

CTAHR RESEARCH NEWS

February 2009
Volume 5, Issue 2 (36)



Yong Li sits back from viewing a sample under a microscope.

The scoop on microbial food safety research

CTAHR parties for a good cause

A jumbo research calabash

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From the Associate Dean and Associate Director for Research

We've weathered wet and windy conditions for a while, now, and we also continue to see weakness in the U.S. economy and pessimistic economic forecasts. As you all know, UH is facing a \$30 million budget deficit; however, this represents just a small fraction of total UH budget of \$745 million. UHM is going through a campus-wide program prioritization exercise, and the Dean's office is working with our department chairs and county administrators to submit the inputs required by the Chancellor's office. This process has taken up a great deal of our time and effort; however, it is a necessary investment that we cannot afford to ignore. Dean Hashimoto noted in the most recent leadership meeting that CTAHR has many unique programs, and we went through a complete re-organization barely 10 years ago, reducing our departments from 11 to six. Although our budget has rebounded from the record low, it is still lags behind the campus average and other peer colleges. We won't know our share of the \$30 million budget cut until later; however, we are cautiously optimistic that we will come out of this round in fairly good shape. Nevertheless, we will continue to actively participate in this process, as we believe UHM will use this updated data and metrics information for future budgetary decisions. You can follow the progress of the campus prioritization process at: <http://www.manoa.hawaii.edu/ovcafo/newprocess/prioritization.html>.

The recent news on the Salmonella-contaminated peanut butter highlights, again, the importance of the food

safety issues in our daily life. CTAHR recognized the importance of this issue and added a food microbiologist position in 2005. Dr. Yong Li began work with CTAHR in late 2005. During the last three and a half years, Dr. Li has established an active research program that is relevant to our local stakeholders. His work on poi and kava are good examples. Also, his ongoing work with *E. coli* is particularly critical for the safety of Hawaii's food supplies, especially Hawaii's milk, which goes through a re-pasteurization process after arriving from the mainland. While the re-pasteurization process is safe, it increases the probability of human error allowing contaminants to enter the process. Research results from Dr. Li's program have provided a rapid detection method for both *E. coli* and Salmonella, an extremely valuable tool for monitoring food safety. We anticipate more exciting work coming out of his laboratory in the future. *Stay tuned!*

Thanks for taking your valuable time to provide us your thoughts on *CRN* through our on-line survey. Doug has summarized your comments for your review. Please continue to send in your publications and other newsworthy items. Keep yourself warm; spring is right around the corner! *Thanks for reading.*



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

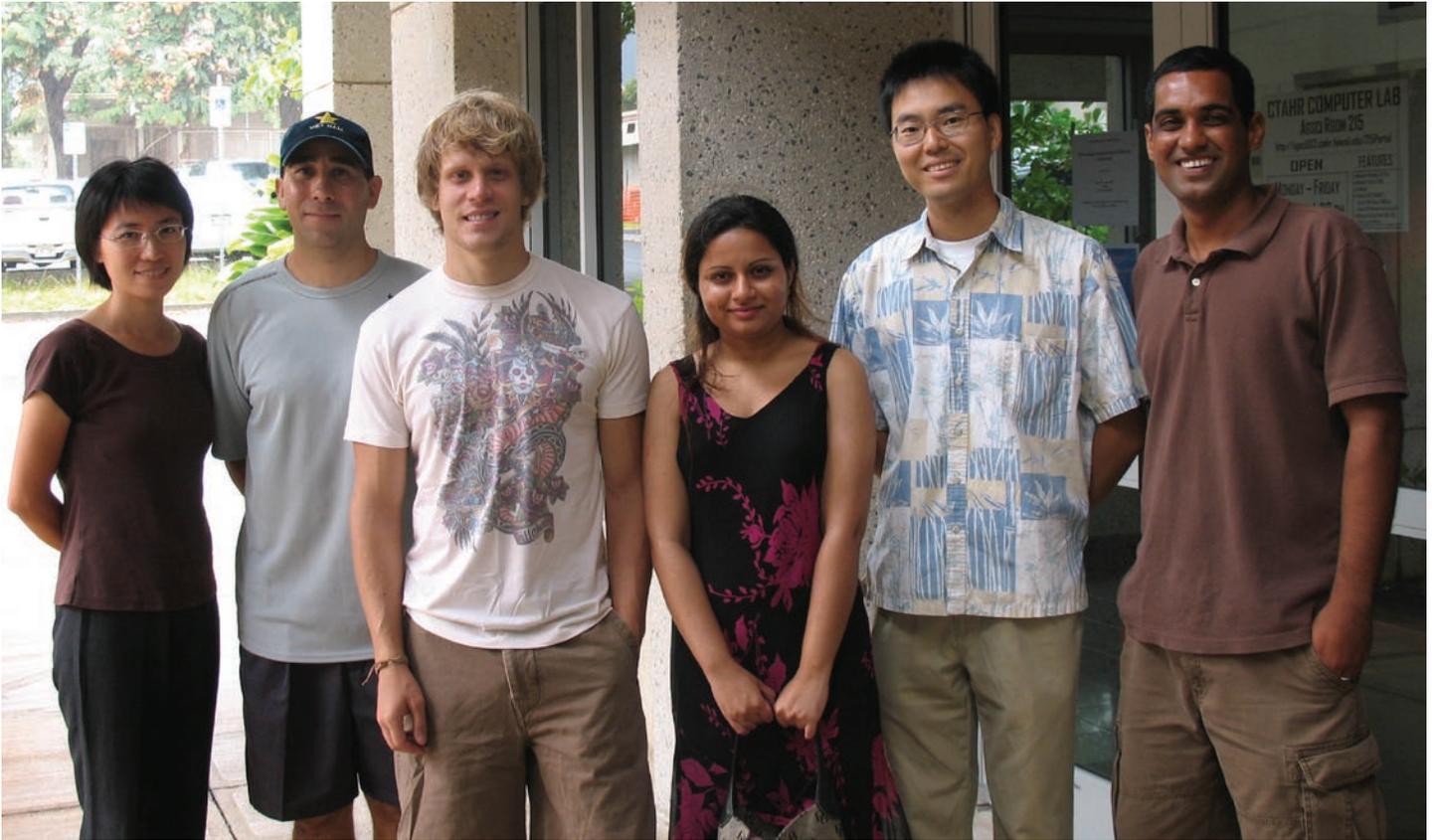


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Enhancing the microbiological quality and safety of Hawaii's food supply

By Yong Li
Assistant Professor
Department of Human Nutrition, Food and Animal Sciences



The Food Microbiology team takes a break in front of Agricultural Science Building (L-R): Jin Dong (China), Alfred Castro (California), David Pirazzini (Wisconsin), Padma Kandukuru (India), Yong Li (China), and Vinod Singh (India).

Hawaii's foods are arguably the most diverse in the nation. As an island state, Hawaii's unique geographical location lends itself to a heavy reliance on tropical resources. Golden pineapples and Kona coffee are just among the exciting products that reflect our island life. Further, the Aloha state is a melting pot of cultures from around the world. The ethnic diversity has led to different cultures sharing and adopting traditional foods – Hawaiian poi, Japanese kamaboko, Chinese manapua, Portuguese linguica, to name a few.

Microorganisms are tiny creatures present almost everywhere: in the environment, on our hands, and in our bodies. They play significant roles in food ecosystems. Microbial growth in a food may cause

texture change, slime formation, discoloration and off-odor development, reducing the quality of food to unacceptable levels. Even worse, certain bacteria and viruses can make people sick if they or their toxins are consumed with food. Every year around 76 million cases of food-borne illnesses and 5,000 associated deaths occur in the United States. Don't get me wrong, not all invisible organisms are undesirable or unhealthy. In fact, some of them are essential for food production and good health. Like yogurts and beer, many foods are fermented by lactic acid bacteria (LAB) or yeast. While fermentation was originally employed to preserve foods and make foods more digestible, it is also turned into a way of transmitting health-promoting (probiotic) microorganisms to consumers. When consumed in



Alfred Castro harvests taro for research on poi fermentation.

adequate amounts, certain LAB species may suppress ‘bad’ bacteria in the gut, promote intestinal well-being, and benefit the host organism (i.e., us!).

Due to year-around tropical weather, Hawaii presents the perfect atmosphere for most microbes to thrive in. During food processing, storage and preparation, pathogens may contaminate foods and finally cause human diseases. They have posed serious health hazards to the people of Hawaii and caused great economic losses to local food producers. Meanwhile, Hawaii provides a unique variety of food products in which the role of microbial activities remains unknown. Organisms involved in spoilage or fermentation of local foods are yet to be identified and characterized.

Since Fall 2005, when I joined the faculty at CTAHR, I have been working with Drs. **Alvin Huang**, **Wayne Iwaoka**, **Soojin Jun**, **Chin Nyeon Lee**, **Lynn Nakamura-Tengan** (HNFAS), **H.C. “Skip” Bittenbender** (TPSS), **Daniel Jenkins** (MBBE) and

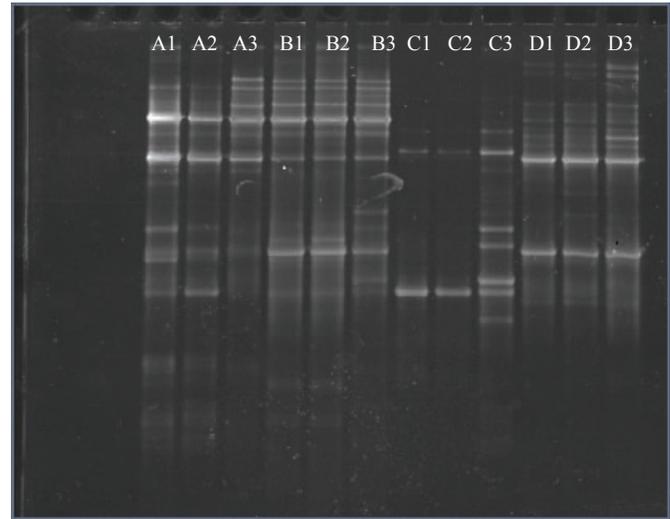
Jim Hollyer (ADAP) to develop new knowledge on various food-borne microorganisms and to use this knowledge to resolve problems related to food quality and food safety, particularly in Hawaii and the Pacific. Junior Researcher Dr. **Jin Dong**, Graduate Assistants **David Pirazzini**, **Padma Kandukuru**, **Hongfei He** and **Vinod Singh**, as well as Undergraduate Assistant **Alfred Castro** have made significant contributions to my program. Some of our current research projects are described in more detail below.

Profiling and characterization of potentially probiotic bacteria in poi

Poi is a staple in the traditional Hawaiian diet. It is a starchy, gray-purple paste made of ground cooked taro corms. Poi is often stored for a couple of days at room temperature before serving to develop a strong, sour flavor. LAB and yeast originated from natural sources are responsible for the fermentation. Poi was first used



David Pirazzini conducts microbiological analysis of poi samples.



Lactic acid bacteria diversity in poi of different brands.

clinically in Hawaii to manage infant food allergies and weight gain in failure-to-thrive infants in the 1950's. It has several properties with beneficial effects for the consumer, including fiber content, easy digestibility, pH influence, and containing potentially probiotic bacteria.

Because so little was known about the bacterial content of poi, this research began by investigating the LAB community in various brands of poi. A mixture of bacterial DNA was directly extracted from poi samples and analyzed by polymerase chain reaction-denaturing gradient gel electrophoresis (PCR-DGGE), a molecular fingerprinting technique. Furthermore, we isolated 152 LAB strains from poi samples and identified them based on their morphological, biochemical, and immunological characteristics. Both the culture-independent and culture-dependent methods identified many species of LAB in poi; most of them were previously unreported in the product. Dominant bacteria varied among different brands of poi, possibly influencing the product's sensory qualities and consumer preference towards a certain brand.

The next focus is to determine the physiological characteristics and probiotic potential of LAB strains isolated from poi. We are evaluating their ability to survive simulated harsh conditions in the human digestive tract, such as low pH and high bile concentration. The isolates will also be tested for their health benefits, including enzyme activity, acid production, and antimicrobial effects against enteric pathogens. Finally, the LAB strains will be evaluated on their safety for human consumption. One of the

required properties of probiotic organisms is that they do not harbor acquired and transferable antibiotic resistances. The data from these experiments will hopefully lead to the development of a functional poi product with control fermentation by the probiotic LAB isolates, thus raising its popularity among health-conscious people of non-Polynesian ancestry.

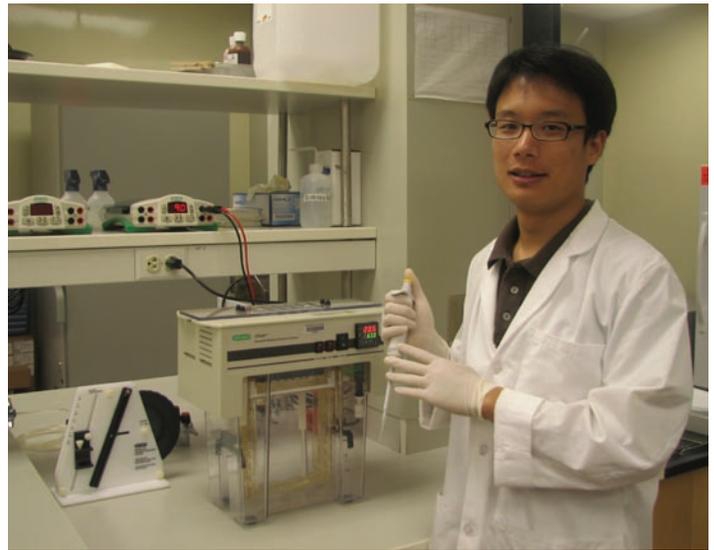
Fingerprinting and control of spoilage microorganisms in kava beverage

Kava is a perennial shrub commonly grown in Hawaii and other tropical and subtropical regions. The stump and roots of the kava plant have been used to prepare this beverage for over 3,000 years. Widely consumed in social gatherings, rituals and ceremonies, kava beverage plays an essential role in everyday life of the people of the South Pacific. The beverage contains special anti-depressant compounds, which in small doses act as muscle relaxants and in large doses produce intoxication and sedation without loss of consciousness. Kava beverage is made for immediate consumption. It has less than three days of shelf life even under refrigerated conditions, which makes it incompatible with today's food distribution system. An effective pasteurization is difficult to achieve due to its high content of starch, which gels upon heating.

The biological nature of spoilage of kava remains unknown. Therefore, our first task was to isolate and identify predominant bacteria in the aqueous extract of kava stumps. We observed considerable variation in the microbial profile of kava extracts based on the source of raw materials. Kava stumps are associated

with polysaccharide-degrading bacteria, which may convert complex carbohydrates in kava beverage into simple sugars. In turn, other bacteria present in the beverage may further ferment simple sugars and cause a drop in pH, which is a major factor that influences the quality of kava beverage.

To test this hypothesis, we employed the PCR-DGGE technique to understand microbial ecology shifts in kava beverage during refrigerated storage. We observed the fading, intensifying, appearance and disappearance of bands in the DGGE profile, revealing the interactions between various bacteria. *Pseudomonas fluorescens* and LAB became dominant over time, and they may be responsible for the spoilage of kava beverage. These



Hongfei He is ready to load a denaturing gradient gel to fingerprint bacterial populations in food samples.

findings provide fundamental information that may enhance the microbiological quality of kava beverage. Testing food-grade antibacterials to control the spoilage organisms and extend the shelf life of kava beverage is currently in progress.

Survival and recovery of pathogenic bacteria under stressful conditions

Escherichia coli O157:H7, a notorious food-borne pathogen, can cause serious human diseases such as bloody diarrhea, kidney failure, and even death. It accounts for over 70,000 infections and 60 deaths per year in the U.S. An important feature of this pathogen is its high acid tolerance. Various acidic foods, including salami, yogurt, mayonnaise and apple cider, have been associated with outbreaks of *E. coli* O157:H7 infection. The pathogen can survive weeks to months in these foods that were previously considered to be of low microbial risk.

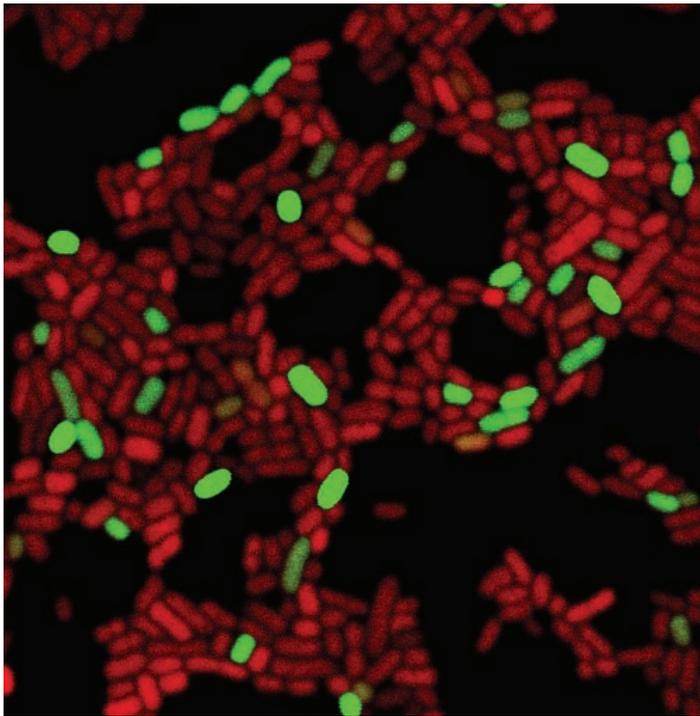
Accurate detection of *E. coli* O157:H7 in foods is imperative for protecting the public's health. In recent years, however, many studies have revealed the ability of certain bacteria to enter a viable-but-nonculturable (VBNC) state. In this state, bacteria cannot be recovered from routine microbiological media, but remain active and show metabolic activities. Therefore, VBNC cells may escape detection if conventional culture-dependent methods are employed. While *E. coli* O157:H7 was found to become nonculturable under starvation or refrigeration, little is known about the occurrence of VBNC *E. coli* O157:H7 in acidic foods.



Kava stumps and roots have been used for 3,000 years to make beverage in the South Pacific.



Vinod Singh prepares samples for PCR.



VBNC cells of *E. coli* O157:H7 (green) induced by lactic acid and cold.

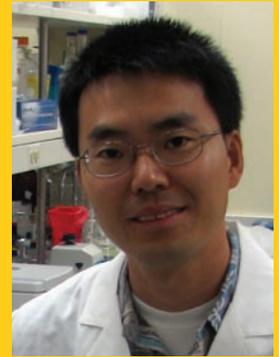
In order to determine whether *E. coli* O157:H7 can enter the VBNC state under acidic and other stress conditions, we inoculated fresh *E. coli* O157:H7 cells into a nutrient broth acidified with lactic acid, an acidic preservative widely used in food processing to inhibit microbial growth. The suspension was stored at a refrigeration temperature to simulate food storage conditions. Although *E. coli* O157:H7 cells stopped growing and lost their culturability after 2 weeks in the acidified broth, the cells still maintained intact membranes and continued to express genes. After the nonculturable cells were injected into embryonated eggs, culturable *E. coli* O157:H7 cells were detected in a large proportion of the eggs. Our results imply that acid and cold can induce *E. coli* O157:H7 to enter the VBNC state. The virulence gene stays active in the nonculturable cells, which may be recovered under optimal conditions. This raises great concerns regarding accurate microbiological analysis of acidic foods and calls for further research on the pathogenicity of VBNC *E. coli* O157:H7.

Yong Li

Hometown: Hunan, China

Joined CTAHR: Fall 2005

Educational History: M.A. Statistics, University of Missouri-Columbia, 2005; Ph.D. Food Science, University of Missouri-Columbia, 2004; M.S. Microbiology, China Agricultural University, 1997; B.S. Microbiology, China Agricultural University, 1994.



Specialization: Food Microbiology

Current Work: Detection, characterization, and management of food-borne microorganisms

Languages Spoken: English, Mandarin

Selected Grants

- Li, Y. Survival, recovery, and quantification of target pathogenic bacteria in pineapple, guava, and orange juices. USDA-CSREES T-STAR. 2006-2010. \$208,490
- Li, Y. Rapid quantification of two major food-borne pathogens in Hawaii by using real-time PCR. Hawaii Community Foundation. 2006-2009. \$49,750
- Li, Y. and Huang, A.S. Molecular fingerprinting of lactic acid bacteria in soil for taro cultivation. HPC Foods, Ltd. 2008-2009. \$25,897

Selected Publications

- He, H.F., Dong, J., Lee, C.N., and Li, Y. 2009. Molecular analysis of spoilage-related bacteria in pasteurized milk during refrigeration by polymerase chain reaction and denaturing gradient gel electrophoresis. *Journal of Food Protection* 72:572-577.
- Wang L.X., Li Y., and Mustapha, A. 2007. Rapid and simultaneous quantitation of *Escherichia coli* O157:H7, *Salmonella*, and *Shigella* in ground beef using real-time multiplex PCR and IMS. *Journal of Food Protection* 70:1366-1372
- Zhu, S.S., Liu, X.L., Liu, P.F., Li, Y., Li, J.Q., Wang, H.M., Yuan, S.K., and Si, N.G. 2007. Flumorph is a novel fungicide that disrupts microfilament organization in *Phytophthora melonis*. *Phytopathology* 97: 643-649

The research calabash

By Doug Vincent
Special Program Director for Grants and Contracts

Human Subjects Training – February 24, 27, 2009

If your research involves human subjects, including collection of survey data, you might be interested in attending one of these workshops put on by the University of Hawaii Committee on Human Studies. **Tuesday, February 24, 2009 at 8:30 am – 12:30 pm** in the Law School Classroom #1 and **Friday, February 27, 2009 at 12:30 pm – 4:30 pm**, again in the Law School Classroom #1. These are single workshops – no cost, no RSVP. This workshop meets UH and NIH requirements of human subjects research training. Contact Bill Dendle at 956-8287 for more information or see the [Committee on Human Studies](#) web site.

Agricultural Education Workshops Scheduled for February 24, March 9, 2009

CTAHR CES, Hawaii Tropical Fruit Growers Association, Hawaii Agritourism Association and the law firm, Alston Hunt Floyd & Ing are sponsoring a series of workshops on February 24 and March 9, 2009 for stakeholders interested in agricultural opportunities and new regulations regarding farm operations. These 30 minute presentations will be given via Polycom at the CES extension offices.

February 24, 2009 – 6:00 – 8:00 pm

- Managing Food Safety Risks – Elizabeth Haws Connally (AHF&I)
- COOL / Seal of Quality – Matthew Loke (HDOA)
- Enterprise Zone Program – Michelle Muraoka (DBEDT)

March 9, 2009 – 6:00 – 8:00 pm

- Agribusiness Incubator Program – Steven Chiang (CTAHR)
- Marketing Agreements – Tim O’Connell (USDA-Rural Dev.)
- Market Opportunities with Government – Elizabeth Haws Connally (AHF&I)

Contact your County Extension Office for more information.

CTAHR Research Portfolio Available for Download

The CTAHR Office of Research has produced a [2009 CTAHR Research Portfolio](#). Over the last year,

Associate Director C.Y. Hu requested “one-pagers” outlining the research expertise of the CTAHR Faculty with research appointments. Originally, these were prepared to share with Chinese institutions with interests in sending students to CTAHR. The “one-pagers” have been compiled into the [2009 CTAHR Research Portfolio](#). This 123 page .pdf file is sorted by Department and each one pager has contact information, research interests and recent publications of CTAHR faculty with research appointments. If you have any questions about the portfolio or need to update information, contact Dr. Hu at 956-8131.

Plan for the 21st Annual CTAHR Student Research Symposium

The [21st Annual CTAHR Student Research Symposium](#) will take place on April 3-4, 2009 in the Agricultural Sciences Building. The Symposium is open to graduate and undergraduate students conducting scholarly work under the supervision of faculty in UH Manoa’s College of Tropical Agriculture and Human Resources and UH Hilo’s College of Agriculture, Forestry and Natural Resource Management. The web site includes [Symposium guidelines](#), information on [preparing abstracts](#), instructions for [oral presentations](#) and [poster presentations](#). **Abstracts are due on March 6, 2009.** [Download the abstract form here](#). For more information contact Symposium program coordinator, **Traci Sylva** by e-mail at tsylva@hawaii.edu. Posters submitted to the [CTAHR Computer Lab](#) for printing before **March 28, 2009** will receive a 10% discount on printing. Posters printed on **April 1-2, 2009** will be assessed an additional \$20 “Rush Fee. For information about large format printing (PC only) contact **Wayne Toma**, HNFAS at toma@hawaii.edu or call 956-7857.

Federal Floriculture Research Grant Request for Proposals

In anticipation of the passage of the FY 2009 federal budget, we are seeking proposals for the USDA CSREES Special Research Grant “**Federal Floriculture Research Grant.**” If our budget remains at FY 2008 levels, we will have limited funds for new projects. [Download the RFP](#). The deadline for new proposals is **4:30 pm, Friday, March 6, 2009**. A memo with further explanation will be sent out soon. If you have questions, contact **Doug Vincent** at vincent@hawaii.edu.

Welcome to Benny Ron, UH's Aquaculture Coordinator

Dr. Tetsuzan (Benny) Ron has been recently hired at the University of Hawaii's Aquaculture Program Coordinator. Dr. Ron will be working out of the Office of the Vice Chancellor for Research and Graduate Education. Dr. Ron's job will be to bring together and enhance UH system-wide aquaculture research, education and outreach activities. Dr. Ron sent round an [introductory letter](#) that explains his function and provides contact information. Dr. Ron can be reached by e-mail at bennyron@hawaii.edu. Welcome to Dr. Ron.



Dry Ice Availability during Extended Power Outages

The recent campus wide power outage on December 26-27, 2008, temperatures were elevated in -80° and other ultra-low temperature freezers. The Office of the Vice Chancellor for Research and Graduate Education has established new policies regarding the making available of dry ice from the Chemistry Stockroom during periods of extended power outages. After power has been off for 10 continuous hours, the Chemistry Stockroom in Bilger 112 will open and dry ice will be made available to help maintain critical temperatures. [You can read more about the policy here.](#)

UH Office of Research Services February 2009 Newsletter

See the February 2009 issue of the [UH Office of Research Services Newsletter](#) for information about a variety of changes implemented recently by the UH Office of Research Services. Included is information about the ORS Form 5.

Still no Federal Budget for FY 2009

We are still anticipating passage of the FY 2009 Federal Appropriations legislations for the Departments of Energy and Agriculture. Even though we are well into the FY 2009 federal fiscal year, we are still waiting for passage of the budget. While we remain hopeful for continued funding for our programs, we won't know what programs have funding until the budget is passed. Given the economic crisis in the country, we must wait to see when the Congress will pass the legislation. We are currently operating under a Continuing Resolution until March 6, 2009 – but sources closer to Washington indicate that we may have a budget some time soon. Now that the “Stimulus Package” is passed, the Congress will take up the Federal budget for FY 2009. Stay tuned.

USDA releases Agriculture and Food Research Initiative Program Announcement – Changes in Deadlines

While funding has not been finalized with the FY 2009 federal budget, in anticipation of the budget, USDA CSREES has released a program announcement regarding the [Agriculture and Food Research Initiative](#) (AFRI). The full RFA for the AFRI has **NOT yet been released** – we expect the release to be February 25, 2009. The AFRI replaced the National Research Initiative Competitive Grants Program, which was not reauthorized in the 2008 Farm Bill. Most research programs require letters of intent prior to submission of a proposal and 30% of the funding is set aside for integrated projects. We have prepared a list of the programs with their due dates, both LOI and proposal, along with USDA CSREES contact information. You can download the information about the [AFRI Deadlines](#). Some of the **deadlines have been CHANGED**. Consult the [USDA CSREES Grants web page](#) for more information or [Grants.gov](#) after the official RFA has been released.

Change in Due Date for Letter of Intent for USDA CSREES Specialty Crop Research Initiative

USDA CSREES has changed the due date for the letters of intent for the Specialty Crop Research Initiative to **March 2, 2009**. The [Specialty Crop Research Initiative \(SCRI\)](#) was established to solve critical industry issues through research and extension activities. SCRI will give priority to projects that are multistate, multi-institutional, or trans-disciplinary; and include explicit mechanisms to communicate results to producers and the public. Projects must address at least one of five focus areas: research in plant breeding, genetics, and genomics to improve crop characteristics; efforts to identify and address threats from pests and diseases, including threats to specialty crop pollinators; efforts to improve production efficiency, productivity, and profitability over the long term; new innovations and technology, including improved mechanization and technologies that delay or inhibit ripening; and methods to prevent, detect, monitor, control, and respond to potential food safety hazards in the production and processing of specialty crops. [More information is here](#) and the [RFA is here](#).

USDA CSREES release RFA for Organic Agriculture Research and Extension Initiative.

The [USDA CSREES Organic Research and Extension Initiative](#) seeks to solve critical organic agriculture issues, priorities, or problems through the integration of research and extension activities. The program will fund projects to enhance the ability of producers and processors who have already adopted organic standards to grow and market high quality organic agricultural

products. Priority concerns include biological, physical and social sciences, including economics. OREI is also seeking projects that emphasize research and outreach that assist farmers and ranchers with whole farm planning and ecosystem integration. Go here for [general information](#) and here to [download the RFA](#). The closing date is **March 9, 2009**.

USDA CSREES release RFA for Biomass Research and Development Competitive Grants Program

The USDA CSREES – Department of Energy Office of Biomass Programs has released its [Biomass Research and Development Initiative Competitive Grants Program](#). This program awards competitive grants for the following technical areas: (1) Feedstocks Development, (2) Biofuels & Biobased Products Development, and (3) Biofuels Development Analysis. This is a joint solicitation and DOE is managing the pre-application process. **Pre-applications are due March 6, 2009**. [Download the RFA here](#). Additional information can be found at the [Biomass Research and Development Initiative page](#).

Facilitation Training Offered in April, 2009

The [Agricultural Leadership Training Program of Hawaii](#) will be offering two courses in April, 2009. [Advanced Facilitation](#) will be offered from April 6-7, 2009. [Facilitative Skills for Collaborative Leaders](#) will be held on April 28-29, 2009. For more information and/or to register see the specific web sites or contact [Dr. Donna Ching](#) of the [Department of Family and Consumer Sciences](#).

Maui Master Gardener Training Course Set

Maui County Cooperative Extension will be offer a 13 week training course for those interested in becoming Certified Master Gardeners. The course will run every **Wednesday** from 9:00 am – 3:30 pm, starting on **April 1, 2009 through June 24, 2009** at the Kahului CES office on the MCC campus. For more information contact, **Anne Gachuhi** on Maui at 808-244-3242 x232 or by e-mail at gachuhia@ctahr.hawaii.edu.

For Graduate Students – Hamilton Library EndNote Workshops

The **Hamilton Library Science and Technology Reference Librarians** are offering workshops in March and April 2009 on how to use **EndNote** – the industry standard bibliographic software; ideal for tracking cited reference in theses or dissertations. I guess I can now dispose of my 3 x 5 card files! Space is limited and the February workshops filled up fast – See the [EndNote Workshop web page](#) for dates and times, to register and for more information.

Hawaii State Science and Engineering Fair Seeking Judges – April 7, 2009

The Hawaii State Science and Engineering Fair is **seeking science fair judges for its annual state fair on: April 7, 2009**. There are two rounds of judging; from 8:00 am – 11:30 am is the Interview section. From 1:00 pm – 4:45 pm is the Interviews and Final Selection for projects. [Download the judges reply form here](#) and **fax it to 956-5183 by February 27, 2009**. Or e-mail the completed form to acadsci@hawaii.edu. CTAHR has a strong history of support of the Hawaii State Science Fair.

CTAHR's Ping Sun Leung and HDOA's Matthew Loke featured in January 2009 *Malamalama*

[Dr. Ping Sun Leung](#) of the [Department of Molecular Biosciences and Bioengineering](#), along with Hawaii Department of Agriculture colleague, Dr. Matthew Loke were featured in the UH magazine, [Malamalama](#) in January 2009 in a story about their recent CTAHR article "[Economic Impacts of Increasing Hawaii's Food Self-Sufficiency](#)".



Need help with making that grant perfect? See CTAHR's Grant Coach.

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 coach, **Sharee Pepper** at 956-8140 or by e-mail at spepper@hawaii.edu.

Dates and Events – Mark Your Calendars Today

Agriculture and Environmental Awareness Day – March 5, 2009

On **Thursday, March 5, 2009** at the Oahu Urban Garden Center at Pearl City from 7:45 am – 1:00 pm, Oahu 5th grade students will descend upon the Urban Garden Center to learn about agriculture and environmental issues in Hawaii. Different CTAHR booths will be set up to teach about various aspects of our college. Volunteers are needed. Contact **Erica Kubota** in the CTAHR Academic and Student Affairs Office, 956-3386 or eoshiro@hawaii.edu.

First Saturday at the Kanewai Lo'i – March 7, 2009

Everyone is invited to attend the monthly community clean up event at the Ka Papa Lo'i o Kanewai Cultural Garden. The garden provides experiential learning opportunities to school and community groups in the traditional farming practices and culture of Native Hawaiians. Come dressed to do yard work and get muddy. Light refreshments will be provided but donations of food and drink are always welcome. Contact the garden at 945-1562 or kanewai@hawaii.edu for more information.

We want your blood...CTAHR blood drive – March 11, 2009

CTAHR is sponsoring a blood drive at the UH-Manoa Campus Center on **Wednesday, March 11, 2009 from 8:00 am – 4:00 pm** in the Campus Center Ballroom 301. For appointments or information call CTAHR Academic and Student Affairs at **956-8183**. You need to bring a valid picture ID with a birth date on it. The Blood Bank of Hawaii will appreciate you spending only one hour and in doing so, you can save three lives!

IPM at home? What a concept! – March 14, 2009 at OUGC

Integrated pest management (IPM) is just one tool that farmers use to lessen the environmental impact of their agricultural practices. But home gardeners may be less educated on how to avoid excessive pesticide use. On

Saturday, March 14, 2009 from 9:00 – 12:00 noon, join Certified Master Gardeners **Brian and Imelda Cyr** at the **Oahu Urban Garden Center** in Pearl City, who will demonstrate practical environmentally sound pest control options for the home gardener. See the [Oahu Urban Garden web site](#) for more information and directions to the UGC.



CTAHR Research Symposium – April 3, 4, 2009

Plan now to attend the CTAHR Student Research Symposium will be **Friday and Saturday, April 3-4, 2009** in the Agricultural Sciences Bldg. Information about the Symposium and dates for abstract submission will be out in the new year. But plan now for the big event.

CTAHR Awards Banquet – April 30, 2009

This year's big event is, and I'm not referring to President Barack Obama's inauguration, our annual CTAHR Awards Banquet will be held on **Thursday, April 30, 2009** at the Hilton Hawaiian Village Coral Ballrooms. Stay tuned for more information as 2009 unfolds.

Mahalo Susan Miyasaka!

Dr. Susan Miyasaka receives thanks from Dean Andrew Hashimoto at the February 18, 2009 CTAHR Leadership Meeting. Susan is returning to the Big Island faculty after serving ably as Interim Hawaii County Administrator. Thanks to Susan for hard work and leadership. Dr. Russell Nagata will assume the Big Island position in early March.



Hawaii's Growing Seed Industry

James L. Brewbaker, Hawaii Foundation Seeds, TPSS/CTAHR, University of Hawaii at Manoa
(Address for Hawaii Science and Technology Council, January 9, 2009)

The views expressed here are those of the author and do not necessarily represent views of College of Tropical Agriculture and Human Resources.

Good Morning. I've been asked to reflect on development of Hawaii's No. 1 agricultural industry... and it's not sugarcane or pineapple or coffee or papayas...it's corn seed.

We started the seed industry on Molokai in the autumn of 1966. And, despite the efforts of activists, it's still there!! Corn seed is about the **only** profitable industry left on Molokai.

In the early 60's I grew corn trials at our Economic Research Station on Molokai. My students and I began to boast at national meetings that Molokai was a splendid place to grow corn, and to grow it every month of the year.

Winter corn nurseries were then coming into fashion, to accelerate genetic advance. The "Green Revolution" was just taking off in the 1960's. That revolution was basically built on genetic conversions to **one gene**.

Any guesses what that gene is?It's a gene for dwarfing....dwarf rice, dwarf wheat, barley, oats, corn ... It's a gene that changes big grasses into little dwarfs that stand erect like soldiers.

The dwarfs responded to added fertilizer by producing more grain instead of leaves. This experience illuminated the concept of "harvest index," and came to affect the genetic improvement of many crops.

Getting back to Molokai:

Sugarcane had bypassed Molokai, and pineapple was dying in the 1960's; land and water and labor were available and cheap. So we rented five whole acres on Molokai in the winter of 1966 and invited corn seedsmen.

Pioneer's Raymond Baker had been a leader in accelerating genetic advance through winter nurseries, and he paid for 4 of those 5 acres. He was so pleased that he returned the following year to set Pioneer up on Kauai. And the industry took off.

Incidentally, when corn-breeder Baker retired, he left a fortune of \$240 million, most of it to Iowa State's breeders. Sadly, none of it came to Hawaii, despite my

encouragement to our administrators.

By 1970 we had 60 seed organizations coming to Hawaii and we founded the Hawaii Crop Improvement Association. At our meeting that year, Lt. Gov. Tom Gill pronounced that Hawaii had a promising new "half-million dollar industry."

Today, the seed industry is worth around \$150 million and growing; Tom Loudat is currently completing an economic analysis of the industry.

Over 200 organizations—private and public—participated in the growth of Hawaii's seed industry. Many of those are now merged into the four chemical giants that dominate the industry today—DuPont, Dow, Monsanto, and Syngenta. This is largely a reflection of the second great "green revolution" that is underway, the biotech revolution integrating biochemistry and genetics.

But the corporations who built the seed industry were often small—Trojan Seeds on Maui, Holden's Foundation Seed on Molokai, Garst Seeds on Oahu, Northup-King on Kauai. The two big ones were Pioneer (now owned by DuPont) and Cargill.

Let me turn to policy issues:

First: At no time in its history did the seed industry have specific tax benefits from the State of Hawaii.

Secondly: At no time did they come hat in hand to HDOA or DBEDT for bailout packages.

Thirdly: The industry thrived in spite of disinterest by Hawaii's big landowners. The "Big Five," Hawaiian Homelands, Bishop Estate often served more as impediments to growth, at least until it was obvious that sugarcane was dying.

Finally: The seed industry generally avoided legislatures and county councils. I sense that they



Dr. Brewbaker at the Waimanalo Corn Field day in 2006.

realized (as recently in Hilo) that legislation often reflects quantity, not quality, of scientific advice.

One PhD with facts in hand is no match for 50 high-school dropouts versed in mythology, if you'll pardon the cynicism.

What about the future of the Seed Industry?

First: It is clear that a third "green revolution" is underway that can only multiply the effect of the current transgenic revolution. This relates to sustainable bioenergy. In grasses like corn, it relates specifically to lignocellulosic sources of ethanol.

The first green revolution was based on dwarfing genes available in the crops at hand. The second revolution was based largely on genes borrowed from bacteria (like BT) or created in the lab (like RoundupReady). The third will build on all three sources.

In corn, for example, we are working with native genes that reduce lignin and greatly enhance economics of chemically producing ethanol. From bacteria are coming endocellulase genes to facilitate this recovery. And from the lab are other options, including unusual byproducts like insulin.

Secondly: The seed industry's future continues to depend on congenial reception by Hawaii. Countries like Chile, Thailand and Australia have impressive developments of seed industries, and are generous in attracting scientists.

Thirdly, the seed industry consistently must hire the brightest and the best agricultural scientists and land managers, as they have in the past. This has not been easy in Hawaii.

In the first place, Hawaii does not generate many crop scientists. For example, out of my 51 graduates, only one came from this state. And, I regret to note also, only one was financed by the seed industry.

Many bright young scientists come here for a couple years and then return home, complaining about poor schools and high living costs. My first PhD came from Canada and spent her entire career helping develop Molokai's seed industry. But let's be honest,



First seed industry meeting, Molokai 1966. Dr. Brewbaker lower right corner.

activism can quickly make a place like Molokai pretty unattractive to hot young PhD's and their families.

Fourth Point: Hawaii has trained far too few people for the seed industry. Thankfully, many of those have been from my team.

We are simply not training plant breeders (or field agronomists, etc.). The University of Hawaii now has 2.3 plant breeders by my count, down 90% since 1990. It is a nationwide phenomenon, partly reflecting the hyper-enthusiasm in colleges for lab-based technologies.

However, seed industry scientists are quick to point out that technological innovations are often useless unless followed by extensive and long-term practical applications in the field thru plant breeding.

Finally, the future of most improvement of crops and animals will automatically involve transgenes. We must get over this hysteria about GMOs. It is said that almost half of Americans still believe in UFOs ("unidentified flying objects"). Under the circumstances, I suppose it is unrealistic to expect them to understand transgenes.

WHATEVAH......the demand in Hawaii for more and better education in the sciences at all levels has never been greater. Thank You.

CTAHR Research News survey results

By Doug Vincent
Special Program Director for Grants and Contracts

In January, 2009, we opened a survey for stakeholder input regarding the Office of Research's CTAHR Research News (CRN). We received 30 responses. Ninety percent of the respondent indicated that they read the *CRN*. While the survey lacked clarity with some of the questions, the following sections were rated very helpful or very useful.

For the question "Do you have any suggestions for improvement? Please provide your ideas and suggestions below. How can we make the CTAHR Research News better or more applicable to your needs?"

- *First of all, I'd like to say that this is a very good publication. My congratulations to those responsible for its creation. Most of the cover stories involve*

Section	Very Useful	Very Helpful	Somewhat Helpful	Somewhat Useful
Welcome	5.9%	12.5%	54.2%	64.7%
Cover Story	23.5%	39.3%	60.7%	76.5%
Short Stories	16.7%	29.6%	66.7%	72.2%
Research Calabash	35.3%	30.8%	53.8%	41.2%
Grants Received	25.0%	23.5%	67.9%	58.5%
New Publications	25.0%	27.8%	67.9%	55.6%
Open Grants	37.0%	41.2%	48.1%	41.2%

Among the open ended questions, we received the following comments about *CRN*. Under "What additional information would you like to see in CTAHR Research News?" we received the following suggestions:

- *I'd like to see it expanded to include Cooperative Extension.*
- *Department Highlights: what's going on in HNFAS? Or NREM or TPSS?*
- *Processes in obtaining grants.*
- *A listing of all publications – not just the refereed ones. Much of the most useful work for Hawaii comes in the form of unrefereed publications.*
- *Updated CTAHR news.*
- *Extension news. Why not make it CTAHR News to cover both research and extension?*
- *The news needs more technical information that is targeted at clients. Too much information about personnel and who does what rather than actual output.*
- *extension faculty demonstrating that CTAHR's projects are well integrated. I'd like to see Cooperative Extension more involved in this publication. Perhaps it could be called CTAHR Research and Extension News. That might encourage extension faculty and their clientele to read. Also, if it included extension, a list of recent extension publications would be appropriate.*
- *No suggestions to improve, but perhaps "useful" and "helpful" not the best terms to describe how as a reader I relate to the CRN; I find much of the material interesting and informative while some of it is just plain dull.*
- *I like it. It is well done, and the articles on the faculty are interesting.*
- *Great job on CRN! I like the feature stories and faculty profiles. We have a lot of good people in CTAHR who labor in relative obscurity. More of that sort of focus would be an improvement. All the grant opportunity information is certainly useful to (active) faculty, but if the target audience is the CTAHR 'ohana in general, it might be good to just put the grant stuff under another link in the pdf, so those who want to know about it could go there.*
- *This is obviously a big undertaking. The question is whether this is the best use of an administrator's time*

- especially in these challenging times. One suggestion would be to cut back to every 2 or 3 months instead of every month.

- None, seems to fulfill its purpose efficiently.
- Same comment as above. Extension faculty members have been saying their work is not known and it could be due to the selective nature of news coming out of CTAHR.
- As a staff member who has been here just a short while I find it very helpful to find out more about what my

department and other departments in the College are doing. The more informed I am the better I can do my job.

- A section on graduate student's research. Alumni news.

We appreciate the suggestions for improvement and if any of you have further suggestions or comments, please contact us at hucy@ctahr.hawaii.edu.

CTAHR parties with a purpose

By Doug Vincent
Special Program Director for Grants and Contracts

CTAHR annual Spring Event, sponsored by the CTAHR Office of Academic and Student Affairs, was held on Friday, February 13, 2009. Over 170 people attended the event which featured a dodgeball tournament and a barbecue. Funds (over \$450) were raised for the River of Life Mission and several attendees signed up for the CTAHR-sponsored Campus-Wide Blood Drive on March 11, 2009. Six Departments competed in a team costume

and dodgeball tournament. The Biological Engineers "The Killer BE's" (Dr. Daniel Jenkins, Bobby Kwan and Jennifer Fukugawa) took the costume prize but the "Admin Animals" (Dean Andrew Hashimoto, Vicky Perry and Kory Yonemoto) won the bragging rights over the rest of the College in CTAHR's 5th Annual Dodgeball Tournament. Following the event, CTAHR enjoyed a lunch of grilled hamburgers, hotdogs and veggie burgers.



The "Admin Animals" Kory Yonemoto, Vicky Perry, and Andy Hashimoto (l-r) show off their trophy.



Costume contest winners, the "Killer BE's", Daniel Jenkins, Jennifer Fukugawa, and Bobby Kwan, (l-r).

It's patriotic to write grants. It's time to write your own "stimulus package."

By Doug Vincent
Special Program Director for Grants and Contracts

“Budget shortfalls, dismal Council of Revenues predictions, dire economic news, recession, layoffs, plant closing, stock market collapses” are all terms we’ve become accustomed to in the last several months. No one doubts the dire economic times we are facing. We must face the reality that the regular sources of revenue that we’ve been accustomed to aren’t going to be there in the near term. We expect a significant budget shortfall this fiscal year. Next fiscal year, UH-Manoa could be faced with trying to operate on, pick a number, \$20 million dollars less than we had this fiscal year. With the passage of President Obama’s economic stimulus package a few days ago, President Obama assured us that we’re at the “beginning of the end.” Even though the stimulus package is a might short on research funding, we all have an opportunity to create our own stimulus package. Many of us are tenured faculty or in permanent positions, but a large share of us are dependent on the funding we bring in to pay salaries and to fund the important work that we do. Why not consider writing your own “stimulus package” by submitting a grant proposal this

year? If you are successful and are funded you might be able to keep that junior researcher on, or to hire a new graduate student, thus lessening the burden on our economy. The federal government doesn’t lack for funding opportunities – Dr. Sharee Pepper; CTAHR’s grant specialist has listed current funding opportunities available. Sharee can help you make that grant perfect, all you need do is ask. If you recall President Obama’s speech on January 20, 2009 – he said *“We remain the most prosperous, powerful nation on Earth. Our workers are no less productive than when this crisis began. Our minds are no less inventive, our goods and services no less needed than they were last week or last month or last year. Our capacity remains undiminished. But our time of standing pat, of protecting narrow interests and putting off unpleasant decisions — that time has surely passed. Starting today, we must pick ourselves up, dust ourselves off, and begin again the work of remaking America.”* Hasn’t the time for **standing pat** ended? Isn’t it time to **begin again**? Why don’t you contribute to our economic stimulus package by writing a grant proposal? We can help you.

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

Agriculture

\$ - USDA, CSREES - Agriculture and Food Research Initiative (AFRI) Competitive Grants Program (Note: includes prior NRI grants)

Deadline: See Table on last page for exact LOI and application deadlines

http://www.csrees.usda.gov/funding/afri/pdfs/program_announcement.pdf or

<http://www.csrees.usda.gov/funding/afri/afri.html>

\$ - USDA, CSREES - Specialty Crop Research Initiative
Deadline: LOI March 2, Application due April 15, 2009
http://www.csrees.usda.gov/funding/rfas/specialty_crop.html

\$ - USDA, CSREES - Biomass Research and Development Initiative Competitive Grants Program (BRDI)

Deadline: March 6, 2009

[https://e-center.doe.gov/iips/faopor.nsf/UNID/4AEB086E28EB0B208525754E007294C3/\\$file/DOE-USDA_PS36-09GO99016_2009_Joint_FOA.pdf](https://e-center.doe.gov/iips/faopor.nsf/UNID/4AEB086E28EB0B208525754E007294C3/$file/DOE-USDA_PS36-09GO99016_2009_Joint_FOA.pdf)

\$ - USDA, CSREES - Organic Agriculture Research and Extension Initiative

Deadline: March 9, 2009

<http://www.csrees.usda.gov/funding/rfas/OREI.html>

\$ - US EPA Region 9, Strategic Agricultural Initiative / Food Quality Protection Act Grant Program.

Deadline: March 18, 2009

<http://epa.gov/region09/funding/food-quality.html>

\$ -USDA, CSREES - Western Sustainable Agriculture Research and Education Program Sustainable Agriculture Tours

Deadline: Open until funding is exhausted

http://wsare.usu.edu/grants/docs/RFA_SAT.pdf

Education

\$ - U.S. DOE Clean Cities/Biomass Program Solicitation for Education and Outreach Projects

Deadline: February 27, 2009

http://www.grants.gov/applicants/find_grant_opportunities.jsp

\$ - Getty Institute Offers Multicultural Undergraduate Internships

Deadline: March 1, 2009

<http://fconline.foundationcenter.org/pnd/15016664/getty>

\$ - National STEM Education Distributed Learning (NSDL)

Letter of Intent Deadline Date : March 11, 2009

Full Proposal Deadline Date : April 15, 2009

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5487

\$ - NSF - Integrative Graduate Education and Research Traineeship Program (IGERT)

Deadline: Preliminary Proposal: March 13, 2009

Full Proposal Deadline Date : September 14, 2009

(BY INVITATION ONLY)

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12759

\$ - NOAA - Dr. Nancy Foster Scholarship Program

Due March 31, 2009

<http://apply07.grants.gov/apply/opportunities/instructions/oppSEC-OED-2009-2001418-cfda11.481-cid2113921-instructions.pdf>

\$ - NSF - Research Experiences for Undergraduates

Deadline: June 5, 2009

http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf07569

\$ - National Education Association (NEA) Foundation - Foundation Supports Professional Development for Educators

Deadline: June 6

http://www.neafoundation.org/programs/Learning&Leadership_Guidelines.htm
[Link to Funder Profile](#)

\$ - Human Frontier Science Program – Short Term Fellowship Program

Deadline: rolling – applications accepted year round

http://www.hfsp.org/how/appl_forms_STF.php

Environment, Water, Energy, Invasive Species Grants

\$ - USDA, CSREES – Conservation Innovation Grants - 2009

Deadline: March 2, 2009

http://www.nrcs.usda.gov/programs/cig/pdf_files/Fiscal_Year_2009_Announcement_for_Program_Funding.pdf

\$ - NSF - Environmental Sustainability

Deadline: March 2, 2009 & September 15, 2009 (5:00 pm submitter's local time)

URL: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501027

\$ - NSF - Energy for Sustainability

Deadline: March 2, 2009 & September 15, 2009 (5:00 pm submitter's local time)

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501026

\$ - NSF - Biotechnology, Biochemical, and Biomass Engineering (BBBE)

Deadline: March 2, 2009 & September 15, 2009 (5:00 pm submitter's local time)

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501024

\$ - NSF - Environmental Implications of Emerging Technologies

Deadline: March 2, 2009 & September 15, 2009 (5:00 pm submitter's local time)

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501030

\$ - NOAA - NWS Hydrologic Research

Due March 3, 2009

<http://apply07.grants.gov/apply/opportunities/instructions/oppNWS-NWSPO-2009-2001614-cfda11.462-cid2137409-instructions.pdf>

\$ - [National Forest Foundation: Collaboration Support Program](#)

Deadline: March 6 & August 7, 2009

http://www.natlforests.org/collaboration_support.html

\$ - HHS, CDC - Climate Change: Environmental Impact on Human Health (U01)

Deadline: March 9, 2009

<http://www.cdc.gov/od/pgo/funding/EH09-001.htm>

\$ - U.S. Environmental Protection Agency, Region 9 - Strategic Agricultural Initiative/Food Quality Protection Act

Deadline: March 18, 2009.

<http://www.epa.gov/region09/funding/food-quality.html>

\$ - NOAA Coastal and Estuarine Land Conservation Program FY 2010 Competition (may need to partner with state agency)

Due March 31, 2009

<http://apply07.grants.gov/apply/opportunities/instructions/oppNOS-OCRM-2010-2001655-cfda11.419-cid2138567-instructions.pdf>

\$ - NIH - Research to Action: Assessing and Addressing Community Exposures to Environmental Contaminants (R21)

Deadline: April 1, 2009

<http://grants.nih.gov/grants/guide/rfa-files/RFA-ES-09-001.html>

\$ - NOAA Broad Agency Announcement (for special projects)

Due September 30, 2009 (closes but applications accepted on a rolling basis)

NOAA Office of Education:

<http://apply07.grants.gov/apply/opportunities/instructions/oppNFA-NFA-2008-2001388-cid2112140-instructions.pdf>

National Marine Fisheries Services

<http://apply07.grants.gov/apply/opportunities/instructions/oppNFA-NFA-2008-2001388-cid2112136-instructions.pdf>

National Environmental Satellite Data Information Service

<http://apply07.grants.gov/apply/opportunities/instructions/oppNFA-NFA-2008-2001388-cid2112133-instructions.pdf>

National Ocean Service

<http://apply07.grants.gov/apply/opportunities/instructions/oppNFA-NFA-2008-2001388-cid2112139-instructions.pdf>

\$ - U.S. Fish and Wildlife Service - Coastal Programs

Deadline: September 30, 2009

<http://apply07.grants.gov/apply/opportunities/instructions/oppCOASTAL-09-cfda15.630-instructions.pdf>

\$- NSF – Long Term Research in Environmental Biology (LTREB)

Deadlines: 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

\$ - HHS, Administration for Native Americans - Family Preservation - Improving the Well-Being of Children Project Planning

Deadline: March 25, 2009

<http://www.acf.hhs.gov/grants/open/HHS-2009-ACF-ANA-NI-0049.html>

\$ - HHS, Administration for Native Americans - Family Preservation-Improving the Well-Being of Children Project Implementation

Deadline: March 25, 2009

<http://www.acf.hhs.gov/grants/open/HHS-2009-ACF-ANA-NI-0059.html>

\$ - CHS Foundation

Rural Youth and Leadership Development

Deadline: rolling – applications accepted year round

<http://www.chsfoundation.org/programs/ryld.htm>

Financial Grants

\$ - Money Management International Financial Education Foundation,

Financial Education Grants

Deadline: rolling – applications accepted year round

<http://www.mmifoundation.org/GrantSeekers.asp>

Health, Nutrition, Food & Biomedical Grants

\$ - [RWJF Issues Healthy Eating Calls for Proposals](#)

Deadline: February 24, 2009.

<http://www.healthyeatingresearch.org/>

\$ - NIH - Improving Diet and Physical Activity Assessment (R21)

Deadline: May 7, 2009

<http://grants.nih.gov/grants/guide/pa-files/PAR-06-103.html>

\$ - NIH -Pilot and Feasibility Clinical Research Studies In Digestive Diseases And Nutrition

Deadline: May 7, 2009

<http://www07.grants.gov/search/search.do;jsessionid=LH5fIHfSL4pBXG0Dt7PpzkdDBMHJSI6vhyGyQ1tpTnGcSJ2WfZD!488375993?oppld=8805&flag2006=true&mode=VIEW>

\$ - CDC, NIOSH - Exploratory and/or Developmental Grant Program (R21) (Focus: Reducing Occupational Disease & Injury)

Deadline: May 8, 2009

<http://grants1.nih.gov/grants/guide/pa-files/PAR-06-552.html>

\$ - NIH – Pre-Application for Dietary Supplement Research Centers: Botanicals (X02)

Deadline: April 30, 2009

<http://grants.nih.gov/grants/guide/pa-files/PAR-09-091.html>

\$ - NIH - Exploratory/Developmental Clinical Research Grants in Obesity (R21)

Deadline: May 7, 2009

<http://www07.grants.gov/search/search.do;jsessionid=LH5fIHfSL4pBXG0Dt7PpzkdDBMHJSI6vhyGyQ1tpTnGcSJ2WfZD!488375993?oppld=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

\$ - [Hitachi Foundation: Business and Communities Grants Program](http://www.hitachifoundation.org/grants/guidelines/index.html)

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

\$ -USDA, CSREES – Microbial Genome Sequencing Program

Deadline: March 2, 2009

http://www.csrees.usda.gov/funding/microbial_genome_announcement.html

\$ - National Geographic Society – Waitt Grants Program

Deadline: Rolling

<http://www.nationalgeographic.com/field/grants-programs/waitt-grants-application.html>

UH, Hawaii and Regional Grants

\$ - UH - \$1 Million Sustainability Research Grant

Deadline: March 1, 2009

<http://www.hawaii.edu/cgi-bin/uhnews?20081208144214>

\$ - 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

USDA, CSREES - Agriculture and Food Research Initiative (AFRI) Competitive Grants Program Contacts (Note: replacing NRI grants)

http://www.csrees.usda.gov/funding/afri/pdfs/program_announcement.pdf

USDA CSREES Agriculture and Food Research Initiative (AFRI) Competitive Grants	LOI Due	Deadline	National Program Leader	e-mail address
Air Quality	3/5/2009	6/5/2009	Raymond Knighton	rknighton@csrees.usda.gov
Animal Genome, Genetics and Breeding	3/5/2009	5/14/2009	Peter Burfening	pburfening@csrees.usda.gov
Animal Growth and Nutrient Utilization	none	7/8/2009	Mark A. Miranda	mmirando@csrees.usda.gov
Animal Health and Well-Being: Animal Health	1/16/2009	3/13/2009	Peter Johnson	pjohnson@csrees.usda.gov
Animal Health and Well-Being: Animal Well-Being	1/16/2009	3/13/2009	Peter Johnson	pjohnson@csrees.usda.gov

Animal Health and Well-Being: Tools and Resources	6/1/2009	8/14/2009	Peter Johnson	pjohnson@csrees.usda.gov
Animal Reproduction	none	3/3/2009	Mark A. Mirando	mmirando@csrees.usda.gov
Applied Plant Genomics Coordinated Agricultural Project	1/16/2009	3/11/2009	Ed Kaleikau	ekaleikau@csrees.usda.gov
Arthropod and Nematode Biology and Management: Organismal and Population Biology	none	3/9/2009	Mary Purcell-Miramontes	mpurcell@csrees.usda.gov
Arthropod and Nematode Biology and Management: Suborganismal Biology	4/1/2009	6/24/2009	Mary Purcell-Miramontes	mpurcell@csrees.usda.gov
Arthropod and Nematode Biology and Management: Tools, Resources and Genomics	4/1/2009	6/24/2009	Mary Purcell-Miramontes	mpurcell@csrees.usda.gov
Bioactive Food Components	1/22/2009	4/7/2009	Etta Saltos	esaltos@csrees.usda.gov
Biobased Products and Bioenergy Production Research	2/11/2009	4/2/2009	Chavonda Jacobs-Young	cjacobs@csrees.usda.gov
Improving Food Quality and Value	1/21/2009	3/31/2009	D. Ramkishan Rao	rrao@csrees.usda.gov
Food Safety and Epidemiology - Biological Approaches to Food Safety	3/4/2009	5/6/2009	Nancy Cavallaro	ncavallaro@csrees.usda.gov
Food Safety and Epidemiology - :Epidemiological Approaches to Food Safety	3/4/2009	5/6/2009	Nancy Cavallaro	ncavallaro@csrees.usda.gov
Food Safety and Epidemiology - Practical Approaches for Food Safety	3/4/2009	5/6/2009	Nancy Cavallaro	ncavallaro@csrees.usda.gov
Human Nutrition and Obesity	none	6/15/2009	Etta Saltos	esaltos@csrees.usda.gov
Integrated Solutions for Animal Agriculture	3/16/2009	6/30/2009	Peter Johnson	pjohnson@csrees.usda.gov
Managed Ecosystems	3/3/2009	6/2/2009	Diana Jerkins	djerkins@csrees.usda.gov
Markets and Trade	none	5/15/2009	Siva Sureshwaran	ssureshwaran@csrees.usda.gov
Microbial Biology: Microbial Associations with Plants	2/16/2009	4/30/2009	Ann Lichens-Park	apark@csrees.usda.gov
Microbial Genomics: Functional Genomics of Microorganisms	2/5/2009	4/16/2009	Ann Lichens-Park	apark@csrees.usda.gov
Microbial Genomics: Genomic Sequencing	none	3/2/2009	Ann Lichens-Park	apark@csrees.usda.gov
Plant Biology: Biochemistry	2/20/2009	4/27/2009	Ed Kaleikau	ekaleikau@csrees.usda.gov
Plant Biology: Plant Breeding and Education	3/16/2009	6/15/2009	Liang-Shiou Lin	llin@csrees.usda.gov
Plant Biology: Environmental Stress	1/30/2009	3/27/2009	Diana Jerkins	djerkins@csrees.usda.gov
Plant Biology: Growth and Development	3/2/2009	5/19/2009	Liang-Shiou Lin	llin@csrees.usda.gov
Plant Biosecurity	4/13/2009	6/26/2009	Liang-Shiou Lin	llin@csrees.usda.gov
Plant Genome, Genetics and Breeding	1/16/2009	3/11/2009	Ed Kaleikau	ekaleikau@csrees.usda.gov
Protection of Managed Bees	3/2/2009	5/1/2009	Mary Purcell-Miramontes	mpurcell@csrees.usda.gov
Rapid Response	7/30/2009	7/30/2009	Mark Poth	mpoth@csrees.usda.gov
Soil Processes	1/16/2009	3/17/2009	Nancy Cavallaro	ncavallaro@csrees.usda.gov
Sustainable Agroecosystems Science	none	3/2/2009	Michael A. Bowers	mbowers@csrees.usda.gov
Water and Watersheds	None	4/15/2009	James P Dobrowolski	jdobrowolski@csrees.usda.gov
Weedy and Invasive Species	4/20/2009	6/19/2009	Michael A. Bowers	mbowers@csrees.usda.gov