

Tech park tours offer 'science in action'

CHERYL
CHEE TSUTSUMI
HAWAII'S BACKYARD



Hawaii is the most isolated population center on earth, with some 2,400 miles of ocean separating it from California, the nearest landmass. About 90 percent of the isles' food is imported, and more than 70 percent of its electricity is from oil.

Thus, food security and alternative energy are critical issues.

Both are the focus of the innovative tenants of the Hawaii Ocean Science and Technology Park, near Kailua-Kona. The park is administered by the Natural Energy Laboratory of Hawaii Authority. More than 80 percent of Hawaii's aquaculture products come from the park.

"Most people think of farming and energy sources as land-based, but HOST Park's businesses are using energy authority's two pipeline systems to obtain clean surface seawater and ocean water from as deep as 3,000 feet to complete their work," said Candee Ellsworth, executive director of the authority's support group, Friends of NELHA. "They're solving worldwide problems with out-of-the-box thinking. It's science in action that visitors can experience."

The Friends in March launched a sustainable aquaculture tour at HOST Park to meet the growing demand for science education and science-related tourism. It starts with a presentation at the Gateway Visitor Center, one of the first Platinum LEED-certified buildings in America. Here are other highlights.

Makai Ocean Engineering

makai.com

Makai Ocean Engineering dedicated the world's largest operational Ocean Thermal Energy Conversion system in August. At this

“They’re solving worldwide problems with out-of-the-box thinking. It’s science in action that visitors can experience.”

Candee Ellsworth
Friends of NELHA

stop on the tour, visitors learn how the temperature difference between warm surface water and cold deep seawater produces electricity.

Volatile oil prices, rising electricity costs and environmental concerns make Makai's alternative energy concept attractive for island communities. Among OTEC's benefits: Its energy source is not controlled by other countries, its power can be ramped up or down in seconds and it supplies constant, steady power around the clock, 365 days a year.

Rising more than four stories high, Makai's demonstration plant is generating enough electricity to power about 120 homes in Hawaii annually. Approximately 12 offshore commercial-scale plants reportedly could meet all of Hawaii's electricity needs. Every year, just one of those plants could replace the burning of roughly 1.3 million barrels of oil and prevent more half a million tons of carbon dioxide emissions.

Makai is working to reduce its cost and improve the performance of its OTEC technologies to make commercial plants a reality in Hawaii, Asia, Southeast Asia, the South Pacific and the Ca-



COURTESY FRIENDS OF NELHA

Visitors get a close look at a growing tank containing 300 to 350 live abalone that are 20 to 25 months old. Baskets in the tank hold anywhere from 250 to 400 abalone, depending on their stage of growth. It takes about three years for them to reach market size. At any given time, Big Island Abalone has about 4 million abalone.



ribbean in the next three to seven years.

Kampachi Farms

kampachifarm.com

Kampachi Farms is revolutionizing the fish-farming industry by reducing reliance on wild-caught fish (whose populations are being depleted by overfishing) and by testing diets of sustainable agricultural proteins as replacements for fish meal. Kampachi (yellowtail), mahimahi, nenu (chub) and Pacific giant grouper inhabit more than three dozen 1,000-to 15,000-gallon tanks on a little more than half an acre. Researchers also discuss the company's experiments with open-ocean aquaculture using an "over-the-horizon" net pen system. Submerged 32 feet underwater, the unanchored pen in the first trial in 2011-2012 drifted for eight months between 3 and 75 miles off Kona.

The results were promising: By the end of the trial, 98 percent of 2,000 kampachi fingerlings reached har-

vest size of 4 pounds in four months — about half the expected time — without buildup of effluent and impact on wild stocks.

The second trial in 2013-2014 was moored 6 miles off Keauhou at a depth of 6,000 feet. The world's deepest mariculture installation, it yielded similar results, with basic husbandry tasks completed almost entirely by remote control. A third trial is set to start in August.

Big Island Abalone Corp.

bigislandabalone.com

From spawning to market, Big Island Abalone Corp. raises Ezo, a premium species of Japanese abalone, at its 10-acre aquafarm, which includes a hatchery, a nursery and 450 tanks containing abalone in five stages of development: nursery (six to seven months), intermediate (eight to 15 months), juvenile (16 to 20 months), young grow-out (20 to 28 months) and mature grow-out (29 to 35 months). BIAC produces up to 100

tons of abalone per year along with the algae that is their primary food source. At any given time the inventory includes about 4 million live abalone.

A guide explains the process, including biology, breeding, feeding and growth; market-size abalone weigh between 25 and 130 grams (0.88 and 4.5 ounces). The visit concludes at a display tank, where guests can see abalone up close, touch them and taste grilled samples.

The abalone is sold online and at BIAC's farm on weekdays, its Kona Abalone store at Ala Moana Center and at Kapiolani Community College's Saturday farmers market. Some 50 restaurants statewide (including MK Restaurant, Yanagi Sushi and Restaurant Suntory on Oahu) serve the abalone.

Cheryl Chee Tsutsumi is a Honolulu-based freelance writer whose travel features for the Star-Advertiser have won several Society of American Travel Writers awards.

IF YOU GO ...

Sustainable Aquaculture Tour

- >> **Meeting place:** HOST Park, 73-4485 Kahlilihi St., Kohala Coast, Hawaii Island
- >> **Time:** 10 a.m. to 12:30 p.m. Wednesdays and Fridays; advance reservations are recommended
- >> **Cost:** \$32 for adults, \$28 for kamaaina, educators, students of any age, seniors (age 60 and older) and active and retired military personnel with valid ID. Children under 8 are free.
- >> **Phone:** 329-8073
- >> **Email:** ed4fon@gmail.com
- >> **Website:** friendsofnelha.org/tours/grand-tour

Notes: Most of the tour is handicap accessible, but visitors with mobility issues should call ahead to ensure it is appropriate for them. Wear a hat and cool, comfortable clothing; apply sunscreen; and bring bottled water.

Friends of NELHA also offer an Ocean Matters Tour and an Ocean Conservation Tour (visits Kanaloa Octopus Farm and Ke Kai Ola, a rehabilitation center for endangered monk seals). Call or view the website for details.

Working toward a green future

Hawaii created the 870-acre Hawaii Ocean Science and Technology Park in 1974 as an incubator for sustainable commercial products, conservation and education programs, and energy- and ocean-related research. To date, the state has invested more than \$100 million in the park, which is home to some three dozen companies that are leaders in green initiatives.

HOST Park is administered by the Natural Energy Laboratory of Hawaii Authority, the nonprofit 501(c)(3) Friends of NELHA supports that state agency with education and outreach activities. Tax-deductible contributions can be made at friendsofnelha.org/donate or by mailing a check to the Friends of NELHA, 73-4460 Queen Kaahumanu Highway, Suite 125, Kailua-Kona, HI 96740.