



2024 MECC Final Report
Community Connections

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Marine energy, often known as ocean energy, has great potential to meet the planet's expanding energy demands in a sustainable manner. Using the kinetic, thermal, and gravitational energy found in our seas offers a chance to move toward a more sustainable and clean future. However, achieving this potential will need many parties' coordinated efforts, creative thinking, and cooperation. This report aims to provide an overview of our team's participation in the Community Relationships Challenge, particularly emphasizing our efforts to raise knowledge of marine energy, establish relationships within the sector, and encourage significant community engagement.

After Action Report

Actions taken since mid-year deliverable: Our team chose to focus on raising awareness of marine energy because we were aware of the unrealized potential of marine energy and wanted to contribute to its increased use. We took a varied strategy to increase awareness, form relationships, and interact with various communities at IIT as part of the Community Connections Challenge to promote advancement in the marine energy industry. Outreach was a key component of our project, as we engaged in active communication with a range of community centers to identify potential areas of cooperation and get information. We made contact with well-known organizations like Navy Pier and Shedd Aquarium by utilizing our professional networks in an attempt to establish collaborations that would increase the reach and scope of our outreach initiatives. We began conversations, shared ideas, and established the framework for possible partnerships over the phone and via email, realizing how important it is to include important stakeholders in advancing the marine energy agenda. Simultaneously, we realized the value of community involvement and made an effort to include nearby groups and schools in our activities. To inform and motivate the upcoming generation of environmental stewards about the possibilities of marine energy, we went out to high schools including Dunbar HS, Perspectives HS, and Urban Prep HS. We persisted in our resolve to build community ties and raise awareness at the local level despite obstacles and scant answers.

Challenges: Despite efforts to connect with Navy Pier and Shedd Aquarium, we had difficulties getting a commitment to conduct a particular event. Nearby high schools were also often unresponsive. In response, we focused on on-campus events that would help improve awareness among the Illinois Tech community and potentially lead to increased ability to do external outreach at a later time.

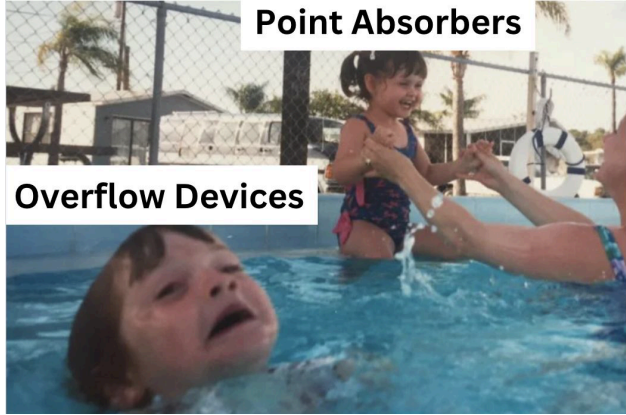
Events: The thorough preparation and implementation of events meant to unite communities from different areas within the school to share expertise, spark cooperative projects, and exchange ideas were essential to our efforts. Using the first event as a crucial venue, we held an event over the lunch hour that provided insights from industry interviewees, highlighted the potential of marine energy, and led conversations on important issues and prospects. Every team member contributed significantly to the event's success, whether it was by setting up meetings, planning snacks, or preparing PowerPoint presentations. Our group's resolve, camaraderie, and dedication to our common objectives carried us over obstacles and unanticipated difficulties. We held a second event in the student center over the lunch hour

where we encouraged passersby to share their knowledge and questions about this innovative field. We provided QR codes linking to professional information for further exploration.. In addition, we were involved in social media and digital outreach. Acknowledging the potential of digital platforms to magnify our message and reach a wider audience, we created engaging promotional materials, and social media content on Instagram and participated actively in our online community. By distributing material strategically, our team aimed to create dialogues, strengthen ties, and motivate action in support of marine energy as a workable answer to our energy requirements.

Reflections: On the journey, we had obstacles to overcome, times of contemplation, and obstacles. Every encounter we had, from overcoming technical obstacles to improving our communication tactics, offered priceless lessons and insights that influenced our future strategy. We discovered the value of flexibility, resiliency, and teamwork in bringing about significant change, and we realized that the advancement of the maritime energy industry necessitates the joint efforts and dedication of all parties involved. Our route has strengthened our views about the revolutionary potential of marine power and the vital role that community involvement plays in advancing efforts to create a cleaner, greener tomorrow. We are driven to continue working toward our goal because we know that if we all work together, we can create a future where people can live in a more sustainable environment. In summary, our experience with the Community Connections Challenge has demonstrated the effectiveness of teamwork, creativity, and tenacity in furthering the maritime energy agenda. We have made great progress in creating connections, increasing awareness, and bringing about major change in the industry and beyond through outreach, engagement, and events. Let's seize the chances that marine energy offers as we get closer to a sustainable future and collaborate to realize its full potential for the good of the environment and the coming generations.

Photos and images from social media:





Point Absorbers



Basic clean energy methods like solar and wind



Marine Energy

Metrics Report

Industry Interview Outcomes: In Fall 2024, we interviewed four individuals. Interviews were conducted by a team of six students that were exclusively focused on community connections. Findings were then later shared with the entire team in the weekly meeting. First, we spoke with Mr. Olivier Bourdin, CEO and Founder of WaveX, a UK-based company focused on utilizing wave energy for low-carbon electricity and combating coastal erosion. WaveX recently achieved success in the Climate Launchpad Competition and Wave Energy Scotland Competition. They are rapidly progressing in developing their wave energy converters (WEC) through various technology readiness levels with testing at Imperial College London. Next, we had the opportunity to talk to Dr. Kelley Ruehl, Principal Investigator from Sandia National Laboratories. Dr. Ruehl's background includes playing a leading role in the development of the wave energy converter simulator, WEC-Sim, which is an open-source simulation software that tests and predicts the performance of these floating devices. To gauge educators' perspectives, we spoke with Dr. Francisco Ruiz, an Associate Professor at IIT in Mechanical and Aerospace Engineering. Dr. Ruiz shared insights into pairing WECs with generation technologies including solar farms and wind turbines. Lastly, we had the opportunity to interview Shannon Ricles, an Education and Outreach Coordinator from the National Oceanic and Atmospheric Administration (NOAA). Throughout her career, Ms. Ricles has seen the merging and development of several sanctuaries across the country, and led countless educational initiatives that show K-12 students how a career in the conservation industry looks like.

Key Takeaways and Insights

- The lightweight materials selected by WaveX make their WEC 60 times lighter per kWh than competitors, enabling cost-effective energy production without compromising efficiency. The strategic decision to deploy devices closer to the shore reduces connection costs, a critical factor in optimizing energy production.
- A distinctive feature of WaveX's approach is drawing inspiration from nature, specifically the stargazer fish, known for navigating underwater seabeds. Mimicking this fish's ability to travel through sand without disturbing surrounding habitats, WaveX designed a self-installing WEC. The device injects compressive air into the seabed, allowing it to slowly lower itself, addressing installation and removal challenges while preserving local marine ecosystems.
- Unlike WECs and other technology that we researched, Ms. Ricles has worked with ROVs (remotely operated vehicles) that were used to explore the ocean floor. She was part of several important investigations and discoveries and she talked about how these devices have been used to find important World War II artifacts as well as explore marine habitats much more closely. Along with these interesting uses, ROVs can also clear debris away and be attached to sensors that allow us to obtain valuable information about these habitats. When discussing our chosen interview topic, Ms. Ricles alluded that it is not a stretch to pair WECs with the usage of ROVs that can allow us to get a detailed visual of the seabed. Doing so can help us better deploy and remove our WEC without harming the seabeds.

Contact info of Interviewees

Mr. Olivier Bourdin
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Shannon Ricles
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All interviewees were professional contacts that the team identified and reached out to. All of them indicated that they were willing to participate in further discussions.

Action Outcomes

Events: Number and types of activities or events: 2, The first event was a technology discussion. The goal of this event was to educate Illinois Tech students on marine energy, the competition, and different technological devices in use. We created a slideshow to introduce the competition and our purpose. We explained some of the device designs that are in use, and then went on to break down the different aspects of our prototype. The second event was a marine energy perception event. The goal of this event was to engage the Illinois Tech community to better understand their perceptions of marine energy and provide resources for further learning. This event took place on the student center bridge, where we encouraged passersby to share their knowledge and questions about this innovative field. We provided QR codes linking to professional information for further exploration.

Engagement: We had ~10 students attend the first event and ~30 students who we were able to talk with at the second event.

Types of attendees: academia (students)

Geographic regions represented: Illinois Tech students includes a fairly global population with 72% of the graduate students being international and 18% of the undergraduates being international students. Detailed demographic metrics on the attendees were not collected.

These events were led by a four person community connections team in the spring.

Communication materials: Communication was mainly done through electronic means and unfortunately, metrics on the number of page clicks and location of viewers was not available.

Reflections: Initial difficulties in connecting with outside organizations to do an event delayed progress. In the future, we would recommend that teams work with Illinois Tech's Associate Vice Provost for Community Affairs to connect with outside organizations. On-campus events allowed us to share marine energy with other students, but these would have had a larger reach if they had been able to be better publicized or done earlier in the semester when students were less busy and more willing to engage.

Social media strategy outcomes

The team has a website that was established in October 2023 as well as an Instagram account. However, the team was run as a semester-long project and there was some transition between the fall and spring teams such that there were no returning members on the community connections team in the spring. This led to low growth of the social media presence.

Reflections: In the future, the team believes they would have greater success with social media if there was a dedicated social media manager on the team and the account information for each team social media was retained by the faculty and/or student team lead.