Chairman's Award - Team 2438

2020 - Team 2438

Team Number
2438

Team Name, Corporate/University Sponsors
'Iolani School & Iolani School

Briefly describe the impact of the FIRST program on team participants within the last five years.

Members develop diverse skills by mentoring FTC members (gr. 7 & 8), running STEM workshops, & leading technical subsystems. Participants become global citizens as they share STEM opportunities with developing organizations & uniting global communities. Through 7 robotics, students have access to internship opportunities at corporate companies such as Navatek LLC, Draper Laboratory, & Pacific Instruments. 98% of members pursue STEM career paths after post-secondary education.

Describe the impact of the FIRST program on your community within the last five years.

- SumoBot Program w/ Boys & Girls Club of Hawaii (B&GC): teach tech skills (youth/adult), donated +$6k. - Environmental Monitoring (EM): STEM citizen science workshops with middle schoolers. - EBooks: distributed in 5 countries, translated into 6 languages. - STEM teacher professional development (PD) workshop: March 2020, student-led, attendance from private & DOE schools. - 'Iolani School PD Workshop (March 9) - Government advocacy from state Senator, local media, U.S. representatives, & Governor.

Describe the team's methods for spreading the FIRST message in ways that are effective, scalable, sustainable, and creative.

- EBooks: in schools in the U.S., Spain, Korea, & the Philippines, written in 6 languages to eliminate language barriers. - Created a cohort of 6 FRC teams and 17 schools across the world to collaborate. - Created FIRST supported hashtags: "#FIRSTwithAloha" & "#IgniteandInspire": campaigns to encourage GP & acts of kindness. - Meet with govt. officials - Ala Wai Elementary school-wide STEM curriculum based off of FIRST principles.

Describe examples of how your team members act as role models and inspire other FIRST team members to emulate.

Members volunteer at FIRST events, mentor 4 FTC teams, develop FLL Jr teams (rookie year TB 2021) & robotics clubs, design community-based projects (all open-sourced), lead outreach initiatives locally & globally, empower primary school students from 20+ countries, manage Make-A-Wish Foundation partnership, meet with govt. officials, built a cohort of FRC teams through the Ignite Initiative, and have volunteered 1000+ hours to initiative since 2018.
Describe the team’s initiatives to help start or form other FRC teams

In 2017, we hosted a learning seminar at 'Iolani for Moanalua High School. Topics ranged from pneumatics to proper prototyping & programming basics. We were excited to welcome Moanalua as a rookie team in 2018. To target FRC team creation on a larger scale, a guide to implement STEM curriculum & create an FRC team was provided to Taki Academy in Japan in order to promote STEM & guide them towards a creation of their future FRC team. Topics included budgeting, FRC basics, & veteran tips.

Describe the team’s initiatives to help start or form other FIRST teams (including Jr.FLL, FLL, & FTC)

The past 2 years, we held quarterly pop-up shops for grades K-6 with unique STEM activities per session. This encourages students to explore FLL opportunities and continue on to FTC. We formed 4 competitive FTC teams, 1 being a rookie team in Fall 2018. We host FTC league meets & scrimmages to promote state-wide community. In Spring of 2020, we implemented a robotics program at Ala Wai Elementary School to teach students & teachers new to robotics in hopes to start a FLL team in 2021.

Describe the team’s initiatives on assisting other FIRST teams (including Jr.FLL, FLL, FTC, & FRC) with progressing through the FIRST program

We create open source digital assets (code/CAD) via online platforms & help other teams implement new technology (helped set up FRC Team 2090's water jet, being a resource hub for FTC & FRC teams). This past year, we aided 2 rookie teams: 7724 (donated Engineering Inspiration award of $5K & raised $14K+) & 7497 (we hosted 7497 to review competition mechanics at our school & fabricated robot parts for them at the HIHO regional). We ran a workshop at HIHO for teams interested in starting outreach.

Describe how your team works with other FIRST teams to serve as mentors to younger or less experienced FIRST teams (includes Jr.FLL, FLL, FTC, & FRC teams)

We mentor three to four FTC teams each year & provide guidance to 4+ FRC Teams. On Oahu, we are 1 of 4 schools who own & operate a waterjet machine. We work with 2090 to make our facilities available to the others. This collaboration focuses our efforts to make resources available to all. When less experienced teams join us in our workspace, we provide mentorship & strengthen our FIRST community overall. We hosted a Make-A-Wish event & ran activities with 1 of our Ignite Schools, FRC Team 2853.

Describe your Corporate/University Sponsors

Though our competition efforts are funded by 'Iolani School, we partner with private and public fellows to support our Ignite Initiative. One example of this relationship is with Apple New Zealand and the NZ Consulate, who will be providing tech resources during our workshops in Rotorua. To show gratitude & GP, 'Iobotics deeply invests in igniting passion in the students within our school community. It is our way for us to say 'mahalo' & to give back to everyone who has given to us.

Describe the strength of your partnership with your sponsors within the last five years.

In our direct work with 'Iolani to build imaginative experiences for our student body, our team finds ways to give back (mach. shop tours, STEM functions). Through our partnership, we are able to support alumni through internships and fabrication assistance at their university-level projects. Through our govt. fellows, future plans about STEM education legislation are in development. In 2020, Hawaiian Airlines NZ reached out to us offering support for our initiative at Rotorua Primary School.

Describe how your team would explain what FIRST is to someone who has never heard of it

FIRST is an organization, composed of multi-level robotics programs, that provides opportunities for students to apply STEM skills to real-world problem-solving. Although FIRST may be best known for robotics competitions & STEM education, the driving themes behind these tech initiatives are student-to-student mentorship, leadership development, & global perspective. The FIRST program equips students with vision & the skills they need to make real changes in their world.

Briefly describe other matters of interest to the FIRST judges, if any

'Iolani has implemented a student-driven robotics curriculum in both classrooms & team environments. Real-world projects are identified, organized, & executed by students. With guidance from both teachers & peers, students are able to create meaningful solutions for problems that impact their communities. Projects run the gamut from simple tasks such as candy sorting to advanced environmental initiatives like autonomous water sampling.

For FRC teams older than 5 years, briefly describe your team's broader impact from its inception.

Since 2016, our projects were made open-sourced to inspire others to take roles in shaping their communities. In 2019, our content was published globally as a series of eBooks. These were distributed to educators in Spain, Japan, Korea, & the Philippines. In 2020, we have visited Molokai, New Zealand, & 7+ Oahu schools to implement our specialized STEM curriculums. We aspire to implement programs that will train faculty how to design and implement STEM programs inspired by their own passions.

Team Captain/Student Representative that has double-checked this submission.
Essay
'Iobotics Team 2438 from 'Iolani School in Honolulu, Hawaii inspires students to develop their identity in a holistic way: blending science w/ creativity & technology w/ community. We know that with good intentions & consistent effort, our mana'o(knowledge) can empower people beyond our island. We believe that everyone deserves access to education & the technology that supports it. This year, we committed ourselves to push beyond our limits to make the collaborations greater & the connections deeper. Our theme for the year, Ho?okele(wayfinding) represents our commitment to global citizenship.

From Past To Present
'Iobotics was founded in 2008 with the belief that when you teach students the skills they need to create, they have the power to shape the world. By the grace of our generous school, we have grown from humble beginnings in a storage room to a home in the Sullivan Center for Innovation & Leadership. Though our space has grown, we've become closer; we let that power of connection be the guiding star on our voyage.

Open Source Projects
Members have developed their own projects tackling real-world problems with innovative solutions. We make these projects accessible globally, making STEM opportunities within reach for all. We showcase our robots & projects at numerous venues(Schools of the Future Conference, EdTech Conference, Mini Makers Faire, Google Science Fair & 'Iolani Fair) allowing us to inspire future innovators. Projects include: portable data-collecting catamaran, autonomous water sampling drone, water monitoring sensor system, vertical takeoff & landing plane, dog wheelchairs, sustainable electric one-man aircraft, & a robot that removes microplastics from the sand.

Expanding Community Outreach
We recognize that the universe equally distributes talent, but not necessarily opportunities. Therefore, our intention has always been to empower others by breaking down barriers financially & geographically. This year, we are focusing on how to expand our impact beyond our island. Our goal this season was three-fold: to continue our programs, to put STEM education assets into the hands of local community leaders, & to globally distribute self-authored, open-source resources. We aim to impact STEM education at a systemic level, & so we focus on making our programs sustainable & scalable.

Elementary School Workshops
One of our sustainable programs include our lower school(LS) STEM workshops: Spark. We meet with 'Iolani LS students(K-6) quarterly. The program curriculum is built upon STEM-related activities to introduce them to innovation & critical thinking. We've created circuits for light-up Christmas cards & constructed mini drones. Developing a strong relationship with our LS counterparts ensures a skilled & sustainable pool of future members in the community & creates a pathway for the fluid continuity of STEM education.

Boys & Girls Club STEM Partnership
This six-week long program immerses students in the engineering field & requires students build, CAD, & control their bot under the guidance of an 'Iobotics member. We donated $6000+ of computer equipment to the B&GC to ensure the longevity & sustainability of the program, which is based on free cloud platforms like Onshape. SumoBots is an open-source affordable introduction to STEM learning for less than $10/student with the available platforms & electronics. We will be training B&GC administrators to equip them with the skills to execute SumoBots without the assistance of 'Iobotics. This puts community members in positions of leadership & ensures sustaining the program for the future, further advancing the mission of 'Iobotics & FIRST.

Environmental Monitoring
We took a student-made, real-world project—a water monitoring sensor to read temperature, transmit location, & collect data on sediment conductivity—and made it scalable. We collaborated with Robert Louis Stevenson Middle School, H?lau K? M?na Public Charter School, & SEEQS Middle School to guide students in the creation & installation of these systems. On the last day, we hike to a waterway that leads into the Ala Wai Canal for installation. The system transmits data to a public spreadsheet on our team website for online access. Monitoring these factors provides critical data about our native ecosystem. This project teaches students how to think like a scientist & inspires future endeavors as they see technology shaping their world.

Global Reach
EBooks
In order to extend our reach beyond our island, we created & published educational multi-touch eBooks(w/ tutorials & graphics) freely available in 54 countries. These books have been distributed to schools across the world, including but not limited to: Future School in South Korea, El Colegio La Loma Maestro Cristóbal Chanfreut in Dos Hermanas, Spain, American International School in Hong Kong, & the Philippines through Barstow High School, located in California. By providing easy-to-follow curriculum for teachers who are less knowledgeable in STEM, we are providing STEM learning opportunities to their students. We've translated them into Korean, Japanese, Mandarin, Spanish & Vietnamese with the help of our team's international boarding students; & our next step is to craft curriculum in indigenous languages.

Ignite Cohort
Our Ignite Cohort, consisting of FRC teams & schools around the world, collaborates with the intention of serving the FIRST mission. Currently, our global network consists of Teams 2853, 3008, 5701, 7497, & 7724 & 17 schools worldwide across Molokaʻi, Lanaʻi, Maui, New Zealand, Japan, Spain & Taiwan. We come together to create specialized programs designed for each audience. Our cohort is committed to the advancement & development of tech proficiency. Designated student chairs work together to meet needs, provide resources(venues, content, manpower) & collaborate. An example would be working with 2853 to run activities for a Make-A-Wish event we ran at our school. Future endeavors include inviting our cohort to our future PD(March 2020). This past season we were able to contribute to our pit neighbor's, 7724, travel to the World Championships. They had qualified to go but lacked funding. We allocated our award of 5K & went on to raise 14K+ via crowdfunding. From this, we felt determined to build a business plan for teams who don't have the opportunities & resources. 

Working with Government Officials
Working with our cohort helped us to see that not only do we need strong programming & well-written STEM curriculum, but we need resources, funding, & supportive legislation. Systemic change is important; govt. support is needed in order to ensure the longevity of this mindset. We meet & talk to govt. representatives to make sure there is funding for STEM programs & that teachers have professional development opportunities. Our partnerships include Hawaii State Senator Michelle Kidani, Governor David Ige, U.S. Representative Tulsi Gabbard, & U.S. Senator Brian Schatz. Ignite works with fellows to elevate communities through STEM fluency. Continued partnerships with govt. officials will pave the way for conversations & collaborations between students & govt.

Connecting the Polynesian Triangle
We are focusing on bridging the geographic gap between Polynesian islands. We see the merit in building those bridges because the ability to create change comes from empowered people that have the tools to be the developers of their own destiny. The solution is not always more funding or more technology, but has & will be, people working together. In this time, where intellectual capital is the world's most valued currency, finding purpose & creating value that aligns with that purpose has never been more important. We serve that end through the partnerships, projects, & creative curriculum that propel us forward as a united STEM community.

Hawaiian Islands
We started by focusing on connecting communities across our state. We currently have partnerships across Oahu, Molokaʻi, Big Island, Lanaʻi, & Maui. Apart from our relationship with Molokai High School, we are connected to numerous local elementary schools in hopes of supporting them with their STEM education endeavors. We traveled to Molokaʻi & met with several educators & principals. We connected with the Maui Economic Development Board & are meeting with them to talk about future collaboration opportunities & shared our eBooks. We are in contact with teachers in Lanaʻi & are currently working with a robotics teacher in hopes of supporting their burgeoning robotics programs. In this way, we are working to accomplish our goals close to home, by uniting communities across Hawaiʻi.

New Zealand
Our initiative to support island communities was prompted by the understanding that these communities frequently face geographic & financial limitations in STEM advancement. In Feb. of this year, we continue to reach out to these groups, & we are traveling to Rotorua, NZ. We created specialized curriculum tailored to classrooms by working with the teachers in Rotorua prior to our trip. Part of the collaboration involves using the curriculum in our own(?Iolani)lower school classrooms so students there, & students here, can share their authentic work.

With the generous support from our school, inspiration from our community, & shared goal to ignite passion in others through STEM & the spirit of FIRST, ?Iobotics will continue to give back to our community. It is a great thing when we can partner with organizations to mentor & support STEM learning, but it is even greater when we can empower someone from that community to become a leader. We give because we have been given; we serve because we have been served; & we help because we have been helped. It will always be part of the 'Iobotics mission to lead, share, & serve in the education of others. We are especially grateful to FIRST for inspiring us on our own journey of Ho?okele(wayfinding); as we find our purpose in humble service to others.