

Engineering Alaska's Future

ANSEP opens doors for Native scientists BY CLAIRE SYKES

WILLIE SAKEAGAK'S FATHER was among the last of the Iñupiat nomads, indigenous Alaskans living on the state's North Slope. Growing up in Barrow, at the edge of the Arctic Ocean, he heard stories about how his father and grandparents trekked from camp to camp with their team of dogs, following the migrating whales and salmon.

"I started Eskimo dancing when I was 3 years old and caught my first caribou when I was 7," says Sakeagak. "By the time I was 10, I was taking the dogs out and hunting by myself." He also attended the village middle school and high school and, like many Alaska Natives of his generation, was among the first in his family to go to college. "My parents knew that getting an education was key to not having financial hardships," he says.

Finding a Path

Sakeagak went on to become a civil engineer, with help from the Alaska Native Science & Engineering Program (ANSEP). For 15 years this ambitious program at the University of Alaska in Anchorage (UAA) has been fostering educational and career development for Native and non-Native students in science, technology, engineering, and mathematics (STEM) fields.

Sakeagak has thrived with ANSEP, which works with students from middle school through college and beyond, from





2022



Clockwise from left: Herb Schroeder, ANSEP's founder and director; ANSEP building at UAA; students in the Pre-College program.



seventh graders building their own computers to university students participating in structured study groups. Through programs like the six-week Acceleration Academy, for high school students and the Summer Bridge program, which provides precollege internships, ANSEP motivates, supports, and challenges students to get on track and stay there with their academic and professional goals. Anyone can join ANSEP, and to pursue a degree in a STEM subject, high school students in the program must take at least three years of math, science, and English classes.

Changing the Paradigm

ANSEP aims to shift the traditional hiring paradigm for indigenous Americans in STEM fields. Part of its mission is to raise the sights of its members — and their potential employers — to envision Native Alaskans in leadership positions in land management, oil industry innovation, construction management, wildlife conservation, and chemistry. Students, teachers, corporations, and bene-

factors help make it all happen.

“Our basic philosophy is that community is more important than any individual,” says Herb Schroeder, PhD, ANSEP’s founder and director. Sakeagak gave Schroeder the Iñupiat name Ilisaurri, which means “teacher.” And it’s appropriate — since the organization’s beginning in 1995, Schroeder has been ushering students along a rigorous academic path. The program encompasses the camaraderie of teamwork, tutoring, networking, and friendships and promotes the concepts of inspiration, satisfaction, and success to help each participant move toward the ultimate goal of a solid career in the sciences.

“That’s when we’re going to see real change for Native people,” says Schroeder. “When they’re in a position of power in organizations, you’ll see an easing of hiring biases and the difficulties Native people face advancing in those organizations. You’ll also see people who have fundamentally different worldviews — about living in the community and in harmony with nature.”

The absence of indigenous professionals was something Schroeder noticed while researching sanitation in rural Alaska back in 1993. “I thought then that we could improve communications in the villages if we had Native people doing the design work for sewage and water systems,” says the UAA engineering professor.

Schroeder started ANSEP with just one student. “I wasn’t able to retain him, but in the process I found that businesses in town wanted Native people, because the projects they did on Native land impacted Native populations.”

By 1998, ANSEP had 12 students. Then funding from the National Science Foundation (NSF) helped build the organization’s infrastructure. “We really took off,” says Schroeder. “The more I got into this, the more determined I became.”

Growing and Succeeding

Alaska Native ANSEP students in the 2009–10 academic year totaled 700; of those, 156 are

As a core component of STEM, math is something that ANSEP tries to get students excited about.

UAA graduates. Even more students participate in ANSEP's Indigenous Alliance for Engineering & Science Education, which Schroeder started in 2001 (when it was called the Pacific Alliance) with help from seed money from the NSF. The alliance replicates the ANSEP model at the University of Alaska Fairbanks, the University of Hawaii at Manoa, and the University of Washington, in Seattle. The program is also offered at universities in Arizona, Colorado, Montana, North Dakota, and Idaho, and other higher education institutions in Hawaii and South Dakota.

Mike Driscoll, UAA provost, says of ANSEP, "It addresses the incredibly complex challenges in getting students interested in, prepared for, and successful in engineering and science careers, while garnering enthusiastic support from communities, corporations, and contributors."

ANSEP also hangs onto its students. Says Schroeder, "One student told me once, 'ANSEP's



a train they won't let you off of. If you quit, they hunt you down and bring you back."

Sometimes they hunt down students and draw them in for the first time. That's what happened to Sakeagak, who received a call from Schroeder during his second semester at the University of Delaware, in 1999. "I was considering going back home then anyway," Sakeagak says. Instead he transferred to UAA and started with ANSEP the following summer. "ANSEP became my second family," he says.

The program makes its home on the UAA

campus, in the 12,000-square-foot ANSEP Building, which was partly designed by students. From the outside, it suggests a dugout canoe of the Tlingit and Haida tribes of Southeast Alaska. "As a metaphor, a canoe keeps you safe while it takes you from one place to another," says Schroeder. "The building helps us do everything better."

The Missing Link

One of ANSEP's central activities at UAA is a weekly meeting that all student members

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must attend. Each Friday everyone chomps on free pizza while listening to presentations from peers, learning about internship and scholarship opportunities, and catching up on a personal level. “This is where I’ve met most of the people in my degree program, and also other Alaska Natives,” says Gwen Francis, Yupik, who graduates in 2012 with a degree in electrical engineering. She’s from Pitkas, a community of 150 in western Alaska. “At first, ANSEP was the only place where I felt comfortable,” she adds.

Feeling uncomfortable, as Francis did, and trying to gain a foothold in STEM can be challenging for indigenous people. “Because they’re led to believe that they’re not up to the challenge, a lot of what we do helps rebuild their self-esteem,” says Schroeder. “The biggest problem is the belief that Native students can’t do science and engineering.”

Much of the problem is endemic to the educational system, according to Schroeder. “There’s systematic subjugation,” he says, “where they don’t see students as future scientists and engineers.” Another obstacle is insufficient science and math coursework in high school, which hinders the transition to

THE AISES CONNECTION

Many Native ANSEP students are AISES members. When ANSEP founder Herb Schroeder, an AISES advisor on the UAA campus, wants to talk only to his Native students, he frames the meeting within an AISES context. The objectives of both organizations are identical, he says, “but how we arrive there is different.” ANSEP actively enrolls its students and enforces an academic regimen, and rewards them with financial support upon successful completion, while AISES financial support is more likely to be in the form of scholarships.

college. A shortage of highly qualified teachers can also discourage kids, and turnover is high. “The vast majority of these teachers are non-Natives from elsewhere, so the culture shock for them is terrible,” Schroeder points out. The failure to provide education and a life vision for Native students in these rural areas sends a message that they’re not intellectually capable, he adds.

So why bother staying in school? Many don’t — approximately 30 percent of Alaska Native students never get a high school diploma, one of the highest dropout rates of any ethnic group in the United States. Not surprisingly, when it comes to professional jobs in the sciences, Alaska Natives are scarce.

For Mike Boylan, wildlife refuges supervisor with the U.S. Fish & Wildlife Service in Anchorage, the dearth of Alaska Natives preparing for professional careers has been dismaying. His office, like many other government agencies and private corporations, provides internships and jobs for many ANSEP students and graduates. “It’s not because these students aren’t interested,” Boylan says, “but because they haven’t had role models, so they haven’t had the motivation and preparation to get them through the school system.” For Boylan’s agency, where the minimum educational requirement for a professional wildlife manager or engineer is a bachelor’s degree, the situation



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can seem like a vicious cycle. “The missing link has been getting these kids through the university,” he says.

Getting on the ANSEP “Train”

The role models and motivation that Boylan sees as necessary for success in school are a built-in part of the ANSEP approach. Students team up and co-enroll in courses, so all ANSEP members taking Physics I, for example, sit in the same classroom together. To help cope with the academic challenges, members are required to participate in formal study sessions. Being involved with ANSEP helped Sakeagak manage how he spent his time. “I became accountable to other people,” he says. “Not only did I need help from others, but also they needed help from me. As I progressed through my junior and

senior university courses, I was encouraged to help freshman and sophomore students.”

Donald Richardson, Athabascan/Yupik, a UAA civil engineering student and ANSEP participant now in his final semester, says the ANSEP community “makes things a lot easier, because I always know someone in one of my classes I can study with. When you’re an engineer, you work on a project or design in groups. So it’s good that we have group-based learning. You learn better that way, and can more effectively accomplish whatever you’re working toward.”

The cultural connection, too, is not lost on Richardson and his ANSEP schoolmates. “Most of us come from rural, community-based areas, fishing together and helping out the elders,” he says. Richardson’s background is not unusual — he grew up in Anvik, a community of

75 people along the Yukon River in Alaska’s interior, still accessible only by plane or boat.

“In the villages, there’s a collective mentality,” says Boylan. “An individual is not particularly assertive or competitive — it’s not the way they’re raised. Historically, kids face so many problems coming from the rural areas to college in Anchorage or Fairbanks. It’s a real challenge. ANSEP has dealt very well with that.”

The program starts as early as middle school, with ANSEP’s ExxonMobil Bernard Harris Summer Science Camp, which debuted this summer. The two-week residential camp on the UAA campus introduces students to college life through activities, experiments, projects, and field experiences.

High school students enter the Pre-College component. Here, they build top-end computers with parts provided by ANSEP, something



As part of ANSEP’s six-week Acceleration Academy, students build and test submersible robots and participate in a range of social and educational activities.



many schools in rural areas can't offer. So far, about 1,000 computers have been assembled. "We are changing people's lives in those few hours it takes to put that machine together. The kids are just bouncing off the walls, they feel so good about themselves," says Schroeder. They also learn how to do AutoCAD and other computer programs used by professional scientists. In order to keep their computers, students must get college-ready by completing courses in trigonometry, physics, and chemistry before they graduate. Last year, about 60 percent of the participating seniors completed these courses.

The summer before their senior year, high school students attend the six-week ANSEP Acceleration Academy. Living on the UAA campus, they attend classes for university credits, build and test rockets and submersible robots, and enjoy other enriching educational and social activities. Those who complete the Acceleration Academy earn a \$2,000 scholarship.

"It's hard work for students, and it's difficult for them to be away from their families," says Francis, who tutored students in math and science last summer.

Following their senior year, students are

ANSEP prepares Native students for leadership positions in fields such as land management, oil industry innovation, construction management, wildlife conservation, and chemistry.

ready for the demanding 10-week residential Summer Bridge program, funded by ANSEP partners. Participants are required to work an internship in the oil industry or with a state or federal agency, and calculus or pre-calculus course work is also required.

As part of the University Retention Program, juniors, seniors, and high school graduates lead weekly sessions on courses they have completed with a grade B or better. "They have to get up there at the whiteboard. When they think on their feet and have to explain something, that's when they really know it," says Schroeder. "The other students can chime in. It speeds up the learning process."

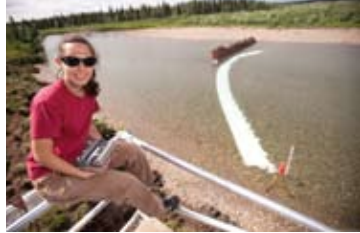
Investing in the Future

Schroeder started the ANSEP Alumni Scholarship Fund in 2002 when Matt Calhoun, the organization's very first alumnus, pledged to donate \$1,000 annually and challenged other



ANSEP alumni to do the same. "I feel so grateful for ANSEP, and indebted to it," says Sakeagak, whose contributions assisted many students receiving scholarships in 2009.

Since July 2008, the Alfred P. Sloan Foundation in New York has helped support 21 ANSEP graduates with fellowships. The Anchorage-based Rasmuson Foundation, which invests in individuals and non-profit organizations dedicated to improving Alaskans' quality of life, gave a \$2 million



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challenge grant in October 2007 to create the Herbert P. Schroeder Endowed Chair of ANSEP. The Rasmuson Foundation's investment was influenced by Schroeder's involvement. "He takes such a personal interest in the work, and in the students," says Diane Kaplan, the foundation's president. "Clearly the program is aligned with the economic goals of the state." The endowment ensures that future UAA Native STEM students will have a faculty advocate.



The first contributor to help match the grant was Alyeska Pipeline Service Company, and seven other corporate partners soon pitched in, pushing the total so far to over \$4 million. Says Matt Carle, stakeholder relations manager at Alyeska Pipeline, "As Alaska continues to grow, we can't have too many engineers. For a lot of the technical challenges we're facing in the state, we need talented people working for us, and we're looking to students from ANSEP to help."

Francis is keeping her options open, with an eye toward the village she grew up in. "There are several rural electric companies there. I think it'd be nice to have somebody close to home represent them," she says.

Sakeagak's current work involves engineering steel-frame modules to build facilities to extract oil from the ground. These are shipped up to the North Slope, where his father was born and raised. Sakeagak and other indigenous professionals at Arctic Slope Regional Corporation (ASRC) Energy Services are able to bridge ASRC's work and the Native communities. "They give the company pillars to stand on, in regard to our clients

actually dealing with Natives," says Jeff Kinneveauk, ASRC senior vice president.

As more ANSEP graduates enter the professional workforce, as school districts offer more math and science classes, and as the organization grows, expect to see more Alaska Natives in the sciences. "High school and middle school students will get more excited about math and science, seeing professions in these areas as something they might want to do with their own lives," says Francis. She appears in the first of two television commercials promoting ANSEP, which aired across Alaska in January 2010.

Adds Richardson, "I think more and more Natives will also realize that it doesn't matter where you come from. If you put in the hard work, you can go into any field you want."

Schroeder takes it a step further. "By inspiring kids to take challenging coursework, we have the potential to change education for everybody in the country." For sure, successful ANSEP students serve as active and inspiring role models — for students and others — while they blaze new educational trails leading Alaska, and the United States, into a strong future. ■

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