CTAHR Research News

November 2008
Volume 4, Issue 9

Dan Jenkins, back left, takes a time out with his laboratory staff.

High tech agricultural tool development

Big island tea workshop

Multiple CTAHR-China MOUs signed

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From the Associate Dean and Associate Director for Research

Have you noticed that daylight is shorter these days? I forgot that winter does exist even in Hawaii! The daily low dropped to 69° F the other day, and I saw many long sleeves shirts and jackets on campus. As the big Turkey Day is approaching, I hope this newsletter is finding you in good health and spirit. No, it does not seem the economy has found the bottom yet; however, some economists have predicted the bottom is near, and we should have a full recovery by some times in 2010. So, there is hope after all. As the chancellor's office continues to issue warning on budget shortfall, we are working with the department chairs and county administrators to tighten our collective belt, and position ourselves for the next round of budget cut, estimated at 5% of our total budget, or $1.3 million in real dollars. Most of these will be covered by the vacant positions, as we really do not have much fat in our operating budget. As I mentioned here last month, we have filled several positions recently, and we are continuing our interviewing with approved positions. We are indeed quite fortunate in timing. Hopefully, we can turn the corner in 2010.

We are proud to introduce to you Dr. Daniel Jenkins, an associate professor in our Molecular Bioscience and Bioengineering Department, in our cover story this issue. Dr. Jenkins represents a new generation of bioengineers who used modern molecular biology, in conjunction of nanotechnology, to find solutions for problems challenging our stakeholders. Dr. Jenkins' research on developing biosensors to detect microbial DNA has practical implications in food safety, biosecurity, and detection of invasive species. His research has many collaborators within and outside of our college. It is a truly multidisciplinary approach to an important issue that will bear fruits in the near future. His research also engages many graduate and undergraduate students, as well as post-doc and technicians. Dan has demonstrated that he is a talented researcher and a dedicated teacher. He has been successful in bringing competitive grants, and publishing the research results in quality refereed journals. CTAHR is truly fortunate to have Dr. Dan Jenkins as a faculty member.

Our office sponsored Virginia Easton-Smith and Yong Li to attend the USDA/CSREES Grantsmanship workshop at Salt Lake City in early October. They filed a report to share their experience. You may want to take advantage of the future workshops when they become available. In addition to our regular columns of grants and calabash, Stuart Nakamoto contributed a piece on the tea workshop he and others conducted in September. Two tea specialists from Tea Research Institute of China also attended to interact with our staff and stakeholders. Tremendous opportunities exist for us to establish further cooperation and collaborations with our Chinese colleagues. My brief report on a recent China trip we made presents some of the opportunities.

Keep your spirit high, and wear long sleeves if you must! Happy Thanksgiving to you and your family!

C.Y. Hu
Associate Dean and Associate Director for Research

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Engineering new tools to protect agriculture in Hawaii

By Daniel M. Jenkins
Associate Professor
Department of Molecular Biosciences and Bioenginnering

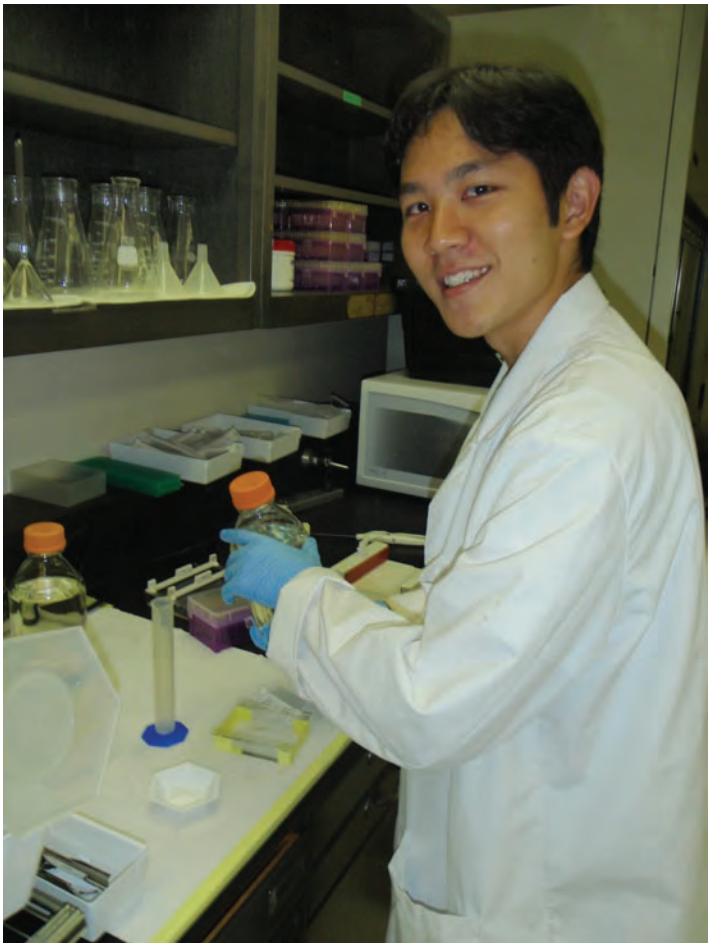
(L to R) Henry Cheng, Jennifer Fukagawa, Nadine Kawabata, Adam Miyamoto, Daniel Jenkins, and Ryo Kubo in the Pope greenhouse where plants infected with bacterial wilt are sampled for analysis.

To keep pace with growing populations and their reliance on a dependable supply of food and other biological materials, agricultural engineers contributed enormously to the productivity of the agricultural sector throughout the twentieth century. Important achievements include innovations in irrigation and drainage, agricultural mechanization, processing of food and fiber materials, and the development of new technologies for producing useful products from low-value agricultural residues. Likewise, related advances such as rural electrification and biological waste treatment have improved the quality of human life, improved sanitation and community health, and helped preserve the quality of natural habitats throughout the world. As we adapt to new conditions like climate change, increasing pressure on finite fossil fuel energy, increasing demand for less chemical-intensive agricultural systems, economic volatility and biological vulnerability of traditional commodity crops, the challenges that biological and agricultural engineers face in the new century are equal if not greater in scope than those from the previous one. Consequently exciting new opportunities are emerging, from developing innovative bioconversion processes to produce renewable fuels from crop residues and other biological feedstocks to designing effective tools and strategies for managing agricultural and natural resources. The work in our lab is focused on engineering user friendly support systems to help ensure the safety and security of food production.

Farmers today are by necessity well-versed in a wide array of knowledge areas; not only do they rely

on an intimate and almost intuitive understanding of agronomic sciences, but to compete effectively they increasingly must be competent in such disparate areas as business and marketing, machine repair, genetics, and information technology. Among the emerging threats to the viability of agricultural business is the spread of destructive plant and animal pathogens through increasing trade in food and other biological products worldwide, and devastating losses of consumer confidence associated with potential implications in outbreaks of food-borne illness. To help address these potential problems, my lab is primarily working on developing gene-based diagnostic methods for bacterial pathogens to facilitate their detection and mitigate their spread and/or introduction into the food supply. Given the limited time and resources that farmers have to learn and use new tools, our objectives are not only to develop technologies that are reliable and accurate, but to develop detection technologies that can be incorporated onto simple, cost-effective platforms that can be used by farmers and regulatory agencies to improve food safety and security.

One of the most commercially successful products of "biological engineering" is the home glucose test kit. Perhaps the greatest factor underlying its success is the simplicity of the system where disposable test strips are plugged into an inexpensive reader and results are displayed within seconds. This has revolutionized the lives of millions of diabetic patients, who are now liberated from the clinical setting and can perform the simple test and administer hormone therapies to control their blood sugar at home. If farmers and regulators had a similarly simple test to detect pathogens in the field or on commercially traded materials, it could dramatically improve the ability to provide an early warning and response system. For detection we are targeting unique DNA sequences from the selected bacteria, both to improve the ability to discriminate highly-virulent strains from other less harmful strains of the same species, and to be able to readily adapt the platform for detection of new pathogens based on easily obtainable DNA sequence information. However, the challenges of rapidly detecting specific pathogens from their unique DNA sequences in complex media such as soil, plant tissue, or irrigation water are formidable. While glucose is a simple carbohydrate which is relatively abundant in biological fluids and which is metabolized by a number of enzymes in reactions that can be directly detected by electrochemical or optical

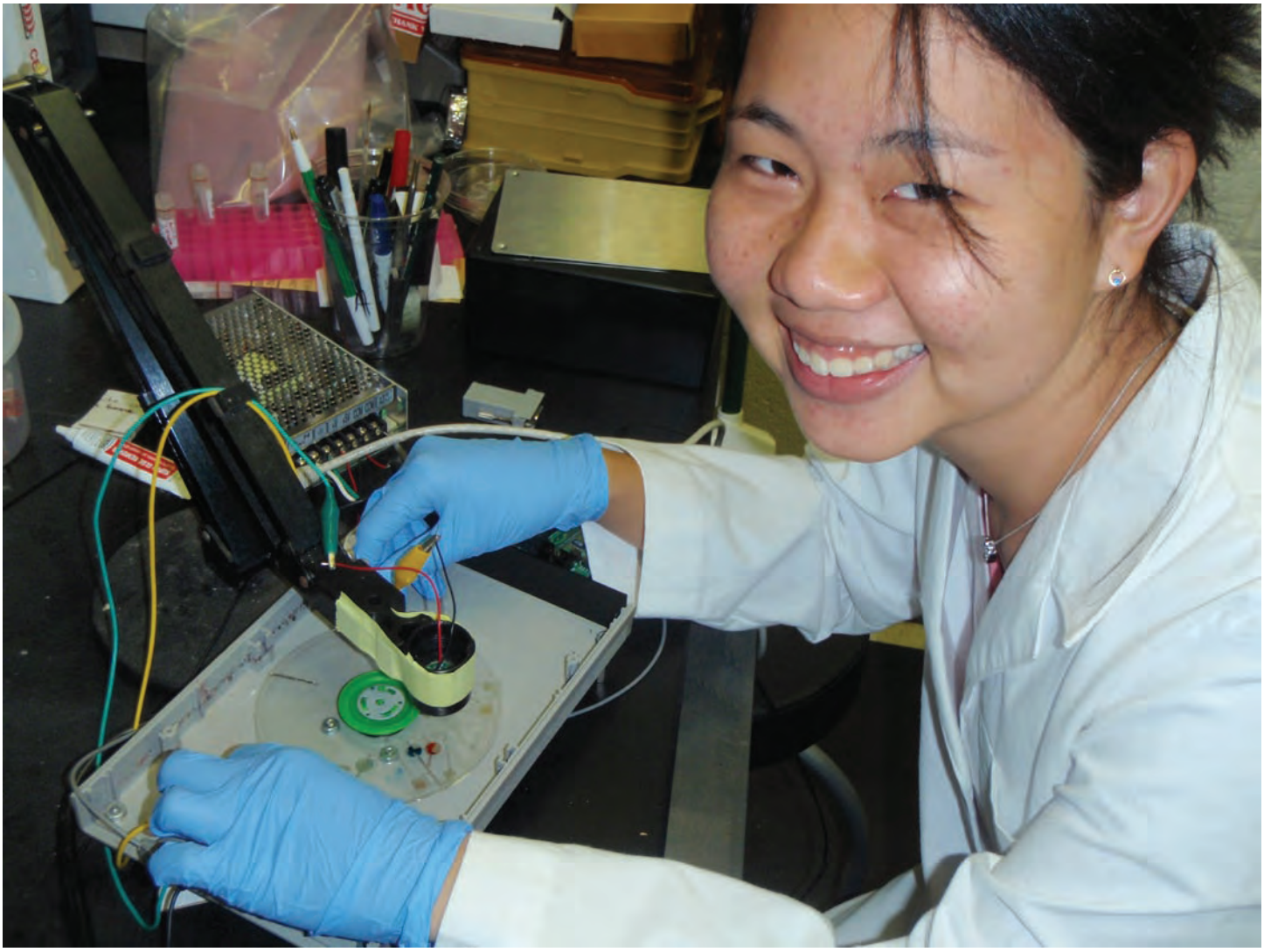


Adam Miyamoto preparing an agarose gel to test the products of his isothermal DNA amplification reaction to detect *Ralstonia solanacearum*.

devices, DNA is a complex biopolymer bound up inside the cell membrane, and often the DNA sequence being sought is highly diluted among other DNA and contaminants from the environment which can make it more difficult to detect. Addressing these challenges requires innovation at the intersection of biology and engineering, and I'm pleased to have this opportunity to give a brief overview of some of the approaches being used by my students and our collaborators.

Bioinformatics and Strain Typing

Continuing improvements in technologies to sequence DNA, the molecular code carrying instructions for all of the other building blocks of life, have resulted in a rapidly accumulating set of sequence data for numerous organisms, from plants and animals to bacteria and viruses. The differences in the DNA codes among different species and even among different individuals accounts largely for variations both in physical appearance and in more subtle differences in biological



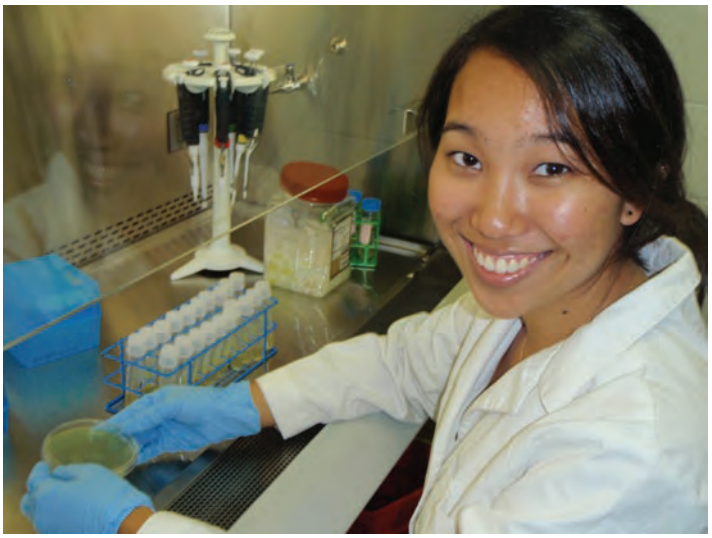
Nadine Kawabata tests her microfluidics platform on a transparent compact disc.

and biochemical characteristics. Our objective is to use differences in DNA "fingerprints" to identify pathogenic organisms just like a crime lab uses DNA fingerprints to identify a suspect in a criminal case. Before we can begin the work in our lab, we rely heavily on the computational efforts of bioinformaticists such as Dr. **Gernot Presting** in CTAHR and Dr. Mark Schell at the University of Georgia, who among other things sift through vast amounts of genetic data in order to find sequences which are unique to particular populations of a organisms that we are interested in. We also rely very heavily on the collaboration of CTAHR bacteriologist Dr. **Anne Alvarez** (PEPS), who has compiled an extraordinary collection of plant pathogenic bacteria isolated from crops and soils throughout the world. Using her collections we can genotype various populations of a pathogen to test the selectivity of our methods, and do controlled greenhouse and lab studies to demonstrate our technologies on samples taken from real infected plant tissues and soil samples.

Cell Capture/ Enrichment/ DNA Extraction

Due to the complex nature of environmental samples and the very low numbers of bacteria required to cause infection, one of the main challenges to bacterial detection remains the recovery of the pathogen DNA from the sample and the exclusion of all interfering compounds. One of our MBBE collaborators, Dr. **Winston Su** is helping on this front by experimenting with a novel separator where cells are captured on magnetic beads tumbling in a sweeping and alternating magnetic field. Since DNA extraction from the cell is also traditionally a laborious process, undergraduate student **Nadine Kawabata** is working on developing new methods to allow automated cell capture and DNA extraction, through immunoaffinity capture onto a

Henry Cheng tests the performance of a gold film electrode patterned from a compact disc.



Jennifer Fukagawa inspects a plate where *E. coli* are expressing a lysing protein against the bacterial wilt disease agent *Ralstonia solanacearum*.

disposable polymer substrate and subsequent cell lysis using generic lysing proteins, other more specifically targeted lysing proteins such as one isolated from a bacteriophage (a virus that infects bacteria) by graduate student **Kwesi Kutin**, or other lysogenic compounds used by PEPS graduate student **Mathews Paret** for biological control. Undergraduate student **Jennifer Fukagawa** under the mentorship of Kwesi Kutin and his fellow graduate student **Ryo Kubota** has been working on transforming *E. coli* to express the bacteriophage lysing protein for further study.

Molecular Tools for Detecting Metabolically Active Bacteria

One of the problems with many bacterial detection methods, including those based on detection of DNA sequences, is that it is difficult to distinguish metabolically active cells which can cause disease from dead cells which cannot. This is particularly a problem where effective treatment methods such as pasteurization can be lethal to pathogens but still leave a residue of DNA and other materials that can result in a "positive" test. Kwesi Kutin successfully developed a new technique to rapidly detect only metabolically active cells of the bacterial wilt pathogen *Ralstonia solanacearum* by incubating a sample of the pathogen with bacteriophage isolated from Oahu soils and detecting proliferation of the bacteriophage DNA. Because bacteriophage naturally lyse the host cell after replicating within the cell, and a large number of unpackaged bacteriophage DNA is subsequently ejected into the sample, the method also has the advantage that it does not require a DNA extraction step from the cell. In addition, Kwesi showed that pathogen counts as low as about 10^2 CFU/ml in infected plant tissue could be detected directly within about two hours- a result several orders of magnitude more sensitive and about as fast as traditional PCR-based methods alone, and days faster than tests involving bacterial culturing. To find alternative methods for discriminating metabolically active cells from dead ones which can be more readily adaptable to detection of other bacterial isolates, we are collaborating with a colleague in HNFAS, Dr. **Yong Li**, to develop molecular methods to exclude DNA from dead cells prior to the detection step.

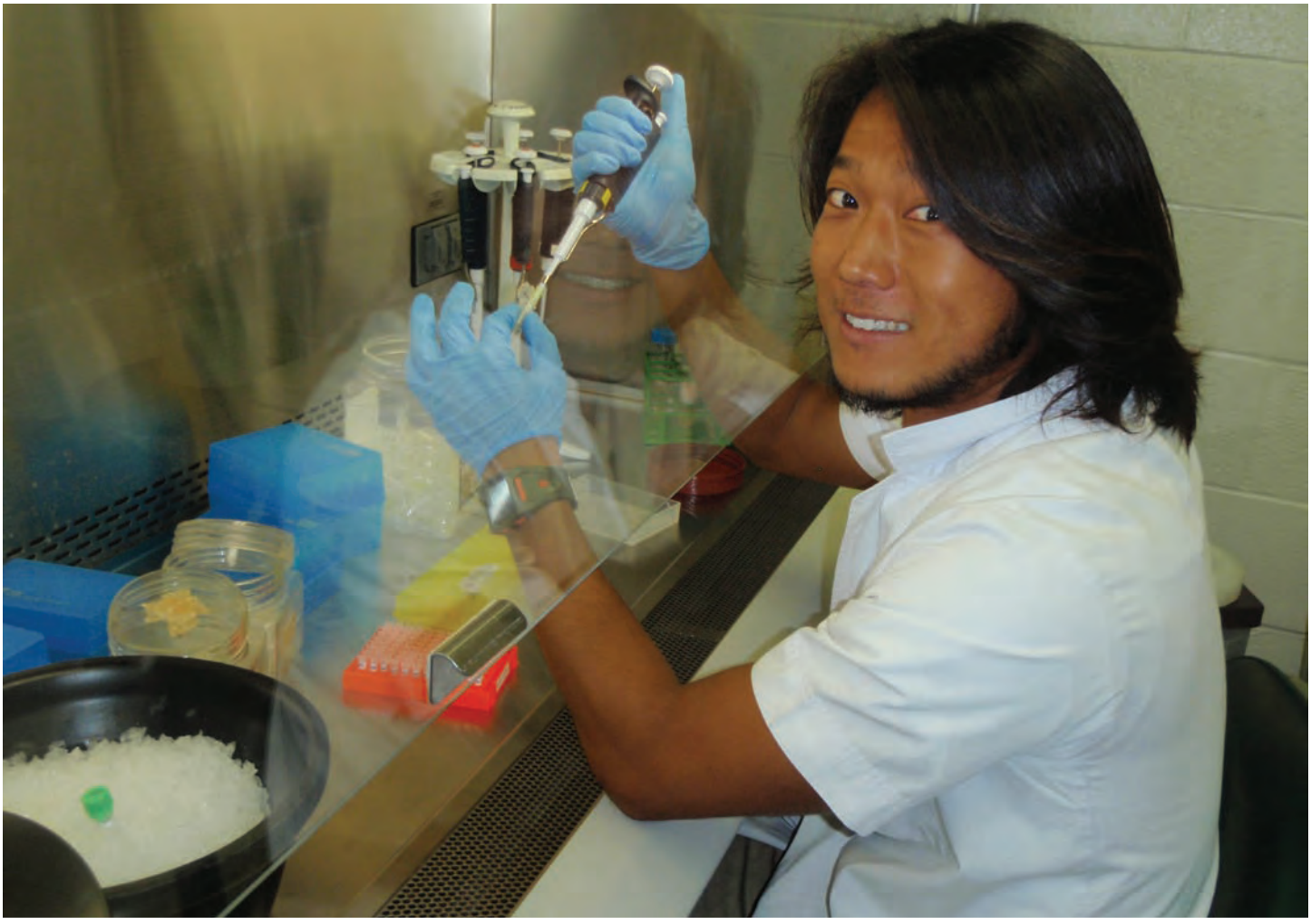
Isothermal DNA Replication

To increase the amount of a particular DNA segment in a sample to a detectable amount it is standard practice to "amplify" the DNA using natural enzymes which copy the DNA. DNA amplification typically involves a process called Polymerase Chain Reaction (PCR) in which a selected DNA fragment is copied each time the temperature is cycled up (to separate the double stranded molecule into single strands) and back down (to allow an enzyme to synthesize new segments of DNA onto the single stranded templates to make two new double stranded copies). While the DNA copy number amplifies exponentially with each thermal cycle, the rate of amplification is limited by the speed at which the sample can be heated and subsequently cooled. To remove this limitation on the cycling speed,

simplify the temperature control, and reduce power requirements, our lab is dedicating a large effort at developing isothermal methods of DNA amplification in which DNA is copied continuously at a single temperature. Graduate student Ryo Kubota is leading these efforts, having successfully used molecular modeling techniques to design a variety of primer sets to allow continuous isothermal amplification of *R. solanacearum* DNA using a method called Loop-mediated AMPlification (LAMP). Remarkably, using sequence information provided by Dr. Mark Schell, Ryo has also designed primers to detect the pathogen at the subspecies level, so that he can selectively detect bacterial populations classified as a "select agent" by the USDA. One of the advantages of the LAMP process is that it results in an amplicon (amplification product) which has repeated loops of single stranded DNA that can be directly detected using a variety of molecular methods. In addition to LAMP, **Ryo** is supervising undergraduate student **Adam Miyamoto** in his efforts to adapt another isothermal amplification method called Rolling Circle Amplification (RCA) for detection of bacterial DNA. This new method appears promising, and results in an engineered amplicon which can be detected with about two orders of magnitude better sensitivity than typical copies of genomic DNA.

Engineering a DNA Detection System

Using the simplicity of the disposable glucose electrode as a model, we have also dedicated a significant effort at engineering simple disposable detection technologies for DNA to simplify the analysis and to help prevent cross contamination between samples. To allow isothermal amplification to be achieved directly on the electrode and allow control of temperature to improve the selectivity of DNA hybridization/ detection reactions, we engineered a disposable screen printed electrode with on-board elements to allow temperature control to within 0.5 °C with a single universal calibration. Undergraduate student **Michael Teruel** contributed to helping adapt



Ryo Kubota preparing an Loop Mediated Isothermal Amplification reaction for detection of *Ralstonia solanacearum* race 3 biovar 2, a potential bioterrorist agent.

this temperature control concept to a plastic electrode system to improve in the heating efficiency, and undergraduate student **Henry Cheng** has successfully developed high quality disposable electrodes patterned from a gold compact disc (CD). Dr. Diego Barrettino, a collaborator at the University of Glasgow, is developing a monolithic electrochemical DNA microarray based on this technology which, if successful, will allow patterning and reading of microarrays using extremely simple electronic addressing (e.g., a USB port) instead of using sophisticated optical instruments as is the current practice. To provide different alternatives for detection on different platforms, Ryo Kubota is working in parallel to demonstrate detection using more traditional optical DNA probes.

Unified Disposable Platform

As one alternative to integrate the entire process from sample enrichment to detection we are also investigating a CD based microfluidics platform where different reactions and processes can be sequenced through microchannels and wells patterned into the CD. The reaction sequencing is controlled by the centrifugal force required to overcome the hydraulic resistance of different valves patterned into the CD, such that the whole process can be automated on a simple brushless CD motor without the need for expensive pumps and valves. Undergraduate student Nadine Kawabata has successfully demonstrated this technology using customized patterns to sequence a series of reactions on a CD, and is currently working on adapting this technology for an automated DNA extraction tool. We are also initiating collaborations with Dr. John Ryan at the Hawaii Department of Agriculture to integrate this platform onto their internationally renowned RFID tracking system for food distribution in Hawaii, to automatically upload test results to the on-line database and set alarms in the case of a positive result.

Daniel M. Jenkins

Hometown: Brooksville, FL

Joined CTAHR: 2002

Education History: B.S., Agricultural & Biological Engineering, Cornell University (1995), M. Eng., Agricultural & Biological Engineering, Cornell University (1996). Ph.D., Biological and Agricultural Engineering, University of California at Davis (2001).

Specialization: Sensors and Instrumentation.

Current Work: Engineering molecular tools for pathogen detection.

Languages Spoken: English, Spanish.

Selected Grants: A model for monitoring ecological impacts of a plant biosecurity release event using conventional and novel methodologies. *USDA-NRI Plant Biosecurity Program*. $500,000.

Selected Publications:

Jenkins, D. M., C. Song, S. Fares, H. Cheng, and D. Barrettino. 2008. Disposable thermostated electrode system for temperature dependent electrochemical measurements. *Sensors and Actuators B (Chemical)*. (In Press).

Kubota, R., D. M. Jenkins, B. Vine, and A. Alvarez. 2008. Detection of *Ralstonia solanacearum* by Loop-mediated isothermal AMPlification method (LAMP). *Phytopathology*. 98(9):1045-1051.

Jenkins, D. M., B. Chami, M. Kreuzer, G. Presting, A. Alvarez, and B. Y. Liaw. 2006 Hybridization probe for femtomolar quantification of selected nucleic acids on a disposable electrode. *Analytical Chemistry*. 78(7):2314-2318.

Aloha to Harriet Iwamura!

After serving several Deans, Interim Deans and other administrators, Mrs. Harriet Iwamura is retiring on November 30, 2008. We wish her a wonderful retirement and will miss her greatly.

A time to give thanks

By Doug Vincent
Special Program Director for Grants and Contracts

November is a special month – a time when we pause and reflect about what we have to be thankful for. Given the difficult economic times and the budget challenges the University of Hawaii faces and will continue to face going forward, it is important to pause during this time and think about the many things for which we are thankful. I'm trying to avoid sounding like Paul Axtell, our conversations consultant that worked with CTAHR several years ago, but I do need to ask you "When was the last time you sent a note of thanks to someone?" As part of Paul Axtell's training, he had us send a notes of thanks to individuals in CTAHR who we appreciate but had not yet or recently expressed our thanks. Being complimentary and grateful for someone's efforts on your behalf is a rather inexpensive way to build morale. It makes you feel better for telling someone and the person receiving the compliment or the note of thanks – well, it just about as good as a dozen roses. Two recent instances of someone thanking individuals came across my or CY's desk recently. If I may, quote them, I'd like to illustrate what these kinds of things can do.

The first was an e-mail from Jody Smith (NREM) to Ted Radovich (TPSS), Ted's student, Christina Theocharis, and to Mark Wright of PEPS.

> *I just wanted to quickly tell you that feedback from the people with whom I work on the new set of field cards of beneficial insects for Hawaii has been tremendous.*
>
> *My clients are delighted to have these very practical materials available and it reflects very positively on CTAHR.*
>
> *My compliments to Dr. Radovich, to his student Christine, and to Dr. Wright for preparing these. They are a superb extension product and helpful for academic use as well.*

The second was a recent e-mail from Mark Thorne of HNFAS to Erin Matsuda in the CTAHR fiscal office:

> *Thank you very much for the clear and concise statement of procedures for reimbursing non-employees. All too often I think it is assumed that the PIs know exactly how to navigate all of the procedural red-tape and this is simply not true. For me I sometimes feel like I am stumbling around in the dark trying to determine which steps I need to take to get something done. What you have provided here is valuable to all PIs, especially those just coming on board. In fact, this could/should be compiled into a one page "how to" flyer and circulated to all CTAHR PIs. With a little coordination with OCS this and other procedural flyers could be produced and made accessible for PIs to quickly access and use. This, I think, would help us all better navigate the procedural seas of the fiscal office and make everyone's jobs easier.*
>
> *Thanks again Erin. I very much appreciate your professionalism, efficiency, and helpfulness.*

The bottom line is that CTAHR is a large extended ohana and with every family, we have our challenges and difficulties. At the end of the day, we're all here to do important work to serve our stakeholders. And we need each other's help – so when was the last time you took time out of your busy schedule to give thanks to someone who helped you do your important work? As we approach the Thanksgiving holiday, think about those you appreciate in CTAHR and let them know about it!

Tea rooting workshop

By Stuart Nakamoto

Specialist
Department of Human Nutrition, Food and Animal Sciences

On September 18, 2008, the Mealani Research Station hosted a workshop on the In-Ground Procedure for Rooting Tea Cuttings followed by presentations by two of China's leading tea researchers, Drs. Cheng and Lin of the Tea Research Institute, China Academy of Agricultural Sciences (TRICAAS). National Center for Tea Improvement. Support for this research and workshop were provided by County of Hawaii Research and Development, Hawaii State Agribusiness Development Corporation, USDA, and CTAHR.

In the morning workshop, participants learned of a simple, low cost method that has proven to be very effective at Mealani. This technique was adapted from methods used in Asia, with modifications from trial and error for local conditions. Rooted cuttings are produced in as little as nine months, ready for transplant into the field.

The major feature of this method is a shade and polyfilm tunnel covering plantings in a raised soil bed. CTAHR faculty Stuart T. Nakamoto and Randall Hamasaki narrated as Farm Manager Milton Yamasaki and the Mealani crew demonstrated the various steps from bed preparation and setup through cutting selection, the timing of tunnel components, and the eventual "harvest" of rooted plants. Participants received a publication detailing the method[1] several tea publications and tea plants that could eventually serve as the source of their own cuttings.

Immediately following the workshop, participants were treated to excellent presentations by two of the top tea experts from China. China is the origin of the tea plant and it was the Chinese who first cultivated tea. As of 2007, there were 80 million tea farmers in China who produced 1.1 million tons of tea. Dr. Hao Cheng is a professor and the Director of the germplasm development program at TRICAAS and Dr. Zhi Lin is a professor and Deputy Director of the TRICAAS Tea Process Engineering Research Centre. TRICAAS and CTAHR have a memorandum of agreement. CTAHR signed a collaborative MOU with the Tea Research Institute last year. Drs. Cheng and Lin's visit was one of the exchange activities we have planned. Alvin Huang visited Tea Research Institute last week. We hope to learn as much as we can from them.

Dr. Cheng spoke on Chinese tea varieties for different end products. Tea (*Camellia sinensis*) plants are highly diverse and come with many types of leaf sizes, shapes, and colors and vary considerably in their polyphenol and amino acid contents. Likewise, China produces a wide variety of tea products such as green, oolong, and black teas that come in many shapes such as needle, flat, spiral, curled, pearl, etc.. He described the China tea variety classification system and how plant characteristics were targeted for various tea products. For example, high amino acid content is desirable for green teas, and suitable varieties are typically characterized by smaller, narrow leaves. TRICAAS has over 2500 varieties in their collection.

Dr. Lin discussed Chinese tea processing and quality evaluation. He provided a history of tea processing in China and the classification of Chinese teas including the usual green-oolong-black as well as others such as pu-er and teguanying, and discussed specific processing methods as well as sensory evaluation methods developed for tea quality control. Dr. Lin provided very helpful answers to the many questions that were asked.

There was fruitful interaction with the project team and station crew on tea growing and processing techniques used at Mealani, and a tasting session with project teas. The Chinese tea experts visited the Hawaii Tea Society the next day and gave another seminar with similar content on the Manoa campus on the following Monday (September 22). This was a great start to what we hope to be a productive and rewarding collaboration between our organizations. Our thanks to Alvin Huang for all his help with our instructors.

Mealani tea field.

Rooting tea cutting.

Alvin Huang, right, leads a discussion with Chinese visitors.

Workshop participants watching demonstration.

(See) Yamasaki, Milton, Randall Hamasaki, Dwight Sato, Stuart Nakamoto. March 2008. *In-ground procedure for rooting tea cuttings*. College of Tropical Agr. and Human Resources, University of Hawaii at Manoa. SCM-23, 4p.

USDA Grantsmanship workshop - Salt Lake City, UT

By Virgina Easton Smith

Assistant Extension Agent
Tropical Plant and Soil Sciences

By Yong Li

Assistant Professor
Department of Human Nutrition, Food and Animal Sciences

The workshop provided an update on various CSREES competitive grants programs, including the National Research Initiative (NRI), Integrated Research, Education, Extension Program, and Higher Education Programs. This workshop was especially helpful to junior faculty or those who have limited grantsmanship experience.

Several steps were suggested to be successful in obtaining USDA-CSREES grants, starting naturally with looking for the announcements at http://www.csrees.usda.gov/business/business.html. Once you find a grant that might be appropriate to your program the next is to thoroughly read the RFA and any other program materials.

It was stressed repeatedly that anyone interested in applying for a specific grant should contact the National Program Leader to discuss whether that grant program is the best fit for your application. The Program Leaders repeatedly encouraged people to contact them with any questions regarding the grant application or program.

It was also stressed that serving on peer review panels, although a big time commitment, is an excellent way to become a more successful proposal writer. After reviewing and discussing so many grant proposals you get a much better understanding of what a good write-up involves.

Something else that was emphasized is that integrated grants, which can include any combination of research, extension and education and which are strongly encouraged, must fully incorporate the components and not just "tack on" an extension component.

Effective October 1 of next year, the National Institute of Food and Agriculture (NIFA) will replace CSREES. The new Agriculture and Food Research Initiative (AFRI) will combine aspects of NRI and the Initiative for Future Agriculture and Food Systems (IFAFS).

(L-r) Virgina Easton Smith and Yong Li at the USDA workshop.

CTAHR signs many MOU in China

By CY Hu
Associate Dean and Associate Director for Research

Dean Hashimoto and I traveled to southern China for two weeks in late October and early November. The objectives of the trip were to foster academic exchanges between CTAHR and eight Chinese institutions of higher education in southern China. This trip was supported by the CTAHR China Fund, established in 1987 with a generous donation from Mrs. Bernice Loui. The CTAHR China Fund was established to support exchange programs between CTAHR and institutes and colleges in southern China.

The eight institutions we visited were: South China Agricultural University, Zhongkai University of Agriculture and Engineering and South China Botanical Garden, all in Guangzhou; Hainan University, and Chinese Academy of Tropical Agricultural Sciences, both on the island of Hainan; Yunnan Agricultural University and Kunming Institute of Botany, both in Kunming; and the Xishaunbanna Tropical Botanical Garden. The last three are in the Yunnan Province. All of these institutions are located in the subtropical region of China, with similar natural environmentsal conditions to those in Hawaii.

Dean Hashimoto signed MOU's on behalf of UHM and CTAHR with both the Zhongkai University and Hainan University exchange programs. In addition, MOU's between CTAHR and Kunming Institute of Botany and XTBG were signed during this visit. Of the eight institutions that we visited, only two have no current formal relationship with CTAHR: Chinese Academy of Tropical Agricultural Sciences (CATAS) and Yunnan Agricultural University. CATAS has a long relationship with UHM, and would like to renew our MOU. CATAS formally separated from South China University of Tropical Agriculture in 2007 and the latter merged with Hainan University. Yunnan Agricultural University also wishes to establish a formal cooperative agreement with the UHM.

All eight Chinese institutions we visited expressed their interests in establishing collaborative research with our faculty members and they are interested in placing their graduate students in our research programs. Zhongkai, South China Agricultural University, Hainan University, and Yunnan Agricultural University want to send their undergraduate students to CTAHR for one to two-years as exchange students. They believe the Hawaii experience will be a big draw for their own recruiting. Yunnan Agricultural University currently has a two-year program with Wageningen University, which is a huge success and they have more than 200 students enrolled in this program each year. Zhongkai has mentioned their interest establishing a similar program with CTAHR.

The South China Botanical Garden, Kunming Institute of Botany and the Xishaunbanna Tropical Botanical Garden first established relationships with CTAHR in 1986 and this visit renewed our relationship with these three post-graduate degree granting institutes under the Chinese Academy of Sciences. All have excellent facilities and equipment and excellent funding to support research in natural resource and environmental management related issues. The South China Botanical Garden has more than 300 graduate students and Kunming Institute of Botany and the Xishaunbanna Tropical Botanical Garden have more than 200 graduate students. All three institutions are located in subtropical areas with environmental conditions very similar to those in Hawaii. Many of their graduate students can benefit from coming to CTAHR for one year of study and their scientists are happy to accommodate visits by our faculty members and graduate students to conduct collaborative research.

While in Kunming, we also visited the largest flower auction facility in Asia and the largest tea wholesale market in Kunming. The flower retail market next to the auction facility is amazing. You can buy 300 long-stem carnations for 75 cents, or a dozen roses for 45 cents! Yunnan Agricultural University has an impressive Puer Tea College and we visited their beautiful tea houses and tasted their products. South China Agricultural University has a tea science department in their horticulture college which we also visited. Both universities have strong floriculture programs with which CTAHR faculty can collaborate. In addition, all the institutions we visited have bioenergy programs and it seems every institution has a collection of Jathropa for use in biodiesel production. An interesting note is

that for the first time we saw many electric scooters in the streets of southern China, particularly in Kunming. They are so quiet that I predict they will become very popular in the US cities two years from now!

We will begin to work on a summer study program with the South China Agricultural University and student exchange programs with Zhongkai University and Yunnan Agricultural University. We will also work to formally establish cooperative agreements with Yunnan Agricultural University and the Chinese Academy of Tropical Agricultural Sciences. Please contact me if you are interested in establishing contact with colleagues in these institutions.

The following links are individual institution's announcement of our visit:

South China Botanical Garden:
http://www.scib.ac.cn/english/news/news.asp?NewsID=1705

South China Agricultural University:
http://english.scau.edu.cn/News/t20081031_34260.htm

Xishaunbanna Tropical Botanical Garden:
http://en.xtbg.ac.cn/n531c46.aspx

Hainan University:
http://www.hainu.edu.cn/waishi/asp_hainu_show.asp?id=66802&fuji_bbsid=

Chinese Academy of Tropical Agricultural Sciences:
http://xw.catas.cn/xw/2008V_ReadNews.asp?NewsID=9104&ClassID=4

Yunnan Agricultural University
http://news.ynau.edu.cn/news/Article/2008/200810/20081031085930.html

Kunming Institute of Botany:
http://www.kib.ac.cn/Html/callin/2008110411431999.html

Zhongkai University of Agriculture and Engineering:
http://pg.zhku.edu.cn/zkxw/shownews.asp?id=1432

CTAHR farms managers meet to discuss experiment station issues

By Doug Vincent
Special Program Director for Grants and Contracts

On November 6 and 7, the Farm Managers from many of CTAHR's experiment stations met in Kamuela, on the Big Island, to discuss issues related to the management of the farms. In addition to the farm managers, the four County Administrators and three members of CTAHR's administration attended the two day meeting. The facilitated meeting sought to develop new ideas about moving the farms forward in these times of budget challenges. Farm managers and staff attending were: Roger Corrales (Waimanalo), Marla Fergerstrom (Mealani), John Gordines (Kauai), Dennis Ida (Waiakea), Angel Magno (Waiakea), David Oka (Maui), Pam Shingaki (Kula), and Milton Yamasaki (Mealani and Lalamilo). County and CTAHR administrators present were Jim Carpenter (HNFAS), Trent Hata (Komohana), Harold Keyser (Maui), Charles Kinoshita (CTAHR), Susan Miyasaka (Hawaii), Wayne Nishijima (CTAHR), Desmond Ogata (ADSC), Ray Uchida (Oahu), Doug Vincent (CTAHR), and Roy Yamakawa (Kauai). Virginia Easton-Smith (Hawaii) and Jim Hollyer (ADAP) served as facilitators and Luisa Castro and Joanne Lichty (both Hawaii) served as recorders. Presentations were made on the budget by Doug Vincent and on CTAHR's academic programs by Charly Kinoshita. As part of the meeting, the farm managers and administrators were asked to brainstorm and provide answers to the following questions:

1. What cost savings ideas to you have that are not implemented at present?
2. How could you increase the efficiency of workers, while still ensuring that the research protocols are followed exactly?
3. How could you increase the morale of workers (without increasing their pay)?
4. What activities could you possibly conduct on your station/facility that could generate revenues for your operation, without compromising research or extension programs?
5. How do you think that increased linkages with CTAHR's departments could help generate revenue or support for stations?
6. How do you think that increased linkage with CTAHR's instructional programs could help generate revenues or support for stations?
7. Given the realities of a limited budget, what could CTAHR administration do that would do that would directly support you and your station?

In the brainstorming sessions, each response was recorded and later each one attending got to vote on the highest priorities items. Each recorded response and the votes received in the prioritization session are available in the group memory. You can download the group memory. On the next day, the participants toured the Mealani and Lalamilo Stations and visited the Kanu O' Ka Aina Hawaiian Academy Charter School, on the grounds of the Lalamilo Experiment Station, and Kawamata Farms, a hydroponic tomato grower and home of Kamuela Tomato™ brand.

Luisa Castro (L) and Jim Hollyer, facilitator, explaining questions for brainstorming session.

Harold Keyser (L) and John Gordines view tea hedges at Mealani.

Milton Yamasaki explaining blueberry varieties at the Lalamilo Station.

Milton Yamasaki, Pam Shingaki, David Oka, Harold Keyser, Roy Yamakawa, Roger Corrales and Wayne Nishijima (L-R) tasting tea at Mealani.

Hydroponic Kamuela brand tomatoes grown at Kawamata Farms in Kamuela.

The research calabash

By Doug Vincent
Special Program Director for Grants and Contracts

USDA CRIS AD 421 Annual Reports Past Due
A reminder that USDA CRIS AD 421 Annual Reports (progress) or Final (termination) reports **were due by November 14, 2008.** If you haven't already done so, please enter the information as soon as possible. This information is needed to enable CTAHR to complete their annual report to USDA. If you **have a USDA grant**, including TSTAR or USDA Special grants, your annual accomplishment report will be due within 90 days of the anniversary date. If your grant is ending the final (termination) report is due 90 days of the termination date. You should receive notification from CSREES about these reports. Or you can view them at the USDA CRIS entry point here. If you have a Hatch or McIntire-Stennis project, your annual accomplishment or final report was due on **Friday, November 14, 2008**. Information on how to complete the USDA CRIS AD 421 report can be found here. Contact **Doug Vincent** at vincent@hawaii.edu if you have questions.

Important: Annual Reports Due for Environmental Health and Safety
Those of you working with biological commodities regulated by Hawaii Department of Agriculture and/or if you hold permits for biological commodities (e.g. recombinant DNA, regulated microorganisms) you need to complete your **2008 annual inventory report** for the period January 1, 2008 to December 31, 2008 by **January 12, 2009**. Contact Eleanor Low (lowelean@hawaii.edu) if you have questions. See the EHSO web site for more information.

UH Office of Research Services November Newsletter
See the November 2008 issue of the UH Office of Research Services Newsletter for information about a variety of changes implemented recently.

From the University Research Council
Peter Garrod and **Hal McArthur**, Co-Chairs of the University Research Council, which govern faculty travel awards, will **no longer accept** appeals for applications that were received **late** and/or **submitted incomplete**. See the memo here.

National Science Foundation Coming to Hawaii – December 3, 4, and 5.
Mark your calendars for December 3, 4, and 5, 2008 if you've ever had an interest in applying for **National Science Foundation** Funding. Representatives, including scientific program personnel, will be in Hawaii on **December 3, 4 and 5, 2008** for a series of workshops. The workshop series begins at **Maui Community College** on Wednesday, December 3, 2008 for a program that focuses on NSF programs of interests to community colleges and on proposal preparation. A similar workshop will be held at **Honolulu Community College** on Thursday, December 4, 2008. On **Friday, December 5**, 2008, at the **Hawaii Convention Center**, NSF will be holding a workshop for 4-year institutions and will cover the NSF proposal and merit review process and the NSF programs that cut across disciplines. Representatives from the seven NSF directorates and the Office of International Science and Engineering will make presentations on their programs and will also be available individually and in breakout sessions to answer more specific questions about potential research projects. Agenda is here and registration form is here. There is no fee for this. Send registration form by **November 25, 2008** to gwilson@nsf.gov.

TSTAR Update
We received **52 proposals from Hawaii** and another **11 proposals from the University of Guam**. We are reviewing proposals for completeness and sending proposals back to PI's should there be additional information needed. We are also classifying proposals into groups and hope to begin the review process soon. Please note, we still do not know what our funding levels will be as the Congress has not passed a federal budget for FY 2009. If you have any questions about the TSTAR program, contact the Program Manager, **Doug Vincent** at vincent@hawaii.edu.

Hawaii Cacao Industry Sets Priorities
On October 23, 2008, CTAHR hosted the Cacao Industry in a strategic planning meeting at the Oahu Urban Garden Center. Cacao farmers, chocolate processors, restaurateurs and others interested in

Hawaii Cacao and Chocolate industry met to set priorities for moving the industry forward. Cacao Specialist **Dr. Skip Bittenbender** (TPSS) hosted the meeting and **Dr. Donna Ching** (FCS) facilitated the meeting. For a summary of the group memory of the meeting, go here.

USDA to release RFA's in January 2009
We anticipate that USDA CSREES will release new Requests for Proposals for new programs in **January 2009.** Included among them will be the **Beginning Farmer and Rancher Development Program**, the **Specialty Crops Research Initiative**, and the **Agriculture and Food Research Initiative** (which replaces the National Research Initiative Competitive Grants Program). In addition, former Smith-Lever 3(d) formula funded programs, (e.g. Integrated Pest Management), are now competitive grants programs. See the USDA CSREES Web site for more information. If you are considering submitting proposals for these programs, we anticipate a 60 day open window for submissions. Start your planning now.

National Vegetable Crop Initiative Releases Goals and Objectives
The National Vegetable Crop Initiative (NCVI) working group, comprised primarily of industry representatives has completed its statement of Goals and Objectives. This initiative will help shape policy and research goals for those interested in vegetable crops going forward. For more information about the NVCI, go to their web site here.

Asian American and Pacific Islander Serving Institutions Program Becomes Law
On August 14, 2008, the **Asian American and Pacific Islander Serving Institutions** (AAPISI) program, as a provision of the Higher Education Opportunity Act, became law. Aligned to the goals of other minority serving institution programs, the AAPISI program will expand the capacities of higher education institutions to better serve college students, particularly those with low-income and/or Asian American and Pacific Islander ethnic backgrounds. Federal agencies will be able to use the AAPISI designation to target grants and programs to AAPI students and communities. (Thanks to Bobbie Yee, FCS for this information.) Stay tuned for more information.

Writing a Grant? Need help? We have it.
The CTAHR Office of Research is offering **grant coaching support** for individuals or small groups who are currently writing grants that have indirect cost returns. We are using RTRF funds to pay for this pilot program; therefore, it is important that we invest in opportunities that result in a return to that investment. Indirect cost returns provides CTAHR, college units and PIs (that generate the RTRF) with additional, highly flexible funding that can be used to support and expand research programs. We hope that by increasing our success rates in obtaining competitive grants, we will have greater direct and indirect costs to support our research activities. So if you are currently writing grants (or you plan to write a proposal) and want help developing, polishing and refining your proposal to meet an upcoming deadline, contact CTAHR grants specialist, **Sharee Pepper** at 956-8140 or by e-mail at spepper@hawaii.edu.

Dates and Events – Mark Your Calendars Today

Second Saturdays at the Oahu Urban Garden Center
The Oahu Master Gardeners and UGC Ohana open the Oahu Urban Garden Center every Second Saturday of the month. From 9:00 am – 12:00 noon, the Urban Garden Center is open to learn about gardening, and plantings. On **Saturday, December 13, 2008** – come learn about Poinsettias at the Urban Garden Center. See the Oahu Urban Garden web site for more information and directions to the UGC.

Grant funding is up; reliance on earmarks continues

By Doug Vincent
Special Program Director for Grants and Contracts

There is good news on the grant funding front. To date, with less than half the FY 2009 fiscal year completed, we have exceeded the funding levels from FY 2008. So far this fiscal year, CTAHR has received 118 awards for nearly $14 million dollars. We have exceeded the bottom we hit last fiscal year, by over $2 million. That's really good news. With over six months left in the fiscal year, we have a chance to make this a good year. But with the good news, comes the reminder that 40% of the funding comes from earmark-funded grants. Don't get me wrong, I love earmarks and appreciate the hard work our delegation does on our behalf. But given the economic crisis in the country, I worry that discretionary spending will be curtailed and the amounts of funding for CTAHR from these programs in the future may be limited. We still don't have a federal budget for the FY 2009 fiscal year and we may face reduced funding to support our program because of other needs or other priorities. We need to find other sources of funding to support our activities.

Several of your colleagues have proven that other sources of funding can be tapped; that competitive grants can be obtained. The list below illustrates the success that many of our faculty members have achieved. Two months ago I told the story about how persistence pays off – that two faculty members – one a researcher and one a specialist – did not give up, re-did their proposals and were successful in obtaining funding from NSF and USDA, respectively upon resubmission of their proposals. This round we've also seen other big grants obtained – Ali Fares of NREM won a USDA CSREES Water Quality grant. Richard Manshardt from TPSS is the recipient of a USDA CSREES Biotechnology Risk Assessment Grant for his proposed work on papaya transgene flow. Andy Kaufman from TPSS won two substantial grants to support his work on landscape ornamentals and urban forests. What matters is that your colleagues are out there seeking extramural funding from a variety of both local and national sources. The $2,000 that Mike DuPonte, HNFAS, earned to fund farm tours is just as important to his program and to CTAHR as larger grants received by others. It doesn't matter "how much" but that we're out there seeking the funding. So for those that received funding since we last reported, congratulations and well done. For those of you still thinking about it – go for it! Funding agencies are just now gearing up for this year's grant cycle – so there are lots of opportunities out there waiting for an outstanding grant proposal from CTAHR. Give it a go!

Competitive Grants and Contacts

First name	Last name / Dept	Project Name	Funder	Amount
Anne	Alvarez / PEPS	Western Regional Center in the National Plant Diagnostic Center	University of California-Davis	$67,780
Joe	DeFrank / TPSS	Weed Control in Hydro Planted Native Hawaiian Plants with Stakeholder Outreach	DA-Natural Resources Conservation Service (NRCS)	22,440
Michael	DuPonte / HNFAS	Hawaii Natural Farming Swine Tour	Utah State University	2,000
Ali	Fares / NREM	Design and Evaluation of Precision Vegetative Buffer Strips as Sustainable Conservation Practices	DA-Cooperative State Research Service	475,000
Andrew	Hashimoto / ADMIN	Pacific Regional Aquaculture Information Service for Education (PRAISE) and Publications	Center for Tropical and Subtropical Aquaculture Research (CTSA)	8,500
Jim	Hollyer / ADAP	Development of a Comprehensive Approach to Hawaii's Farm-Level Food Safety Risk Assessments	Hawaii Farm Bureau Federation	70,000

Andrew	Kaufman / TPSS	Green & Healthy Hawaii: Identifying & Introducing Alternative Ornamental Landscape Plants…	Hawaii-DLNR	120,516
Andrew	Kaufman / TPSS	Beyond the Tropical and the Quaint. People's Psychophysiological Responses to Urban Forests.	National Urban and Community Forestry Advisory Council	112,577
Charles	Kinoshita / ADMIN	Agribusiness Training Guidebook	Oahu Resource Conservation and Development	16,000
Ping Sun	Leung / MBBE	Economic Analytical Support for Fishery Management Actions	National Oceanic and Atmospheric Administration	26,000
Qing	Li / MBBE	Proteomics Study of Tropical Plants	Hawaii Agriculture Research Center	32,000
Shu Hwa	Lin / FCS	Digitization Video of Chinese Last Empire Dress Code	Hawaii Council for the Humanities	5,000
Richard	Manshardt / TPSS	Quantifying Transgene Flow in Papaya	DA-Cooperative State Research Service	375,000
Charles	Nagamine / PEPS	Hawaii Pesticide Applicator Training 2008-2010 Work Plant	Hawaii Department of Agriculture	45,871
Stuart	Nakamoto / HNFAS	2008 Hawaii Tea Educational Outreach Program	Hawaii Farm Bureau Federation	17,600
Ted	Radovich / TPSS	Enhancing Phyto-nutrient Content, Yield and Quality of Vegetables with Compost Tea in the Tropics	Utah State University	64,909
Dan	Rubinoff / PEPS	Invasive Ant Control for Native Ecosystems Preservation and Restoration in Hawaii	Hawaii Invasive Species Council	73,726
Janice	Uchida / PEPS	Determine the Efficacy of Fungicides to Protect Endangered Species from the Rust Puccinia psidii….	Hawaii-DLNR	34,810
Janice	Uchida / PEPS	Evaluating Impact of Puccina Psidii Rust Strains on Ohi'a…	Hawaii Invasive Species Council	36,049
Sylvia	Yuen / COF	Relating to the Evaluation of the UPLINK Program	Hawaii-Department of Human Services	177,760
Sylvia	Yuen / COF	Eat Healthy Community Presentation	Hawaii Medical Service Association	1,200
			21 projects	$1,784,738

New faculty publications

Greg Bruland (NREM)
Carrasquillo, A.J., G.L. Bruland, A.A. MacKay and D. Vasudevan. 2008. Sorption of tetracycline and fluoroquinolone zwitterions to soils and soil minerals: Influence of compound structure. *Environmental Science and Technology* 42:7634–7642.

Hartman, W.H., C.J. Richardson, R. Vilgalys, and G.L. Bruland. 2008. Environmental and anthropogenic controls over bacterial communities in wetland soils. *Proceedings of the National Academy of Sciences* 105(46):17842-17847.

Creighton M. Litton (NREM)
Litton, C. M. and C. P. Giardina. 2008. Below-ground carbon flux and partitioning: Global patterns and response to temperature. *Functional Ecology* 22:941-954.

Tomoaki Miura (NREM)
Jiang, Z., Huete, A. R., Didan, K., and Miura, T. (2008). Development of a two-band enhanced vegetation index without a blue band. *Remote Sensing of Environment*, 112(10), 3833-3845.

Earmark Funded Grants and Contracts

First name	Last name / Dept	Project Name	Funder	Amount
Ken	Grace / PEPS	Prevention and Control of Invasive Termite Species in Hawaii and the American Pacific	DA-Department of Agriculture	$61,383
Andrew	Hashimoto / ADMIN	UHM-Collaborative Effort for Evaluating Regionally Based Feedstock and Co-Products for Aquaculture and Livestock	DA-Department of Agriculture	200,353
Douglas	Vincent / ADMIN	Environmental Effects of Tephritid Fruit Fly Control and Eradication	DA-Department of Agriculture	53,239
Douglas	Vincent / ADMIN	Minor Crops Pest and Disease Control	DA-Department of Agriculture	221,593
Douglas	Vincent / ADMIN	Detection, Control and Mitigation of Banana Bunchy Top Virus (BBTV) and Citrus Tristeza Virus	DA-Department of Agriculture	25,717
Douglas	Vincent / ADMIN	Detection, Control and Mitigation of Banana Bunchy Top Virus (BBTV) and Citrus Tristeza Virus	DA-Department of Agriculture	94,808
Douglas	Vincent / ADMIN	Protecting Papaya from Pests and Disease	DA-Department of Agriculture	233,316
Earmark-Funded Grants and Contracts			7 projects	$890,409
Total this period			28	$2,675,147
FY 2009 YTD			118	$13,992,341
FY 2008 Total			114	$11,101,686
FY 2009 YTD	Competitive Grants		71	$8,293,757
FY 2009 YTD	Earmark-Funded Grants		47	$5,698,584

Dan Rubinoff (PEPS)

Snyder, J. F., Warren, A. D., Rubinoff, D. and G. T. Austin. 2008. *Zizina otis* (F. 1787) Becomes Established on Oahu, Hawaii (Lepidoptera: Lycaenidae: Polyommatinae). *News of the Lepidopterist's Society* 50. pp.3-6.

Cognato, A. and D. Rubinoff. 2008. New Exotic Ambrosia Beetles Found in Hawaii (Curculioinidae: Scolytinae: Xyleborina). *Coleopterists Bulletin* 62:421-424.

Jinzeng Yang (HNFAS)

Suzuki,ST, Zhao B, Yang J. 2008. Enhanced muscle by myostatin propeptide increases adipose tissue adiponectin, PPAR-α and PPAR- γ expressions. *Biochemical and Biophysical Research Communications*. 369: 767-773.

Cesar, JR, Zhao B, Yang J. 2008. Analysis of expressed sequence tags from abdominal muscle cDNA library of the pacific white shrimp *Litopenaeus vannamei*. Animal. 2: 1377-1383.

Yang J, Ferreira R, DuPonte MW, Fukumoto GK, Zhao B. 2008. Growth performances of F1 Angus Plus calves grazing on pasture in Hawaii's tropical climate. *Tropical Animal Health and Production*. Epub ahead of print

Wu Z, Li Z, Yang J. 2008. Transient transgene transmission to piglets by intrauterine insemination of spermatozoa incubated with DNA fragments. *Molecular Reproduction and Development* 75: 26-32.

Grant opportunities abound

By Doug Vincent
Special Program Director for Grants and Contracts

Grant "season" for this fiscal year is well underway. Below is a listing of funding opportunities available for you. Thanks to Dr. Sharee Pepper, CTAHR's grant specialist for finding these funding opportunities. If you need help with "polishing" your proposal, please contact Sharee (spepper@hawaii.edu) and make an appointment for her to review your proposal. One of our major funding agencies is undergoing some "renovation" this year. With the passage of the 2008 Farm Bill and by "October 1, 2009", USDA CSREES is being phased out and will be replaced with the National Institute of Food and Agriculture (NIFA). (Obviously this change is still a work in progress!) Familiar parts of USDA CSREES have also been phased out and its functions will be part of NIFA. For example, the USDA CSREES National Research Initiative Competitive Grants Program was not reauthorized in the Farm Bill. Its place will be taken by Agriculture and Food Research Initiative (AFRI). So if you expecting to submit a proposal to the USDA CSREES NRI program this year, you are out of luck. However, pending funding availability, the new AFRI program will be implemented. It is anticipated that RFA's for proposals will be released in January 2009. For these grants, it is likely that proposals will be accepted in the following areas:

A) Plant health and production and plant products;
B) Animal health and production and animal products;
C) Food safety, nutrition, and health;
D) Renewable energy, natural resources, and environment;
E) Agriculture systems and technology; and
F) Agriculture economics and rural communities.

Other changes are the movement of former Smith-Lever 3(d) formula funded programs, such as Integrated Pest Management, into competitive grants programs. Already the Extension IPM Coordination and Support Program RFA has been released. Other extension programs in this category will be releasing RFA's as they are developed. The Specialty Crops Research Initiative and the Beginning Farmer and Rancher Development Program are expected to release their RFA's in January 2009. So begin now to prepare for the RFA's to be released. As a place to start with USDA CSREES – try their Grants page. Not interested in USDA funding opportunities? Then I recommend going to Grants.gov and go to the "Find Grant Opportunities." You can do a basic keyword search, or browse by Category or by Federal Agency. We have some funding opportunities for you to explore but we can't possibly put all of them for you. Try these sites to track down opportunities that might match up with what you do.

The following list includes some current funding opportunities that may be of interest to CTAHR faculty. If the deadline is too short for this year, it is still a good indication of the likely due date for next year. **Let us know if we can be of any assistance with developing and editing your grant application.**

For information on submitting grants electronically on grants.gov the following publication may be useful. **USDA, CSREES Grants.gov Application Guide – A guide for the preparation and submission of CSREES applications via grants.gov.**
http://www.csrees.usda.gov/funding/grant_forms/electronic_app_guide.pdf

Agricultural Grants

$ - USDA, CSREES
Western Sustainable Agricultural Research and Education Program
Farmer/Rancher Research & Education Grants
Proposal Deadline: December 5, 2008
http://wsare.usu.edu/grants/docs/RFA_FRG.pdf

$ -USDA, CSREES
Western Sustainable Agricultural Research and Education Program
Professional & Producer Grants
Proposal Deadline: December 5, 2008
http://wsare.usu.edu/grants/docs/RFA_PP.pdf

$ - USDA, CSREES
Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers Competitive Grant Program
Deadline: December 12, 2008
http://www.csrees.usda.gov/funding/rfas/pdfs/09_outreach.pdf

$ - Hawaii Invasive Species Council RFP
Invasive Species Research and Technology Projects
Deadline: January 05, 2009
http://www4.hawaii.gov/bidfiles/RFPHISC2009.pdf

$ - USDA, CSREES
Extension Integrated Pest Management Coordination and Support Program
Deadline: January 6, 2009
http://www.csrees.usda.gov/funding/rfas/pdfs/eipm_support_program_112008.pdf

$ -USDA, CSREES
Western Sustainable Agriculture Research and Education Program
Sustainable Agriculture Tours
Proposals: Open until funding is exhausted
http://wsare.usu.edu/grants/docs/RFA_SAT.pdf

Education Grants

$ - NSF - National Science Foundation: East Asia and Pacific Summer Institutes for U.S. Graduate Students (EAPSI)**Application deadline for summer 2009 is December 9, 2008.**
Second Tuesday in December, Annually Thereafter.
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5284

$ - USDA, CSREES **-** Secondary Education, Two-Year Postsecondary Education, and Agriculture in the K-12 Classroom Challenge Grants Program
Deadline: December 15, 2008
http://www.csrees.usda.gov/fo/fundview.cfm?fonum=1083

$ - USDA, CSREES - Children, Youth, and Families at Risk Sustainable Community Projects
Deadline: December 16, 2008
http://www.csrees.usda.gov/fo/childrenyouthfamiliessustainablecommunityprojects.cfm

$ - Environmental Protection Agency (EPA), Office of Environmental Education - Environmental Education Grants (RFP#: EPA-EE-09-02)
Application Deadline: December 18, 2008
http://www.epa.gov/enviroed/pdf/solicitationnotice2009.pdf

$ - USDA, CSREES - Higher Education Challenge Grants
Deadline: January 30, 2009
http://www.csrees.usda.gov/fo/educationchallengehigheredhep.cfm

$ **-** National Education Association (NEA) Foundation **-** Foundation Supports Professional Development for Educators
Deadline for 2009 application due February 1 & June 6
http://www.neafoundation.org/programs/Learning&Leadership_Guidelines.htm
Link to Funder Profile

$- UH Sea Grant, Dean John A Knauss Marine Policy Fellowship
Deadline: Friday, February 20, 2009
http://soest.hawaii.edu/SEAGRANT/education/fellowship.html

$ - Human Frontier Science Program
Short Term Fellowship Program
Proposal Deadline: rolling – applications accepted year round
http://www.hfsp.org/how/appl_forms_STF.php

Environment, Water, Energy, Invasive Species Grants

$ -SeaWorld & Busch Gardens Conservation Fund - Funds for Wildlife and Habitat Protection
Deadline is December 1, 2008
http://www.swbg-conservationfund.org/get_involved.html

$ - U.S. Environmental Protection Agency
Broad Agency Announcement for Conferences, Workshops and/or Meetings
Proposal Deadlines: December 9, 2008
http://es.epa.gov/ncer/rfa/2008/2008_baa.html

$ - Project AWARE Foundation -Aquatic Conservation Programs Funded Worldwide
Deadline is December 15, 2008
http://www.projectaware.org:80/english/grants/grant_information.aspx

$- NSF – Long Term Research in Environmental Biology (LTREB)
Deadlines: January 09 and July 9 Annually
http://nsf.gov/pubs/2007/nsf07588/nsf07588.htm

$ - National Forest Foundation: Community Assistance Program
Local Forest Partnerships Fund
Deadline: proposals accepted on a rolling basis throughout year
http://www.natlforests.org/consp_05_cap.html

Families, Youth and Children Grants

$ - USDA, CSREES - Children, Youth, and Families at Risk Program:
Deadline: December 12, 2008
http://www.csrees.usda.gov/fo/childrenyouthandfamiliesliaison.cfm

$ - USDA, CSREES - Children, Youth, and Families at Risk Program:
Children, Youth, and Families Education and Research Network (CYFERnet)
Deadline: December 16, 2008
http://www.csrees.usda.gov/fo/childrenyouthfamiliesedandresearchnetworkcyfernet.cfm

$ - USDA, CSREES - Children, Youth, and Families at Risk Program:
Sustainable Community Projects
Deadline: December 16, 2008
http://www.csrees.usda.gov/fo/childrenyouthfamiliessustainablecommunityprojects.cfm

$ - CHS Foundation
Rural Youth and Leadership Development
Proposal Deadline: rolling – applications accepted year round
http://www.chsfoundation.org/programs/ryld.htm

Financial Grants

$ - U.S. Department of Health and Human Services, Administration for Children and Families
Assets for Independence Demonstration Grants
Proposal Deadlines: January 15, 2009, March 25, 2009
http://www.acf.hhs.gov/grants/open/HHS-2008-ACF-OCS-EI-0053.html

Money Management International Financial Education Foundation
Financial Education Grants
Proposal Deadline: rolling – applications accepted year round
http://www.mmifoundation.org/GrantSeekers.asp

Health, Nutrition, Food, Biomedical Grants

$ - Allen Foundation - Support for Nutritional Programs
The application deadline is December 31, 2008
https://www.allenfoundation.org/

$ - PHS 2008-02 Omnibus Solicitation of the NIH, CDC, and FDA for Small Business Innovation Research Grant Applications (Parent SBIR [R43/R44])
Deadline: January 7, 2008
http://grants.nih.gov/grants/guide/pa-files/PA-08-050.html

$ - HHS, National Institutes of Health (NIH)
Improving Diet and Physical Activity Assessment (RO1)
Letters of Intent Due: January 16, 2009 (optional)
Proposal Deadline: February 16, 2009
http://grants.nih.gov/grants/guide/pa-files/PAR-07-259.html

$ - HHS, NIH
Improving Diet and Physical Activity Assessment (R21)
Letters of Intent Due: January 16, 2009 (optional)
Proposal Deadline: February 16 & May 7, 2009
http://grants.nih.gov/grants/guide/pa-files/PAR-07-259.html
http://www07.grants.gov/search/search.do;jsessionid=LHSfIHFSL4pBXG0Dtb7PpzkdDBMHJSl6vhyGyQ1tpTnGcSJ2WfZD!488375993?oppId=8282&flag2006=true&mode=VIEW

$ - NIH
Pilot and Feasibility Clinical Research Studies In Digestive Diseases And Nutrition
Deadline: May 7, 2009
http://www07.grants.gov/search/search.do;jsessionid=LHSfIHFSL4pBXG0Dtb7PpzkdDBMHJSl6vhyGyQ1tpTnGcSJ2WfZD!488375993?oppId=8805&flag2006=true&mode=VIEW

$ - NIH
Exploratory/Developmental Clinical Research Grants in Obesity (R21)
Deadline: May 7, 2009
http://www07.grants.gov/search/search.do;jsessionid=LHSfIHFSL4pBXG0Dtb7PpzkdDBMHJSl6vhyGyQ1tpTnGcSJ2WfZD!488375993?oppId=8575&flag2006=true&mode=VIEW

$ - NIH –
Improving Diet and Physical Activity Assessment (R21)
Deadline: May 7, 2009
http://grants.nih.gov/grants/guide/pa-files/PAR-06-103.html

Humanities Grants

$ - Hitachi Foundation: Business and Communities Grants Program - Grants Address Economically Isolated Communities
Interested organizations may submit an online inquiry to provide information about project ideas **at any time** and the Foundation's will determine if it fits their priorities.
http://www.hitachifoundation.org/grants/guidelines/index.html.

Rural and Community Development Grants

$ - USDA, Rural Development
Community Facilities Loan and Grant Program
Deadline: Applications accepted on an ongoing basis
http://www.rurdev.usda.gov/rhs/cf/cp.htm
http://www.rurdev.usda.gov/rhs/cf/brief_cp_grant.htm

$-Farm Foundation Grants
Deadline: Applications accepted on an ongoing basis
http://www.farmfoundation.org/news/templates/comm_template.aspx?articleid=357&zoneid=67

Science Grants

$ - NSF
Industry/University Cooperative Research Centers Program
Deadline: January 2 2009 (Letter of Intent)
http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf08591

$ - NIH, CDC, & FDA
PHS 2008-02 Omnibus Solicitation of the NIH for Small Business Technology Transfer Grant Applications (Parent STTR [R41/R42]) & Small Business Innovation Research Grant Applications (Parent SBIR [R43/R44])
Deadline: January 7, 2009
http://www07.grants.gov/search/search.do;jsessionid=LHSfIHFSL4pBXG0Dtb7PpzkdDBMHJSl6vhyGyQ1tpTnGcSJ2WfZD!488375993?oppId=16619&flag2006=true&mode=VIEW

$ - DOD, Office of Naval Research (ONR) - Young Investigator Award
Deadline: January 12, 2009
http://www.onr.navy.mil/02/baa/docs/09-005.pdf

$ - Future Fisherman Foundation: Physh Ed Grants National Fishing and Boating Education Grants Initiative - Funds for K-12 Curriculum Development
The application deadline is January 19, 2009.
http://www.futurefisherman.org/programs/physh_ed/grants.html

$ - NSF
Science, Technology, and Society
Proposal Deadlines: February 1, 2009
http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf08553

$ - National Geographic Society – Waitt Grants Program
Deadline: Rolling
http://www.nationalgeographic.com/field/grants-programs/waitt-grants-application.html

UH, Hawaii and Regional Grants

$ - University of Hawaii (UH), University Research Council Faculty Travel Funds
Proposal Deadline: rolling – applications must be in >4 weeks before travel.
http://www.hawaii.edu/urc/pdf/factravel_g.pdf
http://www.hawaii.edu/urc/pdf/factravel_f.pdf

Other

$ - Tourism Cares - Preservation Programs Supported Worldwide
The first of three letter of inquiry deadlines for 2009 is January 30.
http://www.tourismcares.org/RelId/606053/ISvars/default/Worldwide_Grant_Program.htm