larger auditoriums (one seating up to 600) in the summer of 2016. Theatre design professors Daniel Anteau, Daniel Glen Carlgren, and Colleen Metzger worked to create scenery, lighting and costumes that would suit the needs of the production regardless of where it played. Anteau worked on a lighting design that could be adapted for various spaces, Carlgren developed a minimalist set that could be loaded in and out of a theatre quickly, and Metzger created costumes for characters seen at different ages and locations in the 25 years over which the play transpires.

Dr. Lampman served as the research director for the STB project, which included two dissertations and a program evaluation conducted by students in the Joint UAA-UAF PhD program in Clinical-Community Psychology. Jennifer Burkhart conducted a qualitative analysis of the experiences of the actors in the play, gathering data through personal interviews with the cast. She successfully defended her dissertation in April 2017. Brittany Freitas-Murrell also completed a dissertation on the project, surveying a sample of audience members minutes before the performance and at one-week and one-month follow-ups to gauge their attitudes about the use of theatre as a means of social change and any changes in their attitudes and behaviors regarding child sexual abuse as a function of seeing the performance. She plans to defend her dissertation in the Fall of 2017. Finally, Amanda Elkins conducted a comprehensive evaluation of the project from start to finish, acting as a 'fly on the wall' at auditions, rehearsals, steering committee meetings, and performances, trying to document the process of this multifaceted, interdisciplinary, community-engaged project. She also interviewed the cast and steering committee members. The hope is that Elkins' work will be published so that other universities can benefit from our experience engaging our campus and community in a difficult but meaningful dialogue.

This project was funded by a UAA Innovate Award and grants from the National Endowment for the Arts, the Alaska State Council on the Arts and its Harper Touring Grant, the Rasmuson Foundation, the Alaska Native Tribal Health Consortium, and the Alaska Children's Trust.

Scholarship is continuing in the aftermath of the project, including conference presentations at the Last Frontier Theatre Conference, at Imagining America, and at the Mid-America Theatre Conference. The Psychology research team (Lampman, Robinson, Burkhart, Freitas Murrell, and Elkins) is currently writing a book chapter to be included in a forthcoming volume on Extraordinary Interdisciplinary Partnerships edited by Christine Henseler and Yasmine Van Wilt. While the play ended its run in the Summer of 2016, the scholarship on STB will be ongoing.

ABOUT DR. HERMINIA DIN

Dr. Herminia Din is Professor of Art Education at UAA specializing in museum technology and community-based art education and the recipient of a previous UAA Innovate Award. On this project, Dr. Din contributed her expertise to the faculty-driven arts-based inquiry and action research surrounding the production of Stalking the Bogeyman.

ABOUT DR. CLAUDIA LAMPMAN

Dr. Claudia Lampman is Professor and Director of the Psychology Department at UAA. She served as the Research Director for the Stalking the Bogeyman project. Dr. Lampman brings 25 years of experience assessing the impact of behavioral interventions, publishing numerous articles on social issues (sexual harassment, bullying, HIV/AIDS, and child well-being), and teaching social psychology and gender.

ABOUT DR. REBECCA ROBINSON

Dr. Rebecca Volino Robinson is an Assistant Professor of Psychology at UAA and a licensed Psychologist in Alaska. She leads the Community Psychology Research Collaborative at UAA, a research learning community funded by the National Institute of Health, BUILD EXITO program. Dr. Robinson is a three-time recipient of the UAA Innovate Award (2014; 2016; 2017).

WINTER IS COMING:

REIMAGINING THE STARK WINTER CAMPUS

ART LIGHT PLAY

With the strong belief that "Art can contribute to an increased awareness of, and can be an effective way of addressing and exploring socially relevant environmental issues," Dr. Herminia Din, a Professor of Art Education at UAA, initiated the Winter Design Project in October 2013. It motivated faculty and students to look at ice and snow from a new perspective, and was intended to spark a wide array of special programs and creative activities across campus with the goal of finding innovative ways to use outdoor winter spaces.

In 2007, Hicks & King wrote "Art education is well situated to address environmental problems that emerge at the point of contact between nature and social life." Their thesis was that community-engaged art in an educational setting helped students raise their own awareness of wellness issues, perception of real world problems, and develop social responsibility and critical thinking skills. With this project, Dr. Din made the case that UAA needed to offer more creative programs related to conceptualizing and creating sustainable art activities or displays — especially in an outdoor setting.

Planning began with administrative support from Facilities & Campus Services, Student Life & Leadership, Dining Services, University Advancement, Office of International and Intercultural Affairs, Office of Sustainability, and the Center for Community Engagement and Learning.

Beginning in February 2014, 15 faculty members participated with more than 500 of their students in this creative enterprise. They represented a wide variety of disciplines including art, math, science, music, Spanish, English, Alaska Native Studies, outdoor education, teacher education and engineering. The project included on-site performances, site-specific installations, and interactive or participatory experiences.

The results dramatically surpassed initial expectations and provided many positive outcomes by offering a unique learning opportunity and helping UAA students understand how Sustainable Art functions in our own environment. Guests from Norway's Nesna University College (Nord University) generated enhanced interest among faculty and students by creating and encouraging a more engaged wintertime campus experience, and strengthening and expanding UAA's participation with Arctic Sustainable Arts and Design network, a Thematic Network of the University of the Arctic.

Dr. Din chronicled this unique collaborative learning experience and its results via publication of "Art, Light, Play: Re-Imagining the Winter Campus" in June 2016 with support from UAA Innovate Awards. The book focuses on how to implement a place-making creative initiative, and discussed how art can be used to make a strong statement about drastic climate change, especially in the Arctic. It encourages readers to look at sustainable medium from a new perspective, to reflect a human relationship with the winter environment, and to inspire further artistic creation and creative solutions. Dr. Din hopes the book will serve as a blueprint for innovative curricula and a guide to transforming a campus's physical and social landscape.

A 3-D Ice sculpture depicting the complexity and beauty of the fractal figure generated from the Cantor Set. The Cantor Set has many wonderful mathematical properties and is created in the following way. Start with a line. Divide it into 3 equal pieces, each one-third in length, then remove the middle third. Next with the remaining two-line segments, remove the middle third again. Keep repeating the process — you can do it an infinite number of times — and what remains form a fractal — the Cantor Set. A 3-D version is illustrated in the ice figure.

ABOUT DR. HERMINIA DIN

Dr. Herminia Din is Professor of Art Education at UAA. She specializes in museum interpretive technology and community-based art education. She received a 2013 UAA Chancellor's Award for Excellence for her efforts on "Junk to Funk" to raise awareness of the "reduce" and "reuse" methods of dealing with waste products. She began the Winter Design Project in 2014 to continue the promotion of sustainable art, a collaborative-learning experience connecting faculty and students that encouraged an in-depth look at ice and snow from a new perspective and inspired further artistic creation and creative solutions.

PATENTS

DRAMATIC GROWTH CONTINUES

INCREASES SINCE FY11:

0→11 PATENTS ISSUED TO FACULTY AND STUDENTS

1→52 PATENT APPLICATION FILINGS AND COPYRIGHT FILINGS

3→51 INVENTION DISCLOSURES ACROSS DISCIPLINES

0→4 UAA START-UP COMPANIES FORMED

Number of students involved in developing and patenting
NEW TECHNOLOGY
IS ON THE RISE

UAA PATENTS ISSUED. INVENTORS ARE INDUCTED INTO UAA'S PATENT WALL OF FAME.

Vehicle Accessory Engagement Tracking US 9,715,369	Timothy Menard * Jeffrey Miller John Lund
Surgical Cutting Device and Methods of Using Same US 9,636,134 B2	Samuel Werner *
Bending Instrument and Methods of Using Same US 9,421,596 B2	Anthony James Paris Shawn Wooten * Paul Harren * Wesley Burgess *
Long Lifespan Wireless Sensors and Sensor Network US 9,257,036 B2	John Lund Todd Peterson
Bending Instrument and Methods of Using Same US 9,003,859 B2	Anthony James Paris Brian Patrick Glasheen Jr. * Gan Wu * Jacob Thompson *
Fish Carcass Disposal System US 8,833,682 B2	Alexandra Elizabeth West *
Process for Demineralization of Bone Matrix and Preservation of Natural Growth Factors US 8,574,825 B2	Nancy J. Shelby Steven M. Scott Benjamin P. Luchsinger Gregory A. Juda Kelly R. Kirker Jesus Hernandez Darrel L. Holmes
Data Hiding Based Messages and Advertisements US 8,555,052 B2	Helena S. Wisniewski Rajarathnam Chandramouli Koduvayur P. Subbalakshmi
Methods and Systems for Multiple Factor Authentication Using Gaze Tracking and Iris Scanning US 7,986,816 B1	Kenrick Mock Bogdan Hoanca
pH-Sensitive Immunoliposomes and Method of Gene Delivery to the Mammalian Central Nervous System US 5,786,214	Eric G. Holmberg
Self-Heating Enclosure with Carbon Fiber US 14/946,230 (non-provisional; Notice of Issuance	Joey Yang Benjamin Still *
Systems and Methods for Heating Concrete Structures US 14/024,152 (non-provisional); Notice of Issuance	Joey Yang Ting Yang * Mithun Singla Christiana Chang Gangbing Song

* indicates individuals who were students when patents were filed.

RHIZOFORM LLC

RHIZOFORM, LLC UAA'S FOURTH START-UP COMPANY

RHIZOFORM WAS NAMED ONE OF THE TOP 36 "BEST UNIVERSITY START-UPS" BY THE NATIONAL COUNCIL OF ENTREPRENEURIAL TECH TRANSFER IN SEPTEMBER 2016.

With the debris gathering in our oceans and elsewhere causing harmful effects on the environment, there is a need for environmentally-friendly biodegradable products. Rhizoform's technology meets this need. It provides biodegradable insulation materials from natural products that can be used for housing insulation, road underlayment, packaging insulation, shipping containers and coolers. It is a potential replacement for Styrofoam.

The idea for Rhizoform's products came about when Dr. Philippe Amstislavski, a UAA Public Health professor, teamed up with UAA professor Dr. Zhaohui "Joey" Yang, a geotechnical engineer. Dr. Amstislavski was experimenting with biomaterials to produce a technology for a thermally insulating biological foam, and Dr. Yang, knowing the challenge of insulating buildings and infrastructure from the extremes of the Alaska winters, suggested testing the foams for their stability and thermal properties. Together they developed a prototype for carbon-neutral, high-value insulation from local forestry products including fungal rootlets. The team received a UAA Innovate Award to further develop their idea, and after a successful effort, Rhizoform was born.

Rhizoform is cost-competitive with synthetic insulation systems. It is:

- Versatile – easily customized to meet required shape and R-value;
- Sustainable — biodegradable at the end of the structure's lifecycle;
- Safe and environmentally-friendly: manufactured from fully-renewable sources with a fraction of the energy input required to produce conventional polymeric foams; and
- Does not create plastic pollution and waste streams, unlike petroleum-based plastic foams.

The patent-pending technology provides a fast-growing, rapidly-renewable carbon-neutral, safe material for a new generation of bioengineered foams by introducing biologically-produced tubes into a structural scaffold. The 3-D scaffold is printed or stamped from forestry byproducts, and fungal rootlets are then introduced. They form a dense matrix consisting of a mass of branching, chitinous tubes. The internal scaffold delivers nutritive media and structure to the fungal tubes as they rapidly grow and bind the scaffold. The composite is then incubated for several days and dried before application. Rhizoform's biomaterial can be designed to achieve precise R-values, mechanical properties, and match the net shape of the surface to be insulated.

Rhizoform is a Seawolf Holdings Company. It was formed in July 2016 by the Vice Provost for Research and Graduate Studies, Dr. Helena Wisniewski, together with Drs. Amstislavski and Yang as the co-founders, who, with student Maria White, are the inventors on the company's U.S. Patent Pending, No. 62/288,156.

DEMO DAY AT CONGRESS

Rhizoform was selected as a recipient of the "Best University Start-Ups 2016" Award and was invited to participate in the University Start-Ups Demo Day held at the U.S. Capitol in Washington D.C. on September 20, 2016. Dr. Amstislavski and Dr. Wisniewski are pictured with U.S. Congressman Young, Alaska's U.S. Senator Murkowski, and U.S. Senator Sullivan during Demo Day at Congress.

COGNICEUTIC SOLUTIONS, LLC

Alaska Natives have known for decades that consumption of the Alaska bog blueberry improved memory, but the compound responsible for this was not known until UAA Professor Colin McGill, Assistant Professor of Chemistry, isolated it.

Loss of memory, cognition, and motor function are effects of aging and neurodegenerative disease. These functional losses often severely impact quality of life and are prevalent problems in today's society. According to the World Health Organization, 47 million people worldwide have dementia and 9.9 million new cases occur each year

Cogniceutic Solutions, LLC, a new UAA Start-Up, developed a therapeutic treatment to improve memory and reduce cognitive deficits of aging-associated dementia and neurodegeneration. With both normal aging-associated cognitive decline and neuro-degenerative diseases affecting a growing segment of the world population, the demand for memory supplements and nutritional therapies will continue to grow.

Advantages of Cogniceutic's treatment:

- Improves and maintains working memory (short-term memory loss).
- Works on both the mild cognitive decline experienced with normal aging and the more severe decline seen in neurodegenerative diseases such as dementia.

Cogniceutic Solutions' therapy has been tested in human nerve cells and "aged rats," which the NIH uses in studies of aging. These studies demonstrate the therapy significantly improves working memory, significantly reduces neuronal redox stress and neurodegeneration, reduces pro-apoptotic (programmed cell death) signaling, and increases levels of ATP. The testing further has shown reduction in levels of harmful neurochemicals that contribute to degeneration of brain function.

Cogniceutic Solutions, LLC is a Seawolf Holdings Company and was formed in December 2014 by the Vice Provost of Research and Graduate Studies at UAA, Dr. Helena Wisniewski, with the faculty inventors Dr. Colin McGill and Dr. Eric Murphy, Associate Professor of Psychology.

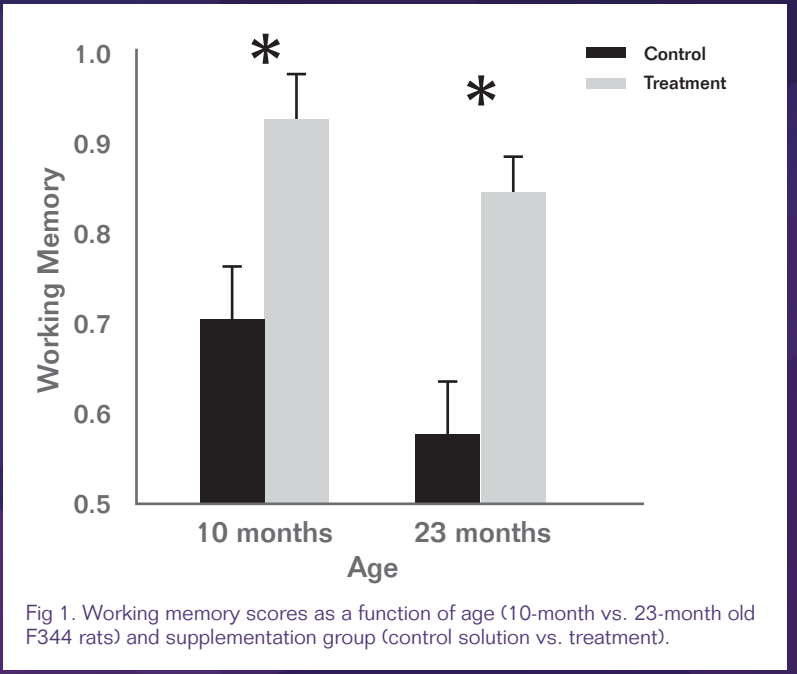


Fig 1. Working memory scores as a function of age (10-month vs. 23-month old F344 rats) and supplementation group (control solution vs. treatment).

Working memory was assessed with a T-maze. A score of 1.0 indicates the rats remembered where they previously received food on every trial. A score of 0.50 indicates no memory for where the food was previously located. The results are statistically significant — they are true with a confidence level of 95%.

Cogniceutic co-founders and inventors, Dr. Colin McGill and Dr. Eric Murphy.

$225,000 INVESTMENT RECEIVED FOR UAA START-UP

University of Alaska Anchorage start-up company Arctic Heat Technologies Inc., formerly CFT Solutions LLC, received a healthy boost thanks to an initial investment of $225,000 by the Alaska Accelerator Fund (AAF). This investment by the Alaska Accelerator Fund illustrates UAA's capability to commercialize research and contribute to the state's economic development.

Dr. Helena Wisniewski, UAA Vice Provost for Research and Graduate Studies and President of UAA's Seawolf Holdings LLC, arranged and negotiated the deal with Ky Holland, one of the fund's managers. Dr. Joey Yang, Professor of Civil Engineering, is the inventor of the company's patented technology Tundra Tape, a carbon fiber-based tape that can be placed beneath concrete to heat surfaces, keeping them free of snow and ice. It has been successfully installed in two walkways on UAA's campus — the main entrance to the new Engineering and Industry Building and the north entrance of the University Lake Annex. Additionally, Cook Inlet Housing Authority installed the tape for a melting pad at its senior housing complex on Peck Avenue.

CFT Solutions was formed by the Vice Provost for Research and Dr. Yang in 2013. The fund's management team will enable the start-up to grow more rapidly. Under the new corporate structure, Alaskan Tim Allen will be president of Arctic Heat Technologies, bringing worldwide industrial product and marketing experience. The initial board of directors will include Dr. Yang and Dr. Wisniewski along with Forrest Nabors, UAA assistant professor and Alaska Accelerator Fund member, and Carl Swanson, accelerator fund investor, who recently retired from Davis Constructors. Managed by Alyeska Venture Management, the AAF supports Alaska start-ups through direct investment and by leveraging the expertise of Alaska managers, advisers and business leaders.

ZENSOR INVENTORS ARE AWARDED PATENT

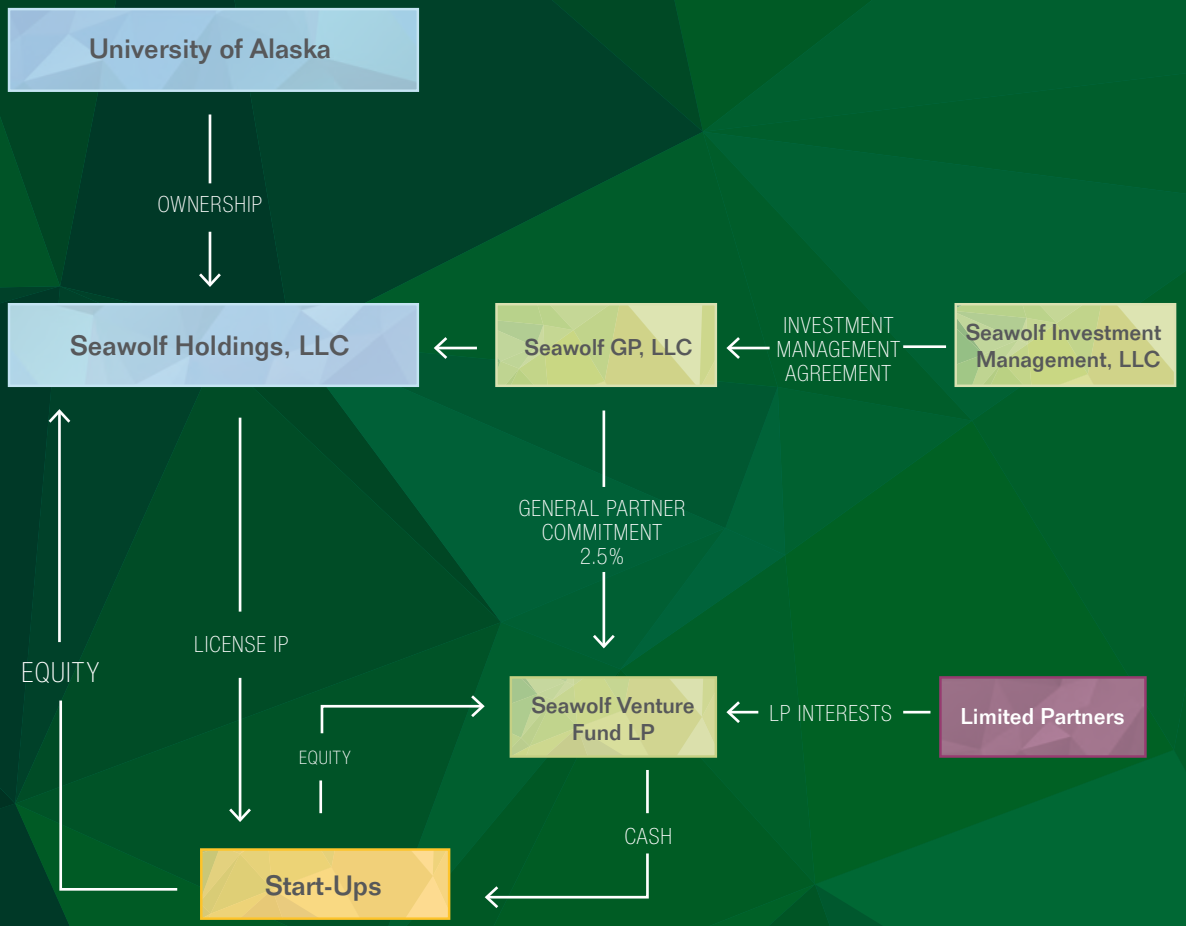
The inventors of Zensor's technology — Dr. John Lund and Dr. Todd Peterson — received U.S. Patent 9,257,036 B2 "Long Lifespan Wireless Sensors and Sensor Network." Zensor created a new generation of wireless sensors yielding an order of magnitude improvement for use in remote monitoring, asset management, surveillance and security. Its advantages include no batteries; collection of wide ranging data on a distributed network at very low cost – 1/30th the price of other sensors; and multiple capabilities in contrast to the limited capabilities of other sensors.

INSPIRING INNOVATION THROUGH COMMERCIALIZATION

The business infrastructure and the facilitation of processes for the commercialization of UAA faculty, staff, and student research reside in the Office of Research and Graduate Studies under the oversight of the Vice Provost for Research and Graduate Studies (VPRGS). These processes include nurturing submission of invention disclosures; guiding the patent process from application filings to patent issuance; developing business plans, LLC agreements, and marketing materials; forming start-up companies; and initializing and negotiating start-up company investment.

In 2012, the VPRGS created an agile infrastructure to commercialize technology based on research and technology projects at UAA. The proposed structure was unanimously approved by the University of Alaska Board of Regents, and VPRGS Dr. Helena Wisniewski was appointed as President. Since that time, this infrastructure has contributed to the dramatic growth of the patent portfolio. The infrastructure includes Seawolf Holdings, LLC, and Seawolf Venture Fund LP. Seawolf Holdings provides a corporate interface between UAA and its enterprise companies, licenses intellectual property to the UAA start-ups and other entities, and holds equity on behalf of the university. Its world-class Board of Directors consisting of CEOs, venture firm partners and entrepreneurs.

UAA TECHNOLOGY COMMERCIALIZATION STRUCTURE



SEAWOLF HOLDINGS BOARD OF DIRECTORS

Dr. Helena S. Wisniewski, Vice Provost for Research and Graduate Studies, Dean of the Graduate School at UAA, and President, Seawolf Holdings, LLC
She has a breadth of senior executive and leadership experience in academia, the federal government (CIA, DARPA), and private industry (Lockheed, Titan, ANSER). She has an impressive record of leading technology innovation, has successfully launched and sold start-up companies, and is the Founding Director of the Arctic Domain Awareness Center at UAA. She serves on public and private board of directors and government committees. She has received awards for outstanding leadership, entrepreneurship, and significant contributions to scientific areas, and is a Fellow of the National Academy of Inventors.

Mr. Thomas Hook, CEO, Q Holding Company
He was the President and CEO, of Integer Holdings Corp., (NYSE:ITGR), the largest medical device outsource manufacturer in the world serving the cardiac, neuromodulation, orthopedics, vascular, advanced surgical and power solutions markets. He grew the revenue to $1.4 billion, through a combination of organic and acquisitive growth. Integer was formed from the merger of Greatbatch™, Lake Region Medical™ and Electrochem.™ He also serves on public Boards of Directors.

Mr. Stephen Socolof, Managing Partner, Tech Council Ventures
He was the Founder and Managing Partner of New Venture Partners, a global venture capital firm dedicated to corporate technology spin-outs with over $700 million under management, and key to launching over 50 companies built upon innovations from major technology companies (Lucent, British Telecom, Boeing, GE, IBM, Intel). He also served as Chair of the Corporate Venture Group within the National Venture Capital Association.

Mr. John Wanamaker, Managing Member, Alaska Venture Partners
AVP is a bespoke investment practice investing in companies both in and out of Alaska and assisting select clients with M&A advisory services. John has founded/co-founded 7 companies, and currently serves as the Venture Partner at the Bristol Bay Development Fund, Co-Founder and CEO of CognitiveDOC, Investor and Director of The Boardroom, Investor and Advisor at Vertical Harvest Hydroponics, Investor and Advisor at Step Away, and serves on the Board of Trustees for Alaska Regional Hospital.

Dr. John Sibert, Founding Chairman, National Association of Seed & Venture Funds
He was Founding Executive Director, Alaska Science & Technology Foundation, COO and Executive Director, Technology Transfer and Industry Collaboration, California State University Institute, and serves on private and public Boards of Directors.

Dr. John Bischoff, Managing Partner of Half Moon Ventures LLC, and Adjunct Professor, George Washington University
He was the former Vice President of Finance and Operations, America Online, Inc. (AOL). He has held executive positions at IBM, including IBM Research at Watson Labs, and serves on corporate Boards of Directors and university advisory boards.

PARTNERING WITH INDUSTRY

Industry continues to generously support UAA education and research efforts through substantial gifts. In addition to providing a significant financial contribution that helped construct the ConocoPhillips Integrated Sciences Building and its numerous education and research labs, ConocoPhillips gave an additional $3 million endowment to support arctic science and engineering research projects at UAA. The ConocoPhillips Arctic Science and Engineering Endowment Award has funded nine high impact research projects since 2015, with the intent that the projects can then have a continuing impact on arctic science and engineering research. These projects include a variety of topics ranging from mycelium-based biomaterials for sustainable thermal insulation in the arctic to vortex-induced vibration in marine pipelines. The endowment continues to fund research at UAA with recipients of the 2017 awards to be selected soon.

The BP Asset Integrity and Corrosion (AIC) Laboratory was created through a $1 million gift from BP Exploration (Alaska) in an effort to support high quality corrosion research, testing, and education in Alaska. The mission of the AIC Lab is to advance the understanding of corrosion processes through fundamental and applied research projects and to provide a pipeline of well-trained, corrosion-savvy engineers to support Alaska's strong and diverse economy. To this end, the AIC Lab and its Director, Dr. Matt Cullin, endeavor to collaborate with industry, government, and university entities on corrosion-related projects relevant to: oil and gas exploration and production; water and wastewater utilities; aerospace coatings and structural integrity prognosis; marine engineering; architectural engineering; chemical processing; and power systems. Current and past research projects include: investigation of the corrosion rates and mechanisms of carbon steel in inhibited monoethylene glycol (MEG) heat transfer systems; failure analysis of ferrous alloys in upstream oil and gas process streams; mechanisms and inhibitors for corrosion under insulation (CUI); and the development and calibration of novel soil resistivity probes.

PROVIDING INCENTIVES THROUGH INNOVATE AWARDS

The Innovate Awards were established by the Vice Provost for Research and Graduate Studies to inspire and encourage new research, creative works and innovation. Each year, the Vice Provost's Research Council reviews Innovate applications from UAA faculty and selects the awardees. From 2012 through 2017, the awards supported 65 projects throughout UAA in diverse areas across Business and Public Policy, Health and Sciences, Biological Sciences, Engineering, Astronomy, Theatre and Dance, English, Psychology, and WWAMI School of Medical Education. The awards support both individual and interdisciplinary team projects.

Some significant Innovate accomplishments include:

- A better than 6:1 return on research investment through externally funded grants;
- A proposal award success rate of 49%, which is more than twice the national average for similar agencies;
- Over 18 publications have been accepted in peer review journals — with more submitted;
- International recognition – Dr. Flanders Crosby is one of the first Americans whose work is archived in Fundacion Fernando Ortiz Foundation, located in Havana, Cuba;
- 17 patent applications have been filed as a result of work funded by the Innovate Awards; and
- Innovate Award research formed the foundation for the first four start-up companies at UAA, one of which received national recognition for "Best University Start-Up."

2012: FIRST ANNUAL INNOVATE AWARDS PRESENTATION

2013: SECOND ANNUAL INNOVATE AWARDS PRESENTATION AWARDEES

2012: FIRST ANNUAL INNOVATE AWARDS

Dr. Jason Burkhead Biological Sciences	"Development of a copper-deficient mouse model of non-alcoholic fatty liver disease"
Dr. Don Spalinger Biological Sciences, Co-PIs Dr. John Lund & Dr. Herb Schroeder	"The Trophic Dynamics of Nutrient Cycling in Western Alaska Tundra Ecosystems"
Dr. Khrystyne Duddleston Biological Sciences, Co-PIs Dr. Fred Rainey & Dr. Loren Buck	"Host-gut-microbiome interactions in the arctic ground squirrel: investigations in an extreme hibernator"
Dr. Cindy Knall WWAMI Medical School of Education	"Assessing NFkB Targets in Oral Epithelial Cells Exposed to Iqmik"
Dr. John Lund Electrical Engineering, Co-PI Dr. Todd Peterson	"Ultra-Long Lifespan Wireless Sensor Devices for Asset Management"
Dr. Anthony Paris Mechanical Engineering, Co-PIs Dr. Jennifer Brock & Dr. John Lund	"Evaluation of Instrumentation to Assess Accelerations of the Head Due to Soccer Ball Heading"
Dr. Scott Hamel Civil Engineering	"Performance of Wood-Plastic Composites in Cold Regions"
Dr. Frank Moore Computer Science /Mathematics	"Improving the Science Value of CCSDS Lossy Compressed Images via Evolutionary Computation"
Dr. John Kennish Chemistry, Co-PI Dr. Patty Zwollo	"Development of an Integrated Cellular-Chemical Approach for Quantifying Effects of Marine Phthalates on the Function of Trout Immune Cells"
Dr. Colin McGill Chemistry	"Investigating nutriceutical application for the Alaska bog blueberry: Inhibition of TNFαmediated nSMase activation by citrate and malate in a human neuroblastoma model"
Dr. Karen Ward Center for Human Development	"Teen Friendships & Dating Program"
Dr. Vivian Gonzalez Psychology/Center for Behavioral Health Research & Services, Co-PI Dr. Monica Skewes	"Social Validity of Alcohol Treatments for Alaska Native College Students
Dr. Don Rearden College Preparatory & Developmental Studies	"Heart of a Whale"

2013: SECOND ANNUAL INNOVATE AWARDS

Dr. Colin McGill Chemistry, Co-PI Dr. Eric Murphy, Psychology	"Malate Supplementation: A Dietary Intervention to Improve Spatial Memory in Aged Rats"
Dr. Aaron Dotson Civil Engineering, Co-PI Dr. LeeAnn Munk, Geology	"Source Identification and Complexation of Copper in an Urban Environment"
Dr. Jeffrey Callahan Construction Management **Justin McVaney** Construction & Design Technology, Co-PI Dr. Kenrick Mock, Computer Science & Engineering	"Augmented Reality, BIM and GIS for Mobile Platforms in Architecture, Engineering and Construction"
Dr. Khrystyne Duddleston Biological Sciences, Co-PI Dr. Paddy Sullivan, Environmental & Natural Resources Institute	"Importance of the Microbial Community as a Driver of Tree Performance and Treeline Position in Northwest Alaska"
Dr. Mark McCoy Chemistry	"Development of a Point of Care Assay for Vitamin D"
Dr. Jonathan Alevy Economics, Co-PI Dr. Michael Young, Psychology, Illinois Institute of Technology	"Seasonality and Economic Behavior"
Dr. Jill Flanders Crosby Theatre and Dance, Co-PI Brian Jeffery, Theatre & Dance	"Secrets Under the Skin Art Installation"
Dr. John Lund Electrical Engineering	"Wireless Sensor Nodes with Advanced Signal Analysis Capabilities for Expanded Sensor Network Applications"
Dr. Scott Hamel Civil Engineering	"Design and Evaluation of Thin-shell Latex-modified Concrete Barrel Roof Units"
Dr. Kenrick Mock Computer Science & Engineering, Co-PIs Dr. Bogdan Hoanca, Computer Information Systems, Dr. Stephanie Bauer & Dr. Raymond Anthony, Philosophy, Dr. Yasuhiro Ozuru, Psychology	"Revealing Human Moral Decision Making Through Eye Tracking"
Dr. Joey Yang Civil Engineering	"Carbon Fiber Tape-Based Anti-Icing Technology for Wind Turbine Blades"
Dr. Andrew Puckett Physics & Astronomy, Co-PI Dr. Travis Rector, Physics & Astronomy	"Seed Funding for the Production of the Definitive Aurora Borealis Planetarium Show"
Dr. Jonathan Stecyk Biological Sciences	"The Turtle Heart: A non-traditional model to understand and potentially treat human cardiovascular disease"
Dr. Jennifer Stone English	"Language, Literature, and Technology in Alaska"
Dr. Patrick Tomco Chemistry, Co-PIs Dr. Mark McCoy, Chemistry, & Steven Seefeldt, UAF Cooperative Extension Service	"Characterization of Aminopryralid Degradation in Alaska Soils"
Dr. Liliya Vugmeyster Chemistry, Co-PI Dr. Dmitry Ostrovsky, Mathematical Sciences	"Computational Modeling of Protein Flexibility via Bridging Polymer and Protein Sciences"

2014: THIRD ANNUAL INNOVATE AWARDS

2014 AWARDEES: THIRD ANNUAL INNOVATE AWARDS PRESENTATION

Dr. Jonathan Stecyk Biological Sciences, Co-PI Khrystyne Duddleston Biological Sciences	"Influence of Temperature and Prolonged Oxygen Deprivation on the Composition and Diversity of the Turtle Gut Microbiota: A Novel Model for Understanding the Role of Gut Microbiota in Normal Physiology and Disease"
Dr. Sarah Gerken Biological Sciences	"Diastylidae of New Zealand"
Dr. John Kennish Chemistry	"Determination of the rose fragrance, salidroside, rosavin and rosarin in the Arctic root Rhodiola rosea"
Dr. Lee Ann Munk Geology, Dr. Berry Lyons, Ohio State University	"Assessing the Effects of Silicate Weathering on Atmospheric CO_2 in the Aleutian Volcanic Arc"
Dr. Nathaniel Hicks Physics & Astronomy	"PCAGE: A New Plasma Confinement Technique"
Dr. Erin Hicks Physics & Astronomy	"A Step toward Understanding the Role of Supermassive Black Holes in Galaxy Formation and Evolution"
Dr. Joshua Swift Psychology	"Client and Therapist Moment-to-Moment Ratings of Significant Events in Psychotherapy"
Dr. Jocelyn McGee Psychology, Co-PIs Gloria Eldridge, Psychology, Dr. Thomas Nighswander, Alaska Native Medical Center, Dr. Rebecca Robinson, Psychology, Dr. Donald Thomas	"Malawi Resilience Project"
Dr. John Kennish Chemistry, Co-PI Dr. Patty Zwollo	"Development of an Integrated Cellular-Chemical Approach for Quantifying Effects of Marine Phthalates on the Function of Trout Immune Cells"
Dr. Aaron Dotson Civil Engineering, Co-PI Eric Dickenson, Southern Nevada Water Authority	"Coupling UV Advanced Oxidation and Ceramic Membranes to Treat Challenging Waters"
Dr. Ghulam Bham Civil Engineering, Co-PI Dr. Kenrick Mock, Computer Science & Engineering	"Development of a Fixed-Base Driving Simulator at UAA"
Dr. Kirk Scott Computer Science & Engineering	"Android Apps for Computer Science Learning in Schools"
Dr. Ganhua Lu Mechanical Engineering	"Vertical Graphene-Nanoparticle Hybrids for High-Performance Supercapacitors"

2015: FOURTH ANNUAL INNOVATE AWARDS

2015 AWARDEES: FOURTH ANNUAL INNOVATE AWARDS PRESENTATION

Dr. Max Kullberg WWAMI Medical School of Education, Co-PI Hui-Ching Kuo, Biological Sciences	"Reprogramming Immunosuppressive Cells in Tumors by Targeted Delivery of All-Trans Retinoic Acid"
Dr. Birgit Hagedorn ENRI, Co-PI Dr. Fred Rainey, Biological Sciences	"Microbiogeochemical Cycling of Mercury in Subglacial Environments"
Dr. Shannon Donovan Geography & Environmental Studies	"Sowing Seeds and Harvesting Community: Increasing Food Security in Anchorage by Expanding Community Gardens "
Dr. Cathy Coulter Elementary Education, Co-PI Dr. Irasema Ortega, Elementary Education	"Language Revitalization and Culturally Sustaining Practices in Education through Writers' Workshop"
Dr. Philippe Amstislavski Health Sciences, Co-PI Dr. Joey Yang, Civil Engineering	"A Biomimetic Alternative to High-End Fabricated Polymeric Foams: Feasilibity Study of Native White-Rot Fungi-Based Insulation Material for Geoengineering Applications"
Dr. Gwen Lupfer Psychology, Co-PI Dr. Khrystyne Duddleston, Biological Sciences	"Dissociating the roles of intestinal bacteria and learned anticipatory responses to sweet tastes in producing harmful effects of artificial sweeteners"
Dr. Clare Dannenberg English/Anthropology, Co-PI Dr. David Bowie, English	"Talking Anchorage: An Investigation of Local Identity in Urban Alaska"
Dr. Zeynep Kilic, Sociology	"Tables of Istanbul"
Dr. Herminia Din Art	"UAA Winter Design Know How Book "
Dr. Angie Zheng, Economics & Public Policy, Co-PI Dr. Yonggang Lu, Information Systems & Decision Sciences, Dr. Holly Wang, Purdue University	"Consumer Preference and Market Potentials for Alaska Salmon in China"

2016: FIFTH ANNUAL INNOVATE AWARDS

2016 AWARDEES: FIFTH ANNUAL INNOVATE AWARDS PRESENTATION

Dr. Rebecca Robinson Psychology, Co-PI Dr. Claudia Lampman, Psychology; Dr. Brian Cook, Theatre & Dance; Dr. Jill Flanders Crosby, Theatre & Dance; Dr. Herminia Din, Art	"Stalking the Bogeyman Project"
Dr. Eric Bortz Biological Sciences	"Bioengineering: an Interferon Bioassay For Cancer Therapy"
Dr. Brandon Briggs Biological Sciences	"Enhancing Biological Production of Ethylene and Isobutene"
Dr. Erin Hicks Physics & Astronomy	"The KONA Survey: Forming Galaxies through Supermassive Black Holes Feeding and Feedback"
Dr. Kenrick Mock Computer Science & Engineering, Co-PIs Patricia Grega, College Preparatory & Developmental Studies; Dr. Sharon Emmerichs, English; Dr. Daniel Kline, English; Dr. David Dannenberg, Developmental Studies; John Cripps, Academic Innovations	"Spirit Quest: Gamifying Student Success"
Dr. Jonathan Stecyk Biological Sciences	"Cardio-physciology of a Unique and Enigmatice Alaskan Species, the Alaska Blackfish"
Dr. Joey Yang Civil Engineering, Co-PIs Simon Evans, Civil Engineering; Gregory McConnell, Civil Engineering	"Prototype Development for the Conversion of Conventional Passive Cooling System of Solar-Powered Active Cooling System"

2017: SIXTH ANNUAL INNOVATE AWARDS

2017 AWARDEES: SIXTH ANNUAL INNOVATE AWARDS PRESENTATION

Dr. Vivian M. Gonzalez Psychology, Co-PI Dr. Monica Skewes, Montana State University	"Does the Firewater Myth Contribute to the Limit Violation Effect? A Daily Diary Study"
Dr. Mychal Machado Psychology, Co-PI Dr. Gloria Eldridge, Psychology	"Treating the Destructive Behaviors of Children Diagnosed with Autism using a Novel Approach"
Dr. Rebecca Volino Robinson Psychology, Co-PIs Dr. Jordan Lewis, WWAMI Medical School of Education; Chris Cavanaugh, Graduate Student	"Exploring Pathways to Recovery from Comorbid Homelessness"
Dr. Anthony Paris Mechanical Engineering, Co-PIs Dr. Getu Hailu, Mechanical Engineering; Dr. Jens Munk, Electrical Engineering; Dr. John Lund, Western Washington University	"Research and Development of an Innovative New Device to Measure a Bicyclist's Power"
Dr. Khrystyne Duddleston Biological Sciences, Co-PI Dr. Patrick Tomco, Chemistry; Dr. Aaron Dotson, Civil Engineering	"Biodegradation of Crude Oil in Arctic Waters and Development of Dynamic Bioremediation Responses"
Dr. Nathaniel Hicks Astronomy & Physics, Co-PI Dr. Jens Munk, Electrical Engineering; Dr. Max Kullberg, WWAMI School of Medical Education; Dr. Brandon Briggs, Biological Sciences	"A Helicon Source for interdisciplinary Plasma Science and Engineering at UAA"
Dr. Scott Hamel Civil Engineering	"Seismic Hold-down Connectors for Polyurethane-based Structural Insulated Panels"

RESEARCH EVENTS

ALASKA'S FIRST WORLD INTELLECTUAL PROPERTY DAY

Lieutenant Governor Byron Mallott addressing attendees at UAA's World IP Day.

UAA hosted the first World Intellectual Property Day in Alaska on May 3, 2016. This event was organized by the Office of Research and Graduate Studies in partnership with the Anchorage Economic Development Corporation (AEDC) and the U.S. Patent and Trademark Office. The theme was "Beyond Commodities: Transformation through Innovation."

John Cabeca, Director of the West Coast U.S. Patent and Trademark Office; Tony Stanco, Executive Director of the National Council of Entrepreneurial Tech Transfer; Jon Bittner, Vice President of the Anchorage Economic Development Corporation; Andrew Mitton, Attorney and Founder of Vellum LLC; and Steve Socolof, Founder and Managing Partner of New Venture Partners, were among the 20 speakers and panelists representing venture capital firms, investors, entrepreneurs and corporate leaders. Sponsors included AEDC, Ballard Spahr, Zip, UAA Colleges of Business & Public Policy, Engineering, Arts & Sciences, and the Business Enterprise Institute.

Dr. Helena Wisniewski, Vice Provost for Research and Graduate Studies, Chancellor Tom Case, and Anchorage Mayor Ethan Berkowitz opened the event. Lieutenant Governor Byron Mallott spoke during the evening session. Awards for the winning entries in the Innovate Idea competition were also presented to five projects:

- Most Beneficial Globally: ERIC BORTZ (Biological Sciences), Interferon Bioassay for Immunotherapy against Cancer.
- Most Transformative: MAX KULLBERG (WWAMI School of Medical Education), Targeted Programming of Myeloid Derived Suppressor Cells in Cancer.
- Most Likely to Succeed: KENRICK MOCK (Computer Sciences), Sensor and Algorithms for Automated Insulin Delivery.
- Most Beneficial to Alaska: PHILIPPE AMSTISLAVSKI (Health Sciences) and JOEY YANG (Civil Engineering), Thermal Insulation Material Grown from Fungi Mycelium and Forestry Byproducts.
- Most Market Best for Alaska: DANIEL PERPICH (Vertical Harvest Hydroponics), for Vertical Harvest Hydroponics.

Established in 2000 by the World Intellectual Property Organization, World Intellectual Property Day is observed annually with a variety of events around the world to raise awareness of the importance of intellectual property and the contributions of creators and inventors.

ARCTIC DOMAIN AWARENESS CENTER RIBBON CUTTING CEREMONY

In August 2014, the University of Alaska Anchorage received an award from the Department of Homeland Security (DHS) to establish and lead a new DHS Center of Excellence — the Arctic Domain Awareness Center (ADAC). The ribbon cutting ceremony was held in October 2015 and marked the formal opening of ADAC. It also marked an important milestone for UAA and Alaska as this was the first time that an institution in Alaska was chosen to be the lead of a DHS Center of Excellence.

More than 100 federal and state dignitaries gathered for the event. The Department of Homeland Security Under Secretary for Science and Technology, Dr. Robert Griffin; Commander, Seventeenth Coast Guard District, Rear Admiral Daniel Abel; Anchorage Mayor Ethan Berkowitz; Alaska's First Lady Donna Walker, and university officials were among those who gathered for the ribbon cutting ceremony at UAA.

ADAC photo celebrating the opening of the Arctic Domain Awareness Center (ADAC).

NSF DAY

The National Science Foundation (NSF) and the University of Alaska Anchorage teamed together to host the first NSF Day in Alaska on Friday, April 8, 2016.

NSF Day was designed to provide basic insight and instruction on how to compete for NSF funding for science, engineering and education research. The workshop was conducted by representatives from NSF and provided background on the Foundation, its mission, priorities and budget. During the day, sessions provided overviews on proposal writing, NSF's merit review process, and programs that fell within NSF's seven scientific and engineering directorates, as well as funding opportunities that crossed disciplinary boundaries. A panel comprised of faculty who had received multiple NSF awards spoke about their experiences and addressed questions from the audience. NSF representatives answered questions and hosted discipline specific breakout sessions to personally engage in discussions with attendees. Special guests included representatives from the offices of Congressman Don Young, Senator Lisa Murkowski and Senator Dan Sullivan.

NSF Day speakers, special guests, and hosts from left to right: Catherine Petty, staff member to U.S. Congressman Don Young; Kathlene Rowell, staff member to U.S. Senator Dan Sullivan; Dr. Susan Weiler, NSF; Jean Feldman, NSF; Dr. Lee Zia, NSF; Dr. Anjuli Bamzai, NSF; Lisa-Joy Zgorski, NSF; Dr. Helena Wisniewski, UAA; Ralph Wachter, NSF; Deborah Jackson, NSF; Dylan Faber, staff member to Senator Lisa Murkowski; and Dr. George Kamberov, UAA.

DR. LANDRY SIGNÉ NAMED AS CARNEGIE FELLOW

UAA Political Science Professor Landry Signé was named one of 33 Andrew Carnegie Fellows, the first Alaska scholar to win this prestigious fellowship.

With a PhD in political science, Landry Signé has focused his life's work on the transformation of African economies, governance, political processes, development, policy implementation and management of natural resources.

Signé has received numerous additional honors including:

- 2015 Archbishop Tutu Leadership Fellow by the African Leadership Institute and the University of Oxford, bestowed to "Africa's highest potential," the finest representatives of the "generation that drives the transformation of Africa."
- 2016 Cameroon Government's Special Prize for Academic Excellence, which is bestowed each year to one scholar considered as the best in the country. He was a special guest of the Youth Minister during the National Youth Celebration.
- 2015 American Political Science Association (APSA) Campus Teaching Award, honoring his teaching excellence and achievement, and was featured in the APSA journal, "PS: Political Science & Politics."
- Appointed by the United Nations Under-Secretary-General and Executive Director of Human Habitat to serve on a newly created global network promoting digital technologies to help implement the United Nations Sustainable Development Goals.
- Selected by The World Economic Forum and Harvard Kennedy School to participate in the fully funded certifying executive program, Global Leadership and Public Policy for the 21st Century, March 28 to April 8, 2016, at Harvard Kennedy School.
- Named to Junior Chamber International's Ten Outstanding Young Persons of the World, an annual program that honors ten young people under the age of 40 who provide exemplary service to their communities.

DR. HELENA S. WISNIEWSKI INDUCTED AS A NATIONAL ACADEMY OF INVENTORS FELLOW

UAA's Vice Provost of Research and Graduate Studies, Dr. Helena S. Wisniewski, was inducted as a Fellow of the National Academy of Inventors in recognition of her contributions to creating and facilitating outstanding inventions that have made a tangible impact on the quality of life and the welfare of society.

The induction ceremony for this esteemed honor took place in April 2016 at the U.S. Patent Office in Washington, D.C. and was performed by the President of the Academy, Dr. Paul Sanberg, and the Commissioner for Patents, Drew Hirshfeld. Other inductees that year included 6 Nobel Laureates, and recipients of the U.S. National Medal of Technology and Innovation and the U.S. National Medal of Science. Collectively, this class of NAI Fellows holds 5,400 patents and represents individuals from research universities and research institutes spanning the United States and the world. Dr. Wisniewski was the first person from Alaska to be inducted into the National Academy of Inventors.

Her career spans extensive executive and leadership experience in academia (UAA, Stevens Institute of Technology, Seton Hall), government (CIA and DARPA), and industry (Lockheed, Titan, and ANSER), as well as service on public and private boards of directors, and government and university committees. She is a technological entrepreneur who has launched and sold start-up companies. Her awards recognize her significant contributions to advance science, technology, entrepreneurship and innovation. She received her PhD in Mathematics from the Graduate Center of the City University of New York, MS in Mathematics from Stevens Institute of Technology, and BA in Mathematics from William Paterson University where she is a Distinguished Alumni.

Dr. Paul Sandberg (left) and Mr. Drew Hirshfeld (right) inducted Dr. Helena Wisniewski as a Fellow into the National Academy of Inventors.

AMONG THE FIRST AMERICANS TO HAVE FIELDWORK ARCHIVED IN CUBA

Jill Flanders Crosby, Professor in the Department of Theatre and Dance, is set to have her extensive fieldwork data archived at the prestigious Fundación Fernando Ortiz in La Havana, Cuba in 2018. Fernando Ortiz was a Cuban anthropologist and ethnomusicologist who devoted himself to the study of Afro-Cuban culture. The foundation founded in his name devotes itself to continued studies of ethnology, sociology and Cuba's popular traditions. Dr. Flanders Crosby's fieldwork data includes over 60 elder oral history interviews conducted in the communities of Perico and Agramonte in the Matanzas province in Cuba and years of fieldwork in West Africa. Her interviews involved the history of the Arará religious dance forms connected to the Ewe and Fon people of West Africa through the Trans-Atlantic slave trade. Her fieldwork material will include videos and photographs of ceremonies and religious objects photographed in Cuba as well as in West Africa as she researched the traces, retentions and changes from one side of the Atlantic to the other. She is presently working on the archive as well as on a book documenting her work under contract by the University Press of Florida. Flanders Crosby is one of the few American scholars to have their work accepted for archive at Fundación Fernando Ortiz.

ABOUT DR. JILL FLANDERS CROSBY

Dr. Jill Flanders Crosby is a Professor in UAA's Department of Theatre and Dance. In addition to helping with Theatre and Dance productions, she researches religious dance forms in Ghana and Cuba. She spearheaded a collaborative art installation inspired by her Ghanaian and Cuban fieldwork that premiered in Havana, Cuba, and showed in Ghana and San Francisco. She researches jazz dance and is currently examining Cook Islands dance.

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