CTAHR IN FOCUS

People, Place, Promise
A Review of 2015 Highlights
CTAHR by the Numbers

People

6 — number of students who passed the International Society of Sports Nutrition certification exam proctored on campus by Maria Stewart.

130 — number of prospective and current CTAHR students assisted by the college’s undergraduate advisors in the 2 weeks leading to fall 2015 semester.

666 — number of students who registered in 18 spring CTAHR courses taught totally online, a 10-fold increase over the previous spring semester.

19,399 — number of hours of volunteer service provided by CTAHR-certified Master Gardeners last year, the equivalent of more than 10 full-time employees.

Place

24 — number of new insect species arriving in the Islands during an average year, such as the coffee berry borer and coconut rhinoceros beetle.

60 — number of breadfruit trees given away by the CTAHR Sustainable Organic Farming program and partners to boost food security in Hawai’i.

70 — Percent of GoFarm students who completed AgPro comprehensive training and now farm in Hawai’i, 7 times the mainland success rate.

Promise

7th — CTAHR’s place among West Coast schools for both fashion design and fashion merchandising programs, as ranked by FashionSchools.org.

313 — number of degrees awarded during 2014–2015. The 241 bachelor’s and 72 graduate degrees represented a 7-year high and an 18% increase over the previous year.

$252,460 — amount in CTAHR scholarships provided to 75 students to assist with tuition, expenses, and travel in 2015–16.

$200 million — value of crops statewide dependent on pollination by local honeybees, whose health is the focus of CTAHR’s UH Honeybee Project.

Since 1936, the seven island relief maps in St. John Plant Science Laboratory (Kaua’i shown here) have served as a teaching tool for countless K–12 and undergraduate students. The maps were made for the college by Richards Quinn and Robert Choy. Fundraising is underway to provide much-needed refurbishing. More information at http://go.hawaii.edu/BW

CTAHR had contact with 1.15 million people last year. That’s like calling on every resident of Kaua’i more than 16 times each.
We toured the food laboratory where Alvin Huang is creating gluten-free cereal and other products with flour made from breadfruit, and we visited the food processing lab where Soojin Jun is developing a super-cooled food preservation technology that maintains superior food quality while prolonging the life of food products.

We sampled the fruits of Leyla Kaufman’s tomato trials, chocolate made from Skip Bittenbender’s cacao, and honey from Ethel Villalobos’s hives. We sipped mamaki tea, which retired Extension Agent Rose Saito extols as a healthy beverage from a native plant, and sugarcane juice, a Southeast Asian favorite that Ted Radovich promotes as a new use for a traditional crop. In addition, student Elsyse Bowman talked about her efforts to develop a probiotic-rich tropical beverage from kefir grains.

Other Student Research Symposium winners described agriculture-related projects with value-added potential—Utsav Tiwari (macadamia and beer grain byproducts as swine fodder), Jessie Chen (oyster production in a small-scale Hawaiian fishpond), and Daniella Orias (positive effects of bittermelon juice in mice fed high-fat diets).

CTAHR Student Ambassadors assisted with the event, and CTAHR Agribusiness Incubator clients were represented with Maui Gold pineapple provided by Hālī’imaile Pineapple Co. (Learn about them on the Maui page inside).

And because it was food for thought, Tessie Amore was on hand with a display of the latest orchids and anthuriums from her varietal trials; Ania Wieczorek offered a hands-on demonstration of a GENE-ius Day STEM education activity; and student Roberto Rodriguez described innovative techniques to combat invasive weeds.

All in all, it was a marvelous demonstration of the value that CTAHR brings to our Island community. But it’s hardly the whole story. Read on for additional highlights about the people, place, and promise that is CTAHR.
MISSION TEACHING

Opportunities Add Up
A new 2+2 program in culinology is one of only 15 Research Chefs Association–approved programs in the U.S. blending culinary arts and food science training for food industry careers. It facilitates transfer of Kapi'olani Community College’s culinary arts AS graduates into CTAHR’s Food Science and Human Nutrition BS program.

CTAHR is also working with the College of Education on a 3+2 program to train agriculture teachers and collaborates with UH’s medical school and cancer center on a PhD in nutrition.

Did you know...
83% of CTAHR undergraduates are from Hawai‘i; 16% come from mainland states.

10,381 Semester Hours Taught

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours Taught</th>
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</thead>
<tbody>
<tr>
<td>Family &amp; Consumer Sci 3,166</td>
<td></td>
</tr>
<tr>
<td>Nat Res &amp; Environ Mgmt 1,673</td>
<td></td>
</tr>
<tr>
<td>Trop Plant &amp; Soil Sci 563</td>
<td></td>
</tr>
<tr>
<td>Molec Biosci &amp; Bioeng 1,248</td>
<td></td>
</tr>
<tr>
<td>Plant &amp; Environ Protection Sci 551</td>
<td></td>
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<tr>
<td>Food Sci &amp; Human Nutrition 2,454</td>
<td></td>
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<tr>
<td>Animal Sci 736</td>
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1 of 17 UH academic units at Mānoa, CTAHR enrolled 5% of the campus’ students and taught 5% of the student semester hours during spring 2015. CTAHR annually produces more than 1 in 10 of Mānoa’s STEM (science, technology engineering, and mathematics) graduates.

CTAHR Profile: New Advising Staff

In 2015, CTAHR engaged three fulltime professional advisors to help undergraduates select majors, make academic plans, complete required paperwork, and stay on track to graduate. Appointments can be made online. Meet the advisors—

<table>
<thead>
<tr>
<th>Name</th>
<th>Roots</th>
<th>Education</th>
<th>Early aspiration</th>
<th>Hobby</th>
<th>Essential food for a long voyage</th>
<th>Best discovery about CTAHR</th>
<th>Inspiration for own career</th>
<th>Goal</th>
<th>Number one tip for students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenn Custodio</td>
<td>Orange County, Calif.</td>
<td>BA, CSU Long Beach; MA, MEd, UH Mānoa</td>
<td>Nurse or history prof</td>
<td>Travel, friend time</td>
<td>Rice, lasagna, fish tacos with guacamole</td>
<td>The many ways to be engaged</td>
<td>Opportunity to make a positive impact</td>
<td>Meet students, learn, be involved</td>
<td>Manage time and maintain balance</td>
</tr>
<tr>
<td>Kalai Hironaka</td>
<td>Kāne’ohe</td>
<td>BA, UH Mānoa; MS, Embry-Riddle Aeronautical U</td>
<td>Professional athlete</td>
<td>Hiking with her dog Jacques</td>
<td>Pickled mango, grandma’s cooking, green smoothies</td>
<td>Diversity of majors, programs, and research</td>
<td>Ability to effect positive change in students’ lives</td>
<td>Facilitate a smoother academic journey</td>
<td>Plan ahead</td>
</tr>
<tr>
<td>Irene Morrow</td>
<td>Makakilo</td>
<td>BEd, MEd, UH Mānoa</td>
<td>Gymnast</td>
<td>Competitive kettleballs</td>
<td>Cookie butter, coffee, husband Drake (for the soul)</td>
<td>How cool the college’s programs are</td>
<td>Great advising she received in college</td>
<td>Create a caring and welcoming environment</td>
<td>See an advisor early on</td>
</tr>
</tbody>
</table>

Job Outlook Is Strong for Ag College Graduates

The U.S. Department of Agriculture forecasts 57,900 openings for the estimated 35,400 new graduates in food, agriculture, renewable natural resources, and the environment through 2020.

Almost half will be managerial level, both in agribusiness and forest ecosystem management. 27% will be in STEM (science, technology, engineering, and mathematics) jobs, particularly those related to food safety and security and nutrition.

There is also demand in biomaterial and food production and pest control and for agriscience teachers, food and environmental inspectors, and urban foresters.

2015 graduates with a BS in agriculture or natural resources will earn $51,220 on average—placing those majors in the top 5 fields for earnings potential.

—The Cheat Sheet
Biomass, solar, wind, and geothermal all must come into play if Hawai‘i is to go completely renewable on the energy front, says researcher Samir Khanal. “With incentives and a policy in place, nothing is impossible. At the very least, Hawai‘i could move to 60–70% renewable energy.”

The Molecular Biosciences and Bioengineering associate professor and his team harvest the energy contained in biological sources ranging from grass to larva while creating byproducts that make the technologies more profitable.

Working with Khanal are nine students, a post-doctoral researcher, and a host of microbes. In anaerobic digestion, or AD, certain microbes convert organic matter into biogas like methane, which can produce heat or electricity or be refined into natural gas. “It’s a simple, mature technology,” used for centuries to deal with human waste in septic tanks, he says. So why not use it on food waste and agricultural residues to replace expensive and pollution-producing diesel? “It could be a sustainable technology for our islands.”

Since joining CTAHR in 2008, Khanal has generated more than $2.8 million in extramural funding. His projects include:

**Energy crops**—like banana grass. Introduced as a windbreak, it grows quickly with minimal input, can be harvested with sugarcane equipment, and doesn’t divert a food crop into fuel production. AD releases the sugars needed for biogas production. The remaining biomass can be formed into pellets for burning in power plants.

**Vinasse**—nutrient-rich waste water produced when sugar-cane is converted to ethanol, and molasses, which retains 50% of the cane’s sugars. Fungus grown on either can be turned into marketable protein-rich animal or aquatic feed. Think tempeh, an FDA-approved edible fungus that has no harmful compounds.

**AD process control**—various microbes take turns in the multi-step AD process. The final group is the most sensitive, shutting the process down if the mixture becomes too acidic. Khanal’s group is injecting small amounts of oxygen to ensure a stable, reliable energy reactor for commercial operations.

**Black soldier flies**—larvae chow down on food waste and pack on fat stores. Dried and pressed under high temperature, they release liquefied fat used in biodiesel. The residual meal can be used as animal feed. Chemical extraction may increase the yield. Khanal’s group is working with a private company to scale up for commercial production.

97% of Hawai‘i residents favor increased development of renewable energy. Solar and wind have overwhelming support; oil and coal, less than 14%.

—Public Attitudes About Renewable Energy in Hawai‘i
http://uhfamily.hawaii.edu/publications

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**Research Briefs**

**An article on tilapia** co-authored by CTAHR aquaponics experts was among the 10 most often cited in the *Journal of Aquatic Animal Health* in 2013–14.

**Research on public attitudes** by PhD student Cheryl Lohr was cited in a public service announcement on feral cat management that aired during the 2015 Grammy Awards show.

**Creating life tables for bugs** like the native wēkiu could help in conservation efforts. PhD student Jesse Eiben and advisor Dan Rubinoff described their method in the August 2014 issue of *Conservation Biology*.

**Small fisheries yield big benefits** ecological economist Kirsten Oleson and colleagues from UH and conservation organizations reported. The Ki‘holo Bay reef “food shed” annually produces 30,000 meals worth $78,000 and generates social benefits too.

**Investigate this...**

The time and cost of travel prevents many UH students from presenting their work at professional meetings, so CTAHR and the UHM College of Engineering host a Student Research Symposium. A record 159 students participated in 2015. Topics of interest to Hawai‘i included a device to purify drinking water, optimal storage for native seeds, use of ag byproducts as pig feed, probiotic compounds in taro, and a study of ethnic differences in apparel purchase decisions.
Foster Care Policy
The importance of social capital (key relationships) in successful transition from foster care to adulthood is detailed in a new Center on the Family publication. See why at http://go.hawaii.edu/qs.

New Agents on Maui
Tech, mentoring, and 4-H experience are strengths Nancy Ooki brings as 4-H agent. She says her first priority is to organize communication and planning so all stakeholders have information and input on the direction of youth development in Maui County.

Urban horticulture is the focus of new Extension Agent Cynthia Nazario-Leary. The CTAHR alumna and former UH Maui College New Farmers Network director plans to deliver a community horticulture program, recruit Master Gardener volunteers, expand outreach opportunities, and support the floral industry.

2014 CTAHR Activities in Priority Categories

<table>
<thead>
<tr>
<th>Priority Categories</th>
<th>Workshops</th>
<th>Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food: Food safety, global food security, hunger</td>
<td>143</td>
<td>37</td>
</tr>
<tr>
<td>Agriculture: Diversified crops for sustainability and competitiveness</td>
<td>250</td>
<td>115</td>
</tr>
<tr>
<td>Community: Youth, family, health, wellness, community development</td>
<td>667</td>
<td>99</td>
</tr>
<tr>
<td>Environment: Natural resources, invasive species, climate change, sustainable energy</td>
<td>145</td>
<td>42</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,203</td>
<td>464</td>
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</tbody>
</table>

Bernard Kratky’s video about clean edible ginger seed propagation at Wai‘akea Research Station has been viewed more than 42,900 times. Watch http://go.hawaii.edu/LU.

Q&A: Associate Dean Sewake on Extension

Kelvin Sewake brings deep commitment and 30 years of Cooperative Extension experience—including two as Hawai‘i County administrator—to his interim assignment as associate dean. The Wahi‘awa-born, CTAHR-educated floriculture expert shares some thoughts on his new role.

Q: What’s so important about Cooperative Extension?
A: Because they are constantly interacting directly with community stakeholders, Extension personnel understand their social, economic, or environmental needs. Therefore, they can work with researchers and partners to develop meaningful programs that have direct positive impacts. Extension adds significantly to our state’s economy and improves people’s lives.

Q: Can you share your focus for the year ahead?
A: We must continue to adapt quickly to rapidly changing needs and succeed with limited resources—reassessing our capacity in terms of personnel, funding, and expertise, and then modernizing and re-structuring to address needs and trends. My first goal is to stabilize our workforce numbers. Our stakeholders’ problems are numerous, and it requires a certain critical mass of personnel to produce and implement effective programs. Second, to increase our internal capacity by providing more in-service training opportunities; having senior people mentor newer personnel; and fostering effective communication among Extension agents, specialists, and researchers. Third, to develop strong partnerships with community leaders and stakeholders by being more visible in those communities and working closely with county administrators, agents, and specialists in those locations.

Q: What can people expect from you as a leader?
A: My core values include trust, respect, integrity, humility, tolerance, compassion, hard work, humor, and friendship. My style is about listening to understand, gathering facts, working in partnership to establish a win-win situation whenever possible, and celebrating the accomplishments of others. I want to promote team spirit and empower people by providing them with the knowledge, skills, tools, and resources they require to achieve programmatic and personal success.

Q: What are the rewards of Cooperative Extension service?
A: The cooperative nature of the work creates many long-lasting professional and personal relationships in one’s own community, across the country, and even internationally. These human bonds are what make the job so rewarding and improve chances of programmatic successes for all.

Alumnus Is a True Bee-liever in CTAHR
A UH alumnus and longtime supporter, Samuel Kakazu Jr. created his own take on a popular bumper sticker to promote the welfare of pollinators. Proceeds (they’re $2 at Ko‘olau Farmers) support the UH Honeybee Project. Learn more on his facebook page at www.facebook.com/beesaregreaterthanme and about the UH Honeybee Project at www.uhbeeproject.com.
Eating Local Pays Many Ways

More than $3 billion leaves Hawai‘i each year to pay for importing food, according to analysis by CTAHR economists PingSun Leung and Matthew Loke. So increasing local food production contributes to the economy as well as food security.

Replacing just 10% of food imports with local production would create 2,300 jobs and $188 million in sales, generating $94 million for farmers, $47 million in wages, and $6 million in new tax revenue, Leung and Loke report.

Can you name...Hawai‘i’s leading vegetable crops in 2014?

- Head cabbage (by volume, at 6.67 million pounds)
- Cucumbers (by farm-gate value, at $4.3 million)
- Kale (by the increase in production, up 186%)

Who’ll Mind the Farms?

FACT: The typical Hawai‘i farmer is a 60-year-old male who lives on the farm he has operated for more than 10 years.

FACT: Principal farm operators over the age of 75 outnumber those under age 25 by more than 10 to 1 in Hawai‘i.

FACT: The number of Island farmers under age 35 declined by 13% from 2007.

Organic and Sustainable

Locally grown organics represented just 10% of Hawai‘i food distributors’ business in 2013. The major problem cited in an Organic Industry Advisory Group survey was inconsistent supply. Just 23 of the state’s 184 organic farms did more than $100,000 in sales in the last USDA census. In response, CTAHR researchers and Extension agents share new varieties and methods with growers who want to go organic and with the 1,497 other farms that use earth-friendly no-till and conservation tillage practices. Some recent examples—

Have a Field Day: Extension staff shared new eggplant hybrids and how-to talks at the Komohana Research and Extension Center Master Gardener Demo Garden. Cover cropping, fertilizer research, Korean Natural Farming and other topics were taught in Waimanalo.

Community Activities: Ty McDonald and other faculty gave talks and demonstrations at the Avocado Festival in Kona. Students in Animal Sciences volunteered to plant bahagras grass as forage at the Naked Cow Dairy in Waianae.

Biocontrol: Agents distributed kits and instructions for using flat bark beetles in an integrated strategy to manage coffee berry borers.

Picture This: The Center for Rural Agriculture Training and Entrepreneurship published several posters explaining how to use oyster mushroom compost to combat destructive nematodes, calculate nitrogen contributed by leguminous cover crops to reduce fertilizer accordingly, employ hot-water treatments to manage several pests, and grow plants that attract beneficial insects.

Color Matters: At the Poamoho Research Station, Leyla Kaufman showed growers how reflective plastic mulch bested traditional black plastic in suppressing weeds, reducing insect density, and increasing tomato yield and quality.

Take an App: “Pic-a-Papaya” diagnoses Papaya Ring Spot Virus by smart phone and offers GMO testing of papaya and plant replacement services.

Trained Professionals: The Sustainable and Organic Agriculture Program held a 2-day professional development workshop in Kahului to keep CTAHR and USDA staff and agriculture professionals abreast of the latest information.

Risky Business: Organic or not, agricultural success requires care. The Risk Management Hawai‘i program held 75 workshops, covering issues such as nutrition and pest control, crop diversification opportunities, food safety, marketing, farm business practices, federal crop insurance, and disaster assistance programs. Attendees rated the workshops as excellent (3.7 on a 4-point scale), and 92% said they were better able to manage agricultural risks after the training.
Research with a Fiber Moral

The human microbiome may be a hot topic, but few research labs analyze what really goes on in the colon. Trained at one that does, nutritional biochemist Maria Stewart continues the work here—a boon to Hawai‘i since few Mainland labs analyze tropical foods common in local diets. “The data are very Mainland centric,” she says. “They may look at the typical grocery store Hass avocado, but we have 100 types of avocado growing here.”

Because it is difficult to monitor the workings of the large intestine, where bacteria act on material passed through the digestive tract, Stewart creates a laboratory rendition of the human colon as a way to understand what happens to dietary fiber. In recent trials, her research group analyzed dragon fruit and two banana varieties from CTAHR’s Waimānalo Research Station. The fruit is subjected to in vitro digestion, which processes food and extracts nutrients as the mouth, stomach, and small intestine would. The residue is placed in bottles, treated with an enzyme to remove dissolved oxygen, and inoculated with fecal samples supplied by three healthy department colleagues. The bottles are flushed with CO2 to replicate the anaerobic environment of the colon and placed in a water bath set at internal body temperature. Periodic samples are taken over 24 hours, the average time material spends in the human colon. Gas is drawn off, the quantity an indicator of metabolic activity; the bacteria killed; and samples extracted and analyze to create fermentation profiles.

The moral of this story: not all fiber is created equal; some types digest quickly, some not at all. Inulin, which may be added to foods to replace fat or up the fiber factor, creates a lot of gas right away. Fibers that break down more slowly appear to promote intestinal health. Butyrate, a short-chain fatty acid created by bacterial fermentation of fiber, is a fuel source for colon cells. Without it, they can die. Since some intestinal diseases are characterized by the absence of such fermentation byproducts, the research may suggest both preventive and therapeutic applications. Healthy colon activity appears to be linked to the immune system as well—which is logical when you consider that digestion involves bringing foreign matter into the body, Stewart says. It may even be related to brain health and depression.

Fiber fermentation profiles provide important information for food manufacturers and the growers who supply them, she adds. Since fiber type and content can vary between produce varieties and at different stages of ripeness, understanding the differences can help the food industry to create processed foods from agricultural seconds that are high in fiber and palatable to the public.
FOCUS ON Invasive Species

Quick Takes

A devastating fungus is responsible for Rapid ‘Ohi’a Death, which has been killing native trees since 2010. Forager J.B. Friday and diagnostician Brian Bushe fingered the pathogen, which also infects Okinawan sweet potato and taro.

To help combat toxic fireweed, Maui Master Gardeners have assisted CTAHR entomologists in raising and evaluating the host-specific Secusio extensa moth for release in Island pastures.

Reducing soil nutrients may benefit native plants since the non-natives seem better suited to take advantage of the increased nutrients available following soil disturbances. MS student Amanda Knauf's research testing that hypothesis won honors from the Association for Tropical Biology and Conservation.

Organisms needn’t be plant or animal to be invasive. Michael Melzer’s Agrosecurity Lab tests for bacteria, viruses, and fungi that cause plant diseases, including the Candidatus liberibacter bacteria associated with citrus greening disease, which is devastating citrus crops on the mainland.

The Constant Battle

Veteran Kāʻu coffee grower John Ah San has worked with CTAHR to identify and deal with banana moths, twig borers, sooty mold, ants, and now the coffee bearer borer. Sure, you can find stuff on the Internet, assuming you can read Spanish, he observes, but even within Hawai‘i, what works in Kona may not work in Kāʻu. “CTAHR people have international contacts. They bring in a lot of information that’s a big help to us and products to test.” That way, growers don’t lose money paying for solutions that don’t work here.

The Big Problem of the Little Fire Ant

At least 44 ant species have found their way to our archipelago, including the big-headed, long-legged, tiny yellow, carpenter, and crazy. But none cause as much concern as the tiny, flame-colored Wasmannia auropunctata, aka little fire ant—deemed one of the world’s 100 worst invasive species for its excruciating sting and ability to colonize diverse habitats, from houses to ground to treetops. Without increased management, the little fire ant will cost Hawai‘i Island $140 million in economic damages, reduce agriculture yields and nursery exports by 50%, and inflict 390 million human and 107 million pet sting incidents over the next decade, according to analysis by CTAHR economists PingSun Leung and Stuart Nakamoto and their inter-agency colleagues.

Entomologist Arnold Hara leads CTAHR’s assault on the ants with research support from Ruth Niino-DuPonte and Susan Cabral and in collaboration with State, county, and private agencies. The ants are aggressively defensive, raining down from trees and stinging in unison when disturbed. They have multiple queens, form multiple inter-connected nests, and readily disperse via colony fragments smaller than a matchbox. Hara tested treatments and published best-practice reports for homeowners and industry detailing monitoring methods and procedures, including hot water drenching, soapy water dips, and granular baits. To deliver insecticides to the treetops, collaborators have adapted pressurized equipment like that used to carbonate soft drinks. They have also made applicators for drones, although their use requires a pilot’s license and permit.

The ants have been eradicated on Kaua‘i and contained on Maui and O‘ahu. On Hawai‘i, economists say increased spending on early prevention, detection, and control could save $5 billion and prevent 2.1 billion sting incidents over the next 35 years.

“As soon as you figure out one pest, another comes along.”

Organisms needn’t be plant or animal to be invasive. Michael Melzer’s Agrosecurity Lab tests for bacteria, viruses, and fungi that cause plant diseases, including the Candidatus liberibacter bacteria associated with citrus greening disease, which is devastating citrus crops on the mainland.

Arnold Hara examines a hot water reservoir tank. Below: Little fire ants on a chopstick smeared with peanut butter.
CHL and the CTAHR Value Chain

While working to prevent childhood obesity among underserved Pacific populations, the extramurally funded, CTAHR-led, 5-year $25-million Children’s Healthy Living (CHL) Program www.chl-pacific.org generates positive effects for Hawai‘i’s economy.

What: A USDA–funded project to determine the level of childhood obesity in the Pacific Islands and test interventions.

Why: Pacific Island populations appear to have some of the highest rates of obesity in the world. Obesity is arguably the leading reversible risk factor for major health problems today.

How: Establish baseline data, conduct needs assessment, and then implement community-based and culturally appropriate programs and policy changes to promote healthy lifestyles. Train a public health nutrition workforce and build local capacity so that changes will be sustainable.

Who: An interdisciplinary, multi-institutional team led by CTAHR nutritional epidemiologist and anthropologist Rachel Novotny and Assistant Director Marie Kainoa Fialkowski, 19 co-investigators at 4 institutions in 8 jurisdictions, plus a cadre of program and support staff, and volunteers.

Impact: 4 students graduated from nutrition or public health programs and another 16 are pursuing degrees, committed to working in their home jurisdictions. Environmental interventions (social/cultural, political/economic, and physical) have been launched and data (body mass index, interviews, and other data) are being analyzed to guide programs and policies and to gauge their effectiveness.

Additional Benefits: Data sets are available to graduate students and policymakers. The project has attracted additional grants, including one from New Zealand.

Testimonial: “After working with families in Wai‘anae to improve their eating habits and health, I want to contribute to changes that have a broader impact on childhood obesity prevention, changes that make it easier for the families to stick to healthy eating habits and ways.” —Monica Esquivel, CHL PhD candidate

Sources: Children’s Healthy Living Program; Office of Research Services 2014–15 Annual Report; UHERO Economic Impact of the University of Hawai‘i
O‘ahu County

Population ....................... 991,788
Under age 18 ...................... 28%
Over age 64 ...................... 16%
Farmers ......................... 1 in 440 adults
Acres of farm per resident ...... < 0.1

Latest USDA Farm Facts
Number of farm operators ...... 1,622
Who are women ................. 35%
Share of principal operators who
Live on the farm operated ....... 55%
Are majority owners ............. 93%
Farm as primary occupation ... 52%
Have farm Internet access ...... 60%
Market value of ag products sold:
Crop sales ....................... $56 million
Livestock, aquaculture ....... $9 million
Farm payroll .................... $28 million
Unpaid workers .................. 863

CTAHR 2014 Activities
Undergraduate students .............. 567
Workshops and presentations ....... 695
Public contacts ....................... 518,589
Volunteer hours .................... 32,671

Purveyor Profile: Holoholo General Store

Product: Delivery of freshly harvested organic produce and food items from a dozen local producers to workplaces and schools.

Proprietors: Founder Jill Nordby and co-owner Jamie Sexton started the community-supported agriculture food hub in 2012. Sisters Elisabeth and Emily Beagle joined the team to establish a 6-acre “organic in transition” farm in Hāle‘iwa.

Workforce: The operation makes work experience available to students in CTAHR’s GoFarm program.

Customers: 300 subscribers receive local produce per week. Holoholo delivered about 100,000 pounds of produce in 2014 and expects to generate an additional 380,000 pounds at Holoholo Farm within the first 5 years of operation.

Added value: Holoholo also delivers recipes, events, and community interactions to promote local farming, healthy communities, and a sustainable future for Hawai‘i.

CTAHR connection: The proprietors won their lease from Kamehameha Schools in the 2014 Mahi‘ai Match-up competition with a business plan that was developed with the help of CTAHR’s Agribusiness Incubator Program.

Influences: Collective background in farming, marketing, social work, green design.

Philosophy: To quote Gandhi disciple Lanza del Vasto, “Find the shortest, simplest way between the earth, the hands, and the mouth.”

Website: http://holoholostore.com

1 in 50 Hawai‘i farms was involved in community-supported agriculture (CSA) in 2012—more than 3 times the national average. Hawai‘i ranks 44th for number of farms, but 35th for number of CSA operations.
Hawai‘i County

Population ............................ 194,190
Under age 18 .......................... 29%
Over age 64 ............................ 17%
Farmers ..................... 1 in 21 adults
Acres of farm per resident............. 3.5

Latest USDA Farm Facts
Number of farm operators ........ 6,554
Who are women......................... 36%
Share of principal operators who
  Live on the farm operated....... 67%
  Are majority owners............... 95%
  Farm as primary occupation.... 66%
  Have farm Internet access....... 70%
Market value of ag products sold:
  Crop sales ....................... $145 million
  Livestock, aquaculture ... $16 million
  Farm payroll ....................... $75 million
  Unpaid workers ................... 986

CTAHR 2014 Activities
Undergraduate students .......... 21
Workshops and presentations..... 254
Public contacts ....................... 485,497
Volunteer hours ...................... 50,270

Grower Profile: Mauna Kea Tea

Products: Organic seasonal green and oolong teas sold online, on farm, and through wholesale accounts.

Proprietors: Taka and Kimberly Ino began farming in 2005 and selling tea in 2008. They have been Health Department Kitchen and USDA National Organic Program Certified since 2011.

Workforce: The owners, 2 part-time employees, a seasonal picking crew, occasional volunteers, and family.

Location: 2 acres planted on a 5-acre lot in Honoka‘a (A‘huaola) among the ‘ōhi‘a forests on the north flank of Mauna Kea, Hāmākua District.

Methods: Masanobu Fukuoka’s Natural Farming principals—no pesticides, chemical fertilizers, or tilling; use of weeds and cover crops to enhance soil fertility.

Influences: Education in philosophy and environmental science; traditional cultivation techniques and mentors.

CTAHR connection: Nursery stock, publications, workshops, and business plan assistance from CTAHR Cooperative Extension and Agribusiness Incubator programs.

Philosophy: “Using various techniques that have minimal impact on the environment, we not only keep the native ‘ōhi‘a forest for the wildlife but also utilize the materials from the forest to help build healthy soil.”

Website: www.maunakeatea.com

Tea was brought to Hawai‘i in 1887 but commercial operations failed. Successful field trials by CTAHR and USDA in the late 1990s rekindled interest and suggested the potential for tea as a specialty crop.
Maui County

Population ..................................163,019
Under age 18 .................................. 29%
Over age 64 ..................................... 15%
Farmers ...........................................1 in 66 adults
Acres of farm per resident .................1.4

Latest USDA Farm Facts
Number of farm operators ..........1,751
Who are women ......................... 36%
Share of principal operators who:
Live on the farm operated ....... 63%
Are majority owners ................. 94%
Farm as primary occupation .... 54%
Have farm Internet access ......... 66%
Market value of ag products sold
Crop sales ....................... $181 million
Livestock, aquaculture ......... $7 million
Farm payroll ................................. $99 million
Unpaid workers .............................1,421

CTAHR 2014 Activities
Undergraduate students .............. 23
Workshops and presentations ......227
Public contacts ...........................134,127
Volunteer hours ..........................8,820

Grower Profile: Hāli‘imaile Pineapple

Product: Exclusive growers of field-ripened supersweet Maui Gold pineapple. 80% of the weekly harvest is delivered to local markets within 3 days.

Location: 1200 upcountry acres leased from Maui Land & Pine.

Proprietors: Founded in 2010 by President and CEO Darren Strand (left), and Executive Vice President Rodrigo “Rudy” Balala with three fellow former Maui Land & Pine managers and ‘Ulupalakua Ranch owner Pardee Erdman.

Workforce: 86, including employees displaced by closure of the state’s last cannery and affiliated field operations.

Distinction: Using water-conserving, sustainable farming practices to produce high-quality fresh fruit and minimizing cull by using imperfectly formed fruit in fresh-cut and quick-frozen products.

Partners: Maui’s Winery at ‘Ulupalakua Ranch (pineapple wine), Hāli‘imaile Distilling Company (Pau Maui Vodka), and the Maui Culinary Academy at UH Maui College (roasted pineapple jam).

CTAHR connection: Help with the initial business plan and advice during startup. “We learned a lot through our relationship with the Agribusiness Incubator.”

Philosophy: “Pineapple agriculture is an integral part of Maui’s identity,” says Rudy.

Website: www.pineapplemaui.com

42 Hawai‘i farms harvested pineapple in 2012, the same number as the previous agriculture census in 2007.
Kaua‘i County

Population .................................. 70,475
Under age 18 .............................. 29%
Over age 64 .................................. 17%
Farmers ..................................... 1 in 53 adults
Acre of farm per resident .............. 2.1

Latest USDA Farm Facts
Number of farm operators ............. 947
Who are women ........................... 38%
Share of principal operators who:
  Live on the farm operated .......... 74%
  Are majority owners ................. 96%
  Farm as primary occupation ...... 48%
  Have farm Internet access ......... 73%
Market value of ag products sold:
  Crop sales ......................... $156 million
  Livestock, aquaculture ........... $91 million
  Farm payroll ....................... $68 million
  Unpaid workers ................... 5,343

CTAHR 2014 Activities
Undergraduate students ............... 10
Workshops and presentations ........ 27
Public contacts made ................. 7,787
Volunteer hours ....................... 8,820

Grower Profile: Kapa‘a Banana Co.

Product: Williams and apple bananas.
Customers: Hawai‘i grocery stores.
Location: 20+ acres near Wailua Falls leased from the State.
Proprietor: Third-generation farmer and CTAHR alumnus Godwin Esaki.
Workforce: Family members and friends who volunteer are a strong part of the company.
Challenge: Establishing a local workforce of associates rather than laborers—what Esaki calls the Special Forces of agriculture.
  “I’m looking for the elite—people who are smart, mechanically inclined, strong, hard working, and more interested in a special career than in the paycheck.”
CTAHR connection: “I have only good things to say about Janel (Yamamoto),” says Esaki, a self-described late-bloomer who benefited from the leadership coaching provided by the Agribusiness Incubator Program specialist. “They’re the key to success. They listened and made recommendations that were helpful. I feel like the farm is a puzzle I’ve been putting together. Now I’ve found most of the pieces.”
Philosophy: “I’d like to see the farm provide a livelihood, not just be a place to go to work, but a viable, happy place to work. I think we’re getting there.”

Ranked 7th for Hawai‘i commodities at $11.3 million in 2011, bananas have been buffeted by drought and bunchy top virus. Between 2007 and 2012, the number of farms dropped by 203 and the number of acres in banana declined by 41%.
Fine China Connections

Last year, CTAHR established a new 3+2 agreement to bring Hunan Agricultural University graduates into CTAHR's graduate food science degree program. The college also signed a memorandum of understanding with Northwest Agricultural and Forestry University in Yangling and renewed an agreement with Qiongzhou University in Sanya. In other activities—

PingSun Leung taught courses at Shanghai Ocean University, and Jinan Banna, at Hunan Agricultural University.

Yong Li worked with a visiting scholar from Minnan Normal University and Qing Li hosted 18 visiting scientists and students. Both collaborations resulted in scholarly publications.

UH students participated in CTAHR-led horticulture study abroad in China and an agriculture tour to Hong Kong.

Made in Maui, Sold Online

Building on the success of the Valley Isle's second annual Made in Maui County Festival, CTAHR County Administrator Cindy Reeves is partnering with the tri-island Office of Economic Development and Maui Chamber of Commerce to create a searchable database marketing hub for vendors of value-added “Made in Maui County” agriculture products.

The project, which could help island producers reach a global market, was awarded $69,194 in USDA funding support for strengthening local food systems, one of 4 pillars in the agency's effort to revitalize rural economies and communities.

Congressional Intern Lena Phomsouvanh

Family Resources (FamR) major Lena Phomsouvanh experienced the progression of seasons and process of lawmaking in the Washington, D.C., office of Sen. Mazie Hirono during spring 2015. She analyzed the impact of federal legislation on education, health, and social welfare in Hawai‘i. A CTAHR stipend helped defray costs not covered by the internship, including winter gear and professional wear.

The daughter of Laotian immigrants, Lena chose a major that would prepare her for a career helping people. She lauds Rick Caulfield’s human development course and credits Loriena Yancura for teaching her how to research ethnic stereotyping. “FamR gives you knowledge of nutrition, sociology, public health, economics, and psychology so you can connect people with the right resources.”

“FamR helped me gain important life skills that you need in the real world, such as financial planning, goal setting, working as a team, and professionalism,” she says. She plans to get a master’s degree and work with local youth.

Entrepreneurs: Seeds to Success

Mililani-based Hawaiian Turfgrass owner Sean Aukanaii Fong was named U.S. Small Business Administration’s 2015 Young Entrepreneur of the Year for Hawai‘i. He grew a small, hand-tended plot into a multi-acre sod farm and licensed, full-service landscape contracting business in less than a decade. The idea took root in the turfgrass course he took on his way to a BS in Tropical Plant and Soil Sciences. He has plowed profits back into the business, and he is passionate about promoting high-quality, low-water, pest-resistant, and shade-tolerant grasses for homes and businesses. With eight employees and equipment to install 100-foot rolls of sod, Fong won the contract to re-sod Moanalua High School’s football field.

“I’ve been my dream, and I pretty much just went full blast,” Fong told Hawai‘i Business.

Other CTAHR-trained entrepreneurs in the news this year:

Mānoa Chocolate owner Dylan Butterbaugh used cacao grown by his mentor, Specialist Skip Bittenbender, to create the chocolate pyramids served at the John A. Burns School of Medicine’s 50th anniversary gala in July. In fashion, Inbar Maor launched her Olena Kai swimwear line and Daisy Merto opened WhiteHot Hawai‘i to provide “fashion forward” bridal and special-occasion dresses. After working for designers like Kenneth Cole and Nine West, alumna Lynn Sakutori launched a-line, her own clothing line, available at Macy’s stores.

Student Honors

As 1 of 6 HortScholars in the U.S., PhD student Emily Teng receives enriching professional development from the AmericanHort organization. She does research on poinsettia pigmentation.

In an Entomological Society of America competition, Jordie Ocenar placed 3rd for her elevator talk and 2nd in the texting quiz at the branch meeting in Idaho.

The Institute of Food Technologists awarded Timothy Shafel 2nd place and $750 in the refrigerated and frozen foods division for his presentation on a novel technique for preserving beef steak.

“Charismatic delivery” won Roberto Rodriguez the Pied Piper Award for his presentation on delivering herbicide to invasive plants in remote locations at UH’s 2015 Albert L. Tester Symposium.

Surfwear’s Mele Moody has been riding a wave of success since earning a BS in Fashion Design and Merchandising. After shadowing a surfwear sales representative and working at a sunglasses firm, she learned how to set up trade shows, show a line, build relationships, and sell a brand at Billabong Girls. Now a sales rep covering O‘ahu and Kaua‘i for Reef surfwear, she says, “I love the people, the brands, the feeling of the industry. I identify with the style and vibe.” She extols the FDM courses she took, from entrepreneurship to sewing and fashion illustration. Focus on your dream job, start small, and take the necessary steps, she advises students. “If you put in the time, stay focused, and do the work, you’ll get there!”

Alumni News


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Meet CTAHR’s Newest Faculty

Natural Resources and Environmental Management

Assistant Professor Kimberly Carlson (roots, Montana; degrees, Stanford and Yale Universities) focuses on tropical land systems. She was attracted by the opportunity to influence environmental policy. She’s an avid Lindy Hop/swing dancer.

An agricultural ecologist, Assistant Professor Rebecca Ryals (roots, Nebraska, New Jersey, Pennsylvania; degrees, Marywood and Duke Universities and University of California, Berkeley) studies soil biogeochemistry and lives without a garbage can.

Assistant Professor Yin-Phan Tsang (roots, Taipei; degrees National Taiwan University and University of Maryland, College Park) is interested in ecohydrology and finding better ways to live in harmony with nature. She is a yogini.

Plant and Environmental Protection Sciences

Assistant Researcher Gordon Bennett IV (roots, Vermont; degrees, Universities of Vermont and California, Berkeley) uses genetics, genomics, and microbiology to explore plant, insect, and bacteria interaction. He is a vegan and outdoor enthusiast.

Tropical Plant and Soil Sciences

A second-generation agricultural scientist, Assistant Researcher Orville Baldos (roots, Philippines; degrees, University of the Philippines Los Baños and UH Mānoa) focuses on sustainable ornamental production. He likes to hike, paint, and cook.

Assistant Researcher Alyssa Cho (roots, Florida; degrees, UH Mānoa, University of Florida) pursues sustainable farming systems research at Komohana. She likes to sew and once dreamed of becoming a professional figure skater.

Assistant Researcher Noa Lincoln (roots, Hawai‘i, Maui, O‘ahu; degrees, Yale and Stanford Universities) brings a broad ecological and social ecology focus to his lifelong desire to heal the environment. He is a capoista, dive master, and musician.

Assistant Professor Michael Muszynski (roots, Ohio; degrees, University of Toledo, Iowa State University) studies molecular mechanisms controlling plant development. A one-time marine biologist wannabe, he plans to spend his spare time snorkeling.

Quick Takes

Professional conference honors went to Ju-Young Kang and Youngjin Bahng for papers on consumer behavior and Hawai‘i retailing strategies, respectively.

Effective interactive online learning techniques were shared by Jinan Banna, Maria Stewart, and Marie Fialkowski in the Journal of Online Learning and Teaching.

Use of innovative approaches that help targeted audiences solve practical problems earned Extension agent Andrea Kawabata a 2015 Western Extension Committee Young Professional Award.

Better water disaster management policies were the focus of a Journal of Natural Resources Policy Research issue edited by Professor Emeritus Chennat Gopalakrishnan. He was also the 2014 Western Agricultural Economics Association Distinguished Scholar.

Friend of Agriculture honors were bestowed on retired County Administrator Harold Keyser by the Maui County Farm Bureau. He still promotes genetic technologies and volunteers in classrooms.

Two CTAHR patent holders—biochemical engineer Winston Su and entomologist Ken Grace—were honored as All Star Inventors at the launch of UH’s chapter of the National Academy of Inventors.

Morgan Represents CTAHR

O‘ahu Rancher John Morgan, president of Kualoa Ranch, will represent CTAHR on the 2016 Council for Agricultural Research, Extension, and Teaching. CARET is a national grassroots organization of agriculture stakeholders who tell agriculture’s story and build support for related land-grant university programs.
Most CTAHR Faculty Serve Multiple Mission Areas

Three out of 4 CTAHR faculty members split their time between activities in the college’s tripartite mission—instruction, research, and Extension.

Family and Consumer Sciences is the heaviest instructional unit, with 40% of full-time equivalent (FTE) appointments in teaching.

Molecular Biosciences and Bioengineering is the most research intensive, with 63% research FTE appointments.

Half of Tropical Plant and Soil Sciences’ FTE are Extension appointments.

CTAHR received $41.4 million in FY2015, down about 2% from the previous year. 10% was from tuition dollars, 43% from State general funds, 44% from extramural sources.

Donor Report

CTAHR’s two largest donors last year were Hau‘oli Mau Loa (graduate assistantships) and Kamehameha Schools (GoFarm new farmer training).

A $75,000 bequest from alumnus and retired professor Jim Carpenter and his wife Jeanne will establish scholarships for students in the Animal Sciences and/or Pre-Veterinary Program. A new portrait in the Ag Science Building honors the 1979 bequest of the late “Hollywood veterinarian” Dr. Charles Reid, which has provided more than $500,000 to pre-vet students like those pictured below.

Extramural Funding

CTAHR was 4th among UH Mānoa units for the number of extramural awards received during 2015. The college won $18.2 million in outside funding for 97 research and 45 non-research grants—a 102% return on State general funds invested in the college.

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Hawai’i’s endemic Kamehameha butterfly (Vanessa tameamea) fascinates visitors to the UH Insect Museum. CTAHR researchers raise the butterflies on campus, but their range is shrinking in the wild. To map populations, CTAHR's Pulelehua Project invites the public to submit photos and observations online. The project has documented more than 75 confirmed sightings on 5 islands to date. Learn more at ctahr.hawaii.edu/pulelehua.