FRC Team 568

2020 Business Plan

FRC TEAM 568 NERDS OF THE NORTH

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1. Executive Summary

1.1 Mission Statement

FRC Team 568's mission is to inspire Alaska's next generation of STEM professionals, regardless of geography, socioeconomic status, race or gender, through building robots and engaging in the community.

1.2 Vision Statement

The team's vision is to expand the influence of FIRST in Alaska, to cause distance and geography to be a null factor, and to act as a bridge between people of all places, skills, and goals.

1.3 Values Statement

FRC Team 568 believes in:

- FIRST core values, especially Gracious Professionalism and Coopertition
- Independence and ability to function, despite our remoteness
- Protection of the environment
- Spread of literacy and education with STEM and FIRST values

1.4 Date Team Began

September 2000

1.5 Team and Program Summary

FIRST Robotics Competition:

FIRST (For the Inspiration and Recognition of Science and Technology) is an organization that runs robotics competitions for students aged five to eighteen to prepare them for the future through STEM. FRC (FIRST Robotics Competition) is a league for high school students in which "Under strict rules, limited resources, and the guidance of volunteer mentors, including engineers, teachers, business professionals, parents, alumni and more, teams of 25+ students build and program robots to perform challenging tasks against a field of competitors. They must also raise funds, design a team "brand," hone teamwork skills, and perform community outreach." (FIRSTInspires.org).

FRC 568 The Nerds of the North:

The Nerds of the North began 20 years ago when Wade Roach started the team as a science club at Dimond High School in Anchorage. The team continued to compete as a Dimond team for many years until turning into an Anchorage-wide team. A few years after that the team became statewide. Over the past few years, the team has been working on more structure and organization and has started using industry standard organizational tools and created leadership roles. FRC 568 has worked on one of its main goals of using

STEM themes to spread literacy through Alaska while working hard on advancing engineering skills. Today, there are members from all over the state working together to create a functional and successful team.

1.6 Location of the Team & Current Team Sponsors

Physical Location: University of Alaska Anchorage (UAA) Campus, Anchorage, Alaska
Remote Communities: Cordova, Fairbanks, Kasigluk, Moose Pass, and Yucatan, Mexico
Remote Community Meeting Space: Zoom Video Conferencing and Discord
Sponsors: Alaska Airlines, BP, ConocoPhillips, GCI

1.7 Summary of Team Impact/Outreach

FRC 568 values outreach and has devoted numerous hours to three main outreach initiatives: STEM Education, FIRST Promotion and Support, and Encouraging Literacy. This season alone, the team has accumulated more than 160 event hours (time spent volunteering as a team) and roughly 1000 hours of combined personal time (the sum of volunteer hours invested by members) of outreach. Over the past two years, they have reached over 6,500 people across all ages and grade levels.

The team engages in marketing techniques in order to spread both the team and FIRST influence. These techniques include maintaining a blog and website (http://frc568.akfirstrobotics.org/), a YouTube Channel (with 27 followers), Twitter (with 1261 followers), Facebook (with 70 followers), and Instagram (with 517 followers).

FRC 568 has produced approximately 200 alumni throughout the team's history of 19 years. Graduated members have gone on to several prestigious universities for many fields, many in STEM. As well, graduates have gone on to careers in distinguished fields of work, such as anesthesiology, engineering for Apple, military intelligence, and the CIA.

1.8 Relationships and Information Regarding Current Sponsors

UAA College of Engineering: The University of Alaska Anchorage is the main university in Anchorage, and their engineering program is one of the best in the state. They provide lab space and mentors, as well as access to industrial equipment.

UAA Center for Community Engagement and Learning: UAA CCEL funds student worker positions that are devoted to growing the team and promoting the team’s literacy programs.

JEDC: The Juneau Economic Development Council implements initiatives to maintain, expand, and create jobs and economic opportunities. They seek to strengthen key regional industries; promote entrepreneurship and small business; develop talent; and deliver core economic development services. They are the biggest backer of FIRST in Alaska, and pay team registration fees.

ZJ Loussac Library: Loussac as a public library is part of the Municipality of Anchorage. They read and edit the Riley Robot books, and help to publish them.

BP: BP is one of the leading energy companies in the world, whose purpose is “reimagining energy for people and our planet. We want to help the world reach net zero and improve people’s lives.” They have sponsored numerous programs and events to spread STEM education and provide monetary donations to the team.

1.9 Summary of Team Growth

The team has grown in many ways over the past three years:

- The number of schools, communities, and sheer amount of geographic area the team now covers.
- Relocating from the back of a chemistry lab to multiple labs at a university.
- The team’s structure through the development of the leadership committee and team bylaws.
- The development of a literacy outreach initiative through writing, illustrating, and translating multiple STEM-based children’s books.

1.10 Summary of Future Team Plans

FRC Team 568 has a number of ambitious plans for the future, including:

- Develop interactive app-based games featuring Riley Robot that will create an interesting interface for kids to learn STEM and FIRST lessons, as well as to provide another method of increasing literacy.
- Develop “Project Avatar” in which virtual contact will be enhanced through the use of simulators and distance-manipulatable robots on site.
- Improve recruitment in all areas, especially outside of Anchorage.
- Improve connections with alumni.
- Develop Riley Robot in writing and publishing more books, translating books into other languages, and creating animated videos.
- Refurbish old robots to optimize them for outreach potential.
- Promote FIRST in Alaska by gaining members and assisting other robotics leagues.

2. Team Overview

2.1 Team History

In September of 2000, the Nerds of the North was founded by teachers Wade Roach and Paul Schwartz, and programmer Chris Curry (as mentors) and a handful of Dimond High School science club students. The team worked in the back of a chemistry classroom and in Chris Curry's garage. The Nerds of the North were sponsored by Kleiner Perkins Caufield & Byers as a rookie team and attended the Silicon Valley Regional and the FIRST Championship at Epcot Center in Florida. The team had some difficulties back then, including lack of infrastructure and expensive travel that actually continue to this day. Despite its struggles, the team won several awards in the early years including the Regional Woody Flowers Award which was presented to mentor Chris Curry in 2005 at San Jose. Since then, the team has drastically evolved. After moving into the high school engineering room, the team began to flourish as the only remaining team of seven in Alaska. In 2017-2018, the team moved into a lab on the UAA campus and began to incorporate members from across the state, truly becoming an all state team. The team is now completely housed at UAA and is fully incorporated throughout the state through remote/virtual participation. In the last two years, the team has received the Engineering Inspiration Award at the Pacific Northwest District Championship and advanced to the Houston World Championship, and received the Team Spirit Award at the Houston World Championship in 2019.

Membership
Over the past three years, the team has evolved greatly. The number of schools involved has gone from 8 to 13, which is a 63% increase. The team's membership has grown an incredible 44%. The team once covered a geographic area of 1,227 square miles, to now an astonishing 461,124 square miles. The percentage of female team members has increased from 15% in 2017 to 22.9% in 2020.

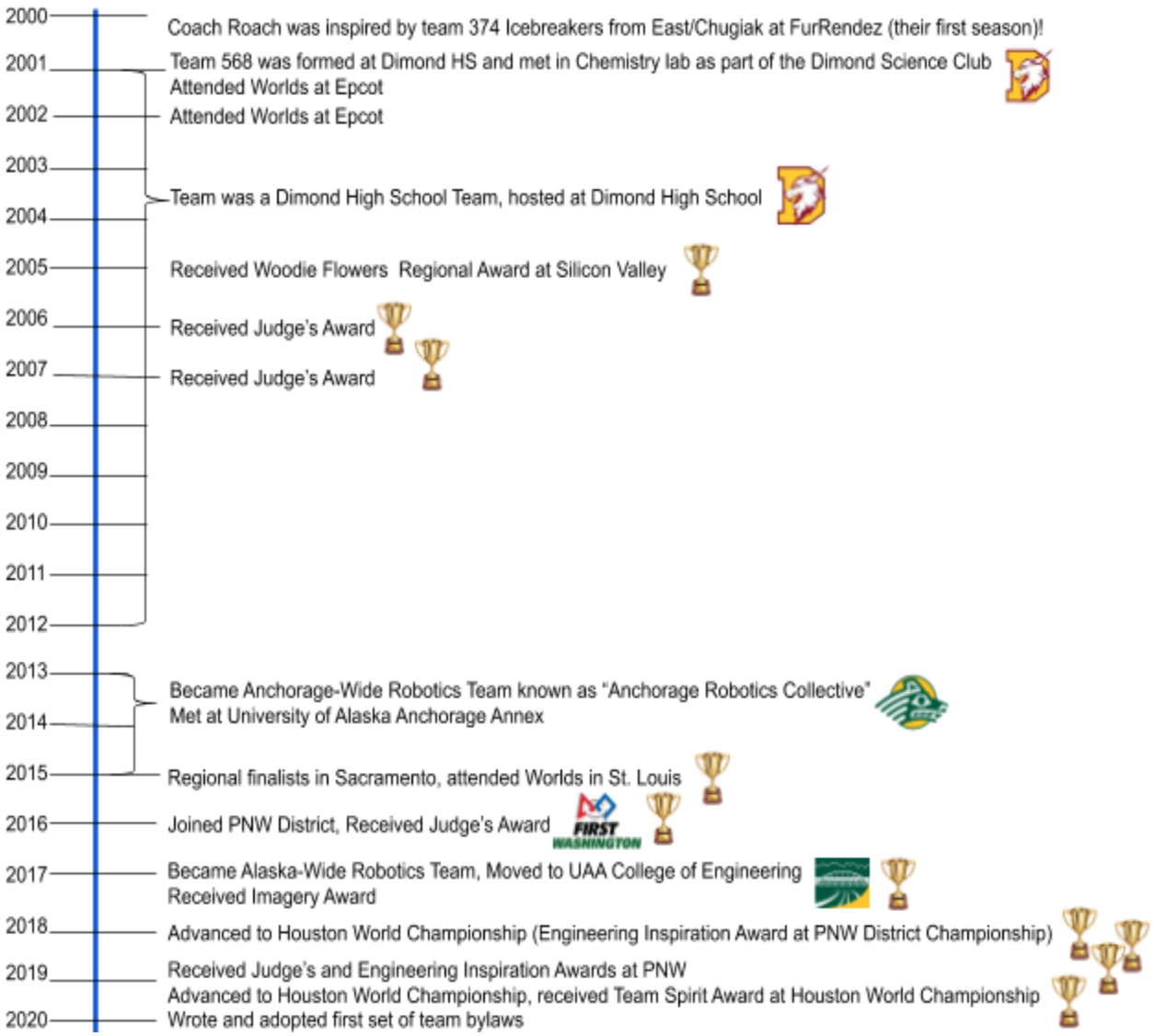
Team Location & Facilities
Beginning in 2017, the team began a shift, moving from Dimond High School to UAA. In doing so, the team opened itself to greater variance of members. Prior to this, team composition was mainly Dimond High School students, with some students from other Anchorage area high schools. However, at UAA, students from other high schools, cities, and villages across the state now have greater access to joining the team. Team members that cannot physically attend meetings attend virtually via Zoom and Discord, and make up 20% of the team.

Team Structure
FRC 568 has developed an efficient structure, including seven leadership positions to govern over two team departments.They have developed a full business department and created their first set of official bylaws to better structure the team. Team meetings are planned and structured based on guidelines in the bylaws. Members are held accountable using the 'member in good standing' clause, ultimately seeing an increase of outreach man hours by 84% from the previous year. The team has also integrated a variety of project management tools to increase efficiency, such as a hybrid of Work Breakdown and Product Breakdown Systems integrated into Gantt Charts.

Literacy Outreach Programs

Another main area of team growth is the Riley Robot literacy initiative, designed to use engaging STEM-themed children's books to encourage younger students to read more. In 2017, the team wrote its first children's book, *Riley Robot and the Race in Space*. Since then, the team has written and illustrated several sequels within the categories of social lessons, math, and science, partnered with other robotics teams to translate several books into Alaska Native languages, opened a storefront on MagCloud, and developed a new website devoted to the Riley Robot Universe to host the team's books and future related educational resources.

Figure 1: FRC 568 Timeline



Over the 19 year history of the team, it has evolved and has received 10 total awards since starting in the back of a chemistry lab in Dimond High School.

2.2 Student Team Members

The Nerds of the North is a highly diverse group from a widely spread area. They are composed of 34 high school students, 8 middle school students (team members in training), and 11 mentors. Members come from 13 different schools, only 50% of which are in Anchorage. Members live in 9 communities covering 461,124 square miles. While meetings are physically held in Anchorage, a thriving virtual connection allows participation for the the 20% of team members who cannot attend regular meetings and those who have no other opportunities to participate in FRC (see Figure 2).

Schools

- South Anchorage High School
- West Anchorage High School
- Dimond High School
- Service High School
- MatSu Career Tech
- Polaris K-12
- Eagle River High School
- East Anchorage High School
- Akula Elitnaurvik
- Soldotna High School
- Mears Middle School
- Cordova High School
- North Pole High School

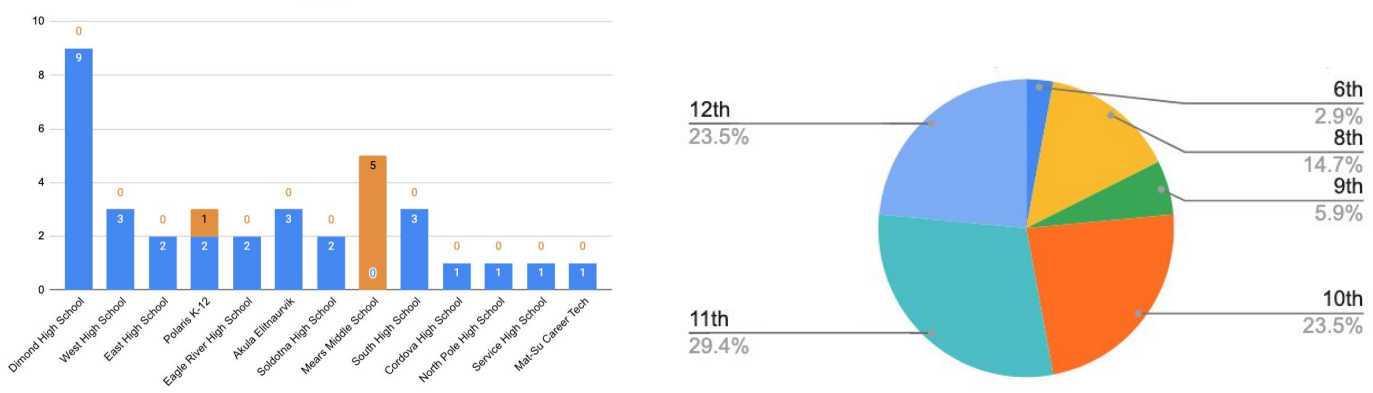
Communities

- Anchorage
- Eagle River
- Wasilla
- Seward/Moose Pass
- Cordova
- Fairbanks
- North Pole
- Kasigluk
- Yucatan, Mexico

Figure 2: Geographic Spread of Team Members

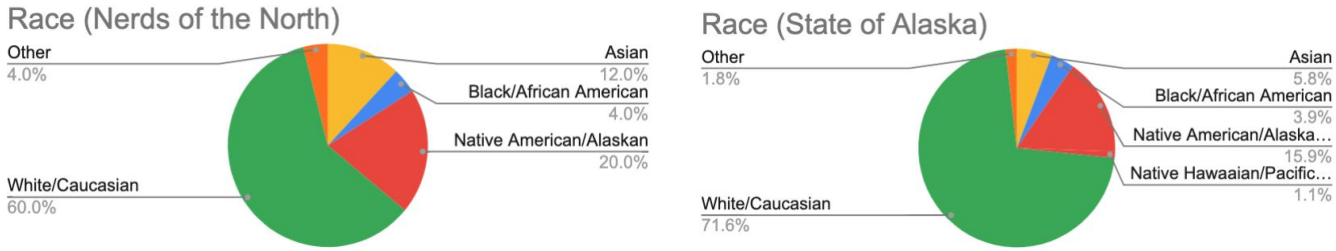
As a technically worldwide FRC team, The Nerds of the North have members from 8 communities across Alaska, as well as one community in Mexico. The team covers a 94,039 square mile area of Alaska, or 461,124 square miles if including the team member in Yucatan, Mexico.

Figure 3: Team Member School & Grade Representation



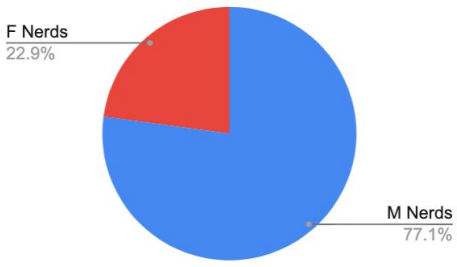
FRC Team 568 is comprised of students (Nerds and Nerdlets) from 13 different schools across Alaska. The team is mostly comprised of 9th-12th graders, but have a strong force of upcoming Nerdlets in 8th grade.

Figure 4: Team Demographics-Race



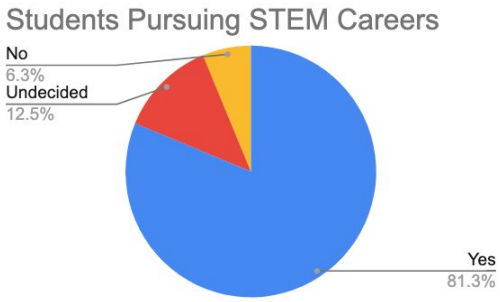
Being the only team in Alaska, FRC 568 aspires to equally represent the state as a whole. Its demographics are currently very similar to the demographics of the state.

Figure 5: Team Demographics-Gender



The team is made up of 22.9% female students and 77.1% male students. While still below the national rate of 28% females working in STEM careers, this is a major opportunity for growth of the team.

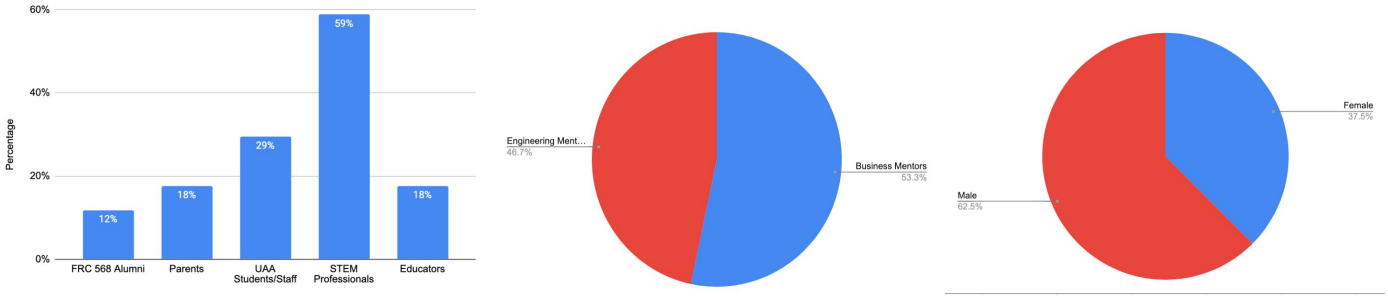
Figure 6: Students Pursuing STEM Careers



Over 80% of current student members have expressed plans to pursue a career in the areas of Science, Technology, Engineering, or Math.

2.3 Team Mentors

Figure 7: Mentor Background & Representation



The team is guided by a wide range of mentors who advise both the engineering and business departments. These mentors represent team alumni, parents, university students and staff, STEM professionals, and educators.

2.4 Team Sponsors

FRC Team 568 is grateful for each and every one of the many community sponsors and partners. Outlined below are ten key partnerships and their contributions and collaborations with the team:

Juneau Economic Development Council: FIRST Affiliate Partner in Alaska. JEDC allocates a portion of the FIRST in Alaska funds to pay the team's registration fees. They also promote the team's work and accomplishments through their communication channels.

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University of Alaska Anchorage College of Engineering: Provides a lab and workshop space for the team's use. Several of their staff also support the team through coaching and mentoring. The college provides numerous engineering students as team mentors, funds some purchases of robot materials, and covers some travel costs. Provides a FIRST Robotics scholarship for FIRST Alumni.

Anchorage School District: Supports the team with $5000 in supplies and provides a substitute for Coach Wade Roach while traveling. ASD is a strong supporter of all FIRST programs providing funding for a five-year development plan for FTC, FRC, and FLL.

Alaska Airlines: Supports FIRST in Alaska, who, in turn, supports FRC 568 and numerous other FIRST teams and events throughout the state. They also support the team by supplying two airline vouchers for competition travel.

University of Alaska Anchorage Center for Community Engagement and Learning: Funds positions for UAA Community Engaged Student Assistants to serve as team mentors and to assist with the Riley Robot book project.

ZJ Loussac Library: Welcomes the team as a part of their Reading Rendezvous event each summer, providing a platform for a read-aloud of the Riley Robot books on stage. Their librarians and youth services have also provided edits and revisions as the team continues to write and illustrate additional books.

BP: Supports FIRST in Alaska, who, in turn, supports FRC 568 and numerous other FIRST teams and events throughout the state. The team has partnered with BP for the past two years to provide a full day robotics workshop for the children of BP employees.

Marathon Oil: Contributed $3000 towards team registration fees through a FIRST Washington grant.

GCI: Supports FIRST in Alaska, who, in turn, supports FRC 568 and numerous other FIRST teams and events throughout the state. GCI hosts a virtual qualifier tournament for FLL robotics and supplies judges and other volunteers to many FIRST in Alaska events.

ConocoPhillips: Supports FIRST in Alaska, who, in turn, supports the team and numerous other FIRST teams and events throughout the state.

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Incentive levels for all donors, both monetary and in-kind donations:

Blue Level (*Up to $499)*	**Silver Level** *($500-$4,999)*	**Gold Level** *($5,000-$9,999)*
● Spenard Builders Supply ● Northern Smiles ● Elizabeth Braun ● Leah Racco ● Becky Crandall ● George & Cheryl Nechodomu ● Lois Brayfield ● Martha Schoenthal ● Laura Kompkoff ● Myles Standish ● Wade Roach ● Vicki Nechodomu ● Dorothy Colegrove ● Lydia Doza ● Michaela Sweet ● Kirsten Sikora	● UAA Center for Community Engagement and Learning ● Sound Medical Laboratory, LLC ● KLS Development, LLC ● Marathon Oil ● Paul Schwartz ● Dale Rooney ● Whitney Schoenthal ● Eric Horstmann ● Steve Ives ● Dale Rooney ● Eric Horstmann	● Juneau Economic Development Council ● Anchorage School District ● UAA College of Engineering

3. Team Management

3.1 Team Membership

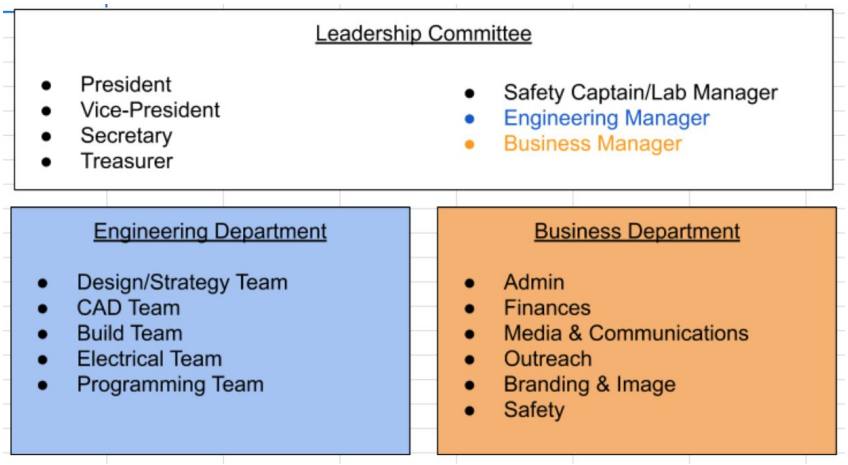
Eligibility
All high school students who live in the state of Alaska are eligible to join the Nerds of the North (with special exceptions for previous residents). An application is required by prospective team members. Middle schoolers (known as 'nerdlets') are allowed to work with and learn from the team as an outreach initiative. For these nerdlets, there is also an application.

Members in Good Standing
A student must be a member in good standing to be eligible to travel with the team to competition, fill a leadership position, and vote on team matters. In order to remain a member in good standing, members are expected to register with FIRST online, attend at least half of team meetings, and attend a quarter of outreach events in their region. The team meets year round, so team members cannot remain in good standing by only attending build season meetings.

3.2 Team Structure

The team is comprised of two main departments: Engineering and Business, which are comprised of teams devoted to specific tasks (see Figure 8). The Engineering and Business Departments are both headed by a department manager who oversees productivity, progress, priorities, and communications within their departments. The team as a whole is overseen and directed by a leadership committee, comprised of elected officers.

Figure 8: Team Organization Chart



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This organizational chart defines our elected officer positions, and the role of the leadership committee within the team, as well as subteam roles within the Engineering and Business departments.

Elected Officers

President	○ Serves as the elected leader (team captain) of Team 568 ○ Is accountable for general management of the team and resides as a leader while also being involved in all aspects of the team ○ Facilitates team meetings and leadership committee meetings ○ Facilitates the end of year election ○ Determines winner of ties in a vote ○ Coordinates Officers and Department Leads ○ Tracks progress of individual committees ○ Ensures that bylaws are executed accordingly
Vice-President	○ Assumes president's duties during absences ○ Assists in team management
Secretary	○ Takes attendance at the beginning of meetings ○ Schedules meetings ○ Writes agenda during Leadership Committee meetings before whole team meetings ○ Reaches out to members and mentors who haven't been attending meetings and makes sure they are still invested in being a member
Treasurer	○ Consults team members from all departments to form a budget ○ Tracks and documents team expenses and incoming funds/in-kind contributions ○ Keeps track of all grants, sponsorships, payments, purchases, etc. ○ Ensures sponsors are acknowledged at the correct sponsorship levels and receive sponsor benefits
Safety Captain/ Lab Manager	○ Keeps lab environment and equipment in safe operating condition ○ Ensures members are wearing safety glasses and other personal safety equipment ○ Monitors appropriate use of lab ○ Makes sure all members have passed a safety test to be in the lab, and equipment test/demonstration in order to use equipment ○ Ensures proper mentors are notified of medical situations and fills out plan of action for improvements to team safety plan ○ Conducts regular safety inspections of the lab ○ Meets monthly with UAA Facilities Manager and UAA Robotics Lab Manager
Engineering Manager	Helps all engineering teams and communicates with department leads to solve problems and questions on the robot
Business Manager	Helps all business teams and communicates with department leads to solve problems and questions relating to business

Leadership Committee

The entire team is led by the Leadership Committee, a group of elected team leaders. These students are responsible for establishing season goals and timelines, and monitoring progress toward those goals. They create an agenda for each meeting and guide breakout groups, as well as make executive decisions as outlined in the bylaws.

Departments

The team is divided into two departments: Business and Engineering. Students are not confined to these sections, however, actions and activities are sorted into these sections for organizational reasons.

Engineering Department Teams	Business Department Teams
Design/Strategy Team Lead: Strategizes the robot design and build after the season's game has been released CAD Team Lead: Documents and presents CAD models or drawings to the team. CAD Lead should have experience in 3D modeling. Build Team Lead: Communicates the build team's decisions to the team and oversees the physical building of the robot. Build Lead should have experience in mechanical engineering and building. Electrical Team Lead: Manages electronics and wiring on the robot. The Electrical Lead should know what each electrical component of the robot does and how to be safe around live electronics. Programming Team: Programs and manages connectivity to the robot. Programming Lead should have experience programming with the appropriate program.	Communications Team Lead: Coordinates external communication of the team including social media and other forms of external communication. Collaborates with the Outreach Team to create the Chairman's Essay/Video. Image and Branding Team Lead: Designs and formats the team's image through jobs such as T-shirt design and logo management on the robot. Outreach Team Lead: Coordinates and leads outreach events and tracks data from events as well as securing outreach opportunities. Collaborates with the Communications Team to create the Chairman's Essay/Video.

Coaches & Mentors

The team is guided by two team coaches and team mentors. The team has one coach for each department, as well as several mentors for each.

Recruitment & Training

The team hosts several 'onboarding' sessions each year, where the season is explained to the team as well as to possible team members, nerdlets, and mentors. Once a member is a part of the team, the team gives them basic training on how to engage in the day-to-day activities of a robotics team, and then allows them to choose a subteam from which to learn advanced skills.

Bylaws

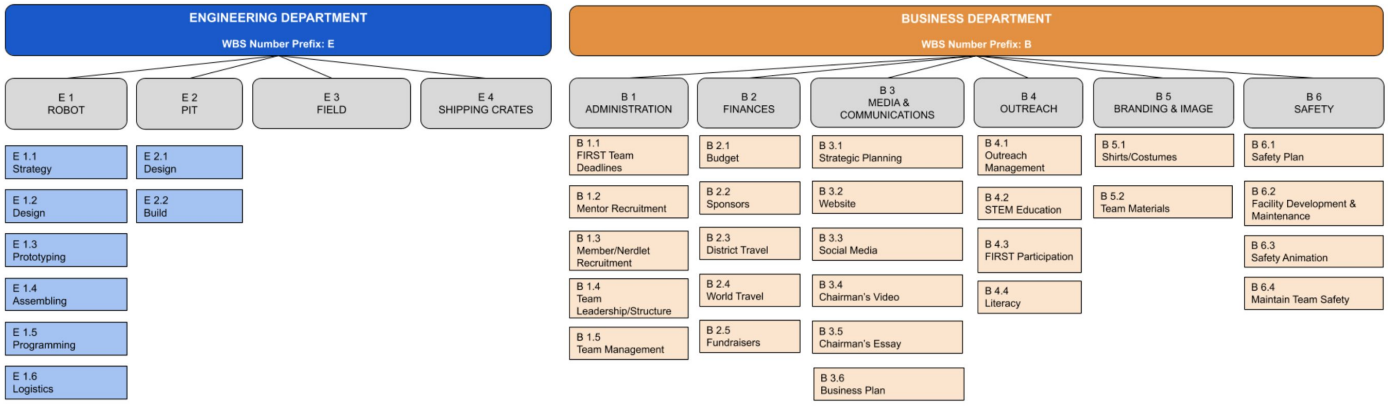
As of September 2019, the team is officially governed by a set of bylaws that were written by and voted upon by student team members. The Leadership Committee and members follow the bylaws, which guide every action of the team. The bylaws outline the purpose, membership rules, leadership rules, team organization, meeting rules, finances, lab and safety rules, and competition guidelines.

Project Management Tools

The team uses several tools to manage business affairs. Gantt Charts are used to integrate Work Breakdown Structures (WBS), Product Breakdown Structures (PBS) and the Responsible, Accountable, Consulted and Informed (RACI) Analysis.

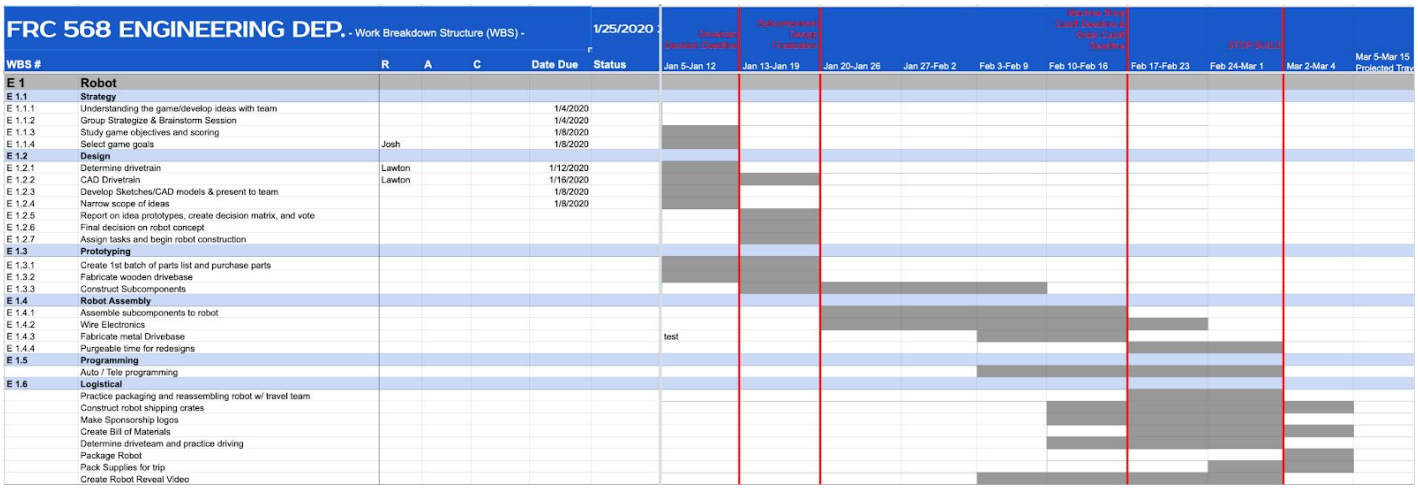
FRC 568 has one chart for each department of the team (Engineering and Business) detailing what tasks need to be done, when they should be started, and when they should be finished. WBS (both flowcharts and Gantt Charts) are used to break tasks down into sub-tasks and assign structured numbering to indicate how each task fits into the big picture (see Figures 9 & 10). For tangible products such as the robot and pit, the team also uses a PBS to categorize products into subcomponents and systems and track progress toward components and parts being developed for the overall product (see Figure 11). The RACI Analysis, integrated into the team's Gantt Charts, is used to delegate responsibilities within the team and represents a hierarchy of responsibility, as each member is assigned one of the four titles for every task.

Figure 9: Department Work Breakdown Structure Flowcharts



The Business and Engineering Departments' WBS flowcharts provide an overview of all the main categories and subcategories of business and engineering tasks, as well as their prefix and numbering systems. The corresponding WBS Gantt charts for each department provide a more detailed breakdown, timeline, and RACI assignment under each of these sections.

Figure 10: Department Work Breakdown Structure Gantt Charts



FRC 568 ENGINEERING DEP. - Work Breakdown Structure (WBS) -

1/25/2020

WBS #		R	A	C	Date Due	Status
E 1	Robot					
E 1.1	Strategy					
E 1.1.1	Understanding the game/develop ideas with team				1/4/2020	
E 1.1.2	Group Strategize & Brainstorm Session				1/4/2020	
E 1.1.3	Study game objectives and scoring				1/8/2020	
E 1.1.4	Select game goals	Josh			1/8/2020	
E 1.2	Design					
E 1.2.1	Determine drivetrain	Lawton			1/12/2020	
E 1.2.2	CAD Drivetrain	Lawton			1/16/2020	
E 1.2.3	Develop Sketches/CAD models & present to team				1/8/2020	
E 1.2.4	Narrow scope of ideas				1/8/2020	
E 1.2.5	Report on idea prototypes, create decision matrix, and vote					
E 1.2.6	Final decision on robot concept					
E 1.2.7	Assign tasks and begin robot construction					
E 1.3	Prototyping					
E 1.3.1	Create 1st batch of parts list and purchase parts					
E 1.3.2	Fabricate wooden drivebase					
E 1.3.3	Construct Subcomponents					
E 1.4	Robot Assembly					
E 1.4.1	Assemble subcomponents to robot					
E 1.4.2	Wire Electronics					
E 1.4.3	Fabricate metal Drivebase					
E 1.4.4	Purgeable time for redesigns					
E 1.5	Programming					
	Auto / Tele programming					
E 1.6	Logistical					
	Practice packaging and reassembling robot w/ travel team					
	Construct robot shipping crates					
	Make Sponsorship logos					
	Create Bill of Materials					
	Determine driveteam and practice driving					
	Package Robot					
	Pack Supplies for trip					
	Create Robot Reveal Video					

Jan 5-Jan 12 | Jan 13-Jan 19 | Jan 20-Jan 26 | Jan 27-Feb 2 | Feb 3-Feb 9 | Feb 10-Feb 16 | Feb 17-Feb 23 | Feb 24-Mar 1 | Mar 2-Mar 4 | Mar 5-Mar 15

FRC 568 BUSINESS DEP. - Work Breakdown Structure (WBS) -

1/25/2020

WBS #		R	A	C	Date Due	Status
B 3.1.3	Create weekly social media schedule document					
B 3.2	WEBSITE					
B 3.2.1	2019 Content: Update team photos	NA	Caden	Vicki	9/30/2019	Abandoned
B 3.2.2	2019 Content: Fix Sponsors	Taylor	Caden	Vicki	9/30/2019	Not Started
B 3.2.3	2020 Content: Update Summer Outreach Blog Photos				9/30/2019	Not Started
B 3.2.4	2020 Content: Create Season Landing Page	Vicki	Caden	Vicki	9/30/2019	Complete
B 3.2.5	2020 Content: Create the Game Page	Vicki	Vicki	Vicki	1/10/2020	Complete
B 3.2.6	2020 Content: Create Team Bio Page	Claire, Emily	Emily	Vicki	3/10/2020	In Progress
B 3.2.7	2020 Content: Robot Page			Vicki	3/10/2020	Not Started
B 3.2.8	2020 Content: Create Chairman's Page			Vicki	3/10/2020	Not Started
B 3.2.9	Create Blogposts for all Outreach Events	Various Authors	Caden	Vicki	3/4/2020	In Progress
	--Reading Rendezvous 2019	Lawton	Caden	Vicki	5/18/2019	Complete
	--BP Bring your Child to Work Day 2019	Lawton	Caden	Vicki	5/23/2019	Complete
	--Robot It! -- Summer Camp Volunteering	Lawton	Caden	Toya	6/27/2019	Complete
	--UAA LEGO Robotics Camp	Lawton	Caden	Mitchell	6/27/2019	Complete
	--FIRST in Alaska Coach Training Workshop	Alexa	Caden	Josh, Alexa, Lawton	7/30/2019	Not Started
	--Science Pub	Caden	Caden	Josh, Alexa, Lawton	9/10/2019	Complete
	--FTC Kickoff	Caden	Caden	Josh, Alexa	9/10/2019	Complete
	--UAA STEM Day	Jaden & Art	Caden	Rest of team	10/6/2019	Complete
	--Riley Robot Writing Workshop	Eric & Madison	Caden	Rest of team	10/6/2019	Complete
	--Riley Robot Illustration Workshop	Madison	Caden	Rest of team	11/16/2019	Complete
	--Introduce a Girl to Engineering Day	Madison & Nora	Caden	Emily, Cooper, Vicki	11/23/2019	Complete
	--FTC SouthCentral League Championship	Ian	Caden	Vicki	11/24/2019	Complete
	--FLL Qualifier	Eric	Caden	Vicki	12/7/2019	Not Started
	--Kasigluk Cake Walk	Eliza & Cyrus	Caden	Greg	12/13/2019	Complete
	--FLL Qualifier	Eric	Caden	Vicki	12/14/2019	Not Started
	--FLL State Championship	Taylor	Caden	Vicki	1/20/2020	Complete
	--FTC State Championship	TBD	Caden	Vicki	2/10/2020	Not Started
B 3.2.10	Create Season Blogposts (Build/Season-specific Content)	Various Authors	Caden	Vicki	3/4/2020	Not Started
	--FRC Kickoff	TBD	Caden	Vicki	1/4/2020	In Progress
	--Simulation Team Update Post #1: Spreadsheet	Brian	Caden	Roach	1/9/2020	In Progress
	--Playing Field Build Update	Griffni	Caden	Steve	1/11/2020	Not Started
	--Intro to Testbeds	Will	Caden	Steve	1/16/2020	Not Started
	--Simulation Team Update Post #2: Java Application	Brian	Caden	Roach	1/21/2020	Complete
	--Build Update: Cheeto	Madison	Taylor	Steve, Vicki		

Nov 4-Nov 10 | Nov 11-Nov 17 | Nov 18-Nov 24 | Nov 25-Dec 1 | Dec 2-Dec 8 | Dec 9-Dec 15

The team uses charts like these (above) to try and stay on top of the building agenda. The team also uses charts like the one above to try and stay up to date on the business agenda.

Figure 11: Department Product Breakdown Structure

FRC 568 ENGINEERING DEPARTMENT - Product Breakdown Structure (PBS) -

PBS #	Name	Type	Source	Quantity	Status	Project Owner	Comment
# 0.0	**Pit Design**	**Assembly**	**Various**	**1**	P - DESIGN IN PROGRESS		
# 1.0	**Tent Structure**	**Assembly**		**1**	D - DESIGNED		
# 1.1	Tent	Purchased Item	UAA	1	R - RECEIVED	Danny	
# 1.2	Banner Display	Assembly	UAA	1	P - DESIGN IN PROGRESS		
# 1.2.1	Banner	Designed Part	UAA	1	R - RECEIVED		
# 1.2.2	Wooden Dowels	Material	Lowes	2	N - NOT DESIGNED OR PURCHASED		
# 1.2.3	Zip Ties	Hardware	Lowes	6	N - NOT DESIGNED OR PURCHASED		
# 1.3	Lighting	Assembly	Amazon	1	O - ORDERED		
# 1.3.1	LED Lights (16 foot roll)	Purchased Item	Amazon	2	O - ORDERED		
# 1.3.2	Strip light mounting clips	Purchased Item	Amazon	15	O - ORDERED		
# 1.4	21" Flat Screen Competer monitor	Purchased Item	UAA	1	N - NOT DESIGNED OR PURCHASED	Vicki	
# 1.5	Video	Designed Part	Make	1	P - DESIGN IN PROGRESS	Taylor	
# 1.6	Raspberry Pi	Purchased Item	Lawton	1	R - RECEIVED	Lawton	
# 1.7	Mounting	Designed Part	3D print	1	N - NOT DESIGNED OR PURCHASED	Lawton?	
# 2.0	**Backboard**	**Assembly**		**1**			
# 2.1	Star Wars Theme Background	Purchased Item	Amazon	1	O - ORDERED	Eliza & Breana	
# 2.2	Grommets	Hardware	Amazon	10	O - ORDERED		
# 2.3	Tent Bungees	Purchased Item	Amazon	10	O - ORDERED		
# 3.0	**Walls**			**1**			
# 3.1	PVC Peg Board Wall Frame	Assembly	Make	1	P - DESIGN IN PROGRESS		
# 3.1.1	1-Inch PVC (4 ft)	Material	Lowes	7	N - NOT DESIGNED OR PURCHASED		
# 3.1.2	PVC T Couplers	Material	Lowes	1	N - NOT DESIGNED OR PURCHASED		
# 3.1.3	4 Way Side Outlet PVC Cuopler	Material	Lowes	1	N - NOT DESIGNED OR PURCHASED		
# 3.1.4	3 Way Side Outlet PVC Coupler	Material	Lowes	2	N - NOT DESIGNED OR PURCHASED		
# 3.1.5	L Coupler	Material	Lowes	2	N - NOT DESIGNED OR PURCHASED		
# 3.1.6	PVC Adhesive	Purchased Item	Lowes		N - NOT DESIGNED OR PURCHASED		
# 3.1.7	Zip Ties	Purchased Item	Lowes	12	N - NOT DESIGNED OR PURCHASED		
# 3.2	Pegboard Wall	Assembly	Various	1	P - DESIGN IN PROGRESS		
# 3.2.1	Pegboard (2x4 foot)	Material	Dimond HS	4	R - RECEIVED		
# 3.2.2	Hinges	Purchased Item	Lowes		N - NOT DESIGNED OR PURCHASED		For folding/collapsing peg board sections

The team uses this PBS chart to help break down pit design and construction into subsections to tackle the process more efficiently.

4. SWOT Analysis

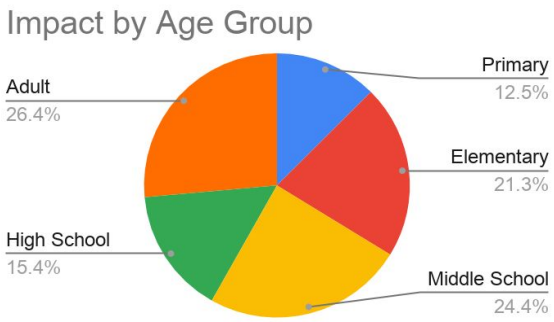
STRENGTHS	WEAKNESSES
• FRC 568 is diverse and incorporates members from a wide array of backgrounds. • The team has access to UAA lab space, which allows access to excellent equipment and computers, and collaboration with the UAA Robotics Team. • Most members of the team have valuable experience in engineering, building, and business. • Team members work together on different outreach opportunities, especially Riley Robot to inspire kids to read. • The team uses virtual tools such as Google Drive, Discord, Zoom, Kitely, etc. to allow virtual members to participate. • The team uses organization charts, RACI matrices, Gantt charts, and other project management tools. • The team includes people from all over the state allowing us to expand into communities with no local STEM activities available. • The team has nearly 20 years of history and many mentors with over 5 years of involvement. • The resources of UAA College of Engineering.	• FRC 568 has to travel out of state for any competition. • Being in Alaska, FRC 568 faces high shipping rates and must wait a longer time to get parts that are needed during the short build season. • Being in Alaska, the team has few large organizations available to sponsor the team. • FRC 568 is the only team in the state of Alaska, so there is little to no physical interaction with other teams. • FRC 568 has members in bush Alaska, so participation is virtual and they have to take several additional flights if they travel with the team. • The team is roughly 77.1% male, so it disproportionately represents the Alaska youth population interested in STEM. • FRC 568 has a hard time recruiting and retaining new members.
OPPORTUNITIES	**THREATS**
• FRC 568 is the only FRC team in Alaska, so let's make it the best! • Alaska has the most FLL teams per capita out of all the states, yet a decreasing number of FTC teams. Many FLL alumni wishing to pursue robotics have no access to FTC, making FRC 568 an ideal choice for them. • There is a lot of space to expand & recruit members. • The team has distance delivery platforms and support, enabling inclusion of virtual team members. • Alaska has the most FLL teams per capita for mentoring and volunteering opportunities. • The ability to access additional resources of UAA College of Engineering. • Amazing mentors participate with the team, and more are always welcome! • For the last 2 years in a row, Alaska has tested 50th in reading performance for 4th graders. There is so much room for growth, providing an ideal environment to continue building the team's literacy projects (Riley Robot books).	• BP announced that they are withdrawing from Alaska, and will no longer be able to sponsor Alaska based programs. BP has been an FRC 568 and FIRST in Alaska sponsor for decades, and leaves a difficult void to fill. • The Alaska state budget faces a number of deep budget cuts over the next few years, many of which impact the team directly (including K-12 education and UAA). FRC 568 is already feeling the impacts of these cuts in the level of financial support provided by state funded entities. • The team faces extreme travel expenses (airfare, hotel, car rental) and increasing costs of tournament registration.

5. Team Impact/Outreach

5.1 Outreach

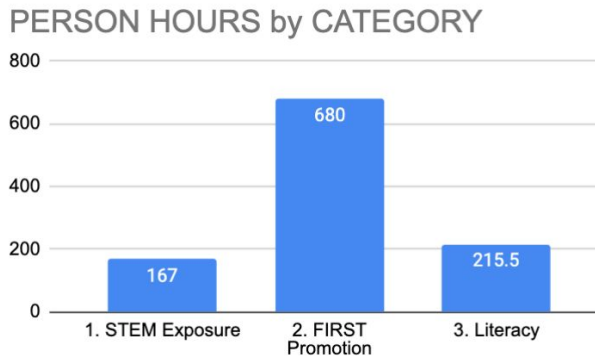
FRC 568 conducts community outreach in 3 main categories: STEM Education, FIRST Promotion and Support, and Encouraging Literacy. This season alone, they have accumulated more than 160 event hours (time spent volunteering as a team) and roughly 1000 hours of combined personal time (the sum of volunteer hours invested by members) of outreach. Over the past two years, the team has reached over 7,000 people across all ages and grade levels (see Figures 12 & 13).

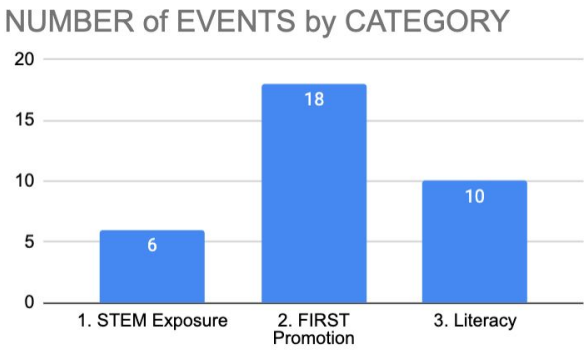
Figure 12: Outreach Impact by Age Group



This graph highlights every age group the FRC Team 568 outreach impacted throughout the State of Alaska through the 2019-2020 Season (Updated 1/23/20).

Figure 13: Outreach Events and Hours





This graph highlights the number of outreach events and hours that the FRC team 568 has participated in throughout the State of Alaska through the 2019-2020 Season (Updated 2/29/20).

FRC TEAM 568 NERDS OF THE NORTH

STEM Education: FRC 568 believes that STEM drives society's forward progress and will lead the world into a brighter future. Exposing youth to STEM topics allows for the potential for pursuit in these fields. This belief is why the team conducts youth outreach.

- Summer Camps: The Nerds of the North volunteer at summer camps at the UAA Summer Engineering Academies and at the Anchorage Museum, where the team teaches students how robots work, and how to program and drive a robot. FRC 568 presents students with challenges and encourages them to work together to find creative solutions and practice coopertition and gracious professionalism.
- STEM Days: The team volunteers at dozens of local STEM Days events, where they provide hands-on activities that teach children STEM concepts beyond robotics, including binary beaded bracelets, paper airplane launching, and kazoo making.
- Women in STEM: The team conducts outreach at STEM events specifically aimed at girls such as Smart Girls Rock! and Introduce a Girl to Engineering. FRC 568 provides tours of engineering labs, robot demonstrations, and interactive activities explaining the engineering process. Over the past 2 years, the team has reached approximately 200 middle and high school girls at these events.
- Workshops: Nerds of the North assist and hold workshops to help people and teams build robots and learn programming. They have participated in BP Bring Your Kid to Work Day, where they taught younger kids how to build and program basic FLL and FTC robots for the day. The team also assisted with an event hosted by the JABOTs(Just A Bunch Of Techies) FTC team, which helped FLL teams prepare for their qualifiers.

FIRST Promotion and Support: The team recognizes the value of promoting FIRST programs and encouraging participation in FIRST. The Nerds of the North volunteers at FIRST events to support FIRST teams in all leagues. They also reach out to the community through robot demos and presentations to encourage forming new FIRST teams and volunteering at FIRST events. Some of these include:

- Tabling Events: Team members volunteer at events such as educator conferences, where they interface with community members and encourage startups of new teams.
- FTC Coach Training: In Summer 2019, FRC 568 volunteered at FIRST in Alaska's new model of coach training, where they mentored 20 new FLL and FTC coaches through an entire season of robotics in just 1 week. The team saw a number of these coaches with their teams at the state championships at the end of their first season.
- FLL and FTC Kickoffs: The team has hosted and ran the Southcentral Alaska FLL and FTC kickoffs for the past several years.
- Volunteering at Local FIRST Tournaments: FRC 568 has volunteered at and organized FLL Qualifiers and State Championships, along with FTC Qualifiers and State Championships, for the past 9 years. This season alone, they represented over 20% of the FLL State Championship volunteer force.
- Mentoring & Assisting FIRST Teams: The team is available to mentor FLL and FTC teams in the area, and have mentored several in the past. This year, the team president mentored a local FTC team, and 12% of Nerds of the North members are active on FTC teams. When the 7.0 magnitude earthquake struck Alaska the week of FLL Qualifiers (November 2018), it left many FLL teams without locations to meet. FRC 568 assisted 4 teams to prepare and practice for the newly scheduled competition.

Encouraging Literacy: According to UAA, illiteracy is a common barrier to college-bound students, and Alaska has consistently ranked as the nation's lowest in 4th grade literacy. Alaska has an 11% illiteracy rate, and FRC 568 believes they can help fix this problem. The Literacy Initiative includes the following:

- Reading Rendezvous: 60% of students lose school skills during the summer, and the Anchorage Public Library has a mission to change that by encouraging youth participation in libraries over the summer. They kick off this summer campaign each year with a massive fair-like celebration with the ZJ Loussac Library in Anchorage. The team provides STEM activities, robot demos, and reads aloud the Riley Robot books on stage.
- Barnes and Noble Events: The team takes advantage of as many Barnes and Noble events as possible, including read alouds and their annual Mini Maker Faire which they showcase peoples homemade innovative gadgets.
- Riley Robot Books: Over the past 3 years, FRC 568 has written and illustrated a number of children's books about Riley Robot, which span three themes: math, science, and social lessons. This literacy initiative exposes students interested in engineering to these values along with increased reading proficiency (see Figure 14).

Figure 14: Riley Robot Literacy Project Timeline

This graph shows a timeline of FRC team 568's work on the "Riley Robot" book series from spring 2018-spring 2020.

5.2 Marketing

Social Media:				
Followers:	70	517	1261	27

5.3 Alumni

In the past 19 years, approximately 200 students have participated on FRC Team 568. Many of the alumni are currently in college and working on degrees from institutions such as:

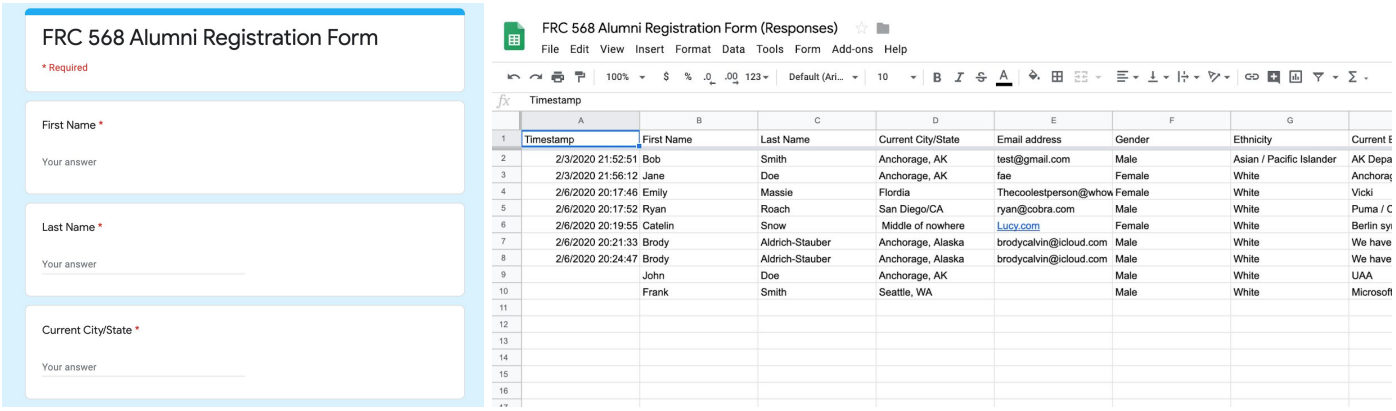
- Montana State University (Mechanical)
- Portland State University (Mechanical)
- Washington State University (Electrical)
- University of Washington (Comp Sci)
- University of Oregon (Mathematics)
- University of Idaho (Statistics)
- University of Kansas (Aerospace Engineering)
- Colorado School of Mines (Chemical Engineering, Mechanical Engineering)
- Purdue University (Agricultural Engineering)

Some notable FRC 568 alumni working in diverse careers include:

- Anesthesiologist - Ben Ekstrum
- Apple Computer Engineer - Max Miller
- Marine Researcher - Lauren Curry
- Military Intelligence - Leslie Curry
- Central Intelligence Agency - Warren Weber
- Information Technology - Brian Zuke

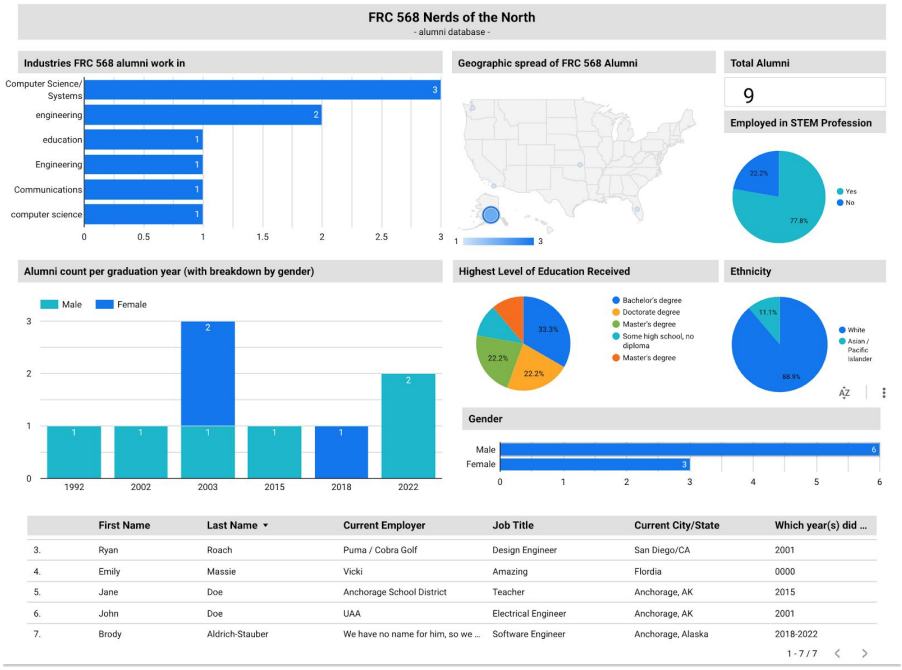
Historically, the team has lacked a method of tracking alumni. In collaboration with the UAA Center for Community Engagement and Learning, the team is in the process of developing a system that integrates Google Forms, Sheets, and Data studio to collect, organize, and display information about team alumni (see Figures 15 & 16). The team plans to begin collecting data from alumni this spring.

Figure 15: Alumni Contact Form (Mock Data)



This Google Form and Sheet will allow contact to the team's alumni. The lost alumni will fill out the form and the data will go directly into the sheets.

Figure 16: Google Studio Alumni Data (Mock Data)



The data from the Google sheet in Figure 15 will go into this studio allowing data to be easily accessed and interpreted.

6. Future Plans

Team Expansion

- Project Avatar: Work on “Project Avatar,” a robot that is controlled by a virtual team member. This will allow team members from across the state to interact in Anchorage with the main team, increasing opportunities for members to communicate and interact.
- Demographic: Recruit members from more areas around Alaska to include more of the state and have more team members in each city. Hopefully having multiple members in each city could create small meetings in each location.
- Alumni: Improve communication with past alumni and create a relationship with them to help strengthen the spirit and well being of the team.
- Recruitment: Improve recruitment presentations and events to interest more high schools and that virtual team members can present at their school as well.

Literacy Initiative

- Riley Robot: Continue writing Riley Robot books in order to teach a wider spread of lessons to many different age groups, and to improve literacy.
- Translations: Get more Riley Robot books translated into more Native Alaskan languages to promote the preservation of these languages.
- Video Animations: Create educational video animations using the Riley Robot characters and world to teach STEM and literacy.
- Games: Make apps or other versions of games to teach young kids math and science skills through hands-on interaction.
- Read-aloud Robot: Create a robot that can read the book out loud at events to promote literacy skills and engineering skills by showing a robot.

Off-Season Build Projects

- Old Robots: Improve old robots to convert them into outreach robots showing a wide variety of what the team can build.
- Drive Trains: Build different types of drive trains to test out ideas and probability of them working for competitions and work in time for competition.

7. Action/Implementation Plan

Strategy	Actions	Group(s) Responsible	Planned Completion
Enhance connection with virtual team members	Design and build a robot for virtual members to control. This robot will allow more significant interaction with remote team members.	Build and Communications	May 2020
Use Riley Robot to increase literacy rate across Alaska	Write kids books in many languages across Alaska, and publish	Outreach	December 2020
Increase attendance outside of Anchorage	Advertise robotics opportunities and create outreach	Virtual members	May 2022
Teach kids and help them enjoy learning through games	Develop a concept, plan, and app	Programming and Outreach	May 2022
Create a library of outreach robots	Modify and maintain robots after each season	Build and Electrical	Ongoing — end of each season
Teach kids through visual media such as videos	Plan and create animations starring Riley the Robot	Outreach	May 2021

8. Team Budget

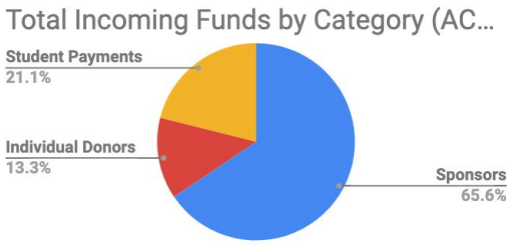
8.1 Team Income & Expenditures

Outlined below are the team's typical annual expenses. See Figures 17 & 18 for detailed income and expenditures from the 2020 season.

Registration Total: $15,000	District Registration	$10,000
	World Registration	$5,000
Lab & Robot Total: $5,970	Lab Expenses	$520
	Field Materials	$450
	Robot Building Costs	$5,000
Districts Travel Total: $23,700	Airfare (approx. 20 people, $800 each)	$16,000
	Hotel	$1,700
	Rental Cars	$2,000
	Food	$4,000
Potential Additional Travel Total: $26,000	District Championships	$9,500
	World Championships	$16,500
Branding Total: $1,725	Pit Hardware and Backdrop	$150
	Buttons, Business Cards, Brochures, Etc.	$250
	LED Lighting	$50
	T-shirts	$1,300
Online Resources Total: $360	Website	$50
	Kitely	$180
	Team Snap	$130
Outreach Resources Total: $200	Riley Book Prints	$50
	Stickers	$150
	Total	**$77,300**

Figure 17: 2020 Team Income

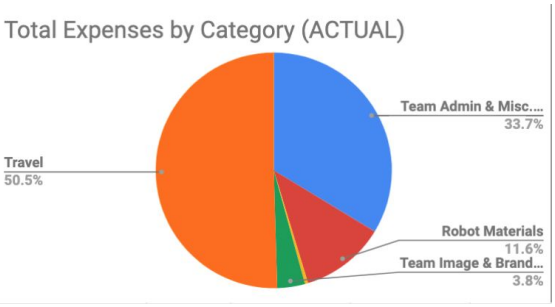
REVENUE & OTHER INCOMING FUNDS		
Category	**Anticipated Funding**	**Actual Funding**
Sponsors	$27,800.00	$26,415.34
Individual Donors	$4,400.00	$5,376.53
Student Payments	$20,000.00	$8,492.40
Totals	**$52,200.00**	**$40,284.27**



This figure shows where the team's money comes from. The majority, 65.6%, was from sponsors. Student payments account for 21.1% of the team's income. And the last 13.3% is from individual donors.

Figure 18: 2020 Team Expenditures

EXPENSES		
Category	**Anticipated Expenses**	**Actual Expenses**
Team Admin & Misc. Costs	$17,710.00	$15,374.00
Robot Materials	$5,799.89	$5,307.34
Lab Expenses	$520.00	$200.00
Team Image & Branding	$2,030.00	$1,729.96
Travel	$49,170.00	$23,035.00
Totals	**$75,229.89**	**$45,646.30**



These figures show what The Nerds of the North spend their income on. The majority is spent on the team's travel.

8.2 Additional Opportunities for Support: In-Kind Contributions

Items:	**Number Needed:**	**Single Item Cost**	**Final Cost**
Team Buttons	150	$1	$100
Business Cards	200	$0.50	$50
Info Brochures (printing services)	100	$0.60	$75
T-shirts	100	$13	$1,300
Riley Robot Book Copies	30	$5	$150

Coffee/Hot Chocolate for Kickoff Weekend	10	$5	$50
Food for Saturday Work Sessions	6	$100	$600
Next year Field Materials	1	$400	$400

8.3 Additional Opportunities for Support: Mentors

Mentor Roles	**Role Description**
Artist	Helping the team illustrate & design Riley Robot outreach books.
CAD Specialist	Helping the team design the robot digitally using Fusion 360, Inventor, etc.
Programming Professional	Helping the team program controls for the robot as well as the autonomous segment.
Graphic Design	Helping the team design shirts, banners, and websites.
Web Developer	Helping the team design and maintain the team website.
Writing/Marketing	Helping the team write the Business Plan, Chairman's Essay, and social media/blog posts
Electrical	Helping the team to wire the robot together, do cable management, and update electronics.
Mechanical	Helping the team prototype and build the robot for competition.
Travel Logistics	Helping the team plan for traveling to competitions.
Fundraising	Helping the team fundraise and acquire sponsors.

9. Sponsor Benefits (Monetary and In-Kind donations)

Level	Sponsor Benefits
Blue *$499 or less*	• Shoutout of thanks on social media • Listed on team website with link • Listed on banner in team pit
Silver *$500-$4,999*	• Shoutout of thanks on social media • Small company logo on robot • Small company logo on website • Listed on banner in team pit
Gold *$5,000-$9,999*	• A thank you video posted on social media • Small company logo displayed on team t-shirt & drive team costumes • Company logo on robot • Company logo on website • Listed on banner in team pit
Alaska *$10,000 +*	• A thank you video posted on Social Media • Large company logo displayed on team t-shirt & drive team costumes • Large company logo displayed on robot • Large company logo displayed on website • Listed on banner in team pit

10. Team Fundraising Opportunities

10.1 Current Team Fundraisers

- **GoFundMe:**
  This is the first year of running a GoFundMe campaign.The team has a goal of $12,000 and are currently just shy of about $4,000!

- **FIRST in Alaska Raffle:**
  Over the past few years, FRC team 568 has participated in and earned money from the FIRST in Alaska Raffle, organized by JEDC, offering items such as Alaska Airlines tickets.

- **Science Pub:**
  Every year, The Nerds of the North goes to the 49th State Brewery (a local Anchorage restaurant) to present to a local community gathering called “Science Pub.” The team displays the year’s theme and robot design, and collects donations for team expenses.

- **E-Week Banquet Coat Check:**
  Each year the team runs the coat check table at the Alaska E-Week Banquet (with the help of the robot) and receive tips as donations.

- **Cake Walks:**
  Nerds of the North members in the village of Kasigluk made cakes and sold them to community members (this is a common form of fundraiser in their village).

10.2 Future Team Fundraisers

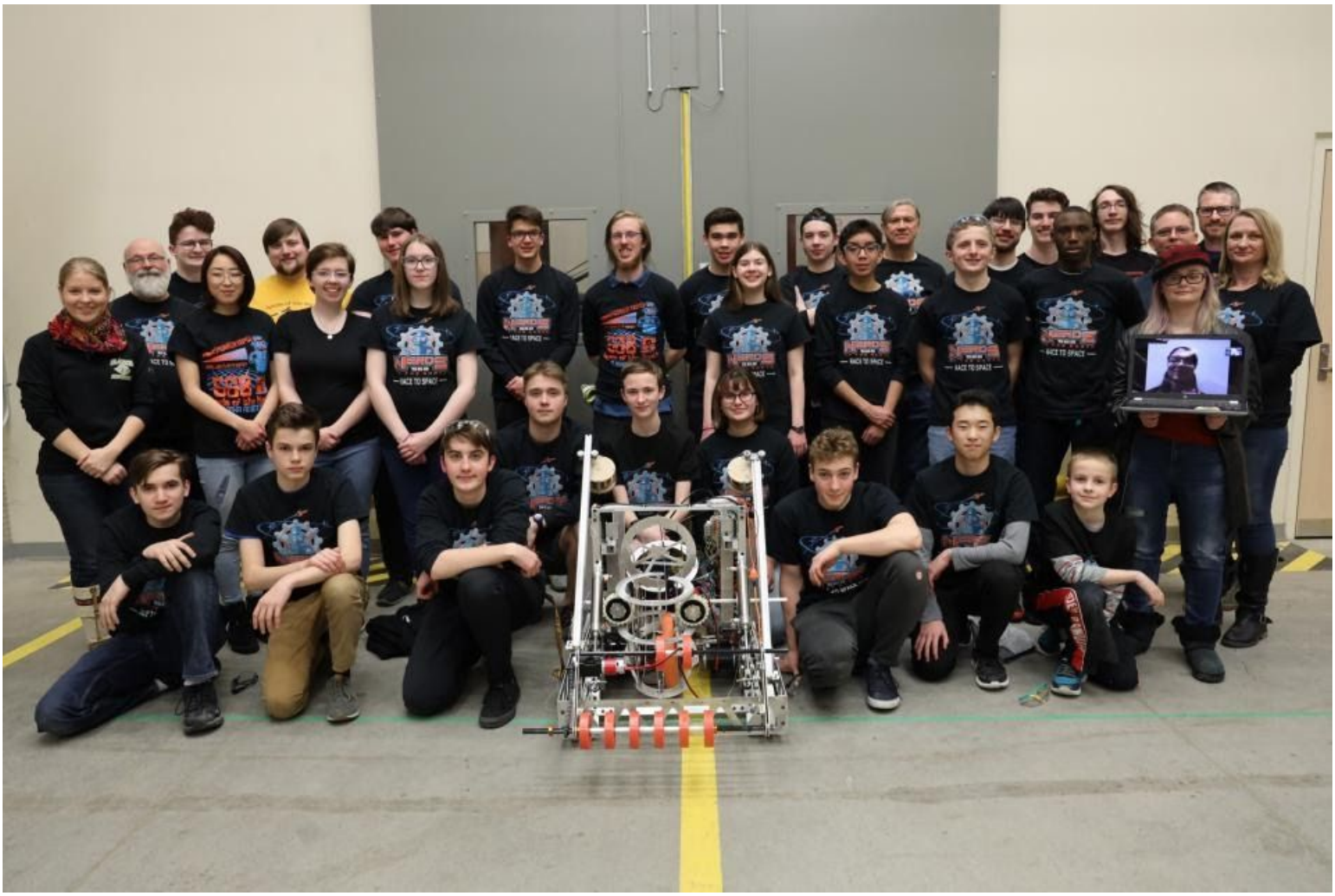
- **Basketball Tournaments:**
  The members in the village of Kasigluk are organizing a basketball tournament in which community teams pay a fee to enter and people pay to spectate. The funds raised will be used for the team.

- **MagCloud book sales**:
  The Nerds of the North plans to self publish the multilingual series of Riley Robot books for children. The books are available on MagCloud and can be used at outreach events.

- **RedBubble:**
  FRC 568 plans to have items such as T-Shirts (robot themed) to sell on RedBubble and earn money to support the team.

11. Final Statement

FRC team 568 is unique because they: are the only FRC team in Alaska, do not exclude anyone in the state, utilize multiple technologies to connect with remote participants who can’t physically be at meetings in Anchorage, promote STEM through children's books which are designed, written, and illustrated by the team, and have implemented a Nerdlet program which allows middle schoolers to be team members in training.



12. Team Contact Information

12.1 Social Media Contacts

Website:	frc568.akfirstrobotics.org	Instagram:	@frcteam568
Email:	frcteam568@gmail.com	YouTube:	FRC 568 Nerds of the North
Facebook:	FRC team 568 Nerds of the North	Twitter:	@FRC568

12.2 Main Contacts

Wade Roach Engineering Teacher Dimond High School Roach_Wade@asdk12.org (907) 360-3793	**Vicki Nechodomu** STEM Outreach & Marketing Specialist UAA College of Engineering vnechodomu@alaska.edu (907) 477-2203

12.3 Team Meeting Information

Location:	University of Alaska Anchorage Engineering and Industry Building, Room 309 2900 Spirit Dr Anchorage, AK 99508	**Dates:**	Tuesday & Thursday Evenings
		Times:	7:30-9:00 PM

12.4 Sponsorship Information

By Check:	Checks can be made out and mailed to AOF Robotics AOF is a 501C3 nonprofit and donations are tax deductible Indicate FRC Team 568 in memo line aofrobotics.aktodds.com
Online:	Donations can be made online through GoFundMe: www.gofundme.com/f/donate-to-frc-team-568

12.5 Mailing Address

Checks:	AOF Robotics Attn: FRC 568 7800 Schuss Circle Anchorage, AK 99507	**Other:**	Attn: Vicki Nechodomu, FRC 568 UAA Eng. & Industry Building 2900 Spirit Dr Anchorage, AK 99508