FIRST Impact Award - Team 2438

2023 - Team 2438

Team Number

2438

Team Nickname

'Iobotics

Team Location

Honolulu, HI - 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 & 99% pursue STEM career paths. 93% of members continue to be involved in STEM education efforts after graduating. Alumni mentors volunteer for FIRST; alumni business owners become FIRST sponsors. Members develop skills by mentoring FRC/FTC/FLL, running STEM workshops in collaboration w/ government agencies, & building global partnerships through STEM Education & our Ignite Publishing House - IPH (open-source STEM curriculum on Apple Books, Google Play, & Kindle).

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

We are 100% BIPOC & International - this guides our Ignite Cohort: CENTAM, Indigenous communities in New Zealand, Tahiti, Navajo/Yüpik/& First Nations. IPH is: 10+ curricula/51 countries/6 languages. We run PD for teachers, began Adopt-a-Class (joins teams w/ teachers for tech support) & started #FRCStrong. Our DEI (diversity/equity/inclusion) initiatives are #WeAreFIRST & #FIRSTwithAloha. We are exploring funding for ‘Oahu Tech Center to serve FIRST efforts on ‘Oahu.

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?

IPH shares FIRST principles on a global stage w/ K-12 STEM curricula. Ignite includes 10+ FRC teams & 25+ schools globally. FIRSTwithAloha supports FRC teams arriving for HI Regional. WeAreFIRST connects us to other indigenous communities & brings DEI education to FIRST teams. We work w/ HI govt on ed. legislation & develop teacher PD to advance FIRST principles. We track STEM involvement & surveys show 250% increase after our programs & 100% of schools continue with robotics after our sessions.

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, build sustainable robotics programs at schools that serve primarily indigenous populations, start campaigns for FIRST principles, design open-sourced community projects, lead global outreach initiatives (focus on marginalized communities), empower students from 20+ countries, manage Make-A-Wish partnerships, meet w/ govt officials, build Ignite & IPH & volunteered 2000+ hrs since 2020.

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-12 STEM events, started a competitive FLL team; students can join our FTC/FRC teams. We formed 4 FTC teams, hosted FTC competitions, started off- season robotics programs, wrote FRC startup guides & hosted workshops for teams. We aided teams 7724&7497 by raising +$19K. #FIRSTwithAloha supports all teams arriving in Hawaii for the HI regional. We support FIRST global teams in Belize & robotics teams in New Zealand. We are working to support & start FIRST teams in indigenous communities.

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 supports global STEM learning. We run community-centered programs: Spring ‘20 in New Zealand we ran our K - 12 place-based STEM curriculum in Māori schools. We used it last year to support the UN Initiative for Clean Water with students in Belize. We work w/ Apple on an indigenous mapping project. We have written a supporting curriculum that we ran w/ the Kwanlin Dün, Champagne & Aishihik First Nations (Feb ‘23). Upon completion of an Ignite program teachers report a 250% 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 10+ FRC teams & 25 schools working together to advance STEM ed. Private/Public sector fellows: Apple US/CA/NZ, NZ Consulate, Yukon First Nations Education Directorate, HI Gov.,Sen., Chamber of Commerce, & DOE. Together we ran 15 STEM programs, published 10+ curricula, raised $40k+ for STEM ed & worked 2k+ hrs for accessible STEM opportunities. We worked on a global mapping project w/ Apple that serves Hawaiian, First Nations, & Indigenous communities & ran the corresponding curriculum.

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

6/7 senior positions are students that identify as female, 100% of our team is BIPOC & International. Ignite works w/ marginalized & indigenous communities. Open-source curriculum focuses on DEI & supports the UN initiative for Women/Girls in Science. WeAreFIRST brings awareness to the DEI work of FRC teams. We write DEI curriculum that includes spotlight sessions (bringing in DEI experts). Our curricular work unites STEM & robotics edu. w/ ancestral knowledge.

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

We create open-source, customizable, curriculum based on sustainable resources. This includes users learning to teach others for continuous knowledge sharing. Programming involves training participants in fundraising, budgeting & sponsor acquisition. We work w/ our govt to promote STEM ed funding. We are now engaged in the grant writing process to secure funds for an ‘Oahu Tech Center. We ensure our programs create value for sponsors & support their aspirational and organizational goals.

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

We give back via machine shop advising, STEM experiences, & by uplifting communities. We support intern projects for FIRST partners like Boeing. With our govt. fellows plans for STEM ed. legislation are in development. For DOE fellows, we design solutions that support DOE functions, & we run PD for teachers world wide. Private sector fellows like Apple & Hawaiian Airlines support our STEM outreach initiatives & we are a pipeline to connect them with community work and relationships.

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

We aimed to strengthen our DEI work and lean on our unique identities to propel us forward. Our team diversity inspired us to unite technological innovation and ancestral knowledge. We believe that innovation is not despite cultural differences, but rather, because of them. We have spent this year bringing together cultural practitioners from around the world to join our DEI advisory board to help us lean on the strength of who we are and where we come from to carry us into the future.

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

We work w/ K-12 students, in communities across the globe, to develop the science & technology skills they need to become agents of change for the future. We work w/ schools/teachers, global companies & govt. reps., to uphold the vision of FIRST. We devoted 7,000+ hrs & $45k+ USD to this. Our goal is to bring accessible & equitable STEM ed. to all indigenous & marginalized communities across Polynesia (Hawaiian/Tahitian/Māori) & North America (Yüpik/Navajo/Kwanlin Dün/Champagne/Aishihik).

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 2022 was Holomua, onward. This year, it is Ho’oku’i, connection. We see now more than ever that we are all connected, and our collective future is critically dependent on relationships of reciprocity. We are designed for fellowship; we must connect so that we can build things that change the world. This is the reason for, and the result of, all that we do.

Essay

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

Ignite’s inaugural theme (2018) was: Hō‘a‘ā (Ignite), during which we established our mission & our purpose. In our sophomore year, Ho‘okele (wayfinding) described our journey to connect learning communities across the polynesian triangle. Last year, Holomua (onward) represented the expansion of our initiatives - to press onward & upward.

While all of our yearly efforts have been substantial in significance and impact, this year’s theme, Ho‘oku‘i (connection) represents the heart of our work, the spirit of our team, and the beliefs that drive our initiatives. The ‘Ōlelo No‘eau: i ka wā ma mua, ka wā ma hope (the future is found in the past) reminds us that we innovate not despite cultural differences, but because of them. We've learned to lean on the strength of who we are and where we come from, to carry us into the future. Through Ignite, we empower others to do the same. Never before have we been more proud to present this body of work.

BREAKING BARRIERS TO EDUCATION

Ignite Cohort Our Ignite Cohort, made up 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, 6909, 7497, 7724, 8615, 8725, 8853 & 25 schools in Molokai, Lana‘i, Maui, Alaska, The Navajo Nation, New Zealand, French Polynesia, Japan, Taiwan, Spain, Belize and most recently First Nation communities in Yukon, Canada. The global reach of our cohort includes a thriving residential program that supports opportunities for students interested in robotics.

Ignite Publishing House (IPH): Student-written STEM curriculum Under IPH, we publish free open-source STEM curricula in 51 countries & 6 languages. These lessons have been used in schools in Hawaii, the US, Yukon, Canada, New Zealand, South America, Mexico, South Korea, Spain, Hong Kong, & the Philippines. To work with schools in New Zealand, we designed place-based, K-8, STEM curricula, focused on water, which perpetuated cultural knowledge. We are further developing this curriculum to prepare for our next interscholastic collaboration in Mo‘orea, French Polynesia; where we will work with their schools & government to use robotics for coral preservation (Project Nemo). This year, our publications include another place-based curriculum that highlights ancestral engineering and identity through the integration of technology & robotics (used in our First Nation collaboration).

FIRSTwithAloha FIRSTwithAloha supports off-island teams arriving for the Hawaii Regional. We have united local teams on ‘Oahu to provide assistance to neighbor island, mainland, and international teams. This cohort receives shipments and hosts teams in machine shop spaces (for robot reassembly after travel). Last spring, Team Yukikaze (8853) worked in our machine shop for a week; during which time we provided extensive machining and programming support. In their 2022 debut, Yukikaze went on to win the rookie all-star award at the Hawaii Regional and secured their seat for the 2022 World Championships in Houston, where we furthered their engineering efforts. It is important that we support new teams in this way to ensure that their participation in robotics continues into the future.

Working with Government Officials To create systemic change, we need resources, funding, & supportive legislation. We meet and talk to representatives to secure funding for STEM programs. Our partnerships include the Yukon First Nations Education Directorate, Hawaii State Senators, former Governor David Ige, U.S. Representatives, and Senator Brian Schatz. Currently we are working with advisors from his office to further develop our proficiency in grant writing (the next phase of our sustainable financial plans), with the final goal being an ‘Oahu Tech Center that can serve all FIRST teams on the island.

PRESERVING CULTURAL IDENTITY

Diversity, Equity & Inclusion 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. DEI is not only present in our ideation, but in our engineering. We focus on equitable design and access to inclusive technology. Our programs address bias against non-native English speakers and other historically disadvantaged groups.

WeAreFIRST Our DEI initiative, WeAreFIRST, debuted at the World Championships this past spring and represents the direction for our social entrepreneurship efforts going forward. We gathered more than 100 statements from teams across the world highlighting the ways in which they create diverse and inclusive spaces on their team. We broadcasted them across our social channels to acknowledge this collective responsibility. Under WeAreFIRST, we also organized a DEI Advisory Board, a cohort of experts from the field to advise FRC teams in their diversity work. These advisors run DEI workshops (Spotlight Sessions) that expand on topics like race, identity, abundance-models (in reference to the way in which we view other cultures), ancestral knowledge/engineering and cultural fluency. At the Hawaii Regional we will be selling the WeAreFIRST shirts to fundraise for a local charity that supports underrepresented students interested in pursuing careers in engineering.

Building Global Communities As part of Hawaii’s diverse Lāhui (community), we understand the importance of culturally significant innovation that preserves identity and honors ancestral knowledge. Our goal is to bring these kinds of learning opportunities to every indigenous and marginalized community across Polynesia and North America.

In our project, Te Hekenga a Rangi (Descendants From the Skies), we designed and ran STEM programs for schools in Aoterora. Our custom curriculum was scaffolded by age and skill level to develop STEM learning pathways. We developed four place-based published curricula which leveraged accessible technology. Through this work, we increased student involvement in RoboNation & SeaPerch, an underwater robotic platform. Students were able to create prototypes, design and 3D print parts, test and iterate, and move past a kit-of-parts robot to a custom bot that served a community purpose (water sampling). In this way, we are empowering communities to move beyond the scope of competitions to a place of culturally significant innovation that is more than just robots.

Scalability and sustainability are two key principles in our program design. Since our collaboration with Māori learning communities in Spring 2020, we have continued to provide mentorship and advice to the teachers and students working with the robot that was designed and built during our visit. This team from Rotorua qualified for the world championships in their corresponding robotics division and traveled to the US to compete for the first time. Empowering rising STEM leaders on their own journeys is critical for program success. We recognize how impactful & important it is for students to see people from their own

communities in positions of STEM leadership.

Since 2022, we have partnered with Apple to develop a curriculum series that joins technology and innovation with explorations of place, identity, and ancestral knowledge. One year later, in February of 2023, we piloted the program in First Nation communities across Yukon, Canada. In partnership with the Yukon First Nations Education Directorate we ran 5 programs (including an FRC and FLL program that provided more than $4,000 USD in FIRST resources) with the Kwanlin Dün, Champagne and Aishihik First Nations. This project, Ńłäyè ghàkenùúdā̃n shį̀ (We Will Learn Together), has given us a renewed mission and vision for our work and has further committed us to our passion of connecting with, and empowering others. We truly believe that with sustained passion, unwavering commitment and sponsor support, we can bring STEM learning experiences to every indigenous community across Polynesia and North America. Our goal is for every Ignite school/team to connect with a new community each year. We have met this goal annually through new sponsor and mentor engagement.

INSPIRING INNOVATION - IGNITING PASSION

Every year, members of our team step out of their comfort zone to develop innovative solutions to global issues. Projects such as the portable data-collecting catamaran, autonomous water sampling drone, water monitoring sensor system, vertical takeoff & landing plane, sustainable electric one-man aircraft (first human-piloted flight completed in Spring 2023), microplastic sifting robot, affordable heart rate monitor & app, and Project Nemo, an underwater vehicle with the goal of making ocean exploration accessible in the classroom, were showcased with the hope of inspiring future STEM leaders. These open-source projects push the boundaries of innovation to serve their communities.

CONCLUSION

With the generous support from our school, inspiration from our communities, and unifying goals, ‘Iobotics 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 empower others to do the same. Now, more than ever, we understand that connection and community are at the heart of all things. It will always be the mission of ‘Iobotics to lead, share, and elevate diverse communities. We are especially grateful to FIRST for inspiring us to find our purpose in service to others, and a special mahalo for creating opportunities for us to live our mission. I ka wā ma mua, ka wā ma hope, ‘Iobotics.;