

## Chairman's Award - Team 2438

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2022 - Team 2438

**Team Number**

2438

**Team Nickname**

'lobotics

**Team Location**

Honolulu, Hawaii - USA

**Describe the impact of the *FIRST* program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in *FIRST* programs as mentors/sponsors.**

100% of members attend college; 98% of members pursue STEM career paths after postsecondary ed. 100% of members continue to be involved with STEM education efforts after graduating. Members develop diverse skills by mentoring other teams at the FRC, FTC, and FLL level, running STEM workshops in collaboration with government agencies, and building global partnerships through STEM Education & our Ignite Publishing House - IPH (open-source STEM curriculum on Apple Books, Google Play, and Kindle).

**Describe your community along with how your team addresses its unique opportunities and circumstances.**

Our members are from 7+ countries. Our Ignite Cohort includes CENTAM, and Indigenous communities in New Zealand, Navajo Nation, and Chevak Alaska. Our diversity has inspired community-centered design, and IPH. Under IPH, we published 5 curricula, in 51 countries & 6 languages. In Covid, we ran PD sessions for teachers, began Adopt-a-Class to connect FRC teams w/ STEM teachers needing tech support, & began 2 FRC social campaigns: #FRCStrong & #Limitless to encourage innovation, beyond the game.

**Describe the team's methods, with emphasis on the past 3 years, for spreading the *FIRST* message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?**

We began IPH to share *FIRST* principles on a global stage w/ K-12 STEM curricula. We grew Ignite to include 7 FRC teams and 20+ schools globally. Under #*FIRST*withAloha we support international FRC teams arriving for HI Regional. #STEMpathy inspires teams to think/be "more than just robots" (community-centered design). We work with HI govt on ed. legislation & develop teacher PD to advance *FIRST* principles. We track STEM involvement in the communities we work in (200% increase after our programs).

**Please provide specific examples of how your team members act as role models within the *FIRST* community with emphasis on the past 3 years.**

Members volunteer at *FIRST* events, mentor FRC, *FIRST* global, FTC & FLL teams, develop *FIRST* teams & robotics clubs, started social campaigns inspired by *FIRST* principles, design open-sourced community projects, lead global outreach initiatives (with a focus on indigenous and underrepresented learning communities), empower primary school students from 20+ countries, manage Make-A-Wish partnerships, meet with government officials, built Ignite and IPH, and have volunteered 1000+ hours since 2019.

**Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.**

We hold K-6 STEM events, started an FLL team; students can join our FTC/FRC teams. We formed 4 FTC teams, hosted FTC matches, started robotics programs, wrote FRC startup guides & hosted workshops for new teams. The Adopt-a-class program connects FRC teams to STEM teachers to provide support. We aided rookie teams 7724&7497 by raising +\$19K & hosted mech/fab workshops. #FIRSTwithAloha supports teams arriving in Hawaii for the HI regional. We're now supporting FIRST global teams in Belize.

**Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?**

IPH curricula supports global STEM learning. We run community-centered design programs: Spring '20 we traveled to New Zealand to implement our K - 12 place-based STEM curriculum; we are using it this year to work with robotics students in Belize. We are working with Apple on an indigenous mapping project that works with Navajo, Chupik, & other indigenous communities. Upon completion of an Ignite program, teachers report a 200% increase in STEM.

**Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years**

Ignite is 7 FRC teams, & 20 schools world wide, working together to advance STEM ed. Private/Public sector fellows are: Apple Americas & New Zealand, NZ Consulate, HI Gov. & Sen., Chamber of Commerce, & HI DOE. Together we have run 10 STEM programs, published 5 curricula in 51 countries in 6 languages, raised \$30k+ for STEM ed & worked 1k+ hrs for accessible STEM opportunities. Currently working on a global mapping project w/ Apple that will serve Hawaiian, 1st Nations, & Indigenous communities.

**Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.**

3/4 lead positions are held by female students, 90%+ of our team are students of color &/or students in the LGBTQIA+ community. We build skills pre-season to eliminate barriers & bias in robotics. We work w/ marginalized groups to build access to STEM. Ignite works with underrepresented & indigenous communities. Our open-source curriculum focuses on DEI & supports the UN International Day of Women & Girls in Science, and Sustainable Development Goal (SDG) 6: Clean Water & Sanitization.

**Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future**

We focus on community managed scalable frameworks. We empower STEM leaders. We create open-source curriculum, train leaders, & provide resources for STEM programs. The curriculum involves learning to teach others, so the sharing of knowledge is continuous; igniting other STEM communities. Sharing programming and curriculum involves training community members in fundraising, budgeting & sponsor acquisition. We work specifically w/ govt reps (Sen., Gov., etc.) to promote funding for STEM ed.

**Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years**

We give back via mach. shop tours, STEM experiences, & by starting teams. We support collegiate enrg projects. With our govt. fellows (Gov., Sen., Rep.), plans for STEM ed. legislation are in development. For DOE fellows, we work w/ students from other schools to design solutions that support DOE functions, & we run PD for teachers in HI. Private sector fellows like Apple & Hawaiian Airlines support our STEM outreach initiatives & we connect them to indigenous & underrepresented communities.

**Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.**

We focused on STEM engagement in academia of marginalized groups. We supported our female members in their STEM pursuits (both w/in & outside of robotics), & encouraged new members from underrepresented groups. We are student advocates of Adobe Women Create; where we support programs like Design Equity: Creativity for Meaningful Change. We are collaborating on a United Nations event to support the International Day of Women and Girls in Science.

**Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.**

We work with students from K-12, in communities across the globe, to develop the science & technology skills they need to become agents of change for the future. We have worked with groups across the world, from schools and teachers to global companies (like Apple) & government reps., to uphold the vision and intentions of FIRST®. We have devoted 5,000+ hours, and \$30k+ USD, to this endeavor, and there is an increase in STEM participation of 200% (on average; in the communities we work in).

**Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.**

Our team is committed to: inspiring innovation & igniting passion, preserving cultural identity, & breaking barriers to education. Our theme in 2020 was Ho'okele, wayfinding. This year, it is Holomua, onward. The past two years have

shown us that we are only just beginning; w/ more people online than ever before, we have more connections to make, more communities to grow, and more passions to IGNITE.

## Essay

We are 'Irobotics, Team 2438 from 'Iolani School in Honolulu Hawaii. We are a group of students & mentors committed to building accessible & equitable STEM programs in communities around the world. We do this work under our outreach division: Ignite.

In Ignite's inaugural year (2018), our theme was: H??a?? (Ignite), during which we established our mission & our purpose. In our sophomore year, the theme of Ho'okele (wayfinding) described our journey to connect learning communities across the polynesian triangle. This year, our theme Holomua (onward) represents the expansion of our initiatives - to press onward & upwards in the midst of challenges that have revealed themselves as opportunities.

### INSPIRING INNOVATION - IGNITING PASSION

Every year, members of our team step out of their comfort zone to develop innovative solutions to global issues. For the past few years, we've presented our projects at: Schools of the Future, EdTech Conferences, the World Wide Education Summit, Mini Makers Faires, the Google Science Fair, & 'Iolani Fair. Projects such as the portable data-collecting catamaran, autonomous water sampling drone, water monitoring sensor system, vertical takeoff & landing plane, dog wheelchairs, sustainable electric one-man aircraft, microplastic sifting robot, & affordable heart rate monitor & app, were showcased with the hope of inspiring future STEM leaders. These open-source projects are always pushing the boundaries of innovation to serve the communities of which they are a part. More than just robots & our new campaign #STEMpathy, summarize our approach to community-centered design, and our belief that high tides float all boats.

### BREAKING BARRIERS TO EDUCATION

#### Scalable & Sustainable Program Design

Our programs are created with scalability & sustainability in mind. We do this with: open-source curriculum, equitable design, accessible technology, and most importantly, STEM training so communities can continue programs autonomously. For example, our SumoBot program immersed students in engineering and taught them to build, CAD, and control small bots. After running this program in the Boys & Girls Club of Honolulu, we developed an open-sourced, affordable, curriculum that eliminated the need for a laser cutter, thereby breaking down financial barriers to entry in robotics. We also created a corresponding training program to support rising STEM leaders on their own journeys; we recognize how impactful & important it is for students to see people from their own communities in positions of STEM leadership.

#### Ignite Cohort

Our Ignite Cohort, made up of FRC teams & schools around the world, collaborate with the intention of serving the FIRST mission. Currently, our global network consists of teams 2853, 3008, 5701, 6909, 7497, 7724, & 21 schools in Molokai, Lana'i, Maui, Alaska, Colorado (Navajo Nation), New Zealand, Japan, Taiwan, Spain, & Belize. Designated student chairs work together to meet needs, provide resources (venues, content, manpower) and collaborate.

This cohort works together to support learning communities worldwide. We also build close relationships internally and support each other in the pursuit of innovation. In 2019, the team from Molokai qualified to attend the World Championships. They had exhausted their budget and did not plan on accepting their seat to Houston. To support this Ignite team, we allocated our Engineering Inspiration award of \$5k and raised another \$13k+ through crowdfunding.

Through this Ignite relationship, we have built a business plan to help other teams w/ their FIRST efforts, hosted teacher PD exchanges, robotics workshops & inter-island school learning trips. We now have a thriving residential program that supports boarding opportunities for students from Molokai interested in robotics.

#### Ignite Publishing House (IPH): Student-written STEM curriculum

Under IPH, we publish free educational multi-touch eBooks, available in schools in 51 different countries. These books have been used in: 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. We have translated this curriculum in 6 languages to support education equity. To work with schools in New Zealand, we designed a place-based, K-8 STEM curriculum focused on water, which perpetuated indigenous knowledge and leveraged accessible technology. We are planning to further develop this curriculum to prepare for our next interscholastic collaboration in Belize. This next iteration will be used in conjunction with the UN International Day of Women & Girls in Science, and supports their Sustainable Development Goal 6: Clean Water & Sanitization.

## Essay - page 2

### Empowering the Next Engineers

Paving the way for the future innovators is a large part of our focus. To ensure a skilled and diverse pool of future engineers, we continue with our lower school (LS) STEM workshops every year. These workshops incorporate STEM skill building activities such as circuitry, mini drone construction and critical thinking. This year, we pressed onward in this work and took another step forward by creating an FLL team for younger members. We will continue to expand our connection with local elementary schools to support them in STEM education & FLL.

### Working with Government Officials

To create meaningful change, not only do we need strong programming and well-written STEM curriculum, but we need resources, funding, & supportive legislation. Systemic change begins in government. We meet and talk to representatives to secure funding for STEM programs and encourage (STEM) professional development opportunities for teachers. Our partnerships include Hawaii State Senator Michelle Kidani, Governor David Ige, U.S. Congresspersons, and our most recent fellow, Senator Brian Schatz. Ignite works with these fellows to elevate communities through STEM literacy. Continued partnerships with government officials will pave the way for conversations & collaborations between the government and our youth.

## PERPETUATING CULTURAL IDENTITY

### Diversity, Equity & Inclusion

All of our programs are designed to create equitable learning environments using accessible technology. We recognize that the universe equally distributes talent, but not necessarily opportunities. Our work in Ignite breaks down the barriers to entry in STEM education, robotics, & engineering. We do this through a concerted focus on equitable design, and access to inclusive technology (ensuring that students and teachers have access to technology and making certain that the technology is inclusive in its design - addressing bias against non-native english speakers, visually/hearing impaired, etc.).

Our innovative projects are community-centered. An example of this is our affordable heart rate monitor and accompanying app, PILI-Play. PILI-Play was designed for use in the DOE to support virtual PE classes while also aggregating health data that secures funding for public schools as part of the SAWS (Safety & Wellness Survey).

### Building Global Communities

As part of our effort to work specifically w/ indigenous learning communities, we designed and ran STEM programming for schools in Rotorua. Our custom curriculum was scaffolded by age and skill level to develop STEM learning pathways. In total, we had four published curricula, all of which were place-based and leveraged accessible technology. The content covered digital storytelling, book publishing, animation, AR, water sensors, CAD, coding, & fabrication. During this work, we upgraded the school's involvement in RoboNation & SeaPerch. Students were able to create prototypes, design & 3D print parts, test & iterate, and move beyond a kit-of-parts robot to a custom bot that also served a community purpose (water sampling). In this way, we are empowering other communities to move beyond the scope of competitions to a place of culturally significant innovation that is more than just robots.

This year, our global partnerships include Belize High School & Apple.

In our work with Belize High School (BHS), we have begun a virtual collaboration that involves version 2 of our place-based, water focused, curricula. It will be tailored to the specific needs of the community and will be modified to support the United Nations work for Women & Girls in Science. We are also providing mentorship to the BHS engineering & STEM programs as they further develop their FIRST Global robotics team.

In our work with Apple, we are collaborating on an Indigenous Mapping effort. We will connect our student-led STEM education initiatives to indigenous communities across the world. In phase 1, we will be working with the Chupik people of Alaska, & the Navajo Nation schools in the continental US. In subsequent phases, we look forward to sharing our work across other continents and writing a corresponding curriculum. Our brevity here is intentional since the project has not yet been released to a wider audience.

## CONCLUSION

With the generous support from our school, inspiration from our communities, and unifying goals, 'lobotics will continue to ignite passion in others and share the spirit of FIRST. It is a great thing when we can create something incredible, but it is even greater when we can empower others to do the same. 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 the mission of 'lobotics to lead, share, and elevate communities. We are especially grateful to FIRST for inspiring us to find our purpose in service to others, and a special mahalo for keeping the 2022 season alive as we push forward. Holomua (onward); 'lobotics.