

Diversifying, Sustaining, Strengthening



2008

IMPACT REPORT

*A New Century
Brings New Challenges*

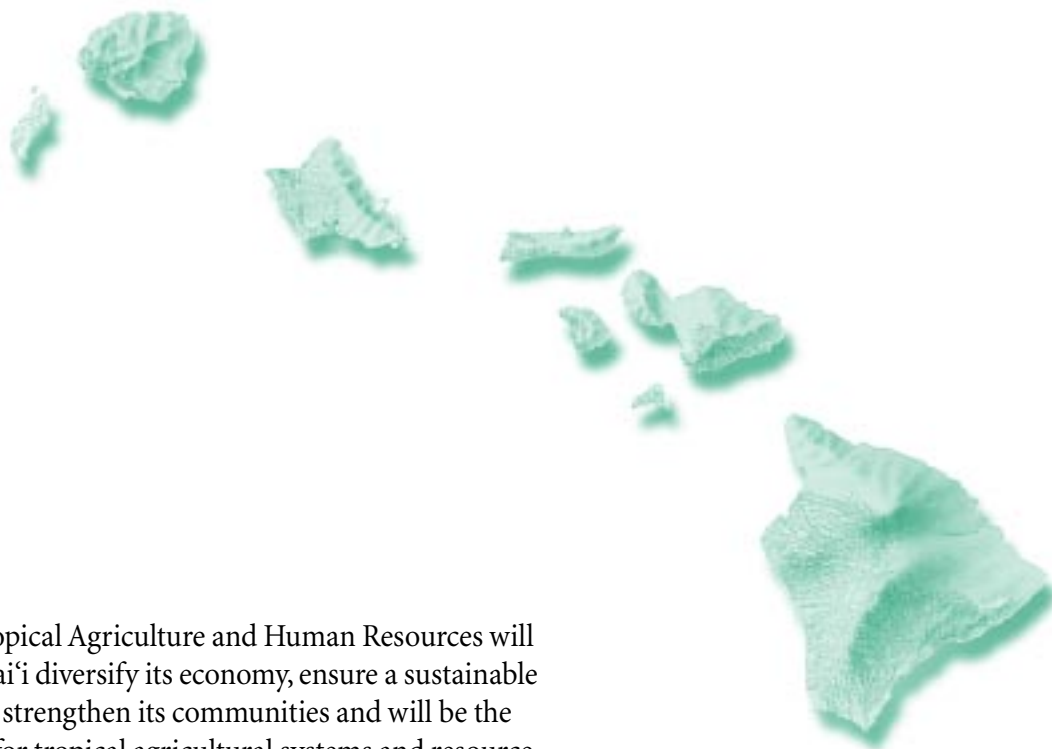


College of Tropical Agriculture
and Human Resources

UNIVERSITY OF HAWAII AT MĀNOA

The founding college of the University of Hawai'i, established 1907





VISION

The College of Tropical Agriculture and Human Resources will actively help Hawai'i diversify its economy, ensure a sustainable environment, and strengthen its communities and will be the premier resource for tropical agricultural systems and resource management in the Asia-Pacific region.

MISSION

The College of Tropical Agriculture and Human Resources is committed to the preparation of students and all citizens of Hawai'i for life in the global community through research and educational programs supporting tropical agricultural systems that foster viable communities, a diversified economy, and a healthy environment.



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College of Tropical Agriculture and Human Resources— A New Century Brings New Challenges



"Producing more of Hawai'i's food and fuel here in the islands is a vital step in creating a sustainable future."

– Andrew Hashimoto,
Dean, CTAHR

As 2008 draws to a close, we see changes on the horizon for our university, state, and nation. This year concluded the centennial of the University of Hawai'i and the College of Tropical Agriculture and Human Resources, its founding college, which was established in 1907 and welcomed its first students in September 1908. Next year, 2009, is the fiftieth anniversary of Hawai'i statehood. How many residents who voted in the June 27, 1959 statehood referendum could have predicted that 50 years later, the highest elected office in the land would be held by a person of color, born in Hawai'i, the child of UH Mānoa alumni?

At the same time, the past year clearly illustrates the daunting challenges ahead. Economies around the world are slowing in the wake of a global credit crisis, and prospects are looming for a deep recession. Visitor arrivals in September 2008 were down 19.5 percent from the same month one year before. As Hawai'i confronts a deficit that is projected to top \$1.1 billion by fiscal year 2011, state agencies like UH and CTAHR face painful budget cuts. We have also seen in 2008 dramatic shifts in the price of oil, which started the year near \$100 per barrel, peaked above \$145 per barrel in July, and is expected to end the year well below \$50 per barrel. Hawai'i is exceptionally dependent on imported petroleum: it represents more than 90 percent of our fuel use and affects the prices that tourists pay to reach our shores and the cost of the goods we import. And among those imports, none is more important than food. More than 85 percent of what we eat arrives here from elsewhere.

Producing more of Hawai'i's food and fuel here in the islands is a vital step in creating a sustainable future, both in the near term and for the generations that will follow us. Through our commitment to provide an excellent education for our students, support the diversification of our economy, protect our environment, and strengthen our families and communities, CTAHR is working to improve Hawai'i's security and outlook.

Many of the initiatives described in this report center on paths we can take to food security. CTAHR outreach is helping farmers find new markets for their crops, promoting farm and food safety, assisting growers who have been harmed by natural disasters, and supporting the expansion of sustainable and organic food production in Hawai'i. For commercial farmers and home gardeners alike, we offer advice, encouragement, and crop varieties developed in the college that are well-suited to Hawai'i's environments and year-round pest pressures.

These are difficult times for Hawai'i's native plants and animals, our irreplaceable natural heritage. CTAHR researchers are studying how we can lessen the damage that invasive species cause to wetlands and forests. Rising unemployment coupled with rising expenses have created difficult times for Hawai'i's families and communities as well. Through affordable family counseling and volunteer projects that bring youth and elders together, our college is helping build strong, resilient ties of love and respect. We are also proud to highlight the accomplishments of our students, whose mastery of twenty-first century technology will help us tackle the challenges of charting a sustainable future.

As we tighten our belts and look for ways to increase our efficiency and collaborate more effectively with our community partners in the coming years, I thank CTAHR's students, staff, and faculty for their hard work and valuable service. I know that your strength, creativity, and humor will help us weather whatever the future brings, and I am honored to be a part of your efforts. Mahalo.

Aloha,

A handwritten signature in green ink, reading "A. G. Hashimoto". The signature is fluid and cursive, with the first name "A." and last name "Hashimoto" clearly visible.

Andrew G. Hashimoto
Dean/Director

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Celebrating CTAHR's First Century

In September 1908, the opening of the College of Agriculture and Mechanic Arts made it possible for Hawai'i students to pursue a college degree without traveling to the mainland or abroad. One hundred years later, we honor our university, our flagship campus, and our founding college with *Hawai'i's College of Tropical Agriculture and Human Resources: Celebrating the First 100 Years*, a beautifully illustrated, 300-page history.

Editors Barry Brennan and James Hollyer and designer Nancy Hoffman-Valies have shaped an enduring record of CTAHR and its people. In brief chapters, more than 90 contributors have pooled their knowledge and memories of more than 1,700 individuals, including 52 outstanding achievers honored for their unique impacts. The full-color, hardbound book boasts nearly 700 images that trace our growth from a house near Thomas Square in Honolulu to a statewide campus that conducts instruction, research, and outreach at 27 locations on five islands. CTAHR alumni can revisit their departments and clubs, stepping back in time through a treasure trove of sepia photographs.

From familiar crop varieties and trusted termite control methods to environmental management initiatives that protect communities and resources, the results of CTAHR's broad investigations can be found throughout the islands. Discoveries made in our college have also had influence worldwide, including techniques for grafting macadamia saplings and pruning coffee plants, and soil studies that have helped farmers throughout the tropics feed their families.

The First 100 Years also celebrates the human resources side of the college, from early food science studies that proved the nutritional value of locally grown foods, to the Hawai'i 4-H program, now in its 90th year, which provides leadership, citizenship, and life skills training to more than 15,000 youths annually. CTAHR outreach in nutrition and wellness, child and elder care, and household resource management has helped generations of families stay healthy and strong.

This limited-edition book is sure to please both Hawaiiana buffs and CTAHR's extensive 'ohana. To order, e-mail CTAHR's Office of Communication Services at ocs@ctahr.hawaii.edu, or call (808) 956-7036.

More farm than college: the Mānoa campus and its farm as it appeared in 1912. The I-shaped Hawai'i Hall and the rectangular engineering building still stand today; the L-shaped building held a chemistry lab.

Our limited-edition book is sure to please both Hawaiiana buffs and CTAHR's extensive 'ohana.

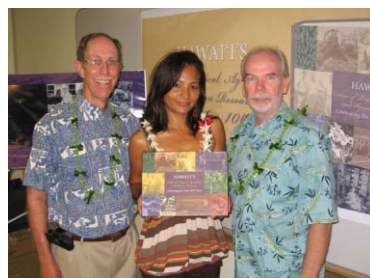


Photo: Miles Hakoda

At the launch party for Hawai'i's College of Tropical Agriculture and Human Resources: Celebrating the First 100 Years, editors Barry Brennan (left) and Jim Hollyer (right) and book designer Nancy Hoffman-Valies pose with their handiwork, a beautifully illustrated, 300-page history of CTAHR.



Historical Photos: UH Photo Archives

Horticulturists Haruyuki Kamemoto and Richard Hamilton are among 52 outstanding CTAHR achievers given special mention in the book. Here they examine guava fruit.

This year marked CTAHR's 20th Student Research Symposium. Nearly 100 students from the college's six departments took part.

Student Research Takes Center Stage

Hawaii's geographic isolation has created an unsurpassed natural laboratory for many CTAHR students. However, long distances and high travel costs can make it difficult for students to participate in professional conferences where scientists present their findings and exchange ideas. To recreate that valuable experience, CTAHR faculty developed the annual Student Research Symposium.

In the symposium's supportive setting, undergraduate and graduate students share their research results through a written abstract, an oral or poster presentation, and a question-and-answer session with faculty judges who assess their work for quality, clarity, rigor, and impact. Student participants are recognized at the annual CTAHR Awards Banquet, many earn college-wide or departmental awards, and the top graduate students receive travel grants to fund their participation in a national or international conference.

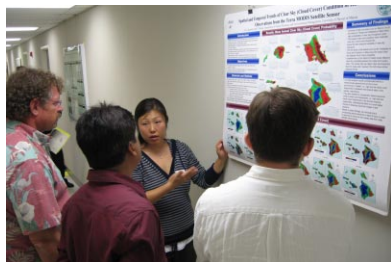
This year marked CTAHR's 20th Student Research Symposium. Nearly 100 students from the college's six departments took part, up from fewer than 30 at the first

symposium. The diverse presentations highlighted basic and applied research in agriculture, engineering, environmental science, food science, and a range of biological and social sciences. Sumptuous meals by CTAHR's own Chef Mark Segobiano added to the festivities.

Reflecting our cosmopolitan student body, 2008's top six prizewinners—Michael Melzer, Sandro Jube, Daniel Adamski, Hongfei He, Jannai Yafuso, and Henry Cheng—have roots in Canada, Brazil, the U.S. mainland, China, and Hawaii. Each of the students used DNA technology in their respective research projects to develop viral resistance in citrus, eliminate a toxin from a potential source of animal forage, assess evolutionary relationships among koa and related native trees, measure the activity of a potentially fatal human pathogen in acidic foods, locate proteins that transmit signals within plant cells, and fabricate inexpensive biosensors to detect a plant pathogen that is subject to quarantine. Mahalo to the students who brought their hard-won knowledge to the symposium, and mahalo to the faculty and staff who have nurtured this event for a generation.



Sandro Jube (left) won first place in the Best PhD Student Poster Presentation category. Sandro is a student in the Department of Molecular Biosciences and Bioengineering.



Kaori Caraway (third from left) received the Department of Natural Resources and Environmental Management Best Undergraduate Presentation award.

Photos: Miles Hakoda

Ka'ū Brew Wins Rave Reviews

For many java drinkers, coffee from Hawai'i means coffee from Kona, a premier source of exceptional specialty coffees for more than a century. But as the sugar industry declined over the past several decades, Hawai'i's coffee cultivation spread beyond Kona to eleven other regions on five islands. Among these, a relative newcomer, Ka'ū, is developing a world-class reputation.

After the Ka'ū Sugar Company closed in 1996, more than two-dozen former sugar workers planted coffee farms and subsequently formed the Ka'ū Coffee Growers Cooperative. Today about 35 coffee growers lease lands in Pāhala from the Ka'ū Farm and Ranch Company.

In 2006, extension specialist Sabina Swift and extension economist Stuart Nakamoto began working with the Ka'ū coffee growers as part of an outreach program funded by the U.S. Department of Agriculture to aid underserved immigrant farmers in Hawai'i County, including former sugar workers growing papayas in Puna and vegetables in Waialua. In addition to helping individual growers, Swift and Nakamoto present workshops on integrated pest management, crop production, marketing, farm finance, and food safety that bring farmers together with CTAHR extension specialists, county agents, and doctoral students as well as representatives from the Hawai'i Department of Agriculture and federal agencies. Recently, they helped growers affected by volcanic smog (vog) apply for disaster assistance.

The Ka'ū growers' commitment to mastering coffee production has yielded remarkable results. At the Specialty Coffee Association of America's 2007 cupping competition, William Tabios (Will & Grace Farms) and Marlon Biason (Aroma Farms) placed 6th and 9th, respectively, out of 104 international entries. Swift and Nakamoto's USDA grant helped fund the growers' participation in the contest. Also in 2007, Lorie Obra's Ka'ū-grown "Rusty's" coffee bested six Kona coffees at a cupping workshop in Kona. And at the 2008 SCAA cupping competition, Manuel Marques' "Ka'ū Forest" took 11th place, edging out a 12th-place Kona entry. Congratulations, Ka'ū growers—Hawai'i can now boast two of the world's top coffee regions!

The Ka'ū growers' commitment to mastering coffee production has yielded remarkable results.



Photo: Dan Nakasone

Chef Alan Wong visits the farm of Lorie Obra, co-president of the Ka'ū Coffee Growers Cooperative. Ka'ū coffee is featured at Alan Wong's Honolulu and The Hualalai Grille.



Photo: Sabina Swift

Coffee cherries ripen on the farm of Leo Norberte, co-president of the Ka'ū Coffee Growers Cooperative.

Given their ecological significance, our coastal lowland wetlands have received little attention from researchers.



Photos courtesy of Greg Bruland

*Natural Resources and Environmental Management graduate student Meris Bantilan-Smith samples vegetation at a Moloka'i wetland dominated by pickleweed (*Batis maritima*), an invasive alien species.*

Coastal Wetlands: Where Land and Sea Unite

Hawai'i has only 35 square miles of coastal lowland wetlands, but these narrow interfaces between land and ocean are vital. They help control flooding, hold back sediments that can smother downstream reefs, sequester carbon that might otherwise contribute to global warming, and absorb nutrients that can cause algal blooms and harm aquatic animals. Coastal wetlands also offer habitat to endangered waterbirds found nowhere else on earth, such as the Hawaiian stilt, the Hawaiian coot, and the Hawaiian gallinule (moorhen).

Given their ecological significance, our coastal lowland wetlands have received little attention from researchers. To remedy this knowledge gap, soil and water conservation professor Greg Bruland and his students have collaborated with scientists from federal agencies and non-governmental organizations as well as land managers across the state to characterize the water, soil, plants, and fish found at 40 semi-natural, restored, and constructed coastal wetlands on five islands. This initial investigation is a key step in developing sound strategies to mitigate harms caused by invasive species and human activity.

The researchers initially sought to identify largely undisturbed coastal wetlands as reference sites on which to model future wetland restoration and creation projects. They discovered that invasive plant and fish species are so pervasive that pristine wetlands can no longer be found. Only 18 of 102 plant species observed were native, and the three most common plants were highly invasive alien species. Likewise, on average more than 80 percent of the fish (as measured by weight) were non-native, and two invasive fish species dominated most of the sites surveyed.

Further monitoring will quantify seasonal changes in wetland water quality, which varies tremendously across the different sites. Preliminary results indicate that the soils of restored and created wetlands are poorer than those of semi-natural wetlands: more compacted, more alkaline, and containing less organic matter. These findings suggest that better management of soil conditions and improved invasive species control measures will help ensure the long-term health and function of our coastal wetlands.

Christina Ryder of Ducks Unlimited, Inc. (left), professor Greg Bruland and graduate student Meris Bantilan-Smith sample water quality at a wetland site in the Keālia National Wildlife Refuge Complex on Maui.



CTAHR and Kalo: Conserving a Legacy

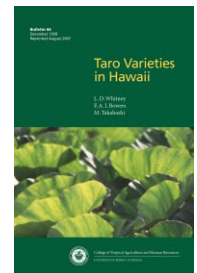
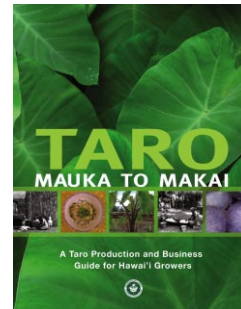
Of all the plants that Polynesian settlers brought to Hawai'i, kalo (taro) may be the most important. The starchy corm is rich in energy, minerals, and fiber, and the leaves provide vitamins and minerals. Prior to western contact, Hawaiians developed between 150 and 300 kalo varieties and may have planted more than 20,000 acres. Today, less than 400 acres of kalo remain, and very few Hawaiian varieties are produced commercially.

For more than a century, CTAHR has sought to support and expand kalo cultivation, and current initiatives to encourage kalo production benefit from this history. For example, between 1928 and 1935 the college assembled the Hawaiian Taro Collection to prevent further losses of kalo. Now, at the annual Taro Variety Field Day on Moloka'i, CTAHR extension agent Alton Arakaki shares this collection—more than 60 Hawaiian kalo varieties—with members of the community. Thousands of huli of these rare cultivars have been distributed since the field day was established more than 20 years ago. Efforts are underway to catalog the college's kalo holdings, reproduce the collection in new locations, and expand the distribution of huli.

Another recent project builds on the college's past successes in breeding new taros through cross-pollination. In 1998, CTAHR plant pathologist John Cho set out to develop new varieties that combine taro leaf blight and aphid tolerance traits from non-Hawaiian parents with the desirable characteristics of Hawai'i's dominant commercial kalo variety, 'Maui Lehua'. Several of the resulting hybrids have met the approval of farmers, processors, and poi testers, with taste and color comparable to 'Maui Lehua', but yields about 30 percent greater. These non-patented hybrids have been adopted by growers on four islands.

If you're inspired to plant kalo and help this Hawaiian heirloom regain ground, you can find helpful information in the college's recently revised best-practices manual, *Taro: Mauka to Makai*, and the reprinted edition of the classic 1939 bulletin *Taro Varieties in Hawaii*. Both are available through CTAHR's Office of Communication Services.

For more than a century, CTAHR has sought to support and expand kalo cultivation.



Two popular taro publications are CTAHR's Taro: Mauka to Makai and Taro Varieties in Hawaii.



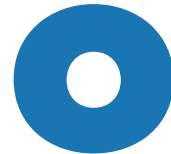
Photos provided by Alton Arakaki

Thousands of huli are made available each year at the Taro Variety Field Day on Moloka'i hosted by Alton Arakaki (center) of CTAHR's Moloka'i Extension Office.



The Family Education Training Center of Hawai'i offers a remarkable learning experience for parents, children, and students.

A 12-Week Course in Domestic Tranquility



On a Friday evening, families come together for dinner. Parents and their children share a meal. Afterward, toddlers, youths, teens, and adults spend time with their peers, playing games and talking story. But this isn't your usual pau hana gathering. The families are taking part in FETCH, the Family Education Training

Center of Hawai'i, and each participant, from the youngest to the eldest, is learning new, more effective ways to relate to their loved ones.

FETCH is the brainchild of family resources professor Mary Martini and her collaborator James Deutch, a licensed clinical social worker who lectures in the college. The program's clients receive a valuable service at an affordable cost while university students experience family counseling firsthand and learn by serving the community.

FETCH is unique in its coordinated approach to family learning. Each week the parents and children tackle identical concepts—such as respect, cooperation, communication, conflict resolution, and problem solving—through age-appropriate curricula. The parents attend sessions led by licensed professionals who volunteer their time, while the

children, in four age-based groups, are guided through the week's lessons by students enrolled in Family Resources 425, Supervised Training in the Helping Skills. Additional Mānoa students sit in on client sessions and assist by setting up and breaking down the classrooms and serving the dinner. Several graduate students from UH Mānoa and Chaminade University have completed master's-level internships with FETCH.

FETCH has served more than 300 families in its first five years. More than 90 percent of surveyed participants report that they are very satisfied and would recommend FETCH to their friends and relatives. The program produces statistically significant improvement in 20 problem areas familiar to many parents, including mealtime, bedtime, tantrums, chores, getting out the door in the morning, and fighting in the car. FETCH volunteers from CTAHR and the community have created a remarkable learning experience for parents, children, and students. For additional information or to register for the 12-week program, visit www.efetch.org.



Photos courtesy of Mary Martini

Drs. Mary Martini, FETCH director, and James Deutch, senior counselor.



Nicole Mau, Char Tovey, and Malia Soque learn how to have fun and contribute to family well-being by helping with meal preparation.

FETCH is funded through grants from the Alcohol and Drug Abuse Division of the Hawai'i Department of Health, and from a federal Serve and Learn Grant through the Hawaii Pacific Islands Campus Compact.

A GEM of a Summer Project

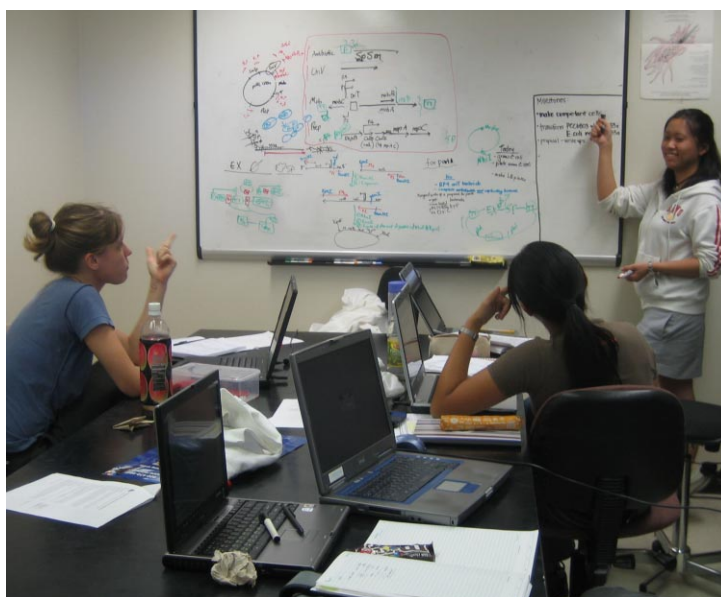
In November 2008, a contest took place that once would have been possible only in the realm of science fiction. Eighty-four teams from 21 countries met at the iGEM Championship Jamboree, the International Genetically Engineered Machine competition. Representing the University of Hawai'i were three CTAHR students—undergraduate Krystle Salazar, master's student Margaret Ruzicka, and doctoral student and team mentor Norman Wang—and UH Mānoa Microbiology undergraduate Grace Kwan. They had traveled to the Massachusetts Institute of Technology to present a toolbox of DNA sequences they had created using the techniques of molecular biology, the advice of Molecular Biosciences and Bioengineering professors Gernot Presting and Loren Gautz and Microbiology professor Sean Callahan, and financial support from CTAHR and UH Mānoa.

iGEM is the world's premier undergraduate competition in synthetic biology, which is the design and construction of new biological parts, devices, and systems, and the redesign of existing, natural biological systems for useful purposes. At the beginning of summer, student teams receive a kit of biological parts, or BioBricks, which they can combine with parts of their own manufacture and insert into living cells to create life forms with new functions. The newly invented parts are added to the BioBricks registry, expanding the toolkit for future competitors.

In the Presting lab, the students constructed a broad-host-range BioBrick plasmid, a circular DNA that can introduce genes into many different types of bacteria, including cyanobacteria (blue-green algae) and *Agrobacterium tumefaciens*, a bacterium that can insert genes into many plants. Because cyanobacteria and plants harness sunlight to make sugars and hydrocarbons, they are promising sources of biofuels. This gives the students' work real-world utility.

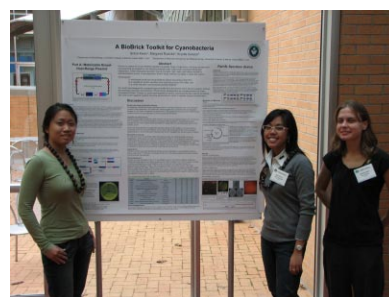
At the iGEM Jamboree, the UH students were named Best Rookie Team and received a bronze medal. But perhaps more important than the BioBricks they produced or the accolades they received was their shared learning experience: setting goals, working independently and as a team, troubleshooting unexpected results, developing contingency plans, meeting deadlines, and persevering to a successful conclusion.

iGEM is the world's premier undergraduate competition in synthetic biology.



UH Mānoa students Margaret Ruzicka, Krystle Salazar, and Grace Kwan were named Best Rookie Team at the 2008 iGEM competition held at the Massachusetts Institute of Technology.

Photos courtesy of Gernot Presting



Grace, Krystle, and Margaret looking relaxed and confident at the iGEM poster presentation.

CTAHR's organic agriculture program is cultivating a multigenerational commitment to sustainable farming in Hawai'i.

Organic Agriculture: Green and Growing

Sustainable agriculture means feeding today's people and supporting today's farmers while managing resources wisely to ensure we can also provide for future generations. This goal is at the heart of our college's organic agriculture program. Whether you're a commercial producer, a garden hobbyist, or a curious student, CTAHR can help you grow food while minimizing synthetic inputs and promoting soil health.

Organic agriculture relies on ecological interactions among plants, animals, and microorganisms, especially in soil, to replace petroleum-based fertilizers and most pesticides. CTAHR is testing many approaches relevant to organic agriculture, including the use of cover crops, compost, and charcoal to improve crop and soil health; selection of hardy crop varieties; and integrated pest management techniques such as biocontrol (using natural enemies to control pests).

Coordinated by researcher Ted Radovich, CTAHR's Organic Agriculture Working Group comprises more than 30 faculty and staff members with expertise in agricultural ecology, soil fertility, disease and pest management, and business management and marketing. The organic program's website,

www.ctahr.hawaii.edu/organic, makes it easy to contact working group members, access publications and online workshops, and learn more about a recent collaborative analysis of Hawai'i's organic sector that brought together producers, retailers, distributors, inspectors, and educators, including representatives from CTAHR, the Hawai'i Department of Agriculture, the Hawaii Farm Bureau Federation, the Hawai'i Organic Farmers Association, and the Hawai'i Cooperative of Organic Farmers.

CTAHR's educational programs in organic agriculture attract young and old alike. Volunteer master gardeners on O'ahu, Maui, and Hawai'i have been trained to give advice on organic and sustainable practices. Through the Student Organic Farm Training program, UH Mānoa students are growing organic crops at the Waimānalo Research Station. An organic food production class, Tropical Plant and Soil Sciences 220, is popular with both undergraduates and retirees. Outreach projects are engaging high-school students to foster lifelong interest in agriculture. In the classroom and the community, CTAHR's organic agriculture program is cultivating a multigenerational commitment to sustainable farming in Hawai'i.



Field trials for organically grown taro at CTAHR's Waimānalo Research Station.



Evaluating botanical pesticides.

A Monthly Invitation to an Urban Jewel

How many O'ahu commuters traveling west on the H1 have looked out the passenger window at CTAHR's Pearl City Urban Garden Center and wished they were strolling through its orchards? The UGC's tropical plant collections welcome more than 12,000 visitors each year, including 2,000 school children, but limited viewing hours have made it difficult for working people to enjoy this 30-acre oasis.

Bringing the UGC's beauty and green-thumb expertise to a wider audience is the inspiration behind Second Saturday at the Garden. O'ahu's Master Gardeners, more than 50 volunteers trained to solve gardening problems and advise the public, urged extension agents Jayme Grzebik and Steven Nagano to open the UGC during hours when workers and their families could attend together. Ray Uchida, CTAHR's county administrator for O'ahu, embraced the idea. The garden center is now open on the second Saturday of each month, from 9:00 a.m. to noon.

From a single-digit head count in June 2008, Second Saturday at the Garden has blossomed. The August 2008 "Local Fruits & Veggies—Garden Fresh!" collaboration with Hawai'i's Departments of Agriculture and Health drew a Second Saturday crowd of 500, including Gov. Linda Lingle, who helped keiki plant vegetables and herbs in the UGC's Idea Garden. More than 160 guests tried their hand at soil testing in September, and nearly 220 made scarecrows and learned about sunflowers in October. At November's event, an Arbor Day tree giveaway attracted 570; Master Gardeners and UGC 'Ohana Volunteers had spent months propagating the 3,000 free saplings handed out at Arbor Day 2008 events across O'ahu.

While the activities and themes change with the month and season, each Second Saturday includes tours of the gardens, tropical gardening demonstrations, a chance to get plant questions answered and plant samples examined by Certified Master Gardeners, and an opportunity to buy small plants and CTAHR-bred seeds adapted to Hawai'i conditions. For directions, go to www.ctahr.hawaii.edu/ougc or call 453-6050. Bring water, hat, and sunscreen. E komo mai!

Bringing the UGC's beauty and gardening expertise to a wider audience is the inspiration for this event.

Second Saturday
at the **Garden!**



Master Gardener Bob Speer takes a break to explain the renovation work underway at the Herb Garden.

Photo: Miles Hakoda



(left to right) Master Gardener intern Stanley Yomen and Master Gardeners Roy Yamashiroya and Don Ojiri inspect one of 25 different turf grasses on display at the garden.

Photo: Carl Okuda

*"A little kindness
and thought made
a big difference."*

Kristine Omura,
Maui 4-H youth, age 14

Bridging Generations Through Community Service



Photos courtesy of
Laura Jean Kawamura

*Kona youth work with the police
department to curb drunk driving.*

When youths and adults pursue shared goals together, each group brings important assets to the team and takes home valuable lessons. This principle forms the basis for Engaging Youth, Serving Community, a 4-H program through which rural young people and adults gain experience, confidence, and leadership skills as they work in partnership to improve their communities.

In 2005, CTAHR extension agents Joan Chong, Laura Jean Kawamura, and Rose Saito brought together five youth-adult partnership teams from four counties for a statewide training session. The 10 adults and 20 young people identified community needs, developed action plans, secured resources, forged collaborations, and implemented a diverse set of projects.

On Kaua'i, youths and adults decorated the dining hall of a Salvation Army soup kitchen in Līhue, creating a more welcoming environment for its patrons. The O'ahu team made visits to kūpuna at the Hale Mohalu care home to help plan and carry out educational programs for residents. Youth-adult partners on Maui provided the National Guard Family Readiness Group with fun activities for children while family members prepared for the stresses of deployment. An East Hawai'i team gave hygiene kits and blankets to neighbors in need and volunteered at a transitional housing site by beautifying the surroundings, donating school supplies, and providing learning opportunities for the children. In West Hawai'i, the team organized healthy living workshops for the public and provided free diabetes screenings and medical binders to senior citizens.

Before funding expired in 2006, the original five teams subsequently trained an additional 40 teens and 20 adults, tripling the program's size and extending its reach to

Moloka'i, O'ahu's Kūhiō Park Terrace, and the East Hawai'i homestead community of Keaukaha. New projects included decorating a second soup kitchen, beach clean-up, recycling, community basketball, a health fair, community safety outreach, and help with preservation of 'Iolani Palace. New funding sources have since been found for additional youth-adult partnership projects, and the partnership model has been integrated into other 4-H activities to better address community needs.



*Youths and adults work together during a beach cleanup
event on Kaua'i.*

Sustaining Traditions by Restoring Forests

Invasive plants in the understory of Hawai'i's forests jeopardize native biodiversity and limit the abundance of culturally significant native plants. Cynthia Nazario-Leary, a doctoral candidate studying with agroforestry professor Travis Idol, is investigating how forest restoration efforts can support Native Hawaiian cultural practices by providing new sources of native plants that can be harvested on a sustainable basis.

At UH Mānoa's Lyon Arboretum in 2005 and 2006, Nazario-Leary planted research plots with three native species chosen for their ecological functions and traditional uses. Māmaki (*Pipturus albidus*), a small tree or shrub whose leaves are used to make tea, may eventually attain a height comparable to the invasive shrub that currently dominates the site, shoebutton ardesia (*Ardesia elliptica*). Palapalai (*Microlepia strigosa*), a fern used in lei, provides ground cover that can shade out ardesia seedlings. Maile (*Alyxia oliviformis*), a slow-growing vine or shrub from which fragrant lei are made, is an economically valuable and limited resource.

Nazario-Leary compared native plants grown in plots from which the ardesia had been cleared with native plants transplanted into intact, non-native forest. The native plants grew best at the cleared sites, where they effectively suppressed reinvasion by ardesia. Both the palapalai and the maile have established well. The māmaki proved susceptible to mite damage and drought during establishment, but the surviving plants have flowered and fruited. Arboretum staff are now outplanting palapalai widely to restore other areas and suppress invasive understory species.

The project's first native plant harvest was held on July 17, 2008 in collaboration with the Nā Pua No'eau Summer Institute program, through which Native Hawaiian high-school students explore the natural and environmental sciences within a framework of Hawaiian values, culture, and language. Students gathered palapalai fronds, collected data to assess frond traits and characterize sustainable yields, and made lei for hula. Nazario-Leary's research illustrates how cultural practitioners and land managers can create educational opportunities while increasing the availability of culturally important native plant resources.

Collaborative forest restoration research can support Native Hawaiian cultural practices.



Photos: Cynthia Nazario-Leary

To help determine sustainable harvest levels, Ceysha Akau-Lopez and Erin Garabitez measure the palapalai fronds they've gathered and record the data.



High-school students from the Nā Pua No'eau program weave the harvested fronds into lei.

Nā Pua No'eau students on the trail at Lyon Arboretum.

An epidemic of foodborne illness linked to Hawai'i produce could do lasting harm to our agricultural industry.

Keeping Food and Farmworkers Safe

Hear the name “*E. coli*,” and your next thought might be “spinach.” In 2006, California-grown spinach contaminated with *E. coli* O157:H7 sickened nearly 200 individuals, causing over \$77 million in industry losses and three deaths. An epidemic of foodborne illness linked to Hawai'i produce could do lasting harm to our

agricultural industry and our reputation as a safe tourist destination. Even worse, it could needlessly injure and kill.

The Hawaii Farm Bureau Federation has funded a program through which CTAHR has coached more than 40 growers in safe food production and best handling practices. Program manager Jim Hollyer, educator Luisa Castro, and extension agents Lynn Nakamura-Tengan and Jari Sugano offer free on-farm safety coaching to limit contamination of produce, especially ground-grown crops that may be eaten raw. Also participating are food science professor Yong Li, who performs microbiological testing, and coordinator Vanessa Troegner, who has helped design signage, hand-washing stations, and caddies to keep harvest baskets off the ground.

During an initial farm review, the “coach” will assess more than 40 criteria affecting worker and consumer health, including hygiene and first-aid equipment, recordkeeping, pesticide handling procedures, sanitizing all surfaces that come into contact with food, and keeping animals away from the production and packing areas. At a follow-up meeting, the coach conducts a mock audit identical to the audits that the Hawai'i Department of Agriculture performs on behalf of food-safety certifier PrimusLabs.com. 30 farms have completed the mock audit. Of these, 14 are now PrimusLabs-certified; the remaining 16 are in the process of gaining certification, which can open new retail markets to growers.

The program builds on past food safety efforts such as the development of a solar-powered water pasteurizer to provide sterile water for washing produce at remote sites. Future goals include the development of rapid assays for foodborne pathogens that can be conducted in the field.



Photos provided by Jim Hollyer

Extension agents Lynn Nakamura-Tengan and Randall Hamasaki conduct a farm review on Maui.



Farm safety educator Luisa Castro collects water samples during a farm certification mock audit.

Help for Kīlauea's Neighbors

Kīlauea is often called the world's most active volcano. While its spectacular lava flows help draw 1.5 million visitors to Hawai'i Volcanoes National Park each year, Kīlauea also releases sulfur dioxide and other acid-forming gases that can create "vog" (volcanic smog). The opening of a new vent on March 12, 2008 dramatically increased these emissions, impacting communities nearby and downwind. Diverse expertise and close relationships with clients allow CTAHR's Hawai'i County extension faculty to offer wide-ranging aid to farmers, ranchers, and residents.

Vog can devastate crops: protea growers in Ocean View report that vog damage has cost them, on average, 40 percent of their household income. Extension agent Kelvin Sewake and plant pathology specialist Scot Nelson are looking into plant treatments that might minimize vog injury by closing leaf openings or neutralizing acidity. In a free publication available at county extension offices and on CTAHR's website*, they identify more than 50 vog-sensitive plants and suggest flushing leaves and flowers with water immediately before or after exposure to heavy vog, acid rain, or ash fall; raising the pH of acidic irrigation water with agricultural lime; and using greenhouses or limiting short-term exposure by covering plants temporarily.

Sewake is also working with extension agents Mike DuPonte and Dwight Sato and animal feed and forage specialist Mark Thorne to establish monitoring of sulfur dioxide, the principal cause of vog-related plant damage, and fluorine, which may accumulate in forage plants and harm cattle.

Hawai'i residents who rely on rainwater catchment systems receive assistance from educator Patricia Macomber. She recommends disconnecting and covering tanks during ash falls and flushing the roof and rain gutters before reconnecting the tanks. Catchment water affected by acid rain can be treated with baking soda or food-grade calcium carbonate granules to raise its pH. CTAHR offers water-testing materials at cost and has informational brochures online at www.hawaiiirain.org. Through research and outreach, the college is helping vog-affected communities weather an ongoing disaster.

*<http://www.ctahr.hawaii.edu/oc/freepubs/pdf/PD-47.pdf>

CTAHR scientists are seeking ways to minimize vog damage to Hawai'i island's agriculture businesses.



Sulfur dioxide in "vog" (volcanic smog) reacts with water in rain or plant leaves to form caustic sulfuric acid.

Among the plants susceptible to leaf injury caused by vog are protea, cymbidium orchid, and macadamia seedlings.

Photos by K. Sewake, R. Anderson, and M. Nagao.



Photo: Patricia Macomber

To protect catchment water from contamination during ash falls, disconnect the tank from the roof and cover it. Flush the roof and rain gutters before reconnecting the tank.

A volcanic plume rises from a vent that opened March 12, 2008 in Kīlauea's Halema'uma'u Crater.

Photo: Kelvin Sewake

COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES

University of Hawai'i at Mānoa

3050 Maile Way, Gilmore Hall 202

Honolulu, HI 96822

www.ctahr.hawaii.edu

ADMINISTRATION

Andrew G. Hashimoto, Dean and Director, 808-956-8234

C.Y. Hu, Associate Dean and Associate Director for Research, 808-956-8131

Wayne Nishijima, Associate Dean and Associate Director for Cooperative Extension, 808-956-8397

Charles Kinoshita, Associate Dean for Academic and Student Affairs, 808-956-6997

Susan Miyasaka, Interim County Administrator, Hawai'i, 808-981-2823

Roy Yamakawa, County Administrator, Kaua'i, 808-274-3471

Harold Keyser, County Administrator, Maui, 808-244-3242

Ray Uchida, County Administrator, O'ahu, 808-956-7138

DEPARTMENTS

Family and Consumer Sciences

Barbara Yee, Chair, 808-956-8105

Human Nutrition, Food and Animal Sciences

James Carpenter, Chair, 808-956-8236

Molecular Biosciences and Bioengineering

Harry Ako, Chair, 808-956-8384

Natural Resources and Environmental Management

Carl Evensen, Chair, 808-956-8708

Plant and Environmental Protection Sciences

J. Kenneth Grace, Chair, 808-956-7076

Tropical Plant and Soil Sciences

Robert E. Paull, Chair, 808-956-8351

Impact Report Staff

Miles Hakoda, Director, Office of Communication Services

Kathleen Vickers, Writer

Dale Evans, Editor

Sharon Tasato, Circulation Services

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