



EVALUATION REPORT

**AK UNiTE (Alaska UNdergraduaTe
research Experience)**

2020-21



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Partnering for Alaska Students by Growing Recruitment and Retention through Undergraduate Research

2020-2021

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EXECUTIVE SUMMARY

The Shaffer Evaluation Group conducted an independent evaluation of AK UNiTE (Alaska UNdergraduaTe research Experience): Partnering for Alaska Students by Growing Recruitment and Retention through Undergraduate Research. This project, funded by the National Science Foundation through its Research Coordination Networks in Undergraduate Biology Education (RCN-UBE) program, was led by a team of biology faculty from several Alaska universities, including the University of Alaska Anchorage and Alaska Pacific University. The project seeks to create new directions in undergraduate biological education by supporting groups of investigators to communicate and coordinate their research, training, and educational activities across disciplinary, organizational, geographic and international boundaries. The evaluation team collected evidence on program implementation and short-term outcomes by conducting interviews with participating students and focus group discussions with participating researchers and the project team and administering surveys to students and researchers. Summary findings and recommendations are presented below.

Key Findings

1. Who participated in AK UNiTE activities, including the launch event and the summer research internships?

- 16 researchers with accepted summer research internship applications reflected a range of organizational affiliations including public and private universities (56%), federal, state, and tribal governments (21%), nonprofits (11%), and a tribal community college (5%).
- A total of 19 students participated in the Summer Research Internship program. Student interns responding to the post-survey represented underrepresented populations in STEM, with 67% of students reporting a non-white race/ethnicity and 67% identifying as female.

2. To what extent were participants satisfied with project activities?

- 100% of students and 86% of researchers reported satisfaction with project activities.
- Researchers expressed strong levels of satisfaction with the launch event (86%) and financial support for internships (86%) and weaker levels of satisfaction with the project's opportunities for networking with other biology researchers (71%) and recruitment of student interns through the SERC website.

3. What successes are associated with implementing this project?

- Successes noted by stakeholders included methods of intern recruitment and mentoring provided by participating researchers and graduate students.

4. What challenges have been encountered in implementing this project? How can these challenges be addressed in the future?

- Challenges noted by stakeholders included unclear expectations or requirements of the internship program; participating researchers not exercising enough influence over

student selection for internship placements; intern scheduling challenges; participating researchers insufficiently prepared to design undergraduate research experiences and offer effective mentoring; and challenges associated with network building during COVID-19.

5. How did the summer research internship benefit students?

- Student benefits associated with summer research internships included gains in scientific knowledge and research skills; improved confidence conducting research; increased awareness and clarification of STEM academic and career options; and increased student network building.

6. How did AK UNiTE benefit participating researchers? What early outcomes are associated with network building efforts?

- Assistance with research projects was a commonly stated benefit for researchers participating in AK UNiTE.
- Early outcomes associated with statewide network building included the development of a [SERC network hub](#), which attracted 15 Alaska-based researchers to post information about their biology research projects, creating an online roster of research studies. The roster and a map of research study locations has informed project team strategy discussions to target communities and areas of research not represented on the current roster.

Recommendations

The evaluation yielded several recommendations to support program improvement and evaluation design for the next phase of this project.

- *Program* recommendations included clarifying in writing the expectations and requirements for the internship program; facilitating at least one to two formal training sessions for participating researchers on designing an undergraduate research experience and effective mentoring practices; increasing the engagement of participating researchers in the selection of interns (e.g., job fair); facilitating a capstone and networking event at the end of each research internship cycle; and coordinating networking activities that allow researchers to connect with peers in their research fields.
- *Evaluation* recommendations included administering pre- and post-intervention surveys to students and researchers; and revising data collection instruments based on incubator study findings. Investment in a longer-term project offers potential for longitudinal follow-up with students and a comparison group design.

INTRODUCTION

The project, AK UNiTE (Alaska Undergraduate research Experience): Partnering for Alaska Students by Growing Recruitment and Retention through Undergraduate Research, was funded in 2020 by the National Science Foundation through its Research Coordination Networks in Undergraduate Biological Education (RCN-UBE) program (award ID: 2019233). The RCN-UBE program seeks to create new directions in undergraduate biological education by supporting groups of investigators to communicate and coordinate their research, training, and educational activities across disciplinary, organizational, geographic and international boundaries.



Photo credit: Lisa Hupp

Need for Project

The student populations of the University of Alaska Anchorage (UAA) and Alaska Pacific University (APU) are 45% under-represented minority (URM), and 91% of students are Alaska residents. Alaska Native peoples comprise the universities' largest minority group. Academic barriers for underserved students in Alaska stem from disparity in financial resources, first generation status, and caregiver responsibilities. At UAA, first-time freshman students declaring a Biological or Natural Sciences major have a first-year retention rate of 70% and a second-year retention rate of 54%. Of the students returning after their second year, 51% of students that initially declared biological sciences as their major, change their major (entering classes of Fall 2015, 2016 and 2017). Thus, an entering class of 121 students in Fall 2017 declines to 30 biology students remaining after their second year. At APU, the overall undergraduate retention rate is 78.5%. One potential solution for this retention issue would be to provide direct engagement with students' communities and model how students can apply their scientific skills to careers in Alaska (Jones et al. 2010).

Few Alaskan undergraduate science students engage with the wide variety of research projects and experiences that take place within Alaska during their first two years of collegiate classes. Even though there are existing research networks in Alaska that serve Alaskan students (e.g. Alaska Native Science and Engineering Program (ANSEP), Alaska IDeA Network of Biomedical Research Excellence (INBRE), Build Exito, Alaska Experimental Program to Stimulate Competitive Research (EPSCoR), One Health, Biomedical Learning and Student Training (BLAST), Alaska Native Geoscience Learning Experience (ANGLE)), these programs often require students to leave their local community to engage in these experiences. While the urban campuses have Offices of Undergraduate Research, a central location or established mechanism within the higher education system in Alaska does not currently exist to help connect all undergraduate students to biology research in their local communities. Research is thriving in Alaska; however, many of these projects originate outside of the state, making it challenging to connect AK undergraduates with authentic research experiences happening in their own communities. Based on the experience of the steering committee, many potential

opportunities exist for undergraduates from Alaska to engage in biological related research. However, Alaskan educators struggle to connect Alaskan students to these opportunities, which are often given to students from institutions in other states across the nation. For example, only ~5% of participants for the Semester by the Bay program, (at Kenai Peninsula College - Kachemak Bay Campus (KBC)) an immersive, experiential learning curriculum focused on the marine sciences, have been from Alaska.

Project Design

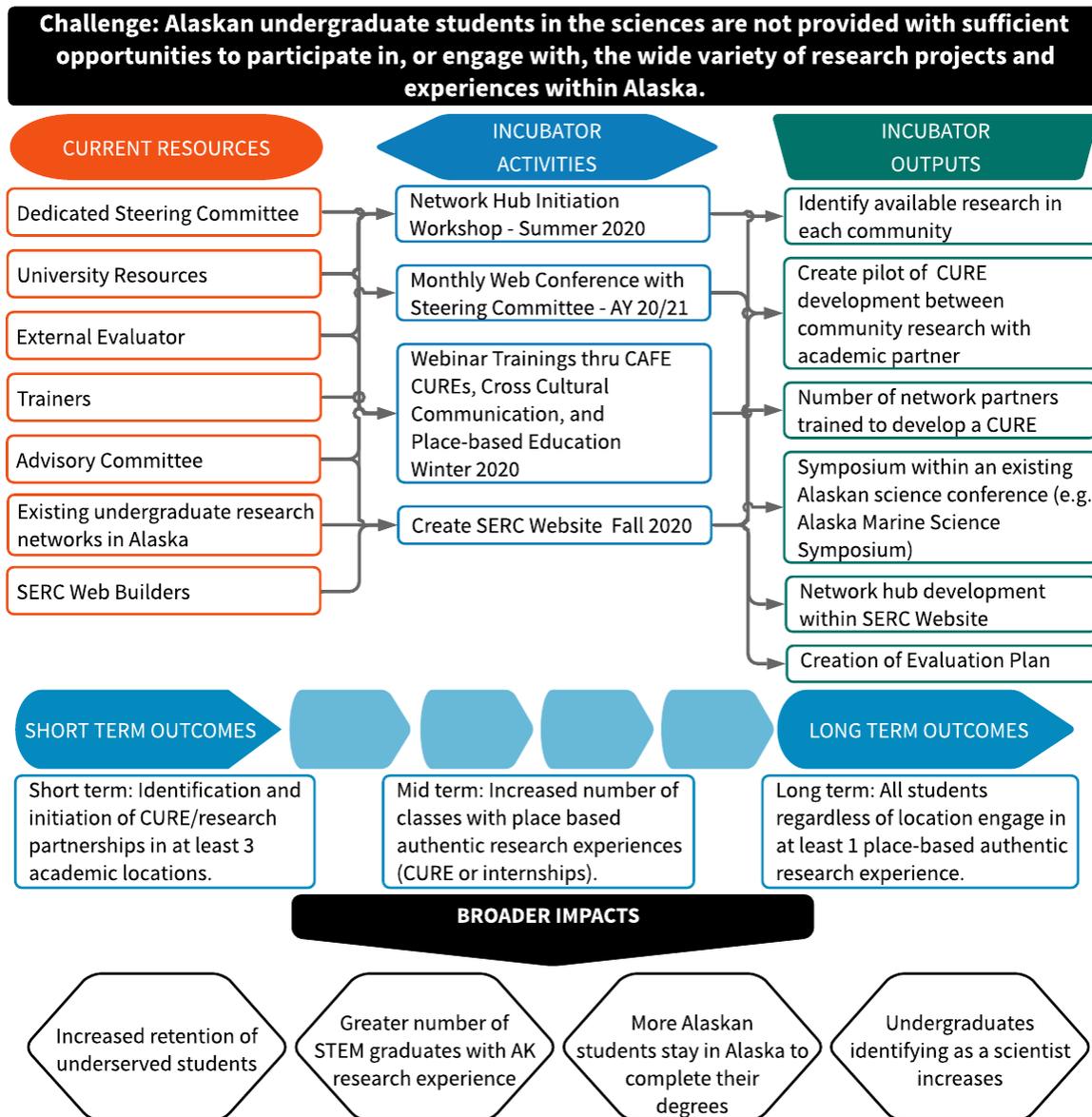
AK UNiTE's overarching goal is to improve the recruitment and retention of underserved Alaskans in the sciences by developing a network connecting faculty and students to research in the locations where they attend undergraduate classes.

The long-term vision for AK UNiTE is to create a network connecting researchers and educators in each community. This network will enable biological sciences faculty to better serve their diverse student populations and provide them with research opportunities early in their academic career, with the goal of increased recruitment and retention in the sciences. Mentored undergraduate research experiences have powerful benefits for encouraging students to continue in STEM fields (Estrada 2018, Jones et al. 2010, Russell et al. 2007). Particularly, the dropout rates of American Indian and Alaska Native students may be improved by including more self-regulated learning, such as research projects, in science curricula (Patterson et al. 2017). Place-based scientific teaching is also increasingly recognized as a powerful approach for recruiting and retaining Native students in scientific fields (Kudryavtsev et al. 2012, Semken, 2005; Semken and Freeman, 2007). Course-based undergraduate research experiences (CUREs) are a bridge that can help introduce students to research and have been shown to disproportionately benefit underrepresented groups and improve their retention in STEM fields (Auchincloss et al., 2014; Lopatto, 2007).

The longer-term project design for AK UNiTE reflects this research by offering place-based research opportunities to increase the involvement of Alaskan students in research and to train faculty in Alaska to develop and implement CUREs in their classes. The logic model for AK UNiTE presents a detailed examination of the incubator project design, providing a graphic representation of resources, strategies, and outputs, while also presenting anticipated outcomes and impacts associated with the longer-term project design (Fig. 1).

The COVID-19 pandemic affected the implementation of the incubator project design. Implementation was delayed until February 2021, when the virtual AK UNiTE launch event was held and the [SERC website](#) was established. Stakeholder input collected during and immediately following the launch event shaped the direction of the incubator project. Incubator funding provided modest stipends and funds for supplies to undergraduate students to engage in research in their "backyard" while taking steps to strengthen Alaska's broad biology research community, including researchers employed by local tribal councils, nonprofits, and state and federal agencies in addition to faculty in Alaska's universities.

Figure 1. Program Logic Model (Original)



Project Objectives

These objectives were identified in the University of Alaska Anchorage's grant application to the NSF RCN-UBE incubator program:

1. To identify community partnerships with local research projects (e.g., state and federal agencies, local tribal councils, non-profits), and create connections for future undergraduate research opportunities.

2. Provide workshops for collaborators in place-based education, as a pathway to research and initial CURE development, and supporting network participants (NW PULSE).
3. Develop a network informational hub within SERC website and perform comprehensive evaluation of the network.¹

Project Status

At the time of the writing of this report, this project had concluded its summer 2021 activities and submitted its annual report to the NSF. Project activities continue through the conclusion of the grant in September 2022. During the upcoming year, the project team plans to apply for the RCN-UBE full network grant during the current funding cycle and to continue to further their original 5 objectives. A summary of upcoming activities is provided below by the original project objectives.

Objective 1: Identify community partnerships with local research projects (local tribal councils, non-profits, state and federal agencies).

The project team continues to disseminate information about the RCN-UBE and work on cultivating partnerships, including encouraging potential partners to sign up for its email listserv.

Objective 2: Train faculty and network collaborators in place-based education, CURE development, and cross-cultural communication.

The project team has identified relevant trainers and plans to hold an informational session for faculty and research partners in Alaska on how to develop CUREs. Their plan is to host a talking circle about CUREs and why people are and are not doing CUREs in their classes or partnering with faculty to do CUREs, to help the team identify resources that AK UNiTE could work to provide. The tentative title for this talking circle is “Successes and Challenges with CUREs in Alaska.” Given the ongoing high rates of COVID-19 in Alaska and the remote nature of the state, the team plans to hold this talking circle virtually to ensure that the event is maximally accessible. In Spring 2022, Libby Roderick is scheduled to deliver a series of virtual workshops for the AK UNiTE community related to cross-cultural communication.

Objective 3: Share resources with current Alaskan researchers at a state-wide symposium.

The project team plans to continue to attend relevant statewide, regional, and national conferences during the coming year to get the word out about the AK UNiTE network and solicit network partners and allies.

¹ Project objectives were revised in May 2020 immediately prior to award. The original set of objectives was: 1) To identify community partnerships with local research projects (local tribal councils, non-profits, state and federal agencies); 2) Train faculty and network collaborators in place-based education, CURE development, and cross-cultural communication; 3) Share resources with current Alaskan researchers at a state-wide symposium; 4) Develop a network informational hub within SERC website; 5) Create an evaluation plan of our network.

Objective 4: Develop a network informational hub within SERC website.

The project team is maintaining and planning to update the SERC website. They will continue to work with SERC to ensure that the website is accessible, engaging, and user friendly.

Objective 5: Create an evaluation plan of our network.

This report represents the completion of the evaluation of the incubator project. Findings will be incorporated into a manuscript to share network plan findings. Evaluation recommendations are presented later in this report.

STUDY DESIGN

The study's purpose is to conduct an independent evaluation of the AK UNiTE (Alaska UNdergraduaTe research Experience) network activities. The evaluation study consisted of two components: 1) a process monitoring study; and 2) a summative evaluation study. Each of these components is briefly described below, along with evaluation questions associated with each component.



Photo credit: USFWS

Primary data sources for this study were project documentation, student interviews, a focus group discussion with network researchers, and student and researcher surveys. Surveys were administered to researchers at two points of time: immediately following the launch event to participating researchers and after the conclusion of the summer research internship to participating students and researchers serving as mentors. Interviews and focus groups were held following the summer research internships. IRB delays prohibited the project from fully collecting pre-intervention data from students and researchers. Data collection protocols and instruments are presented in Appendix A. The evaluation plan was reviewed and approved by the UAA IRB in August 2021.

Process Evaluation Study

- 1. Who participated in AK UNiTE activities, including the launch event and the summer research internships?***
- 2. To what extent were participants satisfied with project activities?***
- 3. What successes are associated with implementing this project? What external factors positively affected implementation?***
- 4. What challenges have been encountered in implementing this project? How can these challenges be addressed in the future?***

The purpose of the process evaluation study is to provide information to the project team to inform improvements to project design and implementation. The process study uses a mixed methods approach to collect information that describes the extent to which the project achieved its intended outputs. The process study also describes factors that have positively or negatively affected implementation, as well as implementation successes and challenges. In addition to utilizing project documentation, this study uses student interviews, a researcher focus group, a project team focus group, and researcher and student surveys to collect data on project implementation.

Summative Evaluation Study

5. How did the summer research internship benefit students?

6. How did AK UNiTE benefit participating researchers? What early outcomes are associated with network building efforts?

The purpose of the summative evaluation is to assess the degree to which the incubator project made progress toward the outcomes and impacts as described in the logic model. Data sources for the summative evaluation are the student and researcher surveys, student interviews, and researcher and project team focus group discussions.

FINDINGS

The evaluation team collected evidence on project implementation and outcomes by observing project activities, reviewing project documentation, conducting interviews with students, facilitating focus group discussions with researchers and the project team, and administering surveys to students and researchers during the period of February through October 2021. Findings are presented below by evaluation study and question.



Screen shot from virtual AK UNiTE launch event, Feb. 2021

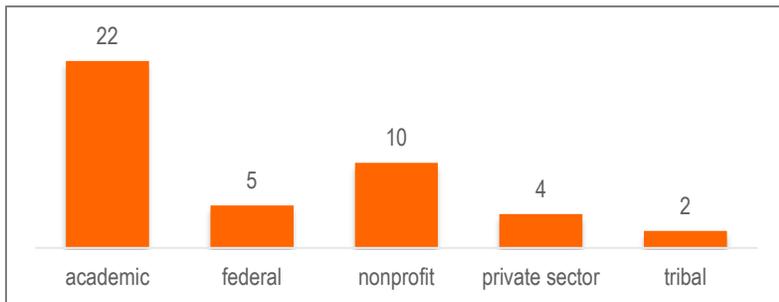
Process Evaluation Study

1. Who participated in AK UNiTE activities, including the launch event and the summer research internships?

Launch Event

The launch event, held Feb. 18, 2021, invited biology researchers to become network partners/members of the RCN. Forty-three people, inclusive of the project team, registered for the event from across the states of Alaska, Washington, and Oregon. While slightly more than half of registrants were affiliated with universities, registrants reflected a diverse blend of organizational affiliations, including nonprofits, federal government, tribal government, and private sector firms (Fig. 2).

Figure 2. AK UNiTE Launch Event Registrants, by Organization Type

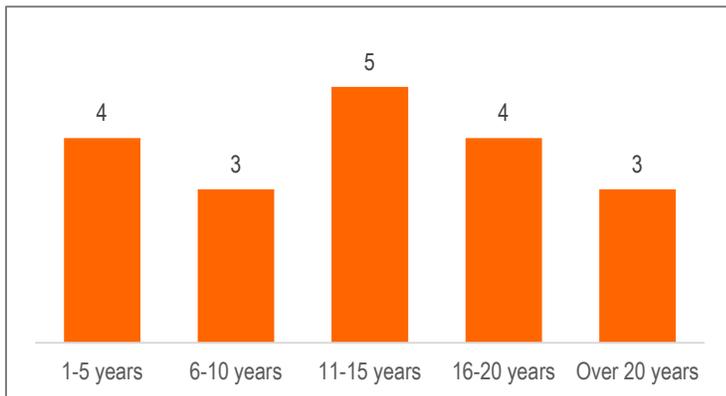


A survey administered following the launch event collected more data about participating researchers (n=19). The researchers responding to the survey were predominantly White, with

16% of respondents self-identifying as people of color (Asian, Hispanic) (Fig. 33). Eighty-nine percent of respondents self-identified as female (Fig. 35).

In response to questions about their area of expertise/knowledge and academic background, 53% reported a master's degree as their last earned degree, 26% reporting a research doctoral degree, and 21% reporting a bachelor's degree (Fig. 39). There was a wide range among respondents in terms of years since their last earned degree (Fig. 3; Fig. 41). Sixty-eight percent reported expertise in the field of Life Sciences; other reported areas of expertise included Physical Sciences and Earth Sciences (16%), Education (11%), and Psychology and Social Sciences (5%) (Fig. 37).

Figure 3. AK UNiTE Launch Event Participants, by Years Since Completion of Highest Earned Degree



Summer 2021 Research Internship Program

After the launch event, the project team began recruitment of researchers to apply to participate in the AK UNiTE Summer 2021 Research Internship program. The final roster of 16 researchers with accepted applications reflect a range of organizational affiliations including public and private universities (56%), federal, state, and tribal governments (21%), nonprofits (11%), and a tribal community college (5%) (Fig. 4). The research projects are listed by institution in Figure 4.

Figure 4. Accepted Summer Research Internship Placements

Institution	Institutional Type	Project Title
Alaska Pacific University	Private university	Using High Frequency Sensors to Analyze Water Quality and Macroinvertebrate Community Composition in the Anchorage Cook Inlet Region
Battelle/NEON	Nonprofit	Temporary field/lab technicians
Center for Alaskan Coastal Studies	Nonprofit	Peatland & Watershed Surveys
Ilisaġvik College	Tribal community college	Research on bacteria within different layers of the soil, aimed at finding new species exposed by melting permafrost
Sun'aq Tribe of Kodiak	Tribal government	Stable Isotope analysis of invasive signal crayfish in Buskin Lake, Kodiak, Alaska
University of Alaska Anchorage	Public university	Virus genomics
University of Alaska Anchorage	Public university	Camera and Acoustic Surveys of Portage Glacier Wildlife
University of Alaska Anchorage	Public university	Exploring turtle brain anatomy using immunohistochemistry
University of Alaska Anchorage, Department of Biological Sciences	Public university	Cardiac physiology of anoxia-tolerant vertebrates
University of Alaska Anchorage, Kenai Peninsula College - Kachemak Bay Campus	Public university	Examining potential prey of beluga whales in the Kenai River
University of Alaska Fairbanks	Public university	Landscape evolution: Adapting to change in ice-rich permafrost systems
University of Alaska Fairbanks	Public university	Acoustics and Visual Surveys of Cook Inlet Beluga Whales in Lower Cook Inlet Rivers
University of Alaska Fairbanks, Alaska Sea Grant Marine Advisory Program - Kodiak	Public university	Harmful algal bloom monitoring
US Geological Survey	Federal government	Sea otter studies
USFWS Kodiak National Wildlife Refuge	Federal government	Avian Internship

A total of 19 students participated in the Summer Research Internship program. The majority of participating students were enrolled at the University of Alaska Anchorage or one of its satellite campuses (74%); the remaining students were enrolled at either Alaska Pacific University or University of Alaska Fairbanks (Fig. 5). Supervising researchers were associated with a broader range of institutions; the largest number of PIs was associated with the University of Alaska Anchorage (58%), followed by the University of Alaska Fairbanks (16%) (Fig. 6).

Figure 5. Summer Research Internship Participation, by Student's Enrolled Institution

Institution Where Student is Enrolled	Count of Students
Alaska Pacific University	3
University of Alaska Anchorage	9
University of Alaska Anchorage, Kenai Peninsula College	4
University of Alaska Anchorage, Kodiak College	1
University of Alaska Fairbanks	2
Total	19

Figure 6. Summer Research Internship Participation, by Supervising Researcher's Institution

Institution of Supervising PI	Count of Student Interns
Alaska Department Fish and Game	2
Center for Alaskan Coastal Studies	1
Iñisaġvik College	1
University of Alaska Anchorage	9
University of Alaska Anchorage, Kenai Peninsula College - Kachemak Bay Campus	2
University of Alaska Fairbanks	2
University of Alaska Fairbanks, Alaska Sea Grant Marine Advisory Program - Kodiak	1
US Geological Survey	1
Total	19

Student demographics were collected through a follow-up survey with a total response rate of 37% (7). The student group was strongly representative of underrepresented populations in STEM (Fig. 62, Fig. 63), with 67% (4) students reporting a non-white race/ethnicity and 67% (4) identifying as female. Of the students responding, 67% (4) identified Alaska as their state of residence (Fig. 60) with an average residency period of 16 years (Fig. 61).

The student survey also collected information about students' academic status. Six students responding to the survey reported full-time enrollment status (Fig. 58; 86%) at either University of Alaska Anchorage or University of Alaska Fairbanks (Fig. 55). Seventy-one percent (5) reported having enrolled in 12 or more credits during the spring 2021 semester (Fig. 57), and all but one student had completed at least two years of postsecondary study (Fig. 56). Five students reported that they had not had a prior research experience (Fig. 59; 71%).

2. To what extent were participants satisfied with project activities?

Students

The average response to a survey question about satisfaction with the research internship was 6.5 using a scale of 1-7, with 100% of students reporting that they were satisfied (Fig. 65; 6 students responding). This high rating was supported by comments shared by students during interviews, who expressed a high degree of satisfaction with the summer research internship program:

It's an amazing program.

- AK UNiTE Student Intern

I would not have had the opportunity to work on this great project without AK UNiTE. I tried to find opportunities on my own and was unsuccessful, so I am incredibly grateful for AK UNiTE. (Student)

I just think it's an awesome program, I obviously have benefited a ton already from it. I hope that it gets additional funding. (Student)

I enjoyed that time felt like I would recommend somebody to do [it]. (Student)

One student, who described themselves as an “adult learner,” clarified that their satisfaction with the research internship experience was due in part to their capability for working independently and being “able to advocate for” themselves. Their assigned mentor had not been present most of the summer due to travel. They expressed some concern that a younger student in a similar situation may have struggled more with the experience.

I would recommend [the AK UNiTE research internship program] with caveats. I feel like I'm an adult learner and am able to advocate for myself and say, Hey, I need help around that. Had I'd had this experience, probably six or seven years ago, I would have felt like a duck just left out in the middle of the ocean. So I would say just, if you're somebody who's not very comfortable advocating for yourself, then choose a mentor who is going . . . to be there every single day or that's going to give you a clear direction. I think my situation was great. (Student)

Researchers

Researchers responded positively to a survey question requesting their satisfaction with their AK UNiTE project experiences. Eighty-six percent of researchers reported being satisfied, very satisfied, or extremely satisfied with their experiences (Fig. 46). Survey respondents also reported a high degree of satisfaction with some components of the project, including the launch event (86%, Fig. 48) and financial support for research internships (86%; Fig. 51). The launch event was viewed positively, with one researcher commenting:

I went to the launch and it was great. We talked, you know, talking with small groups, and it was nice to connect that way.

- AK UNiTE Participating Researcher

I went to the launch and it was great. We talked, you know, talking with small groups, and it was nice to connect that way. (Participating researcher)

In their written comments in the survey, researchers also spoke warmly about the relationships they developed with the student interns and spoke appreciatively about the available funding to pay for internships.

Researchers expressed weaker levels of satisfaction with the project's opportunities for networking with other biology researchers (71%; Fig. 49) and recruitment of student interns through the SERC website (57%; Fig. 50). During the focus group, some researchers expressed disappointment with the networking aspects of this project and wished that there had been more opportunities to connect with other researchers.

I think just doing [an activity similar to the launch event] another time or two more times to kind of cement those folks in my brain 'cause I don't have a great memory, I was too busy to write the names down. But if I if we had extra events then for sure I would remember those people and reach out to them. (Participating researcher)

3. What successes are associated with implementing this project?

Intern Recruitment

Recruiting is the initial step in establishing undergraduate research internships. For this project, the target was internal students already enrolled in Alaska undergraduate programs. AK UNiTE used strategies previously reported as effective with coordinating an undergraduate research internship program, including using personal invitations from faculty, promoting the opportunity through various means, including online and class announcements, and using an application process (Manley et al., 2017).

They didn't have very many requirements. There was no essay requirement, it was simply just putting in my information, and then an interview, which I felt comfortable with.

- AK UNiTE Student Intern

Students identified the recruitment process as an important factor contributing to the project's success. Students reported hearing about the internship opportunity through listserv emails from their institution or in classroom announcements and spoke about professors reaching out to them to personally recruit them to the program.

[My professor] announced the AK UNiTE program. I saw her during office hours [and she said] I really think you should sign up. You'd be a perfect candidate. You're doing really well on my class. . . . So I really think that you should give it a shot. And she directly told me to sign up for it. And I'm really glad she did that. (Student)

Students appreciated the ease of the application and interview process. The application website was "easy to navigate," and the email correspondence with project staff was "straightforward." One student observed that there were few requirements to apply:

They didn't have very many requirements. There was no essay requirement, it was simply just putting in my information, and then an interview, which I felt comfortable with. (Student)

The interviews, conducted by the principal investigators, took place on Zoom and were reported by students to be "very easy to schedule." One student appreciated that the assigned mentor was not responsible for interviewing, since from the student's perspective it reduced bias in the selection process: "[The interview] was not with the principal researcher on the project, which was kind of interesting. . . . So that that made it like less, there was less bias, I think in that great in that case." One minor suggestion from a student was to de-identify email distributions to applicants.

Mentoring

There is significant evidence supporting mentorship as instrumental to fostering scientific identity and career pathways for underrepresented minority students in science, technology, engineering, and mathematics (STEM) fields (Atkins et al., 2020). The quality of the AK UNiTE mentoring relationship was essential to the success of the

internship experience for many students. A strong theme that emerged during interviews was the high value that interns placed on the opportunities the mentoring relationship facilitated for them. (Also see discussion about student network building under Outcomes later in report.)

I think the best thing about the whole thing was working with the grad student and professor so closely.

- AK UNiTE Student Intern

[The assigned mentor] was so happy to connect me with all kinds of the opportunities to work, help volunteer with the [research center] and learn more. So she was like, very inspiring in the sense that she really . . . made sure it's an inclusive experience. (Student)

I think knowing people in the field, knowing people being able to say I'm involved in research. . . So for my first class this semester, I said to my teacher, yeah, I'm actually part of this research group. Right now we're researching [research topic], we're doing all of this yada, yada. And that's when he was like, oh, if you like doing research, and you already have experience I know of somebody at USGS who wants students to do research. I'll give you her email. . . So now I have another internship because of the first one. Amazing. (Student)

In some cases, students described mentoring during their internship as very intentional, including weekly meetings and assigned readings of scientific articles and research papers written by peers and mentors. (Also see discussion about mentoring under Challenges, below.)

Part of [the other researcher's] weekly meetings were like, read an article and talk about it, as well as what you don't understand. Fully read your mentor's research papers. That way, you know what you're building upon. And so that guidance really helped. . . [The other researcher] definitely talked about her experiences and being a researcher and what that meant, and how being an educator and a researcher impacted her life. (Student)

In some internships, students benefited not only from their relationship with the assigned mentor but also with other faculty in the same lab facility who also mentored them.

And then there was also another mentor that wasn't assigned to me directly, that was available very readily in the lab. And they invited me to their research meetings and everything. So I felt like that was also a huge benefit to me, that I was able to go not only with my mentor and what they were doing, but also with the other team. (Student)

Peer mentoring was mentioned by two students during interviews as a valuable part of the experience. Interns connected with graduate students in the lab, who provided guidance and information. Grad students coached interns on research and technical skills needed to conduct the project. They also provided interns with academic and career guidance.

I think the best thing about the whole thing was working with the grad student and professor so closely and having those times on the drives like pick their brains about what I should do in school or what I should do with my internship and basically like getting advice for my field and what I want to do and how to get into grad school and how to do all of that from people who obviously know a lot about it. (Student)

I was mostly working directly with a grad student of [the assigned researcher]. . . They were constantly there to answer questions. If I was looking at that, I could just shoot it with the text me or get back to me very quickly. It seems like I had a lot of questions, [the grad student] would instantly be like, Let's go meet up at a cafe and talk about science and talk about how to plan projects and talk about all of that. She made me structured graphs and structured lists of how to organize my data. And then she said, basically, if you do this, then maybe we can even make a poster presentation at a wildlife conference. . . And she still is walking me through different products this winter . . . and really letting me do like spearhead all of it. (Student)

One student described how a grad student had helped them navigate a challenging workplace situation, suggesting that their guidance was valuable in ways that extended beyond biological research:

Once because of the grad students I was able to gain the knowledge on how to go about a situation where we intruded on another researcher's area without knowing that we were in. An email [was sent] out to us, asking us to move the devices and me, I kind of took offense that we weren't hurting anything. And then the grad student was able to explain to me how we can both do our research without, you know, intruding on the other. So that makes sense now. . . I think that's probably a big game because I would have never known to approach it the way she approached it had that incident not happened. I probably could have just always taken offense because, you know, no harm, no foul. But she, you know, she turned it to a different perspective for me to see that. Okay, I understand how that came about differently. (Student)

Researchers also spoke highly about their engagement with students in terms that were often altruistic in nature. While noting that it was rewarding to have additional assistance for research projects, researchers spoke about their personal fulfillment in engaging with the “next generation” of researchers. When discussing the time they spent with AK UNiTE research interns, some researchers explained that they invested in these mentoring relationships because, for them, it was an investment in their field and research area.

She didn't even realize being a wildlife biologist and doing research was a possibility so that you know, kind of cemented where she wanted to be and work for the future, which is always fun to see, you know, steal her away from pre-med basically, which is what I told her I was doing. So it's fun and it's nice to kind of inspire the next generation. But I like that I like that she's interested in research and that was positive. (Participating researcher)

Yeah, [the highlight was] absolutely getting to know this individual. I was feeling excited to meet her and I was looking forward to working with her and I think we can still maintain a connection. (Participating researcher)

4. What challenges have been encountered in implementing this project? How can these challenges be addressed in the future?

Internship Program Expectations

The most significant issue raised by students and participating researchers in the AK UNiTE summer research internship program was unclear expectations or requirements of the internship program. Participating researchers responding to the post-internship survey and during the focus group discussion reported the expectations of the internship program as “unclear.” Researchers sought clearer guidance on internship hours and the expected structure of the intern experience at their research site. At least one student also raised a similar concern during an interview, explaining that the expectations for their internship was unclear. The project team has recognized this issue, explaining that they gave “some independence to the research partners in terms of how they supervise students and let them know they’re in their wheelhouse doing research with the student.” Some representative quotes from researchers are presented below.

People are nervous about students and the expectations with students, and so I think having more clear cut expectations for some to say these are what the procedures are, these are possibly mentoring ideas or providing training to that I think is something that we need to give partners more support for and try to kind of give them the resources to feel like they can be successful.

- AK UNiTE Project Team Member

My greatest challenge was not having a clear vision of how to navigate my relationship with my mentor, as well as not having any set goals. It worked out great for me. But it did stress me out a little bit not knowing exactly what I was supposed to be doing, as well, what was expected of me overall. And that was because there was nothing I was supposed to deliver. At the end, there was no essay assigned to write or reflections. I just felt like there was no clear goal with my research or not, not only with my research, but with the internship. (Student)

I was interested in the research internship component. I went to the website, but the application was too open. It didn't have enough parameters. . . I think with the application process they tried to be pretty loose and open and normally that should work, but there were like a lot of moving parts for me. . . Is it a 100-hour program or is it an 80-hour program? How many weeks? They were very loose with this program, like we could do anything. (Participating researcher)

Not only would more parameters help us, but I think it would help the student more. My student was really concerned about not having the time to finish everything, then the end of the project wasn't very set so there wasn't a poster session that they had to do or a Zoom meeting. . . She wasn't sure how she was supposed to spend her time. The between 80 and 100 hours thing confused her as well. So I think having more of a schedule in mind would really benefit the students and more check-ins with the entire program would be really great. This would help us see how everyone else is doing, the

progress is going, the pros and cons of avoiding them in the future. (Participating researcher)

Related to this topic of clarifying expectations for the research internship program was to add a capstone event or project. There was interest expressed by all researchers participating in the focus group discussion in adding a capstone event or project, such as an online poster session. In addition to providing students with a formal ending to their internship, it also provides them with the experience of presenting their research to an audience of peers and faculty. For the faculty, it could also provide an opportunity for informal networking. Below are representative quotes from the researcher focus group. Of note, the AK UNiTE project team had organized a “Virtual End of Summer AK UNiTE Shareout” event for researchers and students, but participating researchers did not acknowledge awareness of this event during the focus group and no students interviewed mentioned an ending presentation.

I would really love to see some sort of ending, like a formal ending, for each student. So having like a poster session and then we could have breakout rooms for like different topics. So you have your animal ecologist, you have your marine folk and that way this student gets the experience creating a poster and presenting on science. But it also gives them the networking opportunity it gives the mentors a chance to network. (Participating researcher)

The other program I worked in did that . . . We had a final session in which students presented in and surely it was 100 students so we all just broke it out to a few presentations. . . It gave the students an opportunity. . . I think a student wrap up would be great, an all hands event that all of us attend and support them. (Participating researcher)

Intern Selection and Placement

Researchers expressed interest in having more influence over student selection for internship placements, with almost 43% of researchers responding in the survey that they were neither satisfied nor dissatisfied with the recruitment process (Fig. 50). The selection and interview process was often handled by the project team when

I want [intern selection and placement] to be more of an active coming together and grouping in the network.

- AK UNiTE Project Team Member

students and participating researchers had not had the opportunity to personally connect. One researcher expressed support for research internships but voiced concern that she was assigned a student who had no intention of continuing study in her research area. She shared with the evaluator, “for us to spend so much time with students who already had a chosen field not related to our mentorship made me less likely to support AK UNiTE activities in the future . . . I felt it was disrespectful of our time and intentions to place non-science students with us.” As noted earlier, however, students reported appreciation for the AK UNiTE selection and interview process, with one student expressing that the process felt “unbiased.” Additionally, two students with health science/medical school future goals shared that the AK UNiTE internship experience made them change their application processes and look for M.D./Ph.D. programs so that they could continue in research and possibly teach while practicing medicine.

The project team recognizes that stronger involvement of researchers was needed to support the selection and placement process. The PI noted during her interview with the evaluator that in the future, she did not want the project team “to be the arbitrators of placement, I want it to be more of an active coming together and grouping in the network.” One idea under discussion within the project team is to stage an event similar to an online job fair, so that students will have the opportunity to meet researchers.

Internship Scheduling

Scheduling students for research internships was at times problematic according to stakeholders. Several interns were non-traditional students, many of whom had full-time jobs or family commitments, and these students often had limited availability or sought a more flexible schedule. Flexible scheduling was a challenge that had to be accommodated by participating researchers. One researcher recommended initiating the internship planning process earlier as a way of mitigating this concern. Below are representative quotes that address internship scheduling.

Flexibility in terms of timing of internship -- academic year vs. summer -- could be really important to recruiting and retaining more diverse participants and ensuring more equitable access to the program.

- AK UNiTE Participating Researcher

A lot of the students, you know nontraditional students, have a lot of obligations outside of school, and so the fact that they were able to try research out I think that's I mean that's really fulfilling. (Project team member)

We ran into some unexpected hurdles with coordinating our schedule with the intern's schedule, so that was challenging. (Participating researcher)

Scheduling conflicts was also a problem – interns wanting to work weekends or after-hours because they had no time during the work-week. (Participating researcher)

Students and participating researchers also discussed the challenge of participating in a research internship program during the summer in Alaska, when there is strong competition for employment.²

I hope that [AK UNiTE] becomes a year-round program. I think summer is awesome. But I think that just for flexibility with other students and there are certain things that have happened in the summer for Alaska. But there's also certain things that only happened in the fall and winter, like everything is very seasonally dependent up here. And so to only have research in one season really limits the research possible. Of course, that's when you can do field work. But if a project like, for example, the [research project] . . . I was told by the [student] who got [the internship], and the [researcher] who runs [the research project] that [there] were actually two or three students placed in that program, and only one of them ended up doing it, because they couldn't start until later in the

² The Alaska Department of Labor and Workforce Development reports that the number of people employed is much larger during the summer. This seasonal variation is due to high levels of employment in specific industries, including the fishing industry and tourism. (Alaska Department of Labor and Workforce Development, Seasonal adjustment and how it works. <https://live.laborstats.alaska.gov/labforce/seasonal.html>)

season. So, you know, it's hard to say, so one student stayed on, because she was willing to wait and the other two students ended up not staying on because they didn't want to wait. But if it was a year-long program that people could say, Okay, I only want to do summer, and they would only get ones that [take place] in summer. . . I think that would be really beneficial, especially in this state. (Student)

Summer can be a difficult time for research experiences, especially for those connected to commercial or subsistence salmon harvest. (Participating researcher)

Flexibility in terms of timing of internship -- academic year vs. summer -- could be really important to recruiting and retaining more diverse participants and ensuring more equitable access to the program. (Participating researcher)

Training on Research Experience Design and Mentoring Practices

Project team members as well as some participating researchers acknowledged that more guidance or training on designing research experiences for undergraduate students and effective mentoring practices would have been helpful. One of the project team

members observed that researchers working outside of an academic position were more likely to express a need for more guidance and support, since “it may have been a long time since they've been in academia or been a part of that student experience that they're nervous about how do I support the students.” This observation was supported by non-academic researchers during the focus group discussion, who asked for more guidance in planning effective internship experiences. Students also observed issues with how participating researchers engaged with them. While some students had very strong relationships with their assigned mentors, other students expressed concern that their mentor was absent or just not very engaged with them.

I wouldn't mind seeing more guidance or training towards being mentors.

- AK UNiTE Participating Researcher

[The assigned mentor] had been my professor. But it was during COVID. So I had never really met him other than a few times. I've gone to office hours via Zoom. And then we communicated mostly via text and email. And then we probably saw each other four times throughout the summer to, for him to explain what I was doing, why I was doing it the experimental design. (Student)

People are nervous about students and the expectations with students, and so I think . . . providing training I think is something that we need to give partners more support for and try to kind of give them the resources to feel like they can be successful. (Project team member)

I wouldn't mind seeing more guidance or training towards being mentors. Like I'm still learning even though I have done it. Every time you do it, you're going to learn something. And being able to keep building on that I think is really useful. (Participating researcher)

Networking Opportunities with Researchers

The major networking event – the launch event – was held virtually due to COVID-19. The project team viewed the event as successful, with strong attendance rates and active participation in small group discussions. Project team members, however, were cognizant of the lost opportunities for informal networking that typically accompany an in-person event and the lowered levels of attention of participants due to the Zoom format. Representative comments from project team members are shared below.

We missed an opportunity early on to possibly build something with other people and create a larger group of partners.

- AK UNiTE Project Team Member

I feel like for a brand-new network that's built on relationships, it makes a world of difference if it's in person, to have those initial connections face to face. I feel like we had a pretty good turnout from that here at the launch event, but I feel like if they were face to face maybe some of those folks would have stayed on after getting to know us in person. (Project team member)

This is a network and we're built on relationships. Knowing people and knowing their faces and knowing what drives them in the body language of how you excited you get with the conversation is, frankly, lost in Zoom. That we couldn't do any of those side discussions you know, and people left halfway through the launch event because they had other things going, that you know is the thing with COVID, now you can scrunch your time. (Project team member)

Project team members and participating researchers also acknowledged that there were too few opportunities to network through AK UNiTE beyond the launch event. Via survey, participating researchers reported on average that they were satisfied with the project's facilitation of networking with other biology researchers, although the ratings for this measure varied considerably (Fig. 49). Project team members offered virtual office hours during the month of April for "help, questions, and clarification" about AK UNiTE, but no other events were offered. Restrictions on project team members' time and concern with Zoom fatigue discouraged the coordination of other online events. The project team established a Slack channel for networking, but two researchers participating in the focus group admitted having difficulty using Slack and therefore elected to not participate in this forum. This sentiment was echoed by one student intern who shared, "having another like, virtual commitment, I think made that platform kind of underutilized." One project team member noted during a focus group discussion that "we missed an opportunity early on to possibly build something with other people and create a larger group of partners."

Summative Evaluation Study

5. How did the summer research internship benefit students?

Student Gain in Scientific Knowledge and Research Skills

Undergraduate research experiences have shown positive effects in increasing students' engagement in their undergraduate studies and their understanding of their field of study. Research also has demonstrated that students participating in research experiences perceived improvements in communication skills, conceptual and analytical thinking, understanding of scientific work, and confidence in problem solving (Lopatto 2003; Haeger et al. 2015; Willis et al. 2013). Undergraduate researchers from underrepresented groups reported higher learning gains than their peers when they participated in undergraduate research experiences (Linn et al. 2015; Munawar 2015).

I have a concrete understanding of what scientific research is and how it is done. Before this opportunity I had no idea how a scientist went from hypothesis to published paper.

- AK UNiTE Student Intern

Survey results point to student acquisition of knowledge and skills during their internship related to conducting research. There are findings of self-reported moderate gains in students' ability to analyze data and other information, integrate theory and practice, read and understand primary literature, and give an effective presentation (Fig. 67). Students also reported moderate to high levels of accomplishment of internship learning outcomes (Fig. 69).

During interviews, students commented on deepening their understanding of the scientific process, including the design and conduct of experiments. Students also spoke about the value of being mentored by project researchers to read scientific literature and understand research design; representative quotes are provided below.

This opportunity introduced me to scientific literature and how to read and understand it as I had to learn what knowledge I was building upon, which is a skill that I will take with me for the rest of my life. (Student)

The experiment design is the biggest one, I think that is something that I didn't have experience with before at all. And now going forward, I actually feel like I could set something up. And I am this winter. (Student)

Being an active participant in the design and implementation of my experiment allowed me to come across gaps in my own knowledge and with my mentor's help I was able to fill those gaps. (Student)

Related to the conduct of experiments, students learned first-hand the realities of doing research, including addressing logistical challenges, obtaining and maintaining equipment, solving problems, and communicating and collaborating with team members. Survey results showed moderate gains in student understanding of the research process, of how scientists

work on real problems and that scientific assertions require supporting evidence. Moderate gains in student tolerance for obstacles faced in the research process was another survey finding (Fig. 73).

Logistical issues faced in research during internship was a popular topic raised during interviews with students; selected quotes are presented below.

I learned that logistically science is difficult, especially in remote locations, such as Alaska. So shipping was an issue to get the [supplies], because it was cold. And so that delayed the research I started in the summer, but like, everything that they had planned had been delayed because of shipping. . . One of the comments that was made by [the researcher] was that being a scientist is like running a small business. (Student)

I saw live field research and action, which I never done before and was exposed to. Also some of the troubles that come come along with doing field research. And some MacGyvering with, one of the devices that we use to collect the water samples, we lost a weight one time and had to improvise with rocks in a sock to weight down [the] camera and collect the data. And it was very real, I I felt like it was very representative of the type of fieldwork in general that biologists do and learning how to troubleshoot different challenges that come up as a team was pretty rewarding. (Student)

It was definitely a learning process. Especially because like the trenches, really like to break, I feel like the first few times I went out there things went wrong, I felt almost like I was cursed, because they were like, this never happened. So now it's been three times in a row. So a lot of it was also dealing with that as well as funding and politics of science, which is, can we get a new sensor, can we get the sensor fix[ed]. And then also learning about how to update the firmware and deal with different brands of SD cards not working. We had a sensor stolen, so then it was a matter of building a lock box for the sensors as well and figuring out how to keep them secure. So, a lot of recovery and technical specs as well. (Student)

Improved Student Confidence Doing Research

Previous research on STEM undergraduate research experiences suggests that these experiences contribute to student confidence in conducting research (John & Creighton, 2011; Hunter, et al., 2007). Results of this evaluation affirmed these research findings.

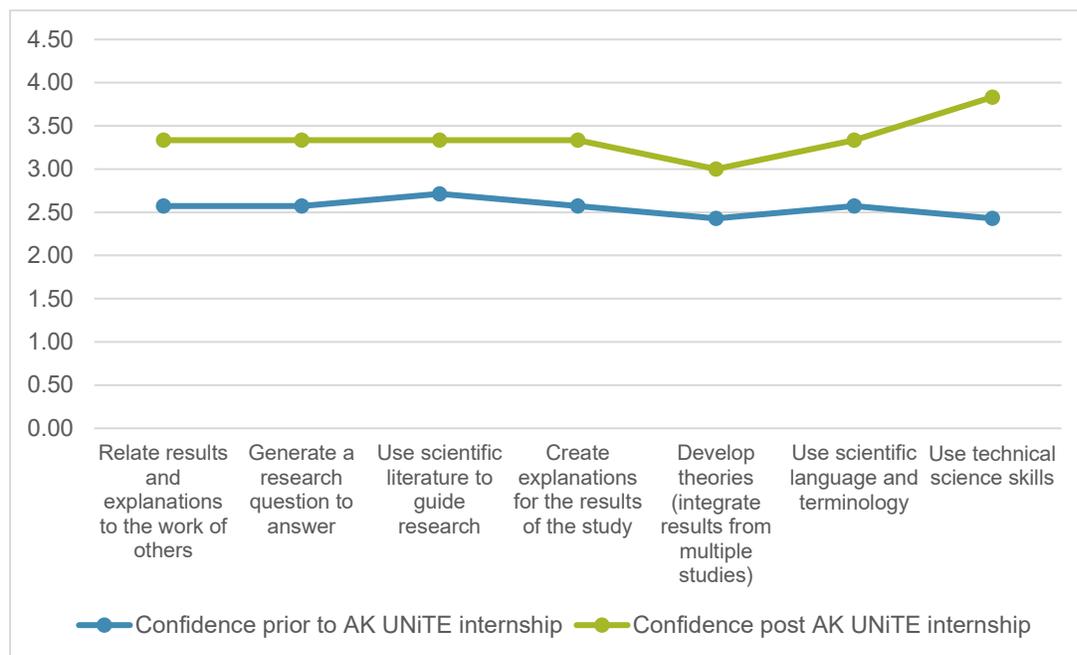
The student survey asked a series of questions asking students to rate their confidence in conducting tasks

associated with scientific research using a previously published self-efficacy scale (Robnett, et al, 2015) prior to and after completing their research internship. While results were not statistically significant due to the very small sample size, students reported stronger levels of confidence across all indicators, with the use of technical science skills showing the largest difference from pre- to post-internship (Fig. 7).

I was very intimidated by research, mostly because I didn't know what it would entail. Now I feel much more confident taking an independent research course for credit. AK UNiTE gave me the confidence to explore what research would look like for me.

- AK UNiTE Student Intern

Figure 7. Comparison of participant's confidence with scientific tasks prior and after their AK UNiTE research internship (Scale of 1 [no confidence] to 4 [completely confident])



During interviews, student discussed how the research internship experience affected their identity and confidence as a scientist. Students spoke about deepening their understanding of biology research, especially its methods, and, as a result, feeling more comfortable discussing research with peers. At least one student mentioned that doing “real work” made them “feel more like a real scientist.” Below are some representative quotes from student interviews.

I learned so much this summer . . . I don't think I'm anywhere near the level of a marine biologist or expert in the field. I could now have a comfortable conversation though, with someone who does that type of research that before I would never have been able to understand. . . I guess before I would not self-identify as a marine biologist researcher. But it definitely did give me the skills and experience to where I do you feel comfortable engaging and talking to other marine biologists that I've met. (Student)

The highlight was just like having a clear understanding of what biology research is and how it works. I feel much more comfortable being able to pursue research in any biology related or science related field, especially biology after this experience. (Student)

I also learned about myself, that, you know, science is something that I couldn't see myself doing before, I would have never ever said, like, oh, I want to do MD PhD, or I want to teach organic chemistry as a professor or something like that. And after this experience, I'm like, well, [before] I wouldn't apply to MD Ph. D. program and work on research and basic science. And, or I would, if I don't get into medical school, I could pursue an advanced degree in science and do something else. So those are things that were very unattainable and abstract in my mind, and now that I saw it in action is something that would be a possibility. (Student)

Influence on Student Academic and Career Direction

Research internships provide students with an opportunity to apply what they have learned in the classroom, thereby bridging academic study and career application. Undergraduate research experiences increase awareness of STEM career options and offer career clarification while providing students with professional experience that enhances their credentials (Adedokun et al. 2012; Odera et al., 2015). In previous studies, undergraduate researchers also have reported that their research experience sustained or increased their interest in post-graduate education (Willis et al. 2013). Hathaway et al. (2002) found that undergraduate research participants were significantly more likely to pursue graduate education and additional research activity. Additionally, students of color who participated in undergraduate research were more likely to pursue graduate education and/or science-related careers (Hathaway et al. 2002; Summers and Hrabowski III, 2006).

Evaluation findings show that the research internship had some effect on students' decision-making about academic pathways and career direction. Students responding to the survey reported a small to moderate gain in clarification of their career path (Fig. 72). This finding was also reflected in interviews with students, who discussed how the internship experience either confirmed or influenced plans for future academic study. At least one student affirmed that their experience encouraged them to consider an advanced degree in biology that was research-focused. Researchers participating in a focus group also mentioned sharing career guidance with students, including advice on how to add the research experience to students' resumes. Representative quotes from interviews are presented below.

It makes me feel like I'm doing real work, you know, so it makes me feel more like a real scientist and like, say, doing biology and then also it added that focus in ecology, so it sort of changed how I saw my direction going. I think I want to do more ecology work and it's solidified the fact that this is what I want to do. . . I think it just really solidified that I want to [do research] because before it was like a concept that I thought I wanted to do. And after doing it, I was like, I want to keep doing this for my whole career. (Student)

I want to go to school and I want to be a heart surgeon. But working on the [research project this summer], I realized, I don't want to be electrophysiologist. . . I'm more interested in like, the pump aspect of the heart and how blood vessels work. . . [The internship] also made me know this is something that that I can see myself [doing]. Having a better understanding of that, and being in the lab, it basically closed a lot of gaps for me. (Student)

The advice I got from [my mentor] about how to get into other research experience opportunities, and how to get into grad school and how to get all of that paid for and how to get grants. He was a just a wealth of knowledge about things outside of work . . . how to take this and turn it into my career.

- AK UNiTE Student Intern

Student Network Building

Research has shown that work experience in the form of placements or internships helps students develop stronger networks and gain more opportunities for graduate level employment (Bennett et al., 2008; Pennington, Mosley and Sinclair, 2013; Moore, Sanders and Higham, 2013). Working with faculty and peers also has been found to counter a sense of invisibility in STEM and offer symbolic recognition by the student's learning community (Malone & Barabino, 2008).

Strengthening students' networks has been associated with retention in STEM programs (Turetsky, et al., 2020); social networks function as "sticky webs," (Moynihan & Pandey, 2008), encouraging students to persist in challenging STEM environments from which they might otherwise drop out.

Students responding to the survey and in interviews discussed the importance of the research internships in developing their own networks, particularly with faculty and other professional researchers. Interns offered examples of opportunities that they received through their interactions with their mentors as a result of their participation in AK UNiTE. These opportunities ranged from an offer to continue to support the participating researcher's work to a job offer that was brokered by a mentor. Below are representative quotes from student interviews that present examples of how building a student's network led to increased opportunities.

I am currently working with the grad student and professors doing a different project this winter. And then actually having that on my resume allowed me to say I'm now working with a different internship but not through AK UNiTE. (Student)

I think just making the connections [has been valuable]. I think knowing people in the field, knowing people being able to say I'm involved in research. . . For my first class this semester, I actually like said to my teacher, yeah, I'm actually part of this research group, we're researching [topic], we're doing all of this yada, yada. And that's when he was like, oh, if you like doing research, and you already have experience I know of somebody at [Federal agency] who wants students to do research. I'll give you her email. . . So now I have another internship because of the first one. (Student)

[The assigned mentor] actually almost got me a job. It didn't work out because it didn't work with my schedule, but I think it will work out next summer. He took me to the [visitor center] and introduced me to the [State government staff] there and connects with me with their director, and actually basically got me a job offer to work in a visitor center where we were doing the [work]. (Student)

I think the most significant benefit that this internship provided for me was the ability to connect and network with professors in my desired field.

- AK UNiTE Student Intern

6. How did AK UNiTE benefit participating researchers? What early outcomes are associated with network building efforts?

Research Assistance

A significant benefit of researchers' participation in AK UNiTE was the provision of student assistance for their research through the financial support provided through the grant. The financial support included \$1,500 scholarships paid to interns who were enrolled in an Alaskan university and up to \$500 made available to participating researchers to be used at their discretion for purchasing supplies in support of their research.

I appreciated having an intern to assist with field work.

- AK UNiTE Participating Researcher

Some researchers also stressed the value of recruiting local interns who reside in or near or had other connections to the community in which field research was taking place. This was perceived as an additional benefit for researchers. Below is a representative sample of quotes from participating researchers.

I don't have a large student pool because [branch campus name] is a remote campus. I was very interested in the project to order to tap into local students here that potentially are going to [this branch campus]. (Participating researcher)

I'd hoped to meet some people through [the student intern], you know, just make those connections locally. It's hard for me to get out to the rural villages there by boat or air. I have been to the community that she's connected with. It was going to be really useful to have another connection, have a go to in my community. . . I need a network here to say, Hey I need a sample out there. Do you think you can grab something or do you know somebody that can get it? You know so for me that networking is really super critical. (Participating researcher)

Biology Research Network Development

As noted in the process evaluation section, there were few opportunities for networking among biology researchers during the incubator phase due primarily to time constraints and challenges associated with COVID-19. Results from the researcher survey and focus group confirmed that few networking activities were offered through AK UNiTE.

I think that it's important to build a network moving forward. . . get the word out that we're doing this project. We're mainly here at the UA campus but how can we transfer to [other] campuses.

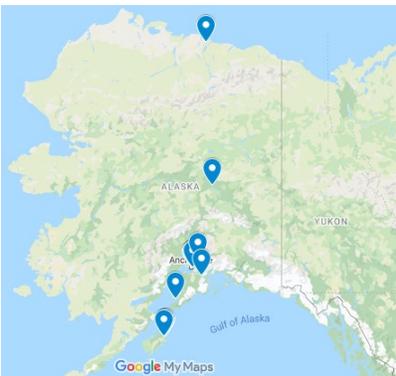
- AK UNiTE Project Team Member

However, there are early indications of network formation. Investments in the [SERC network hub](#) helped attract 15 Alaska-based researchers to post information about their biology research projects, creating an online roster of research studies. The project team also

generated a map of research study locations (Fig. 8). This documentation has provided the project team with an evidence base for discussions about which communities and areas of research are not represented in the current roster. As of the date of this report, the PI was conducting personal outreach to researchers working in outlying communities as a key network-building effort.

Qualitative data collected through the survey and focus group discussions suggest that while the opportunities for network building through the incubator project were low, there is interest in building a statewide network of biological researchers in Alaska. There were two points raised during the researcher focus group worth reiterating here. First, researchers expressed that since they are busy, networking activities must be productive and easy to get involved with. Related to this first point, researchers agreed that the concept of a single biological researcher network should be differentiated in order to be most effective. There was general agreement that a network should offer opportunities for specialty networking (e.g., marine biology) within the larger network:

Figure 8. Alaska state map showing locations of AK UNITE research



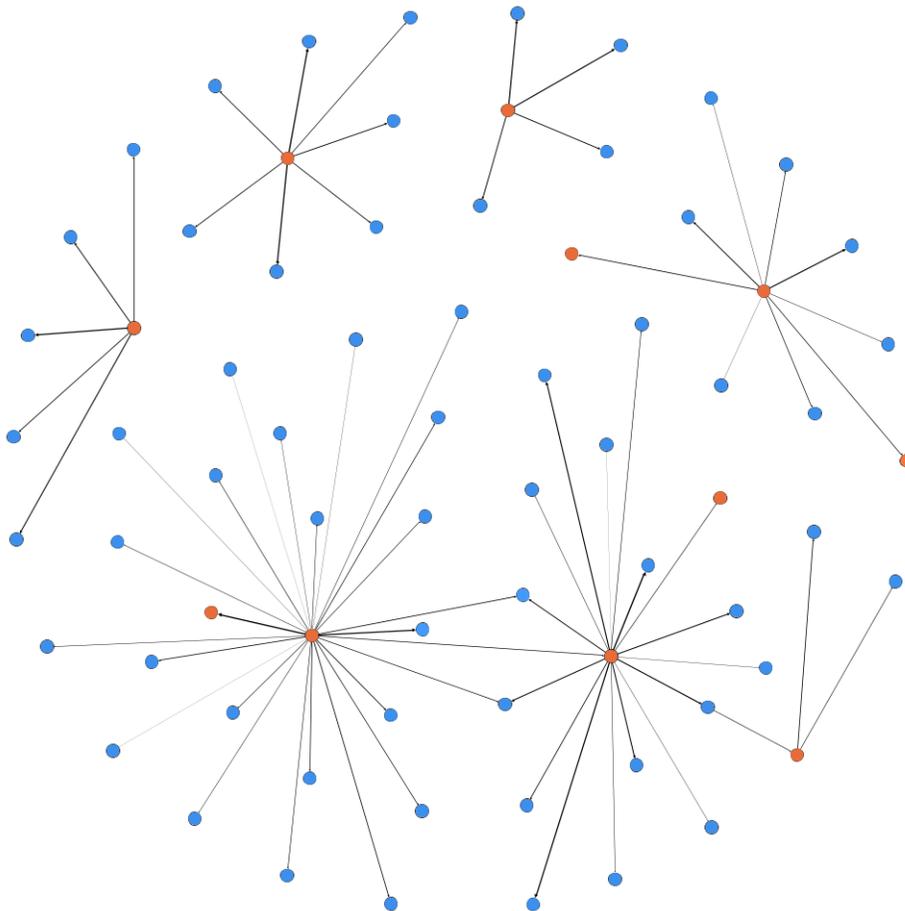
The biology [focus] is too broad. . . So there's no way you could possibly connect with all these people and keep them in your network because I can't keep up with [my research topic area] to be honest, sorry. But maybe a solution would be to pair up the like-minded researchers and create some networking opportunities among them like if everybody can't meet everybody and keep up with them, then make the marine science people go together, the animal researchers together, the medical people, and that way the networks are smaller and tighter and you could actually make the relationships happen. (Participating researcher)

Developing an evaluation plan for documenting network growth was an intended output of the incubator project. While IRB delays prohibited the project from fully collecting pre- and post-data on research network development during this pilot, the evaluation team was able to prepare and pilot a network status scale through a post-survey administered to researchers supervising internships.

Using networking data collected through the network status scale, the evaluation team conducted an exploratory social network analysis to understand the networks of relationships among participating researchers and the relative strengths of those relationships. Figure 9 is a visual illustration of the results of this analysis. The thickness of lines between nodes represents the strength of individual relationships among researchers, based on how close participating researchers reported they are with professionally engaged colleagues, the length of time the relationship has existed, the frequency of communication, whether a formal agreement supporting collaboration is in place with a colleague's institution, and the types of interactions the participant has had with the colleague; thicker lines indicate stronger relationships. The lines also feature arrows that show the direction in which the relationship has been reported. Orange nodes (n=11) represent network participants, and blue nodes represent additional colleagues listed by survey participants. For the full project, the evaluation plan will plan to administer periodic surveys to the research network members to track changes in the number of network participants, the networks of relationship among participating researchers, and the relative strength of those relationships.

The incubator project analysis of network status data provides an interesting snapshot of existing biological research networks in Alaska among responding researchers. Several participating researchers and their networks appear to be working fully independently of each other. In this analysis, three participating researchers' networks were entirely unique; the same participating researchers also did not identify as colleagues researchers that were in other participating researchers' networks. Also, several participating researchers identified small collegial networks, and for several researchers, these networks strongly featured other participating researchers. The exception to these patterns is two researchers, who were not members of the project team, who demonstrated robust networks that included connections with project team members; these two researchers have relatively large networks characterized by relationships of varying strength and a small number of common contacts. Ideally, a fully functioning biological sciences network in Alaska would resemble the networks of these two researchers.

Figure 9. Network connections of AK UNiTE participating researchers



RECOMMENDATIONS

Program

The process evaluation highlighted both success and challenges related to the project's primary activities – the facilitation of a biological sciences research network and undergraduate research experiences. The recommendations that follow are drawn primarily from suggestions offered by project stakeholders. Some recommendations have been enacted already by the project team; current activities have been noted *in italics* following the recommendation.



Photo credit: Anna Shaffer

1. Clarify in writing the expectations and requirements for the internship program, including requirements for internship hours, capstone events, supplemental activities for students (e.g., reading scientific literature), and flexible scheduling for nontraditional students.
2. Consider offering additional internship cycles each year other than in summer. *At this time, the project has extended some internships into fall 2021.*
3. Facilitate at least one to two formal training sessions for participating researchers on designing an undergraduate research experience and effective mentoring practices. *As discussed earlier in this report, the project team has identified relevant trainers and plans to hold an informational session for faculty and research partners in Alaska on how to develop CUREs. In Spring 2022, Libby Roderick is scheduled to deliver a series of virtual workshops for the AK UNiTE community related to cross-cultural communication.*
4. Increase the engagement of participating researchers in the selection of interns (e.g., job fair) and make intern application categories more specific (e.g., marine biology, avian biology, virology instead of just biology).
5. Facilitate a capstone and networking event at the end of each research internship cycle.
6. Facilitate networking activities that allows researchers to connect with peers in their research fields.

Evaluation

For the incubator study, the evaluation and project teams developed interview and focus group protocols and survey instruments.

1. Administer pre- and post-intervention surveys to students and researchers. Using a retrospective approach, the evaluation team was able to collect pre- and post-data on one scale but using a pre-post data collection strategy will improve data quality. Using a

pre-post strategy with the researchers' post-network status survey will produce valuable findings related to network growth.

2. Revise data collection instruments based on incubator study findings. Qualitative data collection illustrated some gaps in survey data collection. For example, the student survey did not collect data on student network building, but this topic appeared among the qualitative findings. Evaluation instruments will be revised to incorporate new scales and question items reflecting findings from the incubator study.
3. Increase rigor of evaluation design. Investment in a longer-term project offers potential for longitudinal follow-up with students to monitor graduate study and career trajectory. Greater investment in evaluation also allows the project to consider a comparison group design with a comparison group drawn from other Alaska students who do not participate in this program.

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APPENDIX A

Consent Form

You are invited to participate in a research study as a participant in AK UNiTE. This research study is examining the impacts of the AK UNiTE Network, a project to create a sustainable network of biology researchers across the state that will help provide place-based research opportunities for Alaskan undergraduate students. The overarching goal of this project is to improve the recruitment and retention of under-served Alaskans in the sciences by developing a network connecting faculty and students to research in the locations where they attend undergraduate classes. This project is supported by a National Science Foundation RCN-UBE (Research Coordination Network in Undergraduate Biology Education) incubator grant.

As a research study participant, you will be asked to complete a survey following your participation in the summer research internship program; some participants may also be selected to participate in an interview or a focus group discussion. The research team will also be granted access to data from your application form to participate in AK UNiTE. We estimate that your participation in this study will take up to 90 minutes of your time.

RISKS AND BENEFITS

There are no anticipated risks with participation in this study.

There are no direct benefits to you as a research participant. Your participation in the study will help us understand how participation in AK UNiTE affected undergraduate students' interests and plans in STEM and the size and strength of researchers' professional networks. The study results will also help AK UNiTE organizers to improve the effectiveness of the program for future participants.

PARTICIPATION

Your participation in this study is voluntary. If you decide to participate, you may withdraw from the study at any time without penalty. If you withdraw from the study before data collection is completed, your data will be destroyed. Your choice about participating in the study will have no impact on your current or future participation in AK UNiTE.

TITLE IX

Members of the research team include University of Alaska (UAA) faculty. All UAA faculty must report any sexual or gender-based discrimination, regardless of who it involves, to the University's Title IX coordinator within twenty-four hours.

CONFIDENTIALITY

All information collected through this study will be kept confidential by the research team. We will not use real names of participants or their organizational affiliations when reporting study findings. Data will be kept secure and destroyed at the end of the study by 10/30/2024.

CONTACT

If you have questions at any time about the study or the procedures, please contact Dr. Rachael Hannah at: the University of Alaska Anchorage or call (907) 786-1633 or e-mail rmhannah@alaska.edu.

If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact the Institutional Review Board at University of Alaska Anchorage, [name, email address, phone number].

CONSENT

I confirm that I am at least 18 years of age and that I understand the purpose of this study and what is involved in the research. I understand that I can ask questions at any time and that my participation is voluntary. I confirm that the purpose of the research, the study procedures, the possible risks and discomforts, as well as benefits have been explained to me.

By checking "Yes", I confirm my willingness to participate in this study.

By checking "No", I do not provide consent to research participation. I will be redirected to the end of this form.

Yes

No

Name: _____

Email: _____

Phone number: _____

Address: _____

City: _____

State: _____ Zip code: _____

[If yes is selected]

Thank you for providing consent to participate in a research study examining the impacts of the AK UNiTE Network. A member of the research team will contact you during the next few weeks. Thank you for your interest!

Dr. Rachael Hannah

Primary Investigator

rmhannah@alaska.edu

(907) 786-1633

Email Communication

Professional Researcher Invitation

Hello AK UNiTE Participant,

You are invited to take part in a network assessment survey of the AK UNiTE program with the University of Alaska Anchorage. This survey is intended to collect information about new network participants, including their organizational affiliation and professional networks, as well as to collect feedback about AK UNiTE and information about the impacts of this project on the growth of networks of biology researchers in Alaska.

This project is supported by a National Science Foundation RCN-UBE (Research Coordination Network in Undergraduate Biology Education) incubator grant. Results from this assessment will be reported to the National Science Foundation and used to support future grant applications to continue to provide support to Alaska's biology researchers.

Thank you in advance for taking the time to support this project.

Student Researcher Invitation

Hello AK UNiTE Participant,

You are invited to take part in a survey of your participation in the AK UNiTE program with the University of Alaska Anchorage. This survey is intended to gain a better understanding of the implementation and outcomes of the AK UNiTE program.

This project is supported by a National Science Foundation RCN-UBE (Research Coordination Network in Undergraduate Biology Education) incubator grant. Results from this assessment will be reported to the National Science Foundation and used to support future grant applications to continue to provide support to Alaska's biology researchers.

Thank you in advance for taking the time to support this project.

Data Collection Instruments

AK UNiTE STUDENT RESEARCHER SURVEY

INTRODUCTION

As an AK UNiTE student researcher, you are invited to complete this survey about your participation in this program.

This survey is being conducted by the Shaffer Evaluation Group, an independent educational evaluation firm commissioned by the University of Alaska Anchorage to gain a better understanding of the implementation and outcomes of the AK UNiTE program.

Confidentiality and Participation:

Participation in the survey is voluntary, and non-participation will have no impact on you. You may skip questions on the survey or stop participating at any time. Your decision to participate or not participate will not affect your support from the AK UNiTE program or your relationships with faculty, administration, and the University of Alaska Anchorage in general.

There is minimal risk of breach of confidentiality; procedures are in place to minimize this risk. All information that would permit identification of an individual respondent will be held in strict confidence, will be used only by persons engaged in and for the purpose of the survey, and will not be disclosed or released to others, including the staff and faculty of the University of Alaska Anchorage, for any purpose except as required by law.

Completing the Survey:

We estimate that it will take approximately 15 minutes to complete the survey. If you have questions about the study, please contact Dr. Patricia Moore Shaffer, the evaluation director (patricia@shafferevaluation.com), or Dr. Rachael Hannah, the project primary investigator (rmhannah@alaska.edu). By completing this survey, you acknowledge that you are at least 18 years of age and voluntarily grant permission for the use of your survey responses as part of the AK UNiTE evaluation.

Click "Next" to proceed with the survey.

YOUR POSTSECONDARY STUDIES & FUTURE PLANS

1. At which campus do you primarily enroll in classes?

- a) University of Alaska Anchorage: Anchorage campus
- b) University of Alaska Anchorage: Kenai River campus – Soldotna
- c) University of Alaska Anchorage: Kachemak Bay campus – Homer
- d) University of Alaska Anchorage: Kodiak College
- e) University of Alaska Anchorage: Mat-Su College
- f) University of Alaska Anchorage: Prince William Sound College
- g) University of Alaska Fairbanks: Fairbanks campus
- h) University of Alaska Fairbanks: Bristol Bay campus

- i) University of Alaska Fairbanks: Chukchi campus
- j) University of Alaska Fairbanks: Fairbanks Community and Technical College
- k) University of Alaska Fairbanks: Interior Alaska campus
- l) University of Alaska Fairbanks: Kuskokwim campus
- m) University of Alaska Fairbanks: Northwest campus
- n) University of Alaska Southeast: Juneau campus
- o) University of Alaska Southeast: Ketchikan campus
- p) University of Alaska Southeast: Sitka campus
- q) Alaska Pacific University

2. What is your academic major?

[write-in text response]

3. In what academic year did you begin your studies?

- a) 2010-2011
- b) 2011-2012
- c) 2012-2013
- d) 2013-2014
- e) 2014-2015
- f) 2015-2016
- g) 2016-2017
- h) 2017-2018
- i) 2018-2019
- j) 2019-2020
- k) 2021-2022

4. During the 2020-21 Spring semester, were you enrolled in:

- a) 6 credits or fewer?
- b) 6- 12 credits?
- c) 12 or more credits?

5. Do you expect to attend university full-time during the 2021-22 academic year?

- a) No
- b) Yes, during fall and spring semesters
- c) Yes, during fall semester only
- d) Yes, during spring semester only

6. What are your plans immediately following graduation? Please rank-order possible plans based on what is most likely:

- a) Work in a science related career
- b) Work in a non-science career
- c) Work as a graduate student for further study in a science field
- d) Work as a graduate student for further study in a field other than science
- e) Teach or to go to school to obtain a teaching certification

- f) Apply for any health professional school (medical school (MD/DO/ND), nursing, veterinary, PA, dentistry)
- g) Undecided and/or exploring my options
- h) Not applicable / Prefer not to answer

[Survey page break]

YOUR RESEARCH EXPERIENCES PRIOR TO AK UNiTE

7. Prior to the AK UNiTE research internship, had you participated in research activities outside of your regular coursework?

- a) No, I have not had a prior research experience
- b) Yes, during one academic semester (typically ~10 hr/wk)
- c) Yes, during multiple academic semesters (typically ~10 hr/wk)
- d) Yes, during a summer research program (typically full-time for at least 5 weeks)
- e) Yes, during a prior academic semester (or semesters) and a summer
- f) Yes, during prior years and/or several summers
- g) Not applicable / Prefer to not answer

8. Prior to the AK UNiTE research internship, how confident were you that you could complete the following tasks?

[Use 4-point Likert scale: A lot (4) to Not at all/a little can we add an N/A]

- a) Relate results and explanations to the work of others
- b) Generate a research question to answer
- c) Use scientific literature to guide research
- d) Create explanations for the results of the study
- e) Develop theories (integrate results from multiple studies)
- f) Use scientific language and terminology
- g) Use technical science skills

[Survey page break]

AK UNiTE RESEARCH INTERNSHIP

9. Please select from the list below your AK UNiTE research internship project.

- a) Acoustics and Visual Surveys of Cook Inlet Beluga Whales in Lower Cook Inlet Rivers
- b) Camera and Acoustic Surveys of Portage Glacier Wildlife
- c) Cardiac physiology of anoxia-tolerant vertebrates
- d) Examining potential prey of beluga whales in the Kenai River
- e) Exploring turtle brain anatomy using immunohistochemistry
- f) Harmful algal bloom monitoring

- g) Landscape evolution: Adapting to change in ice-rich permafrost systems
- h) Peatland & Watershed Surveys
- i) Research on bacteria within different layers of the soil, aimed at finding new species exposed by melting permafrost
- j) Sea otter studies
- k) The Role of the Rumen Microbiome in Diet Selection and Foraging Behavior of Moose
- l) Using High Frequency Sensors to Analyze Water Quality and Macroinvertebrate Community Composition in the Anchorage Cook Inlet Region
Virus genomics

10. Please rate the degree to which your AK UNiTE research internship enabled you to accomplish each learning outcome listed below.

[Available options will be the 5 learning outcomes selected by the researcher from a set of standardized options for the research project identified in the earlier question; these answer options will be piped in based on the answer provided in question #9]

[Sample learning outcomes for project a) in Question #9:

1. *Be able to explain biological concepts; data; and methods including their limitations using language understandable by collaborators in other disciplines.*
2. *Execute protocols and accurately record measurements and observations.*
3. *Identify methodological problems and suggest how to troubleshoot them.*
4. *Suggest how collaborators in STEM & non-STEM disciplines could contribute to solutions of real-world problems.*
5. *Work effectively with teammates to complete projects.]*

[4-point Likert scale: Very much, Adequately, Somewhat; Not at all]

10. Thinking about the answers you gave above, can you explain why the internship enabled you or didn't enable you to accomplish these learning outcomes?

[open-ended narrative question]

11. Using a scale of 1 to 4, please rate your overall satisfaction with the AK UNiTE research internship experience?

[rating scale indicating 1 as lowest score and 4 as highest score]

12. What suggestions do you have for changing the internship program to improve students' experiences in the future?

[open-ended text response]

[Survey page break]

AK UNiTE RESEARCH INTERNSHIP BENEFITS

13. After your AK UNiTE research internship, how confident are you that you can complete the following tasks?

[Use 4-point Likert scale: A lot (4) to Not at all/a little can we add an N/A]

- a) Relate results and explanations to the work of others
- b) Generate a research question to answer
- c) Use scientific literature to guide research
- d) Create explanations for the results of the study
- e) Develop theories (integrate results from multiple studies)
- f) Use scientific language and terminology
- g) Use technical science skills

14. Consider the possible benefits you may have gained from your AK UNiTE research internship and rate the extent to which you gained these benefits. If for any reason you prefer not to answer, or consider the question irrelevant to you, please choose the "Not applicable / Prefer not to answer" option.

[4-point Likert scale: No gain/very small gain; small gain; moderate gain; large gain; N/A or Prefer not to answer; use Qualtrics "slider" function with radio button for NA/Prefer not to answer.]

- a) Ability to analyze data and other information
- b) Ability to integrate theory and practice
- c) Ability to read and understand primary literature
- d) Clarification of a career path
- e) Learning to identify traditional or indigenous knowledge
- f) Learning to respect traditional or indigenous knowledge in scientific research
- g) Provide critical scientific feedback to improve science
- h) Readiness for more demanding research
- i) Skill in the interpretation of results
- j) Skill in science writing
- k) Skill in how to give an effective oral presentation
- l) Self-confidence in performing scientific work
- m) Tolerance for obstacles faced in the research process
- n) Understanding of the research process in your field
- o) Understanding of how scientists work on real problems
- p) Understanding how knowledge is constructed in science
- q) Understanding that scientific assertions require supporting evidence

15. What do you think was the most significant benefit or change you experienced as a result of taking part in the internship?

[open-ended text response]

16. Which aspect of the internship helped bring about this benefit or change?

[open-ended text response]

[Survey page break]

ABOUT YOU

17. Is Alaska your state of residence?

- a) No
- b) Yes

[The following question uses split logic; if yes above, the question below appears.]

17a. How many years have you resided in Alaska?

[write in numeric response]

18. Please indicate how you identify yourself. (Select one or more)

- a) American Indian or Alaska Native
- b) Asian
- c) Black or African American
- d) Hispanic
- e) Native Hawaiian or other Pacific Islander
- f) White
- g) Prefer not to respond

19. Please describe your current gender identity.

- a) Male
- b) Female
- c) Trans male/Trans man
- d) Trans female/Trans woman
- e) Genderqueer/Gender non-conforming
- f) Different identity (please state) _____
- g) Prefer not to respond

AK UNiTE Pre-Network Assessment

Thanks for attending the inaugural event of the AK UNiTE Network! This event kicks off a project to create a sustainable network of biology researchers across the state that will help provide place-based research opportunities for Alaskan undergraduate students. This project is supported by a NSF RCN-UBE (Research Coordination Network in Undergraduate Biology Education) incubator grant.

This network assessment survey is intended to collect baseline information about network participants, including their organizational affiliation and professional networks. A follow-up survey at a later date will enable the AK UNiTE Network to report about the impacts of this project on the growth of networks of biology researchers in Alaska.

Participation in this network assessment survey is voluntary and non-participation will have no impact on you. You may skip questions on the survey or discontinue participation at any time. We estimate that it will take approximately 10-20 minutes to complete the survey.

All personal information collected through this survey will be held in confidence by the evaluation team; data will be reported in aggregate only. If you have questions about the study, please contact the external evaluator, Dr. Patricia Moore Shaffer (patricia.shaffer@shafferevaluation.com). By completing this survey, you acknowledge that you are at least 18 years of age and voluntarily grant permission for the use of your survey responses as part of the AK UNiTE evaluation.

Your Organizational Affiliation

Please identify yourself and your affiliated organization/institution.

- Name (1) _____
- Organization/Institution (2) _____
- Department or Office (if applicable) (3) _____
- City (4) _____
- State (5) _____

Please describe your affiliated organization/institution. (select one only)

- Academic (1)
- Government Agency (Federal) (2)
- Government Agency (State) (3)
- Government Agency (Local) (4)
- Nonprofit Organization (5)
- Private Sector (6)
- Tribal Entity (7)
- Self-Employed (8)
- Other (9) _____

What is your primary role at this organization/institution?

- Graduate Student (1)
- College/University Faculty (2)
- Educator (3)
- Community or Staff Researcher (4)
- Other (5) _____

Are you affiliated with another institution?

- Yes (1)
- No (2)

Your Organizational Affiliation

Please identify your second affiliated organization/institution.

- Organization/Institution (1) _____
- Department or Office (if applicable) (2) _____
- City (3) _____
- State (4) _____
- Country (5) _____

Please describe your affiliated organization/institution. (select one only)

- Academic (1)
- Government Agency (Federal) (2)
- Government Agency (State) (3)
- Government Agency (Local) (4)
- Nonprofit Organization (5)
- Private Sector (6)
- Tribal Entity (7)
- Self-Employed (8)

What is your primary role at this organization/institution?

- Graduate Student (1)
- College/University Faculty (2)
- Educator (3)
- Community or Staff Researcher (4)
- Other (5) _____

About You

Is Alaska your state of residence?

- Yes (1)
- No (2)

Display This Question:

If "Is Alaska your state of residence?" = 1

How many years have you resided in Alaska?

Please indicate how you identify yourself. (Select one or more)

- American Indian or Alaskan Native (1)
- Asian (2)
- Black or African American (3)
- Hispanic (4)
- Native Hawaiian or other Pacific Islander (5)
- White (6)
- Prefer not to respond (7)

Please describe your current gender identity.

- Male (1)
 - Female (2)
 - Trans male/Trans man (3)
 - Trans female/Trans woman (4)
 - Genderqueer/Gender non-conforming (5)
 - Different identity (please state) (6)
-

- Prefer not to respond (7)

Your Expertise and Educational Background

What is your main field of knowledge or expertise?

- Life Sciences (e.g., Arctic Biology; Biological and Biomedical Sciences; Health Sciences) (1)
- Physical Sciences and Earth Sciences (e.g., Chemistry; Geosciences; Atmospheric Sciences & Ocean Sciences; Physics and Astronomy) (2)
- Mathematics and Computer Sciences (e.g., Computer and Information Sciences; Mathematics & Statistics) (3)
- Psychology and Social Sciences (e.g., Psychology; Anthropology; Economics; Political Science & Government; Sociology) (4)
- Engineering (e.g., Bioengineering and Biomedical Engineering) (5)
- Education (e.g., Educational Administration; Educational Research; Teacher Education) (6)
- Humanities and Arts (e.g., Traditional Arts, Fine Arts, Foreign Languages and Literature; History) (7)
- Other (e.g., Business Management & Administration, Communications) (8)

What is your highest earned degree?

- High school diploma or equivalent (1)
- Associate's degree (e.g., AS, AA) or equivalent (2)
- Bachelor's degree (e.g., BS, BA, AB) or equivalent (3)
- Master's degree (e.g., MS, MS, MBA) or equivalent (4)
- Professional doctoral degree (e.g., MD, DVM) or equivalent (5)

- Research doctoral degree (e.g., Ph.D., DSc) (6)
- Does not apply (7)
- Prefer not to respond (8)

In what year did you graduate with your highest earned degree?

AK UNiTE Post-Network Assessment

Thanks for participating in the AK UNiTE Network! The goal of this project is to create a sustainable network of biology researchers across the state that will help provide place-based research opportunities for Alaskan undergraduate students. This project is supported by an NSF RCN-UBE (Research Coordination Network in Undergraduate Biology Education) incubator grant.

This network assessment survey is intended to collect information about new network participants, including their organizational affiliation and professional networks, as well as to collect feedback about AK UNiTE and information about the impacts of this project on the growth of networks of biology researchers in Alaska. Results from this assessment will be reported to the National Science Foundation and used to support future grant applications to continue to provide support to Alaska's biology researchers.

Participation in this network assessment survey is voluntary and non-participation will have no impact on you. You may skip questions on the survey or discontinue participation at any time. We estimate that it will take approximately 20 minutes to complete the survey. All personal information collected through this survey will be held in confidence by the evaluation team; data will be reported in aggregate only. If you have questions about the study, please contact the external evaluator, Dr. Patricia Moore Shaffer (patricia.shaffer@shafferevaluation.com). By completing this survey, you acknowledge that you are at least 18 years of age and voluntarily grant permission for the use of your survey responses as part of the AK UNiTE evaluation.

Your Organizational Affiliation

Please identify yourself and your affiliated organization/institution.

- Name (1) _____
- Organization/Institution (2) _____
- Department or Office (if applicable) (3)

- City (4) _____
- State (5) _____

Please describe your affiliated organization/institution. (select one only)

- Academic (1)
- Government Agency (Federal) (2)
- Government Agency (State) (3)
- Government Agency (Local) (4)
- Nonprofit Organization (5)
- Private Sector (6)
- Tribal Entity (7)
- Self-Employed (8)
- Other (9) _____

What is your primary role at this organization/institution?

- Graduate Student (1)
- College/University Faculty (2)
- Educator (3)
- Community or Staff Researcher (4)
- Other (5) _____

Are you affiliated with another institution?

- Yes (1)
- No (2)

Your Organizational Affiliation

Please identify your second affiliated organization/institution.

- Organization/Institution (1) _____
- Department or Office (if applicable) (2)

- City (3) _____
- State (4) _____
- Country (5) _____

Please describe your affiliated organization/institution. (select one only)

- Academic (1)
- Government Agency (Federal) (2)
- Government Agency (State) (3)
- Government Agency (Local) (4)
- Nonprofit Organization (5)
- Private Sector (6)
- Tribal Entity (7)
- Self-Employed (8)

What is your primary role at this organization/institution?

- Graduate Student (1)
- College/University Faculty (2)
- Educator (3)
- Community or Staff Researcher (4)
- Other (5) _____

About You

Is Alaska your state of residence?

- Yes (1)
- No (2)

Display This Question:

If "Is Alaska your state of residence?" = 1

How many years have you resided in Alaska?

Please indicate how you identify yourself. (Select one or more)

- American Indian or Alaskan Native (1)
- Asian (2)
- Black or African American (3)
- Hispanic (4)
- Native Hawaiian or other Pacific Islander (5)
- White (6)
- Prefer not to respond (7)

Please describe your current gender identity.

- Male (1)
- Female (2)
- Trans male/Trans man (3)
- Trans female/Trans woman (4)
- Genderqueer/Gender non-conforming (5)
- Different identity (please state) (6)

-
- Prefer not to respond (7)

Your Expertise and Educational Background

What is your main field of knowledge or expertise?

- Life Sciences (e.g., Arctic Biology; Biological and Biomedical Sciences; Health Sciences) (1)
- Physical Sciences and Earth Sciences (e.g., Chemistry; Geosciences; Atmospheric Sciences & Ocean Sciences; Physics and Astronomy) (2)
- Mathematics and Computer Sciences (e.g., Computer and Information Sciences; Mathematics & Statistics) (3)
- Psychology and Social Sciences (e.g., Psychology; Anthropology; Economics; Political Science & Government; Sociology) (4)
- Engineering (e.g., Bioengineering and Biomedical Engineering) (5)
- Education (e.g., Educational Administration; Educational Research; Teacher Education) (6)
- Humanities and Arts (e.g., Traditional Arts, Fine Arts, Foreign Languages and Literature; History) (7)
- Other (e.g., Business Management & Administration, Communications) (8)

What is your highest earned degree?

- High school diploma or equivalent (1)
- Associate's degree (e.g., AS, AA) or equivalent (2)
- Bachelor's degree (e.g., BS, BA, AB) or equivalent (3)
- Master's degree (e.g., MS, MS, MBA) or equivalent (4)
- Professional doctoral degree (e.g., MD, DVM) or equivalent (5)

- Research doctoral degree (e.g., Ph.D., DSc) (6)
- Does not apply (7)
- Prefer not to respond (8)

In what year did you graduate with your highest earned degree?

Please indicate the geographic location of the institution associated with your highest earned degree.

- Inside Alaska (1)
- Inside the United States or U.S. Territory (2)
- Outside of the United States (3)

Project Questions

Check the characteristics below that describe your research project that was supported by AK UNiTE this summer.

- Took place primarily outside of an academic or laboratory setting (1)
- Addressed a research question or problem that is of interest to community stakeholders (2)
- Engaged researchers from other organizations/institutions (3)
- Involved other community partners (4)
- Was part of a course undergraduate research experience (CURE) (5)

How many students, including your AK UNiTE research intern, participated in your research project this summer?

Overall, how satisfied were you with your experience with the AK UNiTE project?

- Extremely satisfied (1)
- Very satisfied (2)
- Satisfied (3)
- Neither satisfied nor dissatisfied (4)
- Dissatisfied (5)
- Very dissatisfied (6)
- Extremely dissatisfied (7)

Please rate your satisfaction with each of these AK UNiTE activities.

	Extremely satisfied (1)	Very satisfied (2)	Satisfied (3)	Neither satisfied nor dissatisfied (4)	Dissatisfied (5)	Very dissatisfied (6)	Extremely dissatisfied (7)	Not applicable / Did not participate (8)
AK UNiTE inaugural launch event (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Networking with other biology researchers (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recruitment of research interns through SERC website (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial support for research internships (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What was most valuable about your participation in AK UNiTE?

What challenges did you encounter in participating in AK UNiTE?

What lessons did you learn through your participation in AK UNiTE?

Are there effective practices developed or observed during your participation in AK UNiTE that could be shared with the larger scientific community?

Your Network

The following questions will be used to map the nature and strength of the research network of AK UNiTE participants in order to communicate the impacts of this project.

In this section, you will be asked to identify colleagues with whom you are professionally engaged and to describe the nature of your professional relationship with them. All information will be kept confidential.

Please list the names and affiliated institutions/organizations of colleagues with whom you are professionally engaged. Affiliated institutions may include, but are not limited to, institutions of higher education, government agencies, tribal entities, nonprofit organizations, and businesses. Leave the affiliated institution blank for individuals with an institutional affiliation.

Colleague/Affiliated Institution/Organization 1 (1)

- Colleague/Affiliated Institution/Organization 2 (2)
-

- Colleague/Affiliated Institution/Organization 3 (3)
-

- Colleague/Affiliated Institution/Organization 4 (4)
-

- Colleague/Affiliated Institution/Organization 5 (5)
-

- Colleague/Affiliated Institution/Organization 6 (6)
-

- Colleague/Affiliated Institution/Organization 7 (7)
-

- Colleague/Affiliated Institution/Organization 8 (8)
-

- Colleague/Affiliated Institution/Organization 9 (9)
-

- Colleague/Affiliated Institution/Organization 10 (10)
-

- Colleague/Affiliated Institution/Organization 11 (11)
-

- Colleague/Affiliated Institution/Organization 12 (12)
-

- Colleague/Affiliated Institution/Organization 13 (13)
-

- Colleague/Affiliated Institution/Organization 14 (14)
-

- Colleague/Affiliated Institution/Organization 15 (15)
-

- Colleague/Affiliated Institution/Organization 16 (16)
-

- Colleague/Affiliated Institution/Organization 17 (17)
-

- Colleague/Affiliated Institution/Organization 18 (18)
-

○ Colleague/Affiliated Institution/Organization 19 (19)

○ Colleague/Affiliated Institution/Organization 20 (20)

○ Colleague/Affiliated Institution/Organization 21 (21)

○ Colleague/Affiliated Institution/Organization 22 (22)

○ Colleague/Affiliated Institution/Organization 23 (23)

○ Colleague/Affiliated Institution/Organization 24 (24)

○ Colleague/Affiliated Institution/Organization 25 (25)

Carry Forward Entered Choices

Based on your selection, respond to this set of questions about the nature of your professional relationship with each colleague.

Researcher/Affiliated Institution 24
(x24)

▼ 1 = Acquaintance (1 ... 5 = Very close colleague (5)

▼ 1 = Less than one year (1 ... 5 = 10 or more years (5)

Researcher/Affiliated Institution 25 (x25)

▼ 1 = Acquaintance (1 ... 5 = Very close colleague (5)

▼ 1 = Less than one year (1 ... 5 = 10 or more years (5)

Carry Forward Entered Choices

Based on your selection, respond to this set of questions about the nature of your professional relationship with each colleague.

	On average, how frequently do you communicate with this person?	Does your institution/organization have a formal agreement with your colleague's institution/organization (e.g., memorandum of understanding)?
Researcher/Affiliated Institution 1 (x1)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 2 (x2)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 3 (x3)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 4 (x4)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 5 (x5)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 6 (x6)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 7 (x7)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 8 (x8)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 9 (x9)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 10 (x10)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 11 (x11)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 12 (x12)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 13 (x13)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 14 (x14)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 15 (x15)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)

Researcher/Affiliated Institution 16 (x16)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 17 (x17)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 18 (x18)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 19 (x19)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 20 (x20)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 21 (x21)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 22 (x22)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 23 (x23)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 24 (x24)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)
Researcher/Affiliated Institution 25 (x25)	▼ 1 = Once a year or less (1 ... 6 = Daily (6)	▼ 1 = Yes (1 ... 2 = No (2)

Carry Forward Entered Choices

For each of your selected colleagues, please select the ways in which you have interacted with them.

	Co-authored a paper (1)	Collaborated on a research project (2)	Co-presented at a professional conference or gathering (3)	Collaborated on a grant application and/or award (4)	Involved in mentoring or advising (5)	Involved in educational activities other than mentoring/advising (6)	Regularly discuss our work (scientific, research, educational) (7)	Connected through a professional (including online) community (8)	Other (9)
Researcher/Affiliated Institution 1 (x1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 2 (x2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 3 (x3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 4 (x4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 5 (x5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 6 (x6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 7 (x7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 8 (x8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 9 (x9)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Researcher/Affiliated Institution 10 (x10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Researcher/Af filiated Institution 11 (x11)	<input type="checkbox"/>								
Researcher/Af filiated Institution 12 (x12)	<input type="checkbox"/>								
Researcher/Af filiated Institution 13 (x13)	<input type="checkbox"/>								
Researcher/Af filiated Institution 14 (x14)	<input type="checkbox"/>								
Researcher/Af filiated Institution 15 (x15)	<input type="checkbox"/>								
Researcher/Af filiated Institution 16 (x16)	<input type="checkbox"/>								
Researcher/Af filiated Institution 17 (x17)	<input type="checkbox"/>								
Researcher/Af filiated Institution 18 (x18)	<input type="checkbox"/>								
Researcher/Af filiated Institution 19 (x19)	<input type="checkbox"/>								
Researcher/Af filiated Institution 20 (x20)	<input type="checkbox"/>								
Researcher/Af filiated Institution 21 (x21)	<input type="checkbox"/>								
Researcher/Af filiated Institution 22 (x22)	<input type="checkbox"/>								
Researcher/Af filiated Institution 23 (x23)	<input type="checkbox"/>								

Researcher/Af
filiated
Institution 24
(x24)

Researcher/Af
filiated
Institution 25
(x25)

Interview Protocol for AK UNiTE Students

Thank you for taking time to speak with us today about your experiences in the AK UNiTE Program at the University of Alaska Anchorage.

My name is _____ from the Shaffer Evaluation Group, an independent educational evaluation firm commissioned by the University of Alaska Anchorage to gain a better understanding of the implementation and effectiveness of the AK UNiTE program. This research study is examining the impacts of the AK UNiTE Network, a project to create a sustainable network of biology researchers across the state that will help provide place-based research opportunities for Alaskan undergraduate students.

Your participation in this study is voluntary, and you may withdraw from today's discussion at any time. You may also decline to answer any questions that may be asked today. Your choice about participating in the study will have no impact on your current or future participation in AK UNiTE.

All information collected during today's discussion will be kept confidential by the research team. We won't use your name or the name of your university when reporting study findings. We will share a transcript of today's discussion and will respectfully request that you review it to ensure that it accurately reflects your comments today.

This session will last no longer than 60 minutes. Before we begin, do you have any questions?

I'd like to start by understanding who you are and your research.

- 1) What is your major at college? What influenced you to select this major?
- 2) What do you hope to do after college?

Next, I'd like to discuss the summer research internship program.

- 1) How did you hear about the AK UNiTE summer research internship program?
- 2) Was it easy for you to apply for an internship? Why or why not?
- 3) Tell me about the research project you were involved with this summer.
 - a. Probe for what research activities the student was directly involved with.
- 4) What was a highlight of your research internship this summer?
- 5) Did you encounter any challenges in your internship this summer? How did you address them?
 - a. Probe for COVID-related challenges and other external factors.
- 6) Is there anything you would have changed about your research experience this summer?

This summer, you had an opportunity to work closely with [insert research mentor name].

- 7) Describe how you interacted with this researcher.
 - a. Probe for learning opportunities:
 - i. building and applying scientific knowledge or skills;
 - ii. developing and applying professional knowledge or skills
 - iii. mentoring;
 - iv. providing career or academic guidance
- 8) Let's talk about what you learned through the internship this summer.

- a. Probe for examples of what the student learned through the internship experience (knowledge, skills, application)
- 9) What was the most significant benefit you gained from participating in the summer research internship? Probe for examples.
- 10) Do you think about research differently after your experience this summer? How?
 - a. Probe for interest in pursuing non-course-based research in the near future.
- 11) What are your plans immediately following graduation? Have your after-graduation plans changed at all as a result of your research internship?

Focus Group Protocol for AK UNiTE Researchers

Thank you for taking time to speak with us today about your experiences in the AK UNiTE Program at the University of Alaska Anchorage.

My name is _____ from the Shaffer Evaluation Group, an independent educational evaluation firm commissioned by the University of Alaska Anchorage to gain a better understanding of the implementation and effectiveness of the AK UNiTE program. This research study is examining the impacts of the AK UNiTE Network, a project to create a sustainable network of biology researchers across the state that will help provide place-based research opportunities for Alaskan undergraduate students.

Your participation in this study is voluntary, and you may withdraw from today's discussion at any time. You may also decline to answer any questions that may be asked today. Your choice about participating in the study will have no impact on your current or future participation in AK UNiTE.

All information collected during today's discussion will be kept confidential by the research team. We will not use real names of participants or their organizational affiliations when reporting study findings. We will share a transcript of today's discussion and will respectfully request that you review it to ensure that it accurately reflects your comments today.

Before we begin our conversation, I have some group norms that I am asking each of you observe:

- First, please do not identify other people (students, faculty, or administrators) by name when you talk. You might say instead, for example, "a student" or "my faculty colleague."
- Secondly, respect everyone's point of view. I don't expect you to agree with one another about everything, and there are no right or wrong answers to my questions. Each student's thoughts are valuable.
- Because your comments are being recorded, I need one person to speak at a time. You do not have to raise your hand; just wait until the person who is speaking stops before you begin.
- Finally, please do not repeat or discuss comments made during this session with others. Please do not repeat or discuss with other students or staff what members of your group may say. If you are asked, you may say that the group talked about ways to improve student learning, but please keep specific remarks confidential.

This session will last about 60 minutes. Before we begin, do you have any questions?

I'd like to start by understanding who you are and your research.

- 1) What are your research interests?
- 2) What organization or university are you associated with?

Next, I'd like to discuss the summer research internship program.

- 1) How did you hear about the AK UNiTE summer research internship program?
- 2) Was it easy to apply to host students for the internship? Why or why not?

- 3) How many students participated in your research project this summer? Of these, how many were part of the AK UNiTE program?
 - a. Funding follow up if some students were not part of the paid opportunity.
- 4) Describe the research project that the students helped support. How did students support the research in this project?
- 5) Did you offer any complementary activities for students to enhance their research internship experience?
 - a. Probe for learning or social activities.
- 6) Can you describe some of the successes you and participating students experienced during their internships?
- 7) What challenges, if any, did you encounter while working with student interns this summer? How did you address them?
 - a. Probe for COVID-related challenges and other external factors.
- 8) What is your perception of the students' benefits from the summer research internship? Probe for examples.
 - a. What kind of relationship was made with the student?
 - b. Are you likely to continue interaction with the student by providing additional research opportunities either informal or formal, such as a continued mentorship?
- 9) If you had the opportunity to utilize AK UNiTE support to offer a future summer research internship, what changes would you make to the structure of your internship, if any?
- 10) Overall, how satisfied were you with AK UNiTE activities? What improvements do you think could be made to the AK UNiTE if this program is continued in the future?

These last few questions focus on AK UNiTE's goal to bring Alaska's biology research community closer together to develop community partnerships with local research projects.

11. Did participating in this project strengthen your skills in mentoring and/or cross-cultural relationships? How?
12. Did participating in this project help you to identify or enhance community research partnerships? How?
13. Do you feel your professional network of Alaska researchers was expanded as a result of your participation in this project? Why or why not?

Focus Group Protocol for AK UNiTE Project Team

Thank you for taking time to speak with us today about your experiences in the AK UNiTE Program at the University of Alaska Anchorage.

My name is _____ from the Shaffer Evaluation Group, an independent educational evaluation firm commissioned by the University of Alaska Anchorage to gain a better understanding of the implementation and effectiveness of the AK UNiTE program. Today's focus group discussion is part of a comprehensive evaluation, the results of which will be used to make recommendations regarding the future of the AK UNiTE program at the College.

Your participation today is voluntary. You may skip questions or discontinue participation at any time. I am audio-recording today's discussion for the purpose of transcribing your comments for analysis. Please be assured that there is minimal risk of breach of confidentiality. All information that would permit identification of an individual respondent will be held in strict confidence by Shaffer Evaluation Group, will be used by only persons engaged in and for the purpose of the evaluation study, and will not be disclosed or released to others for any purpose except as required by law. You will not be identified by name, and information from the study will be reported only in the aggregate at the program level.

Before we begin our conversation, I have some group norms that I am asking each of you observe:

- First, please do not identify other people (students, faculty or administrators) by name when you talk. You might say instead, for example, "a student" or "my faculty colleague."
- Secondly, respect everyone's point of view. I don't expect you to agree with one another about everything, and there are no right or wrong answers to my questions. Each student's thoughts are valuable.
- Because your comments are being recorded, I need one person to speak at a time. You do not have to raise your hand; just wait until the person who is speaking stops before you begin.
- Finally, please do not repeat or discuss comments made during this session with others. Please do not repeat or discuss with other students or staff what members of your group may say. If you are asked, you may say that the group talked about ways to improve student learning, but please keep specific remarks confidential.

This session will last about 60 minutes. Before we begin, do you have any questions?

Let's start by discussing challenges that encountered in implementing this project.

- 1) First, what challenges did you experience in implementing this project? [Try to probe responses that are not related to COVID-19]
- 2) What challenges did you and your team encounter that were associated with COVID-19? Specifically, how did the changing conditions affect each project component?
- 3) What project outcomes were unexpected?
- 4) How are external factors affecting project outcomes?
- 5) What factors affected implementation of each project component?

- 6) What factors affected project outcomes? Where there any that were outside of your control?
- 7) What lessons learned can be identified from project implementation?
- 8) Are there effective practices that could be shared with the larger scientific community?
- 9) For each project component can you identify the lessons learned?
- 10) Thinking about the life of the project, can you identify effective implementation practices?

APPENDIX B

Researcher Survey Data Tables

Figure 10. Participant-identified primary organizations in pre-network assessment

Institution or Organization	Frequency
University of Alaska Fairbanks	3
Center for Alaskan Coastal Studies	2
NEON / Battelle	1
USGS Alaska Science Center	1
Alaska Pacific University	1
Aleut Community of St. Paul Island Tribal Government	1
Homer Soil and Water Conservation District	1
Red Mountain Consulting LLC	1
Alaska Pacific University	1
University of Alaska Anchorage / NOAA	1
University of Alaska Anchorage, Kodiak College	1
ConocoPhillips Alaska, Inc.	1
US Geological Survey	1
Defenders of Wildlife	1
Alaska Department of Fish and Game	1
Edmonds College	1

Figure 11. Participant-identified primary organizations in post-network assessment

Institution or Organization	Frequency
University of Alaska Fairbanks	2
Alaska Department of Fish and Game	1
Center for Alaskan Coastal Studies	1
University of Alaska Anchorage	1
University of Alaska Anchorage-KPC-Kachemak Bay Campus	1
University of Alaska Fairbanks-Alaska Sea Grant	1

Figure 12. Participant-identified departments in pre-network assessment

Department	Frequency
Alaska Science Center/Ecosystems Office/Marine & Freshwater Ecology	1
Alaska Sea Grant Marine Advisory Program	1
Bering Sea Campus and Research Center	1
Biology & Wildlife Department	1
Biology Dept - Emeritus	1
Domain 18&19	1
Environmental and Permitting	1
Health Sciences	1
Kachemak Bay National Estuarine Research Reserve	1
Marine & Environmental Science	1
Wildlife Conservation: Herbivore Nutrition Lab	1

Figure 13. Participant-identified departments in post-network assessment

Department	Frequency
Biological Sciences	2
Biological Sciences & Alaska Center for Conservation Science	1
Marine Advisory Program	1
Marine Biology	1
Wildlife Nutrition Lab	1

Figure 14. Cities in which researcher's affiliated organization is located, in pre-network assessment

City	Frequency
Anchorage	7
Homer	4
Palmer	2
Kodiak	2
Fairbanks	2
Lynnwood	1
Juneau	1

Figure 15. Cities in which researcher's affiliated organization is located, in post-network assessment

City	Frequency
Homer	2
Anchorage	1
Fairbanks	1
Juneau	1
Kodiak	1
Palmer	1

Figure 16. State in which researchers' affiliated organization is located, in pre-network assessment

State	Frequency
Alaska	18
Washington	1

Figure 17. State in which researchers' affiliated organization is located, in post-network assessment

State	Frequency
Alaska	7

Figure 18. Description of participant's organization or institution in pre-network assessment

Institution type	Frequency
Academic	8
Nonprofit Organization	4
Government Agency (State)	2
Government Agency (Federal)	2
Private Sector	2
Government Agency (Local)	1

Figure 19. Description of participant's organization or institution in pre-network assessment

Institution type	Frequency
Academic	5
Government Agency (State)	1
Nonprofit Organization	1

Figure 20. Primary role at organization or institution in pre-network assessment

Role	Frequency
Other	11
College/University Faculty	5
Student	1
Community Researcher	1
K-12 Educator	1

Figure 21. Primary role listed as “Other” at organization or institution in pre-network assessment

Role – “Other”	Frequency
Program Manager	2
Research Professional Staff, Education and Training Coordinator	1
Emeritus	1
Environmental Coordinator	1
Program Organizer in Addition to Educator and Researcher	1
Executive Director	1
Researcher/Data Manager/D & I Change Agent	1
Outreach Coordinator	1
Owner/Lead Scientist	1

Figure 22. Primary role at organization or institution in post-network assessment

Role	Frequency
College/University Faculty	3
Educator	2
Grad Student	1
Community Researcher	1

Figure 23. Participant affiliation with secondary organization in pre-network analysis

Are you affiliated with another institution?	Frequency
No	15
Yes	4

Figure 24. Participant affiliation with secondary organization in post-network analysis

Are you affiliated with another institution?	Frequency
No	5
Yes	2

Figure 25. Participant identified secondary organization type in pre-network analysis

Organizational type	Frequency
Academic	3
Nonprofit Organization	1

Figure 26. Participant identified secondary organization type in post-network analysis

Organizational type	Frequency
Academic	2

Figure 27. Participant secondary organization role in pre-network analysis

Role	Frequency
College/University Faculty	1
Student	1
Education & Outreach Lead	1
Board Member/Volunteer	1

Figure 28. Participant secondary organization role in post-network analysis

Role	Frequency
Educator	1
Volunteer	1

Figure 29. Is Alaska the participant's state of residency in the pre-network analysis

Organizational Type	Frequency
Yes	18
No	1

Figure 30. Is Alaska the participant's state of residency in the post-network analysis

Organizational Type	Frequency
Yes	7

Figure 31. Participant average length of time as a resident of AK in pre-network assessment

Average Number of Years	Minimum Number of Years	Maximum Number of Years
19.47	3	40

Figure 32. Participant average length of time as a resident of AK in post-network assessment

Average Number of Years	Minimum Number of Years	Maximum Number of Years
14.43	3	30

Figure 33. Participant ethnicity identification in pre-network assessment

Ethnicity	Frequency
White	16
Asian	1
Hispanic	1
Hispanic, White	1

Figure 34. Participant ethnicity identification in post-network assessment

Ethnicity	Frequency
White	6
Asian	1

Figure 35. Participant gender identification pre-network assessment

Gender	Frequency
Female	17
Male	2

Figure 36. Participant gender identification post-network assessment

Gender	Frequency
Female	7

Figure 37. Participant main field of knowledge or expertise in pre-network assessment

Field of knowledge	Frequency
Life Sciences	13
Physical Sciences and Earth Sciences	3
Education	2
Psychology and Social Science	1

Figure 38. Participant main field of knowledge or expertise in post-network assessment

Field of knowledge	Frequency
Life Sciences	6
Education	1

Figure 39. Participant highest earned degree in pre-network assessment

Degree	Frequency
Master's degree (e.g., MS, MS, MBA) or equivalent	10
Research doctoral degree (e.g., Ph.D., DSc)	5
Bachelor's degree (e.g., BS, BA, AB) or equivalent	4

Figure 40. Participant highest earned degree in post-network assessment

Degree	Frequency
Master's degree (e.g., MS, MS, MBA) or equivalent	3
Research doctoral degree (e.g., Ph.D., DSc)	3
Bachelor's degree (e.g., BS, BA, AB) or equivalent	1

Figure 41. Participant's reported graduation year with highest earned degree in pre-network assessment

Average year	Furthest year	Most recent year
2007	1984	2020

Figure 42. Participant's reported graduation year with highest earned degree in post-network assessment

Average year	Furthest year	Most recent year
2011	2003	2020

Figure 43. Participant's reported geographic location of institution highest earned degree was earned in pre-network assessment

Geographic Location	Frequency
Inside the United States or U.S. Territory	11
Inside Alaska	7
Outside of the United States	1

Figure 44. Participant's reported geographic location of institution highest earned degree was earned in post-network assessment

Geographic Location	Frequency
Inside the United States or U.S. Territory	4
Inside Alaska	3

Figure 45. Participant reported students, including the AK UNiTE research intern, participating in their research project this summer

Average number of students	Smallest number of students	Largest number of students
13.57	1	83

Figure 46. Participant's satisfaction with their experiences with the AK UNiTE project (Scale of 1 [Extremely dissatisfied] to 7 [Extremely satisfied])

Ratings	Frequency	Percent
Neither satisfied nor dissatisfied	1	14.29
Satisfied	3	42.86
Very satisfied	1	14.29
Extremely satisfied	2	28.57
Mean	5.57	
Std. Dev.	1.13	

Figure 47. Characteristics of research projects

Characteristics (Respondents could select more than one characteristic)	Frequency	Percent of respondents reporting this characteristic
Took place primarily outside of an academic or laboratory setting	5	71.43
Addressed a research question or problem that is of interest to community stakeholders	3	42.86
Engaged researchers from other organizations/institutions	2	28.57
Involved other community partners	3	42.86
Total Responses	13	

Figure 48. Participant's satisfaction with AK UNiTE inaugural launch event (Scale of 1 [Extremely dissatisfied] to 7 [Extremely satisfied])³

Ratings	Frequency	Percent
Neither satisfied nor dissatisfied	1	14.29
Satisfied	2	28.57
Very satisfied	2	28.57
Extremely satisfied	2	28.57
Mean	5.67	
Std. Dev.	1.21	

³ One response of "Not applicable/Did not participate" (8) was removed from the analysis

Figure 49. Participant's satisfaction with networking with other biology researchers (Scale of 1 [Extremely dissatisfied] to 7 [Extremely satisfied])

Ratings	Frequency	Percent
Dissatisfied	2	14.29
Neither satisfied nor dissatisfied	2	14.29
Satisfied	1	14.29
Very satisfied	1	28.57
Extremely satisfied	1	28.57
Mean	4.57	
Std. Dev.	1.51	

Figure 50. Participant's satisfaction with recruitment of research interns through SERC website (Scale of 1 [Extremely dissatisfied] to 7 [Extremely satisfied])

Ratings	Frequency	Percent
Neither satisfied nor dissatisfied	3	42.86
Very satisfied	2	28.57
Extremely satisfied	2	28.57
Mean	5.43	
Std. Dev.	1.40	

Figure 51. Participant's satisfaction with financial support for research internships (Scale of 1 [Extremely dissatisfied] to 7 [Extremely satisfied])

Ratings	Frequency	Percent
Neither satisfied nor dissatisfied	1	14.29
Satisfied	3	42.86
Very satisfied	2	28.57
Extremely satisfied	1	14.29
Mean	5.43	
Std. Dev.	0.98	

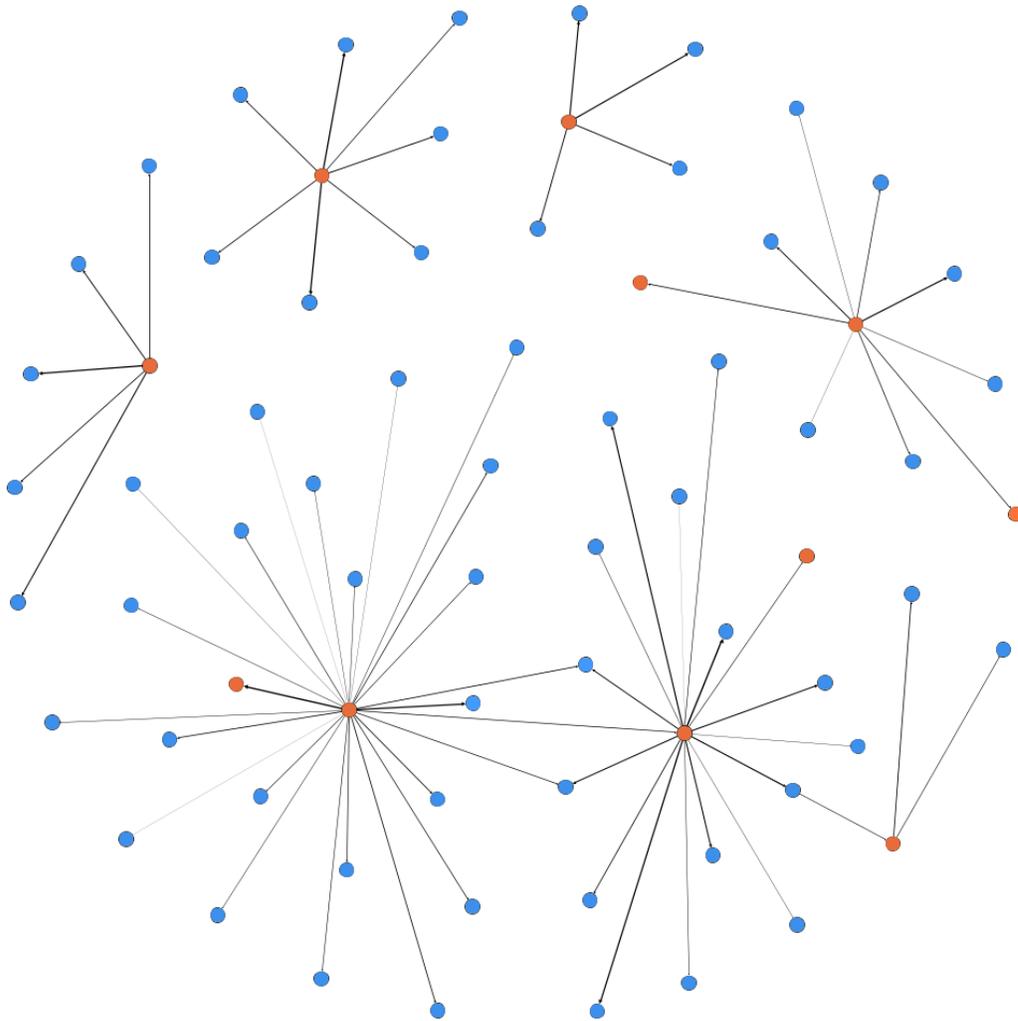
Figure 52. Overall average reported size and strength of network for network participants in pre-network assessment

Average size of network	Average strength of relationship
7.79	12.43

Figure 53. Overall average reported size and strength of network for network participants in post-network assessment

Average size of network	Average strength of relationship
9.86	12.41

Figure 54. Network connections of participants



The thickness of lines between nodes represents the strength of relationship, based on how close they report they are with professionally engaged colleagues, length of time the relationship has existed, frequency of communication, formal agreement with colleagues' institution, and the types of interactions the participant has been involved with colleague. Thicker lines indicate a stronger relationship. Orange nodes represent network participants and blue nodes represent additional colleagues listed by survey participants.

Student Survey Data Tables

Figure 55. Participant's primary campus for enrolled classes

Campus Locations	Frequency	Percent
University of Alaska Anchorage: Anchorage campus	5	71.43
University of Alaska Fairbanks: Fairbanks campus	2	28.57

Figure 56. Reported academic year participants began studies

Year began	Frequency	Percent
2012-2013	1	14.29
2015-2016	1	14.29
2018-2019	1	14.29
2019-2020	3	42.86
2020-2021	1	14.29

Figure 57. Participant's number of credit's enrolled in Spring Semester 2020-21

Number of credits enrolled spring 2021-21	Frequency	Percent
12 or more credits	5	71.43
6- 12 credits	2	28.57

Figure 58. Participant's identification of full-time student status

Student status	Frequency	Percent
Yes, during fall and spring semesters	6	85.71
No	1	14.29

Figure 59. Participant's identification of research activities outside of regular coursework

Research activities	Frequency	Percent
No, I have not had a prior research experience	5	71.43
Yes, during one academic semester (typically ~10 hr/wk)	1	14.29
Yes, during prior years and/or several summers	1	14.29

Figure 60. Identification of Alaska as state of residency

Organizational Type	Frequency	Percent
Yes	4	57.14
No	2	28.57

Figure 61. Participant average length of time as a resident of AK

Average Number of Years	Minimum Number of Years	Maximum Number of Years
15.83	2	35

Figure 62. Participant ethnicity identification

Ethnicity	Frequency	Percent
American Indian or Alaska Native and White	2	33.33
White	2	33.33
Asian and White	1	16.67
Hispanic	1	16.67

Figure 63. Participant gender identification

Gender	Freq	Percent
Female	4	66.67
Male	2	33.33

Figure 64. AK UNiTE research internship's participants worked with

Internship	Freq
Exploring turtle brain anatomy using immunohistochemistry	2
Arctic microbes: tracking population changes with a warming climate	1
Cardiac physiology of anoxia-tolerant vertebrates	1
Examining potential prey of beluga whales in the Kenai River	1
Virus Genomics	1

Figure 65. Participant's satisfaction their AK UNiTE research internship (Scale of 1 [Extremely dissatisfied] to 7 [Extremely satisfied])

	Mean	Std. Dev
Internship satisfaction (n=6)	6.50	0.84

Figure 66. Participant's confidence with tasks prior to their AK UNiTE research internship (Scale of 1 [No confidence] to 4 [Completely confident])

Tasks (n)	Mean	Std. Dev
Relate results and explanations to the work of others (7)	2.57	1.13
Generate a research question to answer (7)	2.57	1.27
Use scientific literature to guide research (7)	2.71	1.25
Create explanations for the results of the study (7)	2.57	1.27
Develop theories (integrate results from multiple studies) (7)	2.43	1.27
Use scientific language and terminology (7)	2.57	0.79
Use technical science skills (7)	2.43	1.13

Figure 67. Participant's confidence with tasks after to their AK UNiTE research internship (Scale of 1 [No confidence] to 4 [Completely confident])

Tasks (n)	Mean	Std. Dev
Relate results and explanations to the work of others (6)	3.33	0.82
Generate a research question to answer (6)	3.33	0.82
Use scientific literature to guide research (6)	3.33	0.82
Create explanations for the results of the study (6)	3.33	0.82
Develop theories (integrate results from multiple studies) (6)	3.00	0.89
Use scientific language and terminology (6)	3.33	0.82
Use technical science skills (6)	3.83	0.41

Figure 68. Comparison of participant's confidence with tasks before and after to their AK UNiTE research internship

	Sum of squares	df	Mean square	F	p
Confidence	1.852	1	1.852	3.989	0.102
Error	2.321	5	0.464		

Figure 69. Participant's reported accomplishment level with learning outcomes associated with each internship (Scale of 1 [Not at all] to 4 [Very much])

Student Learning Outcomes (n)	Average Rating
Explain how scientists use inference and evidence based reasoning to generate knowledge. (2)	3.50
Describe the iterative nature of science and how new evidence can lead to the revision of scientific knowledge. (2)	3.50
Interpret, summarize, and evaluate evidence in primary literature. (1)	3.00
Evaluate claims in scientific papers, popular science media, and other sources using evidence based reasoning. (2)	3.50
Recognize gaps in our current understanding of a biological system or process and identify what specific information is missing. (2)	4.00
Design controlled experiments, including plans for analyzing the data. (1)	4.00
Execute protocols and accurately record measurements and observations. (3)	3.67
Identify methodological problems and suggest how to troubleshoot them. (1)	4.00
Analyze data, summarize resulting patterns, and draw appropriate conclusions. (3)	3.00
Relate conclusions to original hypothesis, consider alternative hypotheses, and suggest future research directions based on findings. (3)	3.33
Be able to explain biological concepts, data, and methods, including their limitations, using language understandable by collaborators in other disciplines. (1)	4.00
Suggest how collaborators in STEM & non-STEM disciplines could contribute to solutions of real-world problems. (1)	4.00
Be able to explain biological concepts, data, and methods, including their limitations, using language understandable by collaborators in other disciplines. (2)	3.50
Use a variety of modes to communicate science (e.g., oral, written, visual). (1)	3.00
Work effectively with teammates to complete projects. (4)	4.00
Record, organize, and annotate simple data sets. (1)	4.00
Use probability and understanding of biological variability to reason about biological processes and statistical analyses. (1)	2.00

Create and interpret informative graphs and other data visualizations. (1)	2.00
Interpret the biological meaning of quantitative results. (1)	3.00
Build and revise conceptual models to propose how a biological system or process works. (1)	3.00

Figure 70. Participants' rankings of plans immediately following graduation

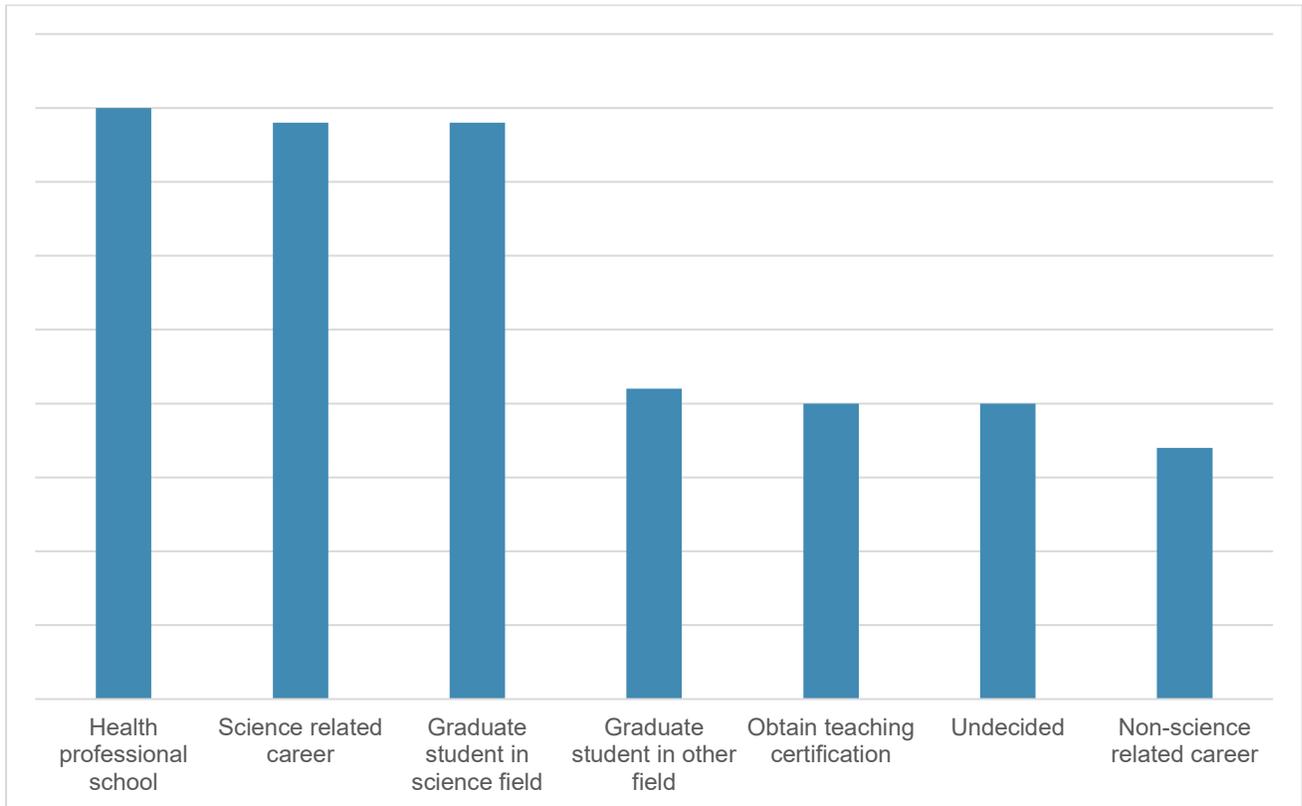


Figure 71. Participant's rating of possible benefits gained from their AK UNiTE research internship for the "Thinking and Working Like a Scientist" subconstruct (Scale of 1 [No gain/very small gain] to 4 [Large gain])

Possible Benefits (n)	Mean	Std. Dev
Ability to analyze data and other information (6)	3.50	0.84
Ability to integrate theory and practice (5)	3.20	0.84
Ability to read and understand primary literature (5)	3.60	0.89
Provide critical scientific feedback to improve science (6)	2.67	1.03
Skill in the interpretation of results (6)	2.83	0.98
Skill in science writing (4)	2.25	1.26
Skill in how to give an effective oral presentation (3)	3.67	0.58
Thinking and Working Like a Scientist Subconstruct	2.94	0.72

Figure 72. Participant's rating of possible benefits gained from their AK UNiTE research internship for the "Personal and Professional Gains" subconstruct (Scale of 1 [No gain/very small gain] to 4 [Large gain])

Possible Benefits (n)	Mean	Std. Dev
Clarification of a career path (6)	2.50	1.05
Readiness for more demanding research (5)	3.80	0.45
Self-confidence in performing scientific work (6)	3.33	0.82
Personal and Professional Gains Subconstruct	3.11	0.78

Figure 73. Participant's rating of possible benefits gained from their AK UNiTE research internship for the "Becoming a Scientist" subconstruct (Scale of 1 [No gain/very small gain] to 4 [Large gain])

Possible Benefits (n)	Mean	Std. Dev
Learning to identify traditional or indigenous knowledge (3)	2.00	0.00
Learning to respect traditional or indigenous knowledge in scientific research (4)	2.50	1.00
Tolerance for obstacles faced in the research process (6)	3.50	0.84
Understanding of the research process in your field (6)	3.17	0.98
Understanding of how scientists work on real problems (6)	3.67	0.52
Understanding how knowledge is constructed in science (6)	2.50	0.84
Understanding that scientific assertions require supporting evidence (5)	3.40	0.89
Becoming a Scientist Subconstruct	3.09	0.75

Figure 74. Summary of participant's rating of possible benefits gained from their AK UNiTE research internship by subconstruct

Subconstruct	Mean	Std. Dev
Thinking and Working Like a Scientist	2.94	0.72
Personal and Professional Gains	3.11	0.78
Becoming a Scientist	3.09	0.75