

THE PIPELINE

MAKAI RECEIVES 2020 TECHCONNECT AWARD TWO YEARS RUNNING

Makai Ocean Engineering has made great strides on its heat exchanger work at HOST Park. They have developed a novel Thin Foil Heat Exchanger (TFHX™) that is ultra compact in size, has flexible geometry, is corrosion resistant and easy to maintain. TFHX™ was awarded the TechConnect Defense Innovation Award two years in a row (2019 and 2020). Applications for this compact and novel technology are numerous including sea water cooling, OTEC, marine vessels, processing plants and even cooling of algae facilities.

Makai was recently awarded a Phase II SBIR by the Army to develop the TFHX™ for ground vehicle cooling. This was made possible by a Hawaii Phase I SBIR grant from the State of Hawaii/HTDC.

More information is available on Makai's next generation thermal solutions and testing facilities at NELHA at <https://www.makai.com/next-generation-thermal-solutions/>



*Makai's 100kW heat exchanger test station at HOST Park's research campus.
Above and upper right close up of the TFHX™ curtesy of Makai Ocean Engineering.*



INSIDE THIS ISSUE

Support Local.....	2
HATCH Demo Day	2
New Park Clients	3
AMC GOLD Connector.....	3
Algae Biomass Org. Awards	3
SBDC Update.....	4
Ocean Era.....	4
Le Grand Bleu	4
UHH Underwater Camera.....	5
Hale Iako AI Demo	5
From the Deep	6
Ike Wai.....	6
Retirements.....	7
Message from ED.....	8



Some of the NELHA products offered by Kona Cold Lobsters

SUPPORT HAWAII AND NELHA BUSINESSES

This year, consider supporting our Hawaii economy and local businesses. Some good choices are products featured on the [Buy Hawaii website](#).

You may also want to consider purchasing foods produced right here at NELHA for your holiday meals or as gifts. You can purchase direct from businesses such as [Big Island Aba-](#)

[lone](#), [Kona Sea Salts](#) or from [Kona Cold Lobsters](#), which distributes a large variety of NELHA seafoods.

Also, unique experiences at HOST Park make great gifts: the [Keahole Center for Sustainability](#) has started tours again, as have [Ocean Rider](#) and [Kanaloa Octopus Farm](#).

Some French humor for you... “Life is a shipwreck, but we must not forget to sing in the lifeboats.” Voltaire.

HATCH AQUACULTURE ACCELERATOR PLANS FOR DEMO DAY ON DECEMBER 3RD

Due to COVID19 travel disruptions, HATCH’s 2020 cohort proceeded in a remote fashion this year. For the past 4 months, 8 global aquaculture and alternative seafood companies have been fully engaged on a program connecting them with world class mentors, industry leaders, corporates and investors as they seek to develop their technologies and build globally successful companies. The teams based from Hawaii to Australia have worked incredibly hard despite the pandemic and time zone challenges to build the necessary connections and knowledge to increase the value of their businesses.

The companies will be presenting during an exciting interactive virtual demo day on December 3rd to which you are cordially invited. This is an international event and consequently, the time will best suit early risers in Hawaii. If 6AM is not agreeable to you, the live event will be recorded and available at HATCH’s website for later viewing.

To sign up for the free live event go to [Eventbrite](#) and use ‘HATCH2020’ as a code to register.

HATCH received 130 applications for the second Hawaii cohort. 8 promising companies were selected for their innovative and scalable solutions to be a part of the cohort which started the online program on August 17, 2020. A list of these companies (along with short descriptions) can be found on [HATCH’s portfolio page](#).





Kona Kanpachi fillets (Photo courtesy of Blue Ocean Mariculture)

NEW HOST PARK CLIENTS

Despite COVID19 economic challenges, three new companies have joined the NELHA ohana since our last newsletter was published! Please join us in welcoming them.

Keahole Point Provisions LLC, a subsidiary of [Blue Ocean Mariculture](#) has entered into a long term sublease to take over the facility previously used by Hawaii Deep Marine Inc. for the purpose of developing a fish processing center.

[Sea Warden](#), one of the HATCH 2020 cohort companies, has moved its operations to NELHA. Sea Warden specializes in remote and continuous monitoring technology for the farmed seafood industry.

[LightManufacturing Inc.](#) has started work on its 1 acre demonstration that utilizes solar heat generated from heliostats to operate a patented molding system to produce high capacity water and holding tanks as well as a variety of other items such as aquaculture tanks, road barriers and kayaks.

We hope you will be as excited about these new projects as we are about them! If you are interested in reaching out to these companies or other park clients, give us a call or send us an email and we will be pleased to facilitate the connection.

NELHA WINS AMERICAN MADE CHALLENGE GOLD CONNECTOR 2020 BADGE

This past summer, NELHA became a Connector for the US Department of Energy American-Made Challenges program which aims to accelerate US domestic energy and global business opportunities. There are various [challenges](#) out at the moment with millions worth in prizes including chal-

lenges for geothermal manufacturing, hydro, waves, ocean observation, fish protection, solar desalination and solar.

Connectors are the core component of the American-Made Network and are organizations that seek to support the efforts of competitors of the American-Made Challenges. Those who have gone above and beyond to recruit teams and support the program have earned gold Connector badges.



ALGAE AWARDS

Cyanotech Corporation's founder and two employees were recently recognized by the Algae Biomass Organization (ABO) for their outstanding efforts and contributions to the world algae industry. Founder and CEO, Dr. Gerald Cysewski was awarded the Lifetime Achievement Award for his contributions to the algae industry, including commercial success, significant research contributions, outreach, workforce development, and mentoring activities. Two longtime employees, with almost twenty-five years of service each, Mr. Warren Pai and Mr. Darin Debina were awarded the Unsung Hero Award. This award recognized dedication and career contributions to the growth of the algae industry. Click here for [more details](#).

Cyanotech



Gerry Cysewski



Darin Debina



Warren Pai

PUBLIC BUSINESS FINANCING UPDATE

Dennis Boyd, *West Hawaii Small Business Development Center*

PPP (Paycheck Protection Program) loans have entered the forgiveness period; borrowers of up to \$50K can use a new simplified form. SBA is open for forgiveness applications, but many banks have not opened their portals yet or are doing so by staggered email invitation. Be advised there probably will be revisions to forgiveness calculations or rules for sums above \$50K. Pressures exist to re-open PPP, but as funds remained unused at PPP application deadline, demand is questionable if reauthorized.

SBA Economic Injury Disaster Loans (EIDL) remain available: low interest rates and long terms, but these are true loans, without possibility of forgiveness.

HI County Holomua Grant Program has limited funds available (11/20/20).

Federal Reserve's Main St. Lending program will end 12/31/20.

Regular SBA loans are available. Businesses need to be strong and demonstrate how they will cope with COVID restrictions. For assistance with this or commercial funding, contact us: dboyd@hisbdc.org.

OCEAN ERA FISH FEED BREAKTHROUGH

Congratulations to Ocean Era for their progress in reducing aquaculture feed's reliance on fish meal and fish oil! Check out this great video for a description of their research at Ocean Era's facility in HOST Park's research campus: https://www.youtube.com/watch?v=rW9yk_U6z1U&feature=youtu.be We are pretty sure you will recognize many familiar faces!



Capture from video link above—Keelee from Ocean Era distributes a specially formulated feed that includes canola and flax oil.

LE GRAND BLEU

Did you know we have a national champion freediver in our midst at NELHA? Kurt Chambers joined Symbrosia in March this year, but for the last ten years he has been a professional freediver, offering courses of all levels to help grow the freediving community here as well as make it safer.

Kurt has set seven U.S. national records, as deep as 331', in the sport of competitive freediving, which entails swimming to extreme depth on breath-hold. While his students are not expected to match his personal best breath-hold of 7:18, he assures that most all his students can learn to hold their breath for at least 3 - 4 minutes within the class.

Kurt is eager to help all ocean-patronizing NELHA employees with their freediving, which could be helpful with work or recreation, and PADI certification is available on request. He is happy to extend a 20% discount to all NELHA employees! His next class in Kona will be on the weekend of 12/5 - 6. You can contact him at kurtchambers@gmail.com. Follow Kurt on Instagram (@chambersbelow) or Facebook (facebook.com/hawaiiifreediving).

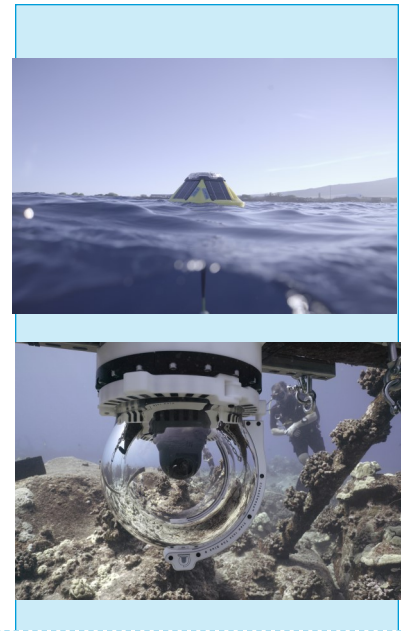


Photo courtesy of Alex St Jean

UH HILO, NELHA AND AQUALINK INSTALL REEF ECOSYSTEM VISUAL OBSERVATION SYSTEM

The University of Hawaii at Hilo, NELHA and Aqualink have partnered to develop a collaborative ocean observatory system to track changes in benthic communities, conduct automated quantification of fish abundance and diversity, and use physiochemical data sensors to stream real-time data. A streaming underwater camera to create a visual observation system of the coral reef ecosystem on Keahole Point has been installed by Dr. John Burns from UHH and is providing valuable monitoring and research data. A surface buoy was also installed in order to actively measure water temperatures at the surface to develop a digital system for visually monitoring any signs of coral bleaching and disease.

The observatory system will provide a unique system to enhance monitoring of coral health and fish assemblage structure. The team is working on a [web portal](#) to make the streaming camera data available. This will be a great mechanism for the public to view the reef daily and watch marine life in real-time.



Photos of Keahole Point installation Courtesy of John Burns

“Thank you for creating and sharing the newsletter. I feel like we are part of something bigger and more meaningful.” Comment received regarding the Summer 2020 newsletter.

ALOHA AI NETWORK DEMONSTRATION

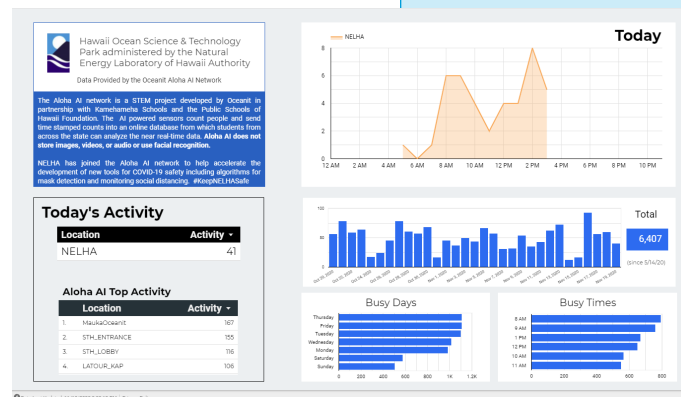
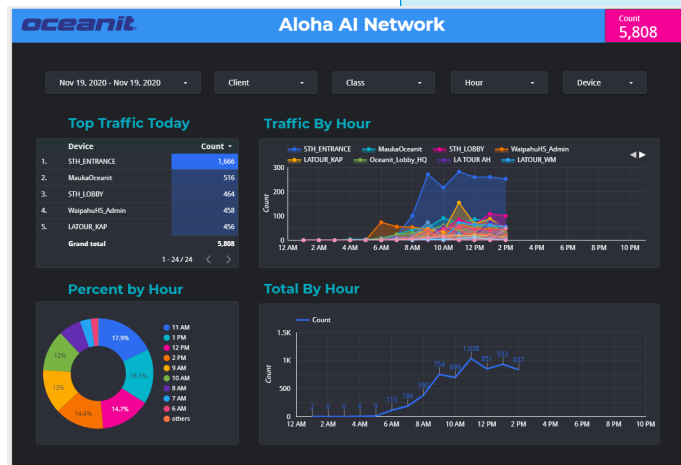
NELHA is assisting Oceanit, Kamehameha Schools and Public Schools of Hawaii Foundation with a project to use artificial intelligence (AI) to count people entering Hale Iako and eventually determine the percentage of mask wearing. The system does not store images, video, audio or use face recognition.

The dashboards are available online:

- [Main dashboard](#) includes 24 sites in the State.
- [NELHA dashboard](#) provides statistics for the Hale Iako west entrance.

More information is provided in this [briefing](#) by Oceanit from April 2020.

Online dashboard screen captures.



Are you enjoying
this newsletter?

Previous issues of
The Pipeline are
available on our
website:

- [Summer 2019](#)
- [Winter 2019/2020](#)
- [Summer 2020](#)

FROM THE DEEP

Look what Santa brought us...

The older and less efficient sea water pumps (below right hand side) are being replaced by brand new shiny ones (below left hand side) to help us maintain the 99.9% seawater distribution uptime. NELHA's operations crew (also pictured below) is looking forward to getting these installed this winter.



UH IKE WAI PROJECT FRESHWATER DISCOVERY

The [University of Hawaii EPSCoR's Ike Wai project](#) researchers have discovered that twice as much freshwater is stored offshore of Hawaii Island than was previously thought. Using electromagnetic imaging, they proved the presence of stacked freshwater lenses separated by basalt layers.

NELHA is pleased to have played a small role in supporting the Ike Wai group's research. If you are interested in the subject, Tech Hui hosted a [presentation by two of the Ike Wai researchers](#) describing their findings. The findings are making national news as there are important implications for all volcanic islands.

The Ike Wai cross disciplinary project, named from the Hawaiian words for "knowledge" and "water", aims to increase understanding of Hawaiian island hydrology to provide decision making tools that address the challenges of water sustainability from climate variability, increasing population demands, and water consumption. Ike Wai researchers have been using the NELHA lab for some of their work.

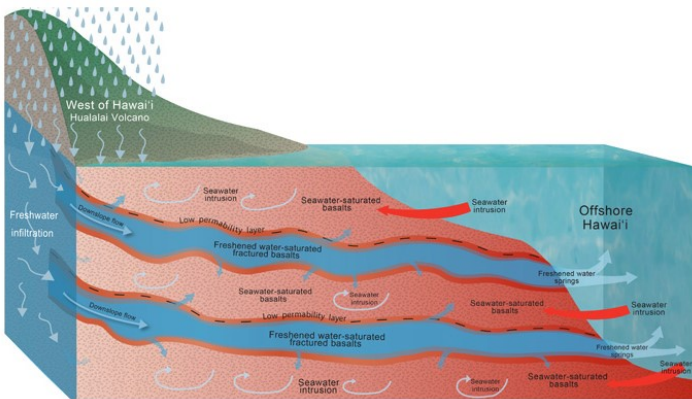


Photo capture of the new conceptual model from rainfall to off-shore from Ike Wai's website

THE END OF AN ERA

Jan War, NELHA Operations Manager, will be retiring on December 31st, after 42 years of dedicated service and commitment to NELHA. We think it is safe to say that no one knows NELHA's history better than Jan, who was recently quoted as saying, "I could not have dreamed of a better and more exciting career. It has been my privilege to be part of this amazing facility and team nearly since its inception in 1974. It will be hard not to continue to stay in touch with NELHA's future developments".

After graduating from Iolani Schools of Oahu in 1970, where he was the captain of both the water polo and swimming teams, and earning a BS in Biology from University of New Mexico in Albuquerque in 1975, he moved to Kona which back then was still a sleepy charter fishing community with very few job opportunities outside the hotel industry. After landing a job at the Keauhou Beach Hotel as a waiter in the hotel's fine dining restaurant, the opportunity to work a special function banquet came up as an overtime assignment. The special function turned out to be the introduction of a proposed ocean thermal energy facility called the Natural Energy Lab of Hawaii (NELH) where Jan obtained the names of two of the initial pioneers of NELH – Dr. John Craven (founding father of NELH) and Hank White (NELH's first Operations Manager).

Jan was hired in 1978 as a Research Technician. The focus back then was determining the rate of biofouling in OTEC heat-exchanges and corrosion studies relating to candidate materials for heat exchanger construction. The infant NELH was then operating out of two garage bays in the Rawson Building in the old Kona industrial area. Commuting to remote Keahole Point research site was by the 4X4 on the "jeep road" that accessed Pine Trees and the O'o-ma coastline. In addition to field studies that were underway at the point, an offshore



Tom Pierce, NELHA Electrician is also retiring at the end of the

underwater research platform was also part of the program. Jan remembers the first time he dove on the "Buoy Project" and describes it like working on a satellite in outer space.

NELH moved to the permanent facility at Keahole Point in 1979; the same year that the Mini OTEC program was anchored 1.2 miles offshore. Jan was promoted to the position of NELH Operations Manager in 1984; a position he has held to this day. As such, he has been in charge of the sea water distribution system and with his crew of 6, they have kept systems running smoothly for decades. NELHA is grateful for Jan's dedication and contributions to the success of HOST Park.

In addition to his responsibilities in Kona, Jan also worked at the Puna Geothermal Facility twice a week between 1988 & 1989 to help start a new program to determine downstream uses of the high temperature brine effluent from of Hawaii's first geothermal electric power plant. This program ultimately succeeded in developing several community-based startups to dry lumber and fruits.

Although Jan is retiring from NELHA, we would be surprised if he did not keep himself busy with fun projects that might involve aquaculture, cultivating plants, organizing triathlons or starting a business, possibly even at HOST park! So you almost certainly will run into him again in the community.

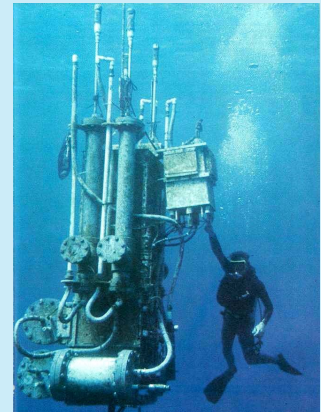
It would appear that Jan has been an inspiration in more ways than one. Another member of the operations team, Tom Piece is also retiring on January 1. Tom has been an electrician at NELHA for over 16 years and plans to return to his native Idaho to be closer to family.

We know they are both looking forward to their well deserved leisure time. A hui hou kakou- until we meet again, safe navigating to you both!

Unfortunately, these pandemic times make it impossible to organize a rocking retirement party. Instead, we are planning one for a year from now once COVID is behind us. We will announce it most likely in 2021's winter newsletter. So stay tuned!



Jan War, (front left) getting ready for a scuba dive under the Mini OTEC barge from NELHA's dive boat circa 1979. Other divers are Hank White, the facilities' first Operations Manager, who initially hired Jan, and Scott Bickel, NELHA Research Technician.



Jan War hanging on the underwater Buoy Project" circa 1978.



Jan War in front of an ROV used to repair the 40" DSW pipeline 2013.



Jan War stands in front of HURL's "PIECES V" during a 2016 prior to inspecting the 55" DSW pipeline.

NATURAL ENERGY LABORATORY
OF HAWAII AUTHORITY

NELHA administers the world's premier energy and ocean technology park. This unique master-permitted park is located on 870 acres of prime coastal property in Kailua-Kona Hawaii and offers research support facilities for the development of renewable energy and other demonstration projects that utilize the unique resources found at the park. It is the world's only facility that continually brings ashore high quality, pristine supplies of both warm surface and cold deep seawater 24 hours a day which allows for various tests to take place with intent to reap economic potentials from the dual temperature seawater delivery system and high solar insolation. Tenants located in HOST Park work at the pre-commercial, commercial, research and educational levels. It is the largest diversified economic development project in the State and is solely focused on developing green economic projects.

Natural Energy Laboratory of Hawaii
Authority
73-4460 Queen Kaahumanu Hwy.
#101
Kailua Kona, HI 96740

Phone: 808-327-9585
nelha.hawaii.gov
E-mail: nelha@nelha.org



A MESSAGE FROM NELHA EXECUTIVE DIRECTOR, GREG BARBOUR

The end of the year is normally a time of year for remembrance and this is especially true this year. When I hear “New Year” this year, I think to myself – Yes please. Despite these difficult times, we take stock of where we came from and have a moment to think about where we are going next year as we pursue the future with hope.

As many of you know, due to the COVID-19 outbreak the NELHA team began a modified work schedule in mid-March to keep essential services running to our clients in HOST Park. Many of us began working from home and Zooming. We returned to our regular work schedule on June 1 and despite a few limited temporary interruptions we have been working full time since then. I am so grateful for their support and all the sacrifices that they have made this year to support NELHA and our clients. I am blessed to have such a wonderful team.

Weathering the Great Pan-

demic of 2020 has shown us the resiliency of the businesses at HOST Park. For the most part, the businesses have seen some setbacks but continue their operations. We have experienced no major departures of businesses at HOST Park and I am happy to report that we have seen six new clients establish their operations at HOST Park since the pandemic began. Many of these are a result of our new global aquaculture initiative. We continue to believe that conditions will only get better and improve in the coming months.

Everyone's hard work and sacrifices this year means that we deserve to have to most beautiful Holiday season. From our NELHA family to yours we give you our warmest thoughts and best wishes for a wonderful and Happy New Year. We wish you peace and joy this holiday season and prosperity throughout 2021 and may your New Year be all that you hope for.

Be Safe.

