

One who mixes ingredients, drugs or medications: a pharmacist

Kāwili Lā'au

The Daniel K. Inouye College of Pharmacy at the University of Hawai'i at Hilo

Winter 2015 • Volume 7, Issue 2



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HILO

UH Hilo breaks ground for DKICP permanent building

Inside: Focus on infectious disease research

Dean's Message

(From the Groundbreaking Ceremony, December 12, 2014)



As some of you know, when I came here in 2006, this college was little more than a hope and a dream. We had so little that a story developed that might be considered an urban legend. People would laughingly say the dean of pharmacy is working out of the trunk of his car. Actually, the legend is true. But I think everyone knew there was a strong commitment to get the job done since the car was a corvette and the color of the corvette was UH Hilo red.

Obviously we have come a long way since that time thanks to the effort of many people. I can't possibly recognize everyone, but I would like to recognize three people who are recipients of the APEx award presented by the College. The word APEx, of course, means a high point. But in our case, it is an acronym for the Advancement of Pharmacy Excellence. I would like to call on Pat DeLeon, Rose Tseng and Gerald DeMello to stand and be recognized. They have contributed a great deal to our college.

Thinking back to 2006 there were many important things we did not have. A curriculum, a faculty, a pharmacy library, clinical sites, accreditation, and so forth. One of the most important things we did not have was alumni.

Over the past few years, students have come and graduated with doctor of pharmacy degrees. Now they are serving the community as seasoned health professionals. We are pleased that one of our star alumni is with us today, Jessica Toyama, president of our inaugural class. She will address us in a few minutes. Jessica, please stand and be recognized.

In addition to the fully accredited Pharm D program, the first and only in Hawaii, we have started research programs, MS and PhD programs, residency programs, and much, much more. Our progress has even exceeded our own expectations. And believe me that was not easy because our expectations have always been very high.

For the first few years I was here, I adopted a quotation attributed to Emerson. It goes like this.

"The whole difference between construction and creation is exactly this: a thing constructed can only be loved after it is constructed; but a thing created is loved before it exists."

Think about that. A thing constructed can only be loved after it is constructed; but a thing created is loved before it exists.

I have definitely found this to be true. The Daniel K. Inouye College of Pharmacy is loved by many. The College has transformed the lives of many, including my own, and those of my family.

This College is a thing that was loved before it was created.

But as time went on, I needed to modify the Emerson quotation:

"A college created can be loved before it exists. But construction is necessary to continue loving that college."

So now it is time for construction.

The college of pharmacy has proven it is an economic engine that helps drive the entire community. Yet we could not provide a permanent facility to carry on our work without help from the legislature. A groundbreaking to acknowledge that trust is indeed a day to celebrate.

But it has been a long and arduous process. Some people have asked if this has worn me down.

The truth of the matter is that I have always known this college has proven its value. And because this college has proven its value, I have always known that our state representatives would see the value of the program and help us secure the future. Today is a day for all of the people to celebrate. It represents the pinnacle of an intense and sustained effort put forth enumerable individuals, to all of whom we owe a great debt of gratitude.

I would like to individually acknowledge everyone involved in this process. But in fact, so many people have come to our support that it would be impractical for me to acknowledge each and every one at this time.

But I would like to acknowledge a group that became known as the friends of pharmacy. They played a very important role in getting us to this point. Those who are here, would you please stand and be recognized? Thank you.

And those who supported us not only intellectually but contributed to our building fund. Such as Mina Pharmacy represented here today by Hany Guirguis. Would you please stand and be recognized? Thank you.

And another good partner, Walgreens, represented here today by Nancy Huang. Would you please stand and be recognized? Thank you.

Finally I would like to recognize one unsung hero who has been with us all the way – and that person is Marvin Wong. Marvin, would you please stand and be recognized? Thank you.

We are here today to celebrate the future. As signified by this blessing and groundbreaking, the College of Pharmacy will have a permanent home. This day will go down in the archives as the day that safeguarded the future of pharmacy as a profession in the State of Hawaii and throughout the Pacific Region.

When student pharmacists enter the profession, they cite an oath: "I promise to devote myself to a lifetime of service to others through the profession of pharmacy."

Through this investment in our future, you can be sure the Daniel K. Inouye College of Pharmacy will devote itself to a millennium of service for all of the people of Hawaii.

Thank you all very much for being here. We truly appreciate your support.

A handwritten signature in black ink, appearing to read 'John M. Pezzuto'.

John M. Pezzuto
Professor and Dean



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On the cover: Dean John Pezzuto (in the driver's seat) and (from left) Director of Clinical Education Lara Gomez, Chair of Pharmaceutical Sciences Ken Morris, Kāwili Lā'au Editor and Director of Media Relations Maggie Morris, Director of Strategic Planning/Continuing Education Karen Pellegrin and Associate Dean for Academic Affairs Edward Fisher, celebrated the groundbreaking for the construction of DKICP's new permanent building. (Heavy equipment contributed by Allan and Jamie Leite of Hilo.)



UH Hilo breaks ground for College of Pharmacy permanent building

Photo by Jaysen Niedermeyer

After nearly eight years in existence, the Daniel K. Inouye College of Pharmacy (DKICP) was able to celebrate a groundbreaking and bilingual blessing on Dec. 12 for a permanent facility on campus at the University of Hawai'i at Hilo.

The event was held at the construction site on South A'ohoku Street next to the college's modular buildings. Special guest speakers included Jessica Toyama, PharmD, Class of 2011, Inaugural Class President Sean Lasky, Class of 2017, Class President

Founding Dean John M. Pezzuto honored several guests who were instrumental in beginning the only college of pharmacy in the Pacific region, and recognized two student speakers, Inaugural Class of 2011 President Jessica Toyama and current student Shaun Lasky, president of the class of 2017.

"Groundbreaking ceremonies are always emotional, but this one is particularly profound not only for the faculty and who have worked painstakingly to get to this point, but for the four groups of PharmD graduates and current students who have believed in us," Pezzuto said. "We are honored to welcome today many other people who put their own sweat equity in the college from the beginning, several of our winners of the coveted Advancedment of Pharmacy Excellence awards: Chancellor Emerita Rose Tseng, former director of university relations Gerald De Mello, and Pat DeLeon, who served as Chief of Staff to Senator Daniel

Inouye when the college was conceived and built. Without them, there may not have ever been a College of Pharmacy."

The ceremony was punctuated with a simple prayer in Hawaiian combined with a "pikai" with salt water, provided by Larry Kimura, who is recognized as the grandfather of the movement to perpetuate the use of Hawaiian language in modern Hawai'i. Dr. Kimura is co-founder of Hawai'i's Punana Leo Hawaiian Language Immersion Schools and chair of the Hawaiian Lexicon Committee to create new Hawaiian words.

University of Hawai'i President David Lassner and

Hawai'i County Mayor William "Billy" Kenoi were featured speakers along with Jennifer Sabas, former Chief of Staff for the late Senator Daniel Inouye. Jerry Chang, director of university relations, served as emcee, as UH Hilo Chancellor Donald O. Straney welcomed the crowd.

"This building is symbolic of the direction UH Hilo is going, and establishes the Daniel K. Inouye College of Pharmacy as an integral part of the State of Hawai'i," Straney said. "While we are extremely grateful, we are also reminded

of the responsibility this trust entails."

DKICP earned full accreditation by the Accreditation Council of Pharmacy Education in 2011. In 2012, the first year UH Hilo CoP was eligible to be evaluated in the US News and World Report, it was ranked as one of the top five new schools of pharmacy in the country.

Under the leadership of the founding dean, DKICP has met or exceeded all expectations since enrolling students



Mayor William "Billy" Kenoi and Dean John Pezzuto



Dr. Larry Kimura provided the blessing



Dr. Ken Morris and Marvin Wong, former aide to Governor Abercrombie



Dr. Jessica Toyama



Dr. Hany Guirguis



Left to right: Rep. Clift Tsuji, Former Inouye Chief of Staff Pat DeLeon, Chancellor Emerita Rose Tseng, President David Lassner, Founding Dean John Pezzuto, Former Inouye Chief of Staff Jennifer Sabas, Chancellor Donald Straney, Mayor William "Billy" Kenoi, Regent Barry Mizuno in 2007. Students, faculty and staff number over 500, four classes have graduated and statewide economic impact is in excess of \$50 million per year. Through successful bids for federal funding, the College of Pharmacy has demonstrated value to the entire state on every island.



Student pharmacists

Degree programs include: PharmD, a four-year professional course of study focusing on basic, biomedical, and pharmaceutical sciences; PhD in Pharmaceutical Sciences, where students with BS, MS, or PharmD degrees are prepared for senior leadership positions in academia, research, education, government, industry and related fields; Masters in Clinical Psychopharmacology (MSCP), that provides advanced professional development to working clinicians; Bachelor of Arts in Pharmacy Studies (BAPS), available to students enrolled in UH Hilo's PharmD program. The College also has gained accreditation to offer continuing education for practicing pharmacists and nurses, and a Residency Program in Community Pharmacy, with licensed pharmacists acquiring further training through DKICP.



Student pharmacists



Shaun Lasky

Focus on Infectious Diseases



With the world's worried eyes on treatment of the ebola virus, researchers continue the battle to find ways to help victims. But ebola is just one disorder classified as an infectious disease; there are many others such as malaria, tuberculosis, hepatitis C, and rat lungworm disease, that are caused by bacteria, viruses, fungi or parasites. DKICP researchers are diligently working on some of those problems, including helping hospitals develop protocols on caring for people who carry highly contagious bacteria. With grants from funding agencies such as the National Institutes of Health (NIH) and the Department of Health in Hawai'i, our scientists work hand in hand with the rest of the global health care community to improve the outcome for millions.

On the clinical front with Dr. Roy Goo:

What are you working on?

One of the most critical problems that healthcare providers are faced with is increasing resistance rates of bacteria to antimicrobial medications (medications which target bacteria, viruses, fungi and other parasites). Each year more resistant bacterial strains are identified, while the number of new drugs continues to dwindle. It is a vicious cycle, the more resistance in a particular community the more drugs must be used to combat infections leading to the development of even more resistant organisms. DKICP is currently working in collaboration with the Hawaii department of health to establish a state-wide antimicrobial stewardship collaborative and develop institution specific antimicrobial stewardship programs (ASP) at hospitals around the state. There is a particular focus on community and critical access hospitals. ASPs are programs that are designed to ensure optimal use of antimicrobial agents so that we are using the right medications to combat infections while avoiding the excessive use that leads to the development of resistance. Since my time with the College, DKICP has worked with several hospitals on Kauai and Oahu to develop ASPs, however this initiative with the Hawaii Department of Health, is the first effort to take this initiative statewide.

Why is it important?

With Hawaii being a hub for visitors from around the world, there is always the potential for the spread and development of drug resistant organisms, and because these organisms do not isolate themselves to one community or one island it is important that there is an organized state-wide effort to address this growing issue. Besides the obvious benefits to patient care, several federal agencies have begun requiring hospitals to have some type of ASP, and in the future the presence of an established ASP may affect the way hospitals are reimbursed. Hawaii will be one of the first states to have a state-wide antimicrobial state collaborative. Perhaps the most unique aspect of this program is that DKICP will be working with hospitals individually to establish programs that

will be individualized and sustainable, as opposed to trying to implement a one size fits all model whose requirements are often prohibitive for many smaller institutions.

Where will it be applicable?

The optimization of antimicrobial use is really applicable to any healthcare setting and every community. The organisms that cause infection can spread very easily between communities, islands and even countries. In general we are seeing similar resistance rates in rural communities such as Kauai and Hawaii Island as we see in metropolitan Honolulu. This is why DKICP has taken on this statewide initiative with faculty from multiple islands taking the lead. On Hawaii Island Kendra Demaris at the Hilo Medical Center (HMC) has already begun work to streamline the antimicrobial selection for common infections and will soon begin work with other hospitals such as North Hawaii and Kona Community Hospital while Maui based faculty Anita Ciarleglio has already begun establishing a program at her practice site. On Oahu, DKICP faculty Cherie Chu and Carolyn Ma have already created an important infrastructure for the expansion of programs there.

How can it affect the future?

The main goal of this program is to slow the spread of antimicrobial resistance and prevent Hawaii from becoming like some large cities on the mainland that are now facing organisms that are resistant to all medications on the market. There is also a large educational component of this initiative which will help to further progress the practice of pharmacy and healthcare in Hawaii, allowing pharmacists, physicians and nurses to become more confident and efficient in managing infectious conditions in our unique island setting.

Dr. Goo is assistant professor in the Department of Pharmacy Practice based on Kauai.



Dr. Roy Goo

On the clinical front with Dr. Anita Ciarleglio:

What are you working on?

We recently began pharmacy involvement in Antibiotic Stewardship at Maui Memorial Medical Center. Although pharmacists at the hospital have always monitored patient profiles, and been responsible for dosing antibiotics like vancomycin and aminoglycosides, along with Dr. Scott Hoskinson, MD, who is a board certified specialist in Infectious disease, Ramona Chapman, RN, BSN, Infection Prevention and Control Coordinator, and Kelly Catiel, RPN, we initiated a formal program to monitor appropriate use of antibiotics.



Dr. Anita Ciarleglio

The results of this review will be presented to the hospital Pharmacy and Therapeutics Committee with accompanying recommendations.

What are you doing to stay current?

I am earning a certification as an Infectious Disease Pharmacist through the Society of Infectious Disease Pharmacists, a national organization. Infectious disease pharmacists implement interventions regarding antibiotics to improve patient care, reduce healthcare expenditures, and minimize the development of antibiotic resistance.

How can this program affect the future?

I strongly believe that the ASP at Maui Memorial will have multiple benefits. By insuring that our patients receive the best antibiotic for their particular infection, for the proper duration of time and at the dose tailored to their specific needs, we hope to see a shorter length of stay and quicker recovery for our patients, decreased costs to both the patient and the hospital, and a decrease in the rate of development of resistant pathogens. The latter affects not only our hospitalized patients, but the entire community. We may be a relatively small facility, but our number one goal has always been to provide the best quality healthcare to all of our patients.

Dr. Ciarleglio is assistant professor in the Department of Pharmacy Practice based on Maui.

Why is it important?

The CDC reports that studies show that 30-50% of antibiotics prescribed in hospitals are unnecessary or inappropriate. Overuse of antibiotics contributes to the increase in *C. difficile* infection and to antibiotic resistance. Antibiotic stewardship programs are designed to use a team approach to insure appropriate use of antibiotics.

How does it work?

Since the beginning of October, we reviewed more than 500 records of patients who have received antibiotics in the hospital. Cases were reviewed for appropriate choice of drug depending on culture and sensitivity results, indication for use, host immune responses and other factors. The antibiotic dose, duration of therapy, route of administration and potential for conversion to oral therapy have also been reviewed.

In the lab with Dr. Susan Jarvi:

What are you working on?

One of the main currently ongoing projects in my lab involves rat lungworm disease (RLWD), caused by the nematode *Angiostrongylus cantonensis*. This is considered a global, emerging, infectious disease. RLWD can be considered as one of the most serious threats to human health of diseases carried by wildlife in Hawaii, and in many other tropical and subtropical countries around the world. This worm reproduces in rats, primarily black rats (*Rattus rattus*) and slugs, snails or other molluscs are also required for development. The 1st stage larvae are expelled from rats in their feces, which slugs and snails eat, and in the slug the parasite develops from the first- to the third-larval stage. Humans can become infected by ingesting intermediate hosts (slugs/snails) containing infective third stage larvae, many times on fresh produce. Larvae travel through the intestines, liver and lungs to reach the central nervous system and the brain. RLWD in humans can result in transient meningitis (inflammation of the meninges of the brain and the spinal cord) or a more serious disease involving the brain, spinal cord and nerve roots -

leading to hyper skin sensitivity, partial paralysis, coma and/or death.

My lab has taken a research-based approach to learn more about RLWD as well as an educational approach to better educate and inform the public. In 2012, in collaboration with second grade teachers from four pilot schools in the Hilo area, and with the assistance of the science curriculum coordinator for the schools, we developed an activity book appropriate for 2nd grade students on RLWD. The contents are based on the 2012 Hawaii State Science standards and contain grade appropriate vocabulary and critical thinking skills. To date, over 7500 books have been distributed. Publication costs for the book were paid for by the UHH DKI College of Pharmacy, and the book is available free of charge. We have also developed an informational brochure geared for adults, with publication costs provided by Island Naturals and the Hawaii County Council.

Our research approaches include developing a qPCR (molecular) test to estimate the parasite load in slugs and snails across the Island looking for transmission 'hotspots'. We

are posting results on our website in the form of a google map (<http://pharmacy.uhh.hawaii.edu/rlw/>), along with FAQs, links to RLW publications, and teacher resources to accompany the RLWD curriculum. We have evaluated how well some solutions are at killing RLW larvae for potential vegetable washes. We have completed two trials in local rats with USDA-APHIS. One was to see if detection of parasite DNA was possible in rat blood in hopes of developing an early diagnostic test for humans. The other was to determine the efficacy of a vaccine developed by collaborators in Spain against RLW in local rats. We are evaluating the possibility of RLW larvae transmission in catchment water. We are working with Hawaii Catchment Co. to test their filtration/UV system to see if RLW larvae can make it through. We are working with collaborators in Thailand to optimize diagnostic tests here in Hawaii and we are gearing up to conduct a pilot study to test 500 volunteers for the presence of RLW antibodies to better understand the prevalence of exposure on East Hawaii Island.



Dr. Susan Jarvi

Why is it important?

Our RLWD educational and research efforts will help save lives. RLWD is a very preventable disease, if you know about it. Education is key, and we are providing activity books to keiki who can then go home and educate their ohana. Students learn about the life cycle of the rat lungworm and its hosts, how humans can contract the disease, and how to best prevent the disease. Students also learn how to make a slug jug for proper capture and disposal of invasive slugs and snails at their own homes, and become educators for their families and communities. We are providing informational brochures to the general public so they better understand how to reduce risk of infection. Through our research efforts, we are learning a lot more about RLW. We've shown that we

can detect RLW DNA in the blood of infected rats, and this may be feasible in humans as well. We have found that RLW

“ Rat Lungworm Disease can be considered as one of the most serious threats to human health of diseases carried by wildlife in Hawai‘i.”

larvae live much longer in rainwater than previously thought. This has important implications for those using catchment as a water source. Currently there are no diagnostic tests for RLWD available in Hawaii and true prevalence of infection is unknown in humans and other species. With assistance from colleagues in Thailand, we are optimizing two antibody-based tests to test plasma from volunteer participants for the presence of antibodies against *A. cantonensis*. There are currently no data documenting symptoms, treatments and long-term disability due to RLWD, yet many victims in Hawaii and elsewhere suffer chronic symptoms. We plan on conducting a survey including questions about these topics as well as exposure information through a self-reported questionnaire completed by study participants.

Where will it be applicable?

These educational and research efforts can be directly applied to reducing the risk of infection in the people of Hawaii, visitors to Hawaii, and to others living in areas of RLW transmission. Most of the cases of RLWD originate in the Puna district of east Hawaii. Isolation and lack of power due to the recent hurricane, and now lava flow, might result in an increase in the number of cases if people resort to using unfiltered catchment water in their households. However, cases have been reported in other areas of the Island and statewide, so this information will be applicable throughout the state.

How can it affect future research?

This is an important first step in documenting the impacts and long-term effects of RLWD and may be informative in the planning of prevention efforts. Documentation of the prevalence of RLW disease using a confirmatory test along with a questionnaire to obtain exposure information and the effects of long-term chronic symptoms have substantial biomedical relevance and potential to impact health care delivery and prevention efforts, which benefit the people of Hawaii.

Dr. Jarvi is professor in the Department of Pharmaceutical Sciences and Director of the Pre-Pharmacy Program.

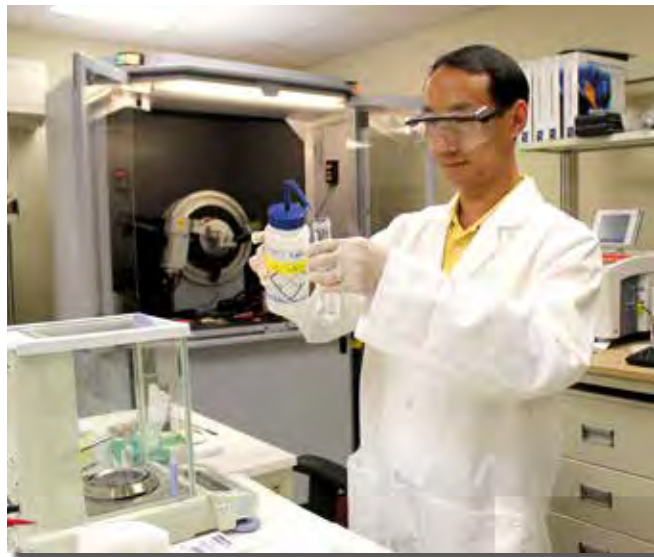
In the lab with Dr. Dianqing Sun:

What are you working on?

My laboratory is interested in the design and synthesis of new antibacterial agents targeting problematic bacterial infections such as *Mycobacterium tuberculosis* (*M. tuberculosis*) and *Clostridium difficile* (*C. difficile*). In collaboration with Dr. Richard Lee at St. Jude Children's Research Hospital in Memphis, TN and Dr. Julian Hurdle at Texas A&M, as well as some other colleagues, we are designing and synthesizing novel small molecule and natural product-inspired chemotherapeutic agents for subsequent antibacterial evaluation. Typically, our synthesized compounds will be initially tested *in vitro* against *M. tuberculosis*, *C. difficile*, and a broad panel of Gram+ve and Gram-ve bacterial pathogens, followed by cytotoxicity, mechanistic, and *in vivo* efficacy studies of emerging antibacterial lead compounds.

Why is it important?

There are significant unmet medical and research needs for controlling and treating bacterial infections. For instance, *C. difficile* is the most common cause of hospital-acquired diarrhea, particularly in the elderly, which can lead to pseudomembranous colitis, toxic megacolon, and death. In recent years, it has become a major cause of death due to a nosocomial infection and the organism is now endemic in hospitals, but it is also an increasing cause of community acquired infections. Each year in the US, it is responsible for >500,000 cases of *C. difficile* infection, approximately 14,000 deaths, and added healthcare costs of several billion dollars. Additionally, because of the emergence of multi-drug resistant and hypervirulent strains, new antibacterial agents with distinct modes of action and less side effects are urgently needed.



Dr. Dianqing Sun

Where will it be applicable?

Many antibiotics in the clinic are natural products or their semisynthetic derivatives. Notably, most clinically used natural product antibiotics are produced from bacterial and fungal microorganisms, and no plant derived antibacterial agents have been used clinically. As such, we have been focusing on exploring the underexplored plants derived phytochemicals as chemical starting points for our antibacterial medicinal chemistry research programs. These chemically modified phytochemicals may serve as promising drug-like leads for further optimization in order to discover compounds for the treatment of tuberculosis, *C. difficile* associated diarrhea, or other clinically problematic bacterial infections.

How can it affect future research?

We hope our basic to translational biomedical research can produce promising antibacterial lead candidates for advanced mechanistic, *in vivo* efficacy, pharmacokinetic and pharmacodynamic, and safety studies in animal models. In the long term, we aim to discover new chemotype antibiotics with unique mechanistic profile, good *in vivo* efficacy and favorable safety properties for further preclinical and clinical drug development.

Dr. Sun is associate professor in the Department of Pharmaceutical Sciences.



In the lab with Dr. Ghee Tan:

What are you working on?

I am conducting drug discovery research on infectious diseases, particularly those that have global health implications. My current emphasis is on malaria and leishmaniasis both of which are caused by parasitic organisms with extraordinarily complex life cycles and host defense mechanisms. My research group has also been screening natural product-derived samples for antibacterial and antifungal activity on a continuous basis. We attempt to find the next lead molecule from nature for further preclinical development.

In addition to the discovery effort described above, a project under development proposes to exploit parasite nutrient transporters as novel drug targets and potential routes for the selective delivery of antimalarial agents into infected red blood cells (rbc). Recent and emerging literature strongly suggests that this "Trojan Horse" chemotherapeutic approach that targets nutrient transporters is applicable to human cancer as well.

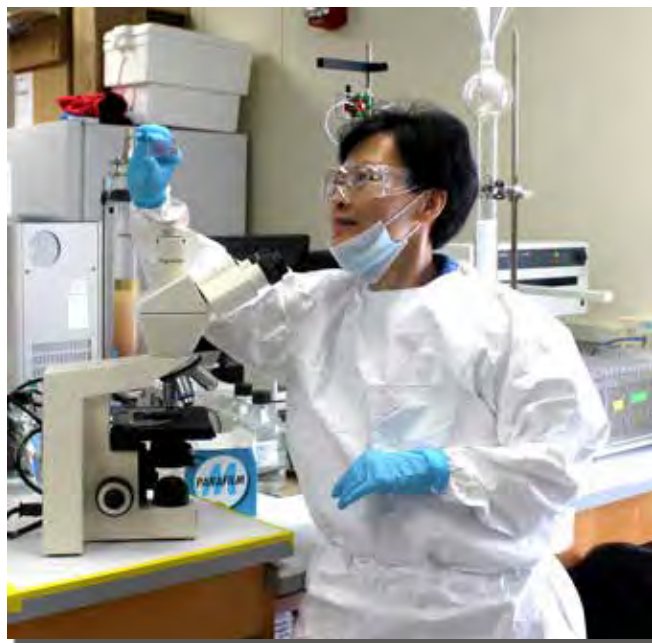
Why is it important?

Infectious diseases such as malaria and leishmaniasis impede the health, economic development, and political stability of many of the world's poorest and most vulnerable nations. Global health problems have been recognized as important destabilizing threats to the world. Infectious diseases do not respect geographical or political boundaries. Therefore, an infectious disease outbreak is not a problem specific to any country. When aided by humans, infectious organisms can travel the globe in less than 24 hours.

Malaria is preventable and curable. Unfortunately, disease control is hampered by the lack of an efficacious vaccine, and the occurrence of multidrug resistant (mdr) strains of *Plasmodium falciparum*, the causative organism of malaria. *P. falciparum* has developed resistance to all existing classes of anti-malarial drugs. Moreover, artemisinin, a key ingredient in combination drug therapies recommended by the World Health Organization (WHO) for the treatment of drug resistant strains of falciparum malaria is the last effective drug available against mdr malaria in the perpetually limited antimalarial armamentarium. New drugs are urgently needed to treat malaria and to block its transmission worldwide.

Where will it be applicable?

An estimated 300 - 500 million clinical cases of malaria occur each year, making it one of the most common infectious diseases worldwide. These infections result in an estimated half a million deaths each year. The victims are primarily children and pregnant women in sub-Saharan Africa, and other tropical and subtropical regions of the world. Non-immune travelers from malaria-free areas are also very vulnerable to the disease when they become infected. My laboratory aims to discover and develop natural product



Dr. Ghee Tan

antimalarial agents that are not only clinically efficacious, but also economical to synthesize in large-scale making the drug affordable to rural populations and resource-poor countries where they are needed most.

How can it affect future research?

The total eradication of malaria is the holy grail of the global health agenda. Primary emphasis is on the identification of new and novel agents that can eliminate gametocytes resident within the patient's rbc and, therefore, block the transmission of the parasite from its human host to the mosquito vector. Gametocytes constitute the sexual stage of the malaria parasite that are essential for the transmission of the disease. Primaquine is currently the only licensed anti-malarial drug that is effective against late-stage gametocytes.

Along similar lines, drugs that inhibit parasite maturation within liver cells could be used for short-term prophylaxis in areas of endemicity, and for eradicating persistent/dormant forms of the parasite that arise with some species of *Plasmodium*. Parasites from an infected mosquito's saliva take up residence in the liver en route to initiating the blood stage infection. Drugs that target the liver stage are unlikely to select for resistant strains due to the limited replication activity of the parasite in the liver. Only 2 licensed drugs (one of which is primaquine) are known to be effective against the liver stages of the parasite.

Consistent with the defined research priorities for malaria control and elimination, validated anti-malarial lead compounds emanating from my laboratory at the DKICP will be synthesized and structurally modified to improve their antimalarial selectivity and potency against the erythrocytic, hepatic and gametocyte stages of *P. falciparum*. Studies will

also be conducted to elucidate the mechanism(s) of action of these lead compounds as therapeutic and transmission blocking agents. Such efforts may ultimately lead to the identification of new molecular targets for malaria. New molecular targets will provide the much needed impetus

for further drug discovery research to bolster the limited number of chemical classes of drugs that exists today.

Dr. Tan is associate professor in the Department of Pharmaceutical Sciences.

On the clinical front with Dr. Elizabeth Ackerman:

What is the background of hepatitis C?

Approximately 130 – 170 million people worldwide are infected with chronic hepatitis C virus (HCV). Of those infected, 3.2 - 3.7 million reside in the United States, which is approximately 1.3 percent of the population. Furthermore, up to 75 percent of individuals who are infected with the virus are unaware of their infection. Chronic HCV infection progresses very slowly, with complications of the virus often taking several decades to clinically manifest. Therefore, conducting clinical trials that identify disease-related morbidity and mortality as a primary outcome would be unrealistic given the time required to reach these outcomes. Instead, conducting efficacy and safety trials for agents to treat HCV that achieve a sustained virologic response (SVR) is more realistic. SVR is defined as the absence of HCV RNA in the blood 12 – 24 weeks after completion of therapy. Achieving an SVR has demonstrated a reduction in mortality in those infected with HCV and is considered a cure.



Dr. Elizabeth Ackerman

What have been treatment options?

Prior to 2011, the first-line treatment of HCV was dual-therapy with ribavirin, an oral capsule dosed twice daily, and peginterferon, a once weekly subcutaneous injection. The duration of therapy with these agents was 24 or 48 weeks, depending on the HCV genotype being treated. In addition to long treatment durations, patients were also subjected to a number of significant adverse events related to both medications. In some instances, adverse events may be severe enough to warrant treatment discontinuation. Additionally, the cure rates with this treatment were only 40 – 50 percent in patients with HCV genotype 1, which is the most common genotype in the United States.

In 2011, two novel agents, boceprevir and telaprevir, received FDA approval for the treatment of HCV genotype 1 infections as a part of combination therapy with ribavirin and peginterferon. Treatment with ribavirin, peginterferon

and either boceprevir or telaprevir became known as “triple-therapy.” Compared to dual-therapy, triple-therapy revealed improved SVR rates ranging between 63-79 percent for treatment-naïve patients and 32-86 percent for treatment-experienced, depending on the type of previous treatment response. Despite improvements in SVR rates, HCV treatment with triple therapy still presented a number of less than ideal characteristics, including continued lengthy treatment durations, extensive adverse events, high daily pill burdens with three-time daily administration schedules, as well as several drug-drug interactions.

In late 2013, an additional two agents, simeprevir (Olysio®) and sofosbuvir (Sovaldi®), were approved for treatment of HCV. In addition to yielding improved SVR rates (53 - 80 percent in patients receiving simeprevir and 56 – 100 percent in patients receiving sofosbuvir), these approvals were significant for a number of reasons, most notably due to several beneficial characteristics demonstrated with sofosbuvir. These characteristics included expanding the approval to treat patients infected with HCV genotypes 1, 2, 3 and 4 (as opposed to only HCV genotype 1 as seen with simeprevir, boceprevir and telaprevir) as well as patients co-infected with HIV, a shorter treatment duration (12 – 24 weeks based on treatment history instead of 24 – 48 weeks), and the possibility of an all-oral/peginterferon-free regimen, which was a novel concept for chronic hepatitis C treatment.

Please discuss new medications being approved and how they fit into therapy.

More recently, in October and November of 2014, the FDA granted both an approval for a new combination agent (ledipasvir/sofosbuvir) as well as expanded approved indication for the use of simeprevir in combination with sofosbuvir. The ledipasvir/sofosbuvir combination, marketed as Harvoni®, is a fixed-dose combination oral tablet that is dosed once daily and is approved for treatment of HCV

genotype 1. The treatment duration is 12 – 24 weeks, based on prior treatment experience as well as the degree of disease progression. Subjects in clinical trials, including traditionally harder-to-treat patients with advanced liver disease, experienced SVR rates of 94 – 100%.

The decision to approve the combined use of simeprevir and sofosbuvir was largely based on results of a study that demonstrated SVR rates of 95 – 100% in patients, including those with cirrhosis. Like ledipasvir/sofosbuvir, the combined use of simeprevir and sofosbuvir is dosed once daily and is recommended for a treatment duration of 12 – 24 weeks.

These approvals mark large advancements in the treatment of chronic Hepatitis C infection and demonstrate a number of improvements in efficacy, safety as well as ease of administration. It is important to note that these recent approvals are for treatment of individuals with HCV genotype 1, therefore leaving several opportunities for growth and advancement for treatment of HCV genotypes 2 through 6.

What do these medications cost?

Not surprisingly, the improved success and convenience of recently approved HCV therapies comes with a large price tag. A 12-week course of sofosbuvir (Sovaldi®) costs a total of \$84,000 at \$1,000 per tablet. Ledipasvir/sofosbuvir (Harvoni®) is even more expensive at \$1,125 per tablet, totaling \$94,500 for a 12-week treatment course. These prices would be doubled for those patients requiring the longer, 24 week treatment duration. The high costs of these therapies have come under high scrutiny from both the media as well as Congress. While this scrutiny is likely justified, it is important to keep in mind the cost of not

treating this infection, as untreated HCV may eventually lead to complications of advanced liver disease, such as liver failure requiring transplantation or liver cancer.

What is a pharmacist's role in treating patients with Hepatitis C?

The role of the Hepatitis C pharmacist has continued to advance alongside the treatment options. With the now outdated "triple therapy" treatment options, the Hepatitis C pharmacists played an integral role in caring for patients undergoing treatment. Responsibilities included having one-on-one patient appointments every 1 – 2 weeks throughout the duration of therapy to ensure and promote medication compliance as well as monitor closely for therapy-related side effects that may warrant dose reductions or even discontinuation of treatment. Most recently, as treatment options have improved and the risk for some side effects have been lessened, the Hepatitis C pharmacist continues to play a vital role in the planning and implementation of therapy. This role would include helping select treatment options, screening for drug interactions, counseling patients on the importance of medication compliance, as well as serving as a point of contact for patient and provider questions.

As the majority of patients infected with Hepatitis C continue to progress to a more advanced state of the disease, pharmacologic treatment options will continue to be developed and will become more commonplace. Knowledge and understanding of these treatments will help pharmacists in a variety of settings to better serve their patients.

Dr. Ackerman is assistant professor in the Department of Pharmacy Practice.





Class of 2018 pledges oath at White Coat Ceremony

Eighty-three student pharmacists recited the Oath of a Pharmacist at DKICP's White Coat Ceremony in the UH Hilo Performing Arts Center on October 12.

The ceremony signifies the rite of passage for students entering their first year in the professional program to affirm their commitment to the values of their profession, including professionalism, respect, integrity and compassion. Distinctive to Hawai'i's ceremony is when each student receives the traditional flower lei as they enter the stage to recite the oath in front of fellow students, faculty and staff, community supporters and family.

The keynote speaker was Sherry Bracken, news reporter for Hawai'i Public Radio and producer and host of Island Issues, a weekly interview program on LAVA 105.3 FM and KKOA 107.7 FM. The students also were addressed by UH Hilo Chancellor Don Straney and DKICP Founding Dean John M. Pezzuto as well as Associate Dean for Academic Affairs Edward Fisher. The event was sponsored by Walgreens, and Scott Sutton, Walgreens Hawai'i district manager, made a

presentation.

Four new pharmacy residents who worked on O'ahu and already have their PharmD were recognized along with the Pharm.D. candidates. Beginning their first-year residencies at Pacific Mental Health were Goldie Leh and Michelle Kim. Beginning second-year residencies are Lehua Kay in Mental Health Psychiatry at Hawai'i State Hospital and Barry Nakaoka at The Queen's Medical Center.

(Photos by Robbyn Peck and Maggie Morris)



Note of thanks from Daryl Masanda, Director, Student Services

Aloha mai Kakou DKICP Faculty, Staff, Students, Families, and Supporters,

We welcomed the Class of 2018 into the pharmacy profession with our eighth White Coat Ceremony. This very memorable event would not have been possible without the hard work and dedication of many hardworking individuals and organizations. I would first like to thank our Dean, Dr. John Pezzuto, for his continued vision and hard work to keep the college moving in a positive direction. He was the first speaker in the ceremony and, as always, shared great insight with the new students and got the ceremony started on the right track. I also want to send a big thank you to Dr. Ed Fisher for graciously serving as the emcee for the event and making sure that all of our wonderful speakers were well introduced and comfortable as they took to the podium. Dr. Fisher also did a great job of keeping the ceremony moving along smoothly throughout its entirety.

I would also like to send a big thank you to the following people and organizations for helping to make this day so special for the students and families of the Class of 2018:

- Walgreens for their continued financial support of this event.
- The speakers: Dr. Pezzuto, Scott Sutton (Hawaii District Manager, Walgreens), Dr. Straney (UH Hilo Chancellor), Ms. Sherry Bracken (Hawaii Public Radio)
- Thank you to Ka Haka 'Ula O Ke'elikolani College of Hawaiian Language for performing the welcoming chant, "Ua Ao Hawaii".
- The beautiful floral arrangements were completed by the Pre-Pharmacy Club. The students that worked so hard were: Sydney Barney, Torrence Ching, Robin Dalmacio, Geralynn Gamayo, Kaleb Huddy, Cami Kanahale, Kate Malasig, Amber Masulit, Jessica Regpala, Samantha Texeira, Isaiah Wise and Brooke Zariello.
- Thank you to Dr. Elizabeth Ackerman and Dr. Kendra Demaris for leading the student processional into



Walgreens Hawaii's District Manager Scott Sutton (left), Walgreen's District Pharmacy Supervisor Nancy Huang, and Dean John Pezzuto



Rep. Clift Tsuji, Sen. Gilbert Kahele, Keynote speaker Sherry Bracken, Mayor William "Billy" Kenoi, Rep. Mark Nakashima

the theatre, Dr. Forrest Batz for introducing the students as they walked on the stage, Dr. Supakit Wongwiwatthananut and Mrs. Pat Juszczak for coating out newest class. Also a big thank you to Dr. Christina Mnatzaganian and Dr. Roy Goo for giving each student a lei on behalf of the College.

- As has become a tradition here at the DKICP, the current P2 class was a very big help with the cleanup of the theatre after the ceremony. Thank you to Shaun Lasky, Kim Roseman, Arthur Barcikowski, Hannah Shin, Hoa Voa, Anne Tanouye, and Walter Domingo (C/o 2016) for all of the help with cleanup.
- Thank you to both of the Professional Fraternities at the DKICP, Phi Delta Chi and Kappa Psi, for working together and serving the cake and refreshments to all the students and guests.
- UHH Performing Arts Center staff for their consistent and professional support of our annual ceremony.
- The staff from the UHH Graphics department for creating and producing the program and invitations.
- Robert Chi and the staff from the Office of Campus Technology for setting up the Live Stream
- Maggie Morris for sending out the media alerts and for taking photos for Kāwili Lā'au.
- Robbyn Peck for directing and documenting the group photos.
- Pacific Floral Exchange for the donation of the beautiful tropical flowers.

I also want to send a very special thank you to the Student Services Staff for planning and executing this event. Thank you to Kristy Nakamura for taking the organizational lead for this ceremony

and Cara Suefuji and Tracey Niimi for their assistance in making this event so special. This staff is so fabulous.

Thank you once again to everyone that helped make this event a very memorable experience for the students and families of the Class of 2018.

Sixth annual health fair proves popular once again

Student pharmacists and DKICP faculty presented its sixth annual Health Fair on Saturday, October 11 from 10 a.m. to 3 p.m. at the Prince Kuhio Plaza.

A few hundred members of the community came out to meet the representatives from the College and to receive health screenings on blood pressure, cholesterol and diabetes. The event also featured a “brown bag” medication check, healthy living demonstrations, as well as informational booths.

For the first four years, the annual health fair was held on campus. Organizers said changing the location to the Prince Kuhio Plaza in 2013 was a win-win for the community and for the College, and they were pleased with the turnout.

Other community organizations conducting activities included A Dream Come True Foundation, AlohaCare, Center for the Study of Active Volcanoes, Civil Defense, HIV/AIDS Foundation, Senior Medicare Patrol, Hospice of Hilo, HMSA, Hawai'i Health Connector, Healthway, Project Vision Hawai'i, Senior Medicare Patrol and The Arc of Hilo.





Career/Interview Days expose students to work world

Student pharmacists from the Classes of 2018, 2017 and 2016 arrived dressed to impress at the annual DKICP 2014 Career Fair on October 24. The event is sponsored every year by the UHAA CoP Chapter and the Office of Student Services.

The event began with a Dean's breakfast for the company representatives. Drs. Edward Fisher and Patricia Uber provided an overview with updates of the College's progress. Representatives from CVS, Fred Meyer Pharmacy, Hilo Medical Center, Kmart, Safeway, Target, Walgreens, and Walmart then spoke all day to the students about internship and career opportunities. Nine fourth-year students were also interviewed in Hilo.

The next day, 54 fourth-year students participated in 134 interviews during Interview Day, which took place at Kapiolani Community College, Oahu. (Photos by Tracey Niimi and Maggie Morris)





Student pharmacists selected to present research at campus-wide conference

Several DKICP students were selected to give presentations on their research at the UH Hilo ALEX Student Research Conference, held by the Office of Applied Learning Experiences (ALEX) on November 7 from 1:30 - 4:30 p.m.

The conference showcased the work of nearly 50 UH Hilo students from diverse major areas of study, and featured 21 unique student research presentations and 23 student internship and project poster presentations. The student pharmacists who submitted abstracts and were selected to present were:



(from left) Tom DeWitt, Director of the Office of Applied Learning Experiences (ALEX), Ashleigh Renaud, Matt Platz, Vice Chancellor for Academic Affairs

Andrea Brauer: "Herbal and non-herbal Dietary Supplement Use Trends Among Hawai'i State Residents"

Alex Guimaraes: "Medicare Reimbursement to Ophthalmologist: A Comparison of Hawai'i to Other States"

Samantha Hanabaga, Carlo Tiano and Kevin Wang: "Student - Run Interprofessional Education Project"

Ashleigh Renaud: "Osteoprotegerin Production in Breast Cancer Subtypes"



Andrea Brauer



Alex Guimaraes



Samantha Hanabaga



Carlo Tiano



Kevin Wang



Resveratrol conference brings international scientists to Big Island

The Third International Conference on Resveratrol and Health, held at the beginning of December in Waikoloa on the Big Island of Hawai'i, brought together nearly 100 scientists from all over the world to focus on the biological effects of resveratrol and resveratrol derivatives.

Participants included scientists from more than 15 countries covering five continents: South and North America, Australia, Asia and Europe. The first such conference was held in September 2010 in Helsingor, Denmark, followed by Resveratrol 2012 in Leicester, England. The next meeting, Resveratrol 2016, is planned for Porto Alegre, Brazil.

Each conference is related to a university. Resveratrol 2014 was sponsored by UH Hilo's Daniel K. Inouye College of Pharmacy, and organized by the University of Hawai'i at Hilo (UH Hilo) Conference Center. Co-organizer Dean John Pezzuto, whose research group was the first to describe the ability of resveratrol to reduce tumorigenesis using the two-stage mouse skin model (*Science*, 1997) welcomed the group to Hawai'i. His talk, entitled "Resveratrol in the treatment or prevention of cancer" was presented during a session dedicated to resveratrol and cancer.

"The depth of resveratrol research is absolutely amazing," Pezzuto said. "There are now over 6500 papers published describing some aspect of resveratrol action. The resveratrol conferences have been the perfect forum for trying to



(From left) Ole Vang, John Pezzuto and Sami Sassi

decipher the actual significance of all of this work."

Because the Pezzuto group's discovery is less than 20 years old, many researchers who were present at the conference have a variety of experience before gaining expertise in resveratrol. Co-organizer Ole Vang, associate professor from Roskilde University in Denmark, was working on flavonoids and only began working on resveratrol a year after the discovery because a student convinced him the compound was more interesting, he said. Another co-organizer, Sami Sassi, who operates a consultant company called CIL North in Denmark, said he has worked with many compounds but began focusing on resveratrol in 2005. They

said the concept of having the conferences began as a way to merge universities and companies because both had something to contribute.

"We are providing a platform to explain the science behind the compound," Vang said. Sassi agreed, saying "A big part of the business is finding out if it works or not."

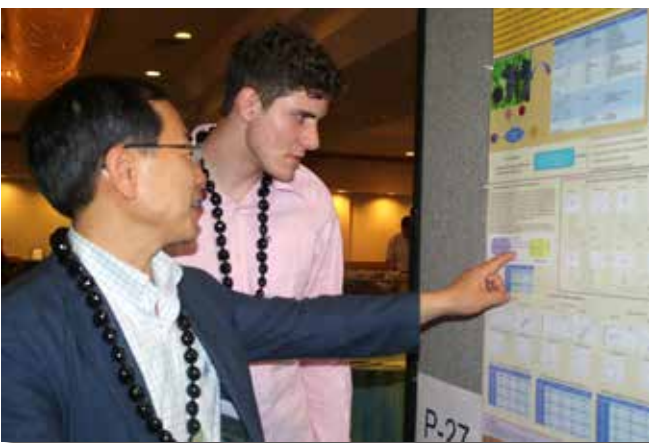
Corporate and university sponsors were DKICP, the *Annals of the New York Academy of Sciences*, Evolva, Food & Function, Jarrow Formulas, Melinjo, Shaklee Corporation, B&D Nutritional Ingredients, Hosoda Nutritional and LifeExtension Foundation.



Dr. Karen Brown

Scientists from all over the world presented their research, including faculty from the Universite de Bourgogne in France, National University of Singapore, University of Barcelona in Spain, Ochanomizu University in Tokyo and Seoul National University in Korea. Internationally recognized experts, such as Karen Brown, a professor from the University of Leicester in England, presented research that represented many years of work.

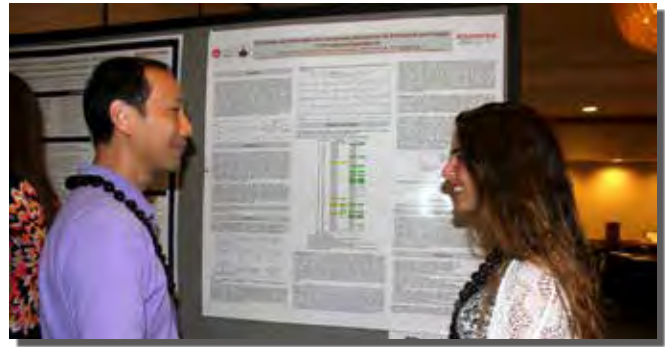
Brown, who is an expert in translational cancer research, began working on resveratrol in 2004. Her talk was entitled "Less is more for cancer chemoprevention: evidence of a non-linear dose response for the protective effects of resveratrol in mice and humans." She acknowledged her hypotheses



Dr. Sang Kook Lee (left) asks a question about research conducted by John Henry Pezzuto, an undergraduate who worked at DKICP labs last summer.

was opposite from current dosage recommendations, and said eventually her group hopes to do some clinical trials to determine risk in colorectal cancer patients.

"This study challenges the current developmental



Dr. Dianqing Sun (left), associate professor in the Department of Pharmaceutical Sciences, discussed his research with Dr. Christina Giusto from High Point University.

paradigm using resveratrol as a model phytochemical, which affects numerous pathways relevant to cancer," she said.

While most researchers who were present look at resveratrol as a cancer preventative, Joseph Baur is studying it at the cellular level for his research on aging. Baur, a Canadian who is a faculty member at the University of Pennsylvania, has been testing anti-aging effects of rapamycin and has been expanding his research to include resveratrol.

"Restricting calorie intake extends lifespan and confers stress-resistance in model organisms," Baur stated in his talk entitled "Resveratrol, sirtuins, and mitochondria in critical injury." "While resveratrol is proposed to mimic some aspects of caloric restriction and has protective effects against a variety of age-related diseases its effects during severe acute stress have received less attention. We are testing the influence of resveratrol in rodent models of hemorrhagic and septic shock."

Other than attracting internationally renowned scientists, the conference also provided a platform



Dean John Pezzuto with Dr. Joseph Baur

to display research that gave local Hawaiian high school graduates some lab experience. The Pezzuto lab participated in the following poster presentations: 1) "Radical scavenging activity of resveratrol in combination with grape seed extract, quercetin and EGCG." Co-authors were John-Henry A. Pezzuto (Hawai'i Preparatory Academy Class of 2011), Yanxin Li, Ethyn Leong (Hilo High School Class of 2014) and Tamara P. Kondratyuk; 2) "Synthesis and evaluation of 2-arylindole derivatives as anticancer and cancer chemopreventive agents. Co-authors were Xufen Yu, Eun-Jung Park, Tamara P. Kondratyuk, John M. Pezzuto and Dianqing Sun; and 3) "A novel resveratrol analogue inhibits STAT3 signaling and induces antitumor cell effects against human glioma cells. Co-authors were Zachary Chelsky, Tamara P. Kondratyuk, John M. Pezzuto, Mark Cushman from Purdue University, and James Turkson, Natural Products and Experimental Therapeutics, University of Hawai'i Cancer Center, Honolulu.

From O'ahu:

DKICP participates in Kapukapuakea health screening



Dr. Wesley Sumida

A major health screening event called Kapukapuakea, which supported an international cultural gathering of Pacific Islanders, was held at Hawaii Pacific University Kaneohe Campus July 8-9. More than 200 delegates from Tahiti, New Caledonia, New Zealand and Hawai'i.

Screening occurred over a two-day period and involved blood pressure, blood sugar, and BMI. A video taken at the event is at: <http://www.youtube.com/watch?v=uHZ3nUnG3mY>.

"This provided critical health care for many people who are from countries where community health screening is uncommon," said Wesley Sumida, associate specialist in the Department of Pharmacy Practice who is based on O'ahu. "It was an interesting health screening experience. For example, a new BMI conversion chart was created for French Polynesia that reports results in metric measurements. Our student pharmacist, Nicole Young, helped to identify previously undiagnosed diabetes and hypertension."

Students join other health care professionals at event

DKICP student pharmacists Darian Oshiro, Emily Lin, and Blanche Duarosan helped support brown bag activities at the 8th Annual COPD Education Day, which was held on September 13 at the Queen's Medical Center in Honolulu. The event was organized by the Hawaii COPD Coalition and was open to the public. The Coalition was formed in 2007 to provide services and support to Hawaii's people affected by Chronic Obstructive Pulmonary Disease (COPD), which



is an umbrella term including emphysema, chronic bronchitis and chronic asthma. The Coalition is a non-profit corporation, serving patients, caregivers, family and friends, and healthcare professionals through research, education and increasing public awareness including early screening and diagnosis.

(Photo by Dr. Wesley Sumida, instructor in the Department of Pharmacy Practice based on Oahu.)

From Kaua'i:

Hawai'i DOH teams with DKICP

The Daniel K. Inouye College of Pharmacy signed an agreement with the Hawai'i Department of Health to begin a statewide effort to facilitate implementation of Antimicrobial Stewardship Programs (ASP) in collaboration with participating Hawai'i hospitals.

"Bacteria are developing resistance to antibiotics faster than we can create new drugs, and studies have shown up to 50 percent of all antibiotics are unnecessary or inappropriately prescribed," said Roy Goo, assistant professor in the Department of Pharmacy Practice who began one of Hawai'i's first ASPs at Wilcox Memorial Hospital on Kaua'i. "The appropriate use of antibiotics has become both a national and local priority."

The initiative will involve multiple faculty members from DKICP in conjunction with participating healthcare facilities on several islands, including Maui, the Big Island of Hawai'i and Oahu. Faculty members will use their expertise in antimicrobial drugs to assist with training and education

sessions to promote judicious antimicrobial use within facilities, as well as to help identify and prioritize areas for intervention.

DKICP has already built relationships with nearly every hospital on every island through many of their existing programs, and Goo is constantly working on developing ties. In July 2014, he was part of a workshop that brought together more than 200 health care professionals from all over the state for the Association for Professionals in Infection Control and Epidemiology's (APIC) conference on Oahu. The conference was an opportunity for Goo to share learning points and successes from his experience in setting up an ASP on Kaua'i.

"Forward thinking is exactly the direction pharmacists need to go in order to keep evolving with the profession," said Carolyn Ma, Chair of the Department of Pharmacy Practice. "This is truly a college-wide effort and is an example of DKICP's commitment to advancing the practice of pharmacy and improving the quality of health care provided

to residents across the state.”

Because DKICP faculty blanket the state, they will be able to individually assist participating health care facilities in developing a tailor-made program based on their specific needs, Goo said. “We’re not trying to make this one size fits all. There are many variables in every system.”

Efforts will initially focus on smaller hospitals in the rural areas of the state because they are less likely to have the funding to create this type of program, Goo said.

“Because ASPs are likely to become mandated by the federal government in the next few years, we can help them get a head start,” he pointed out.

Know your pharmacist, know your medicine

By KristiAnne Nishek, Class of 2015

(Reprinted with permission from The Garden Island newspaper, TGI wellness section, October 22, 2014)

In a report by the Center for Disease Control, “In 2007-2010, almost one-half of all Americans reported taking one or more prescription drugs in the past 30 days; use increased with age, from 1 in 4 children to 9 in 10 persons aged 5 and over.”

Medications can occasionally interact with other medications, herbals/supplements or over-the-counter medications. Sometimes even your diet can affect the way medications work in your body. These interactions can cause the medication levels to be too high or too low. If the medication levels are too high, it can increase the amount of side effects that the medication may cause. And if the medication level is too low, it will not be effective.



KristiAnne Nishek

Tapping into the knowledge of a pharmacist is something anyone at any age with medications can benefit from. Pharmacists can offer advice on the best medications can benefit from. Pharmacists can offer advice on the best medication to relieve symptoms of a cold and what foods to avoid with certain medications. Pharmacists will routinely review a patient’s entire medication list to determine if there are any interactions that may affect how your medications are working, ensure you are taking all your medications correctly, and provide advice regarding your herbal supplements and natural products. Seeking the advice of your pharmacists is particularly important in patients who are at an increased risk for side effects, such as children, the elderly and those with multiple medical conditions.

Pharmacists also will answer questions regarding any allergies you may have and provide information on which medications and herbal supplements to avoid. They also can work with you to teach you how to properly use medical devices like inhalers, nebulizers, insulin pens, glucometers and blood pressure monitors. Pharmacists are experts in many chronic medical conditions such as diabetes, high blood pressure and high cholesterol.

Pharmacists can provide information on your particular medical conditions including what kind of foods are good for diabetes, or what blood pressure monitor would work best for you and what goals to shoot for, all to help you improve your overall health without the need for medications.

Pharmacists also play an important role in preventing illnesses by providing immunizations against influenza or the shingles virus in addition to many other conditions. These immunizations are an important part of your health care as they can prevent you from getting any unwanted illnesses.

Many times these immunizations are free or low cost, depending on your health insurance. Immunizations are one of the greatest ways to keep you healthy. If you have any concerns about getting any immunizations, you can always talk to your pharmacist for more information.

October is recognized as Pharmacist’s Month by the American Pharmacists Association. Pharmacists are the most easily accessible health care provider and are more than happy to answer any questions or concerns you may have and you don’t even need to make an appointment!

KristiAnne Nishek is the Daniel K. Inouye College of Pharmacy representative on the Hawai’i Pharmacists Association Board of Directors and the President of the Hawai’i Chapter of the American Pharmacists Association.



APhA-ASP activities highlights

National organization sends outreach visitor to UH Hilo

Dr. Crystal Atwell (center in red), Director of Student Development for the American Pharmacists Association-Academy of Student Pharmacists (APhA-ASP) met with members of DKICP's student chapter (APhA-ASP) on September 22. APhA-ASP chose UH Hilo for the visit as a complimentary student outreach to assess the strengths of the chapter and improve upon the chapter's development. While on campus, Dr. Atwell met with the group president Leilani Isozaki, president-elect Dann Hirayasu, Associate Dean Dr. Edward Fisher, Hawaii Pharmacists Association Board Representative Dr. Carolyn Ma, Chapter Advisor Dr. James Hall, as well as faculty members and student services. Dr. Atwell also presented student opportunities through APhA-ASP at a general meeting with the APhA-ASP members.



Student pharmacists spread knowledge to local schools

DKICP student pharmacists from APhA Operation Heart went to Waiakea Intermediate School (WIS) December 1 to present to more than 110 students in Ms. Candace Paul's health class. APhA Operation Heart educated WIS students on what blood pressure is, why it is important to your health, and what things affect blood pressure. The five classes of students were also led in a hands-on activity where the WIS students used semi-automatic blood pressure cuffs to take blood pressure readings on each other. Ms. Paul said that DKICP students "gave a great presentation with excellent information and connections - my deepest gratitude and well wishes to them all!" Plans for another visit to Ms. Paul's class are in the works for the spring semester. (Provided by Moani-Lehua Hagiwara, Class of 2016)



Students help out at Walgreen's flu clinic

DKICP students from APhA-ASP participated at the Walgreen's Flu Clinic on September 27 for Operation Immunization. (Photo provided by Leilani Isozaki, Class of 2016.)

Student pharmacists participate in Puna Regional Emergency Preparedness Fair 2014

By **Samantha Hanabaga and Carlo Tiano, Class of 2016**

With collaborative efforts among the Puna Community Development Plan Subcommittee on Connectivity and Emergency Response and Hawai'i County Civil Defense, Hawai'i Island had its annual Puna Regional Emergency Preparedness (P.R.E.P) Fair on Saturday, August 30, 2014. This beautiful sunny day enlightened many hearts and educated many community members on how to be prepared in case of an evacuation or natural disaster. This huge event involved 72 exhibitors, approximately 300 volunteers, and over 2,000 fair-goers. The National Community Pharmacist Association (NCPA) Student Chapter at the Daniel K. Inouye College of Pharmacy was graciously invited to participate in this event for a second consecutive year. Student pharmacists of the NCPA student chapter conducted two booths: a compounding booth and an informational booth.



As a fun and exciting activity for the children and keiki of the Puna area, student pharmacists were delighted to work with the kids on compounding various colors of silly putty and putting smiles on their faces. There was approximately 50 kids that stopped by the compounding booth. This booth served as an interactive activity, such that the kids were actively involved in the compounding, while

being instructed by the student pharmacists. Many of the keki were thrilled, curious, and amazed by what they have made. As student pharmacists, we hope to instill the interest of science and introduce the profession of pharmacy among the keiki in the community.

The informational booth covered the topic of medication emergency preparedness. This booth not only discussed and educated community members on medication emergency preparedness, but also provided and gave out a descriptive handout, which included tips on medication storage, keeping an adequate supply of medications on hand, making a plan with your doctor, and a list of things that should be included in your home emergency kit. We also provided a user-friendly medication emergency list for community members to keep a log



of their current medications and have their doctor and pharmacy contact information easily accessible.

Student pharmacists were accompanied by two of our very own Daniel K. Inouye College of Pharmacy Faculty Pharmacists: Mrs. Patricia Juszczak, B.S., R.Ph. and Dr. Christina Mnatzaganian, PharmD, BCACP, who were readily available in answering questions and concerns regarding medication emergency preparedness. The information provided was very valuable, in a sense that most community members were overlooking the importance of including their medications to the list of priorities in the case of an emergency.

This event resembled a first step in establishing our role as pharmacists and acknowledging another way pharmacists can utilize our expertise and serve their community members through consultation and education on how to be medication ready in the case of an emergency or natural disaster.

Currently, there is very limited amount of information for the state of Hawai'i residents regarding medication emergency preparedness that is provided by the state department of health and civil defense offices and their online services. Therefore, it was a pleasure to have student pharmacists step up and actively get involved in bridging the gap and educating the public on how to be medication ready through their selfless contributions and efforts.

From this event, we hope everyone will be better prepared and feel a sense of comfort knowing we are all working toward a common goal of building Community Resilience in Puna and beyond. Due to the fact, that the state of Hawai'i is yet to establish a complete information guide and detailed plan on the topic of medication emergency preparedness; the message that is prominently emphasized and advocated is to "Plan Ahead." You never know what mother nature has planned for you, so be wise, take initiative, and plan ahead. Live safe, live prepared, live ALOHA!

Student pharmacists compete in Salvation Army Thanksgiving Food Drive

By Carlo Tiano and Samantha Hanabaga, both from the Class of 2016

We all live busy lives. In this fast paced world, it is important to sometimes stop and take time to appreciate all the things that we have, all the accomplishments, and how fortunate we are to have clothes to wear, beds to sleep on, and the privilege to live in freedom. The Holiday of Thanksgiving gives us that opportunity. When we think of Thanksgiving, we provoke



NCPA member Ryan Higa, Class of 2017, helped out with the 2014 food drive.

thoughts of turkey dinners, stuffings, casseroles, and football, but Thanksgiving is more than that. It has broader significance. It is important to remember that Thanksgiving consists of two words: thanks and giving. Through the holiday of Thanksgiving, we are given the opportunity to reflect on the things that we are grateful for and give thanks, including the gift of giving.

The holiday reminds us not just to share our material possessions, but also to direct our time and talents to helping those in need.

As a tradition for the past several years, the National Community Pharmacists Association (NCPA) Student Chapter at the Daniel K. Inouye College of Pharmacy puts on a Thanksgiving Food Drive providing donations to our very own Hilo Community's Salvation Army. However, to keep things interesting, NCPA turns the food drive into a friendly class competition, with the winning class prized with a fridge full of snacks and drinks during Finals week. This serves not only as a motivational factor, but makes it fun and exciting, while serving its purpose of giving back to the local community. It is amazing how much food items are donated each year.

This year's Thanksgiving Food Drive was three weeks duration, from November 1-24. The competition had a slow start but surprisingly had a two-fold increase in energy and intensity towards the end. The food count at the end of the second week had a low of 18 and a high of 54 items, by the third-year and second-year pharmacy students respectively. After three weeks of competition and strategic planning among the classes, the end counts were 189, 203, and 186, with class of 2017 placing first and the class of 2018 as the runner-up. This was a very close competition, with only a difference of 14 items or less among the classes. Overall, a total of 578 non-perishable food items were donated to the Hilo Salvation Army. The Salvation Army was thrilled and very

thankful for the generous contributions and efforts in giving back to the Hilo community and providing food for those in need.

The NCPA Student Chapter at the Daniel K. Inouye

“ The holiday reminds us not just to share our material possessions, but also to direct our time and talents to helping those in need. ”

College of Pharmacy prides itself in the development and participation in community service events, which serves as one of its main focus as an organization. As future community pharmacists, we dedicate our future to serve as leaders in the development and promotion of better health in the Hawaii community. NCPA continues to connect with the Hawaii community through their multiple community service events, with the Thanksgiving food drive being one of them.



Thanksgiving 2014

The College would like to thank Dean and Mrs. Pezzuto along with their children, John Henry, Elisabeth and Michael, for opening their home again to all for Thanksgiving dinner. More than 100 people came with plates of their special dishes to pass accompanied by four turkeys, two hams, countless dishes of stuffing and gravy, biscuits and warm carmaraderie.

Phi Delta Chi sends holiday cheer to children in need

By Audrey Fung, Class of 2017

The Phi Delta Chi Professional Pharmacy Fraternity held an Operation Christmas Child donation event on November 15, 2014. Operation Christmas Child is handled by Samaritan's Purse, which sends shoe boxes filled to the brim with gifts to children in more than 150 countries worldwide. Phi Delta Chi brothers and pledges gathered round with faculty to wrap and donate gifts. There were more than 100 participants who donated gifts, money, or gift



wrapping materials. Big Island Toyota joined the cause and donated plastic reusable shoe boxes for the event. School supplies, Legos, Elsa dolls, and toiletries were among the popular gifts that were hand-picked and hand-wrapped. After all the joyful Christmas music, tubes of wrapping paper, and rolls of tape, PDC donated 106 gifts.

Faculty Seminar Series

Dr. Patrick Sinko, associate vice president for research in the Office of Research and Economic Development



and Distinguished Professor, Department of Pharmaceutics, Ernest Mario School of Pharmacy, Rutgers University presented a talk on "Intestinal Delivery of Nanocarriers: Targeting, Mechanisms and Translation" October 29.

Dr. Jon Clardy, Hsien Wu and Daisy Yen Wu Professor of Biological Chemistry and Molecular Pharmacology at Harvard Medical School spoke to DKICP faculty and students about "Trying to align chemical ecology with drug discovery" at 11 a.m. Oct. 1.



(from left) Dean John Pezzuto, Dr. Jon Clardy, Chair of Pharmaceutical Sciences Ken Morris

Faculty Briefs

Mahavir Chougule, assistant professor, Department of Pharmaceutical Sciences, received the UH Hilo Research Council travel award to attend the American Association of Pharmaceutical Scientists (AAPS) 2014 Annual Meeting and Exposition, November 2-6 in the San Diego Convention Center, San Diego. Dr. Chougule also presented the research entitled "Design and analysis of hybrid onconase nanocarriers for mesothelioma therapy" at the 12th International Nanomedicine & Drug Delivery Symposium, October 6-8, in Chapel Hill, NC; and delivered an invited talk entitled "Targeted Nanocarriers for the Treatment of Cancer" at the Eshelman School of Pharmacy, University of North Carolina at Chapel Hill, Chapel Hill, NC on October 9. In addition, he served as a grant reviewer on the 2014 NIH Developmental Therapeutic study section.

Deborah Juarez, associate professor, Department of Pharmacy Practice, was lead or co-author on several peer-reviewed published manuscripts: 1) "Significance of HbA1c and its measurement in the diagnosis of diabetes mellitus: US experience." In *Diabetes, Metabolic Syndrome,*

and Obesity. Coauthors were assistant professors **Christina Mnatzaganian**, **Roy Goo**, and **Kendra Demaris** and Pharmacy & Health Sciences Information Resources Coordinator **Helen Smith**; 2) "Factors Affecting Medication Adherence Trajectories for Patients With Cardiovascular Disease." In the *American Journal of Managed Care* (in press); 3) "Evidence-based adherence classes for combination anti-hypertensive, lipid-lowering, and anti-diabetic therapy." In *American Journal of Pharmacy Benefits*. She also was a co-author on several poster presentations at academic conferences.

Dana-Lynn Koomoa-Lange, assistant professor in the Department of Pharmaceutical Sciences, and **Ingo Lange**, post-doctoral associate, were co-authors on an article entitled "MYCN promotes TRPM7 expression and cell migration in neuroblastoma through a process that involves polyamines" accepted for publication in *FEBS Open Bio*. Dr. Koomoa-Lange also received a Keystone Symposia Travel Award to present "Cell Death Signaling in Cancer and the Immune System" in Sao Paulo, Brazil

Oct. 28-Nov. 3. She was an invited speaker and panelist at the 9th Annual He Hulai Health Disparities Conference: Cancer Research in Native and Pacific Peoples He Hulai Conference in September, and an invited plenary speaker at the 8th Annual Islands of Opportunity Alliance Louis Stokes Alliance for Minority Participation Program in Hilo last August.

Christina Mnatzaganian, assistant professor, and **Victoria Rupp**, assistant specialist, Department of Pharmacy Practice, both passed and received Board Certification for Ambulatory Care Pharmacy from the Board of Pharmacy Specialties, an autonomous division of the American Pharmacists Association (APA). The designation confirms their value as pharmacists in knowledge and scope of practice.

Karen Pellegrin, director of continuing education/strategic planning, was selected to be part of an Awardee Panel Workshop at the Health Care Innovation Awards (HCIA) National Summit in Baltimore on October 27-28. Her presentation proposal, entitled "Think like a franchisor: Spreading innovation" was one of the highest scoring proposals received by the group, which is the Centers for Medicare and Medicaid Services (CMS) program

that funded the \$14.4 million Pharm2Pharm project. Dr. Pellegrin also had the following accepted for publication: 1) "Cost-effective strategies for rural community outreach: Lessons from an education program on medication safety for chronic disease in the elderly" in *Preventing Chronic Disease*. Co-authors are Barbato A, Holuby RS, Ciarleglio AE, Taniguchi R. and 2) "Improving accuracy and relevance of race/ethnicity data: Results of a state-wide collaboration in Hawai'i" in *Journal for Healthcare Quality*. Co-authors are Miyamura JB, Ma CSJ, Taniguchi R.

Dianqing Sun, associate professor, Department of Pharmaceutical Sciences, is the corresponding author on the following papers: 1). "Synthesis, structure-activity relationship studies, and antibacterial evaluation of 4-chromanones and chalcones, as well as olympicin A and derivatives" in *Journal of Medicinal Chemistry* with Feng L, Maddox MM, Alam MZ, Tsutsumi LS, Narula G, Bruhn DF, Wu X, Sandhaus S, Lee RB, Simmons CJ, Tse-Dinh YC, Hurdle JG, and Lee RE. 2). "Recent advances of natural and synthetic β -carboline as anticancer agents" in *Anti-Cancer Agents in Medicinal Chemistry* with Zhang M. In addition, Dr. Sun was recently invited to serve as a review panelist for National Science Foundation.

Accreditation team conducts site visit

Edward Fisher (left), associate dean for academic affairs, explains a detail to Anthony Provenzano, PharmD and Jeffrey W. Wadelin, PhD, who were conducting a focused on-site evaluation Oct. 16 for the Accreditation Council for Pharmacy Education (ACPE). The pair met with DKICP representatives on Oahu before coming to UH Hilo campus to interview members of the executive committee and student affairs and clinical education offices, as well as the assessment and curriculum committees.



DKICP begins new publishing opportunity

Beginning in January, 2015, the *Hawai'i Journal of Medicine and Public Health* (HJMPH) is featuring a new health column called "DKICP Scripts." Dr. Carolyn Ma, chair of the Department of Pharmacy Practice, is the column editor and coordinator.



"We felt it was important to establish this partnership with HJMPH that will enable faculty and affiliates of the College to submit articles describing contemporary issues of pharmacy education and practice," Ma said. "We hope these articles will be of broad interest to the readership of the Journal, and we welcome any suggestions for topics falling within the realm of our expertise."



The inaugural piece, entitled "Academic Pharmacy Strikes Hawai'i, Part 1," is written by Mrs. Mimi Pezzuto, instructor in the Department of Pharmacy Practice, and Dean John Pezzuto. Following publication of Part 2 of the inaugural article, to be co-authored by Dean Pezzuto and Dr. Ma, faculty will have the opportunity of submitting articles of contemporary interest for the profession of pharmacy.

HJMPH is a monthly, peer-reviewed journal published by University Clinical, Education & Research Associates (UCERA).



Preceptor Spotlight:

Former preceptor of the year Fred Cruz receives DOH Award

(Reprinted with permission from Hawai'i Department of Health)

HONOLULU – The Hawai'i State Department of Health (DOH) STD/AIDS Prevention Branch is pleased to announce the 2014 Annual Suzanne Richmond-Crum Award was presented to Fred Cruz, R.Ph. for his tremendous contributions to HIV/AIDS pharmacy services in Hawai'i.

For more than 15 years Cruz has dedicated himself to taking care of individuals affected by HIV/AIDS while serving as an HIV pharmacist for specialty pharmacy at CarePlus/CVS. In this role, his focus has always been to support HIV-positive clients so they are able to stay on their life-saving medications.

"Fred would make an extra effort to call all of his patients, helping them deal with any side effects and helping to address any barriers to promote adherence to their medications," said Cyril Goshima, M.D., "He would work with clients who had special requests like going out of town on a trip and making sure they had enough medications until they got back. Fred is the face of HIV medications in Hawai'i."

During his career working as a pharmacist for more than

30 years, Cruz has served on the Board of Directors for the AIDS Community Care Team, and as a member on the Hawai'i HIV Community Planning Group. His perspectives and opinions on HIV treatment, service delivery, and client well-being issues were highly sought out and much respected by the planning group. He has worked as a team member with Hawai'i AIDS Education Training Center to provide training for providers in Hawai'i and across the Pacific Islands. Fred is also a mentor to students from the University of Hawai'i at Hilo, College of Pharmacy.

Suzanne Richmond-Crum passed away in August 2004 after serving as director of the Hawai'i Seropositivity and Medical Management Program (HSPAMM) of DOH's STD/AIDS Prevention Branch for more than 10 years. The award was established in honor of the competence and compassion she demonstrated in her HIV/AIDS work, and is presented annually to an individual in Hawai'i for their outstanding contribution in providing HIV/AIDS services.



Lara Gomez (left), Director of Clinical Education in the Department of Pharmacy Practice, presented the Advanced Pharmacy Practice Experience (APPE) Preceptor of the Year for 2012 to Fred Cruz, RPh, Director, Pharmacy Operations, Hawai'i at CVS Caremark.

Rotation Report:

Jin-Bae Pak Class of 2015

I had the privilege to be the first student to do a rotation at InControl Diabetes Learning and Resource Center is located in Honolulu, and it was a very rewarding experience. My experience reinforced what was taught in didactics and I was able to apply and expand on that knowledge through a plethora of patient interviews.

The center is owned and operated by Kevin Kam, RPh, CDE. They receive referrals from physicians all over the state of Hawaii and specialize in serving the diabetic population. Their referrals include patients that are newly diagnosed, have uncontrolled diabetes of varying degrees, or have type 1 diabetics in need of more specific insulin regimens or insulin pump therapy to name a few. It is a very unique practice because 100 percent of their focus is on education of the importance of managing diabetes.

On most Tuesdays, Kevin Kam teaches a group diabetes education class. The curriculum is a simplified

version of what we learn in Integrated Therapeutics and includes pathophysiology, pharmacology, non-pharmacologic interventions, such as diet and exercise, and prevention of diabetes and its complications. By educating the patients in this manner, it helps to give them a sense of control and knowledge over this disease state. I was tasked with teaching

the pharmacology portion of the class from the second week on. It was a challenging experience to lead the group diabetes education class and teach the pharmacology portion. Discussing pharmacology in a simplified manner for the group was a great opportunity to improve on public speaking and medication counseling.

On the other days of the week, the schedule consisted of one-on-one patient counseling sessions that usually lasted anywhere from 30-45 minutes per patient. The type of visits would vary from patient to patient and included a variety of topics related to diabetes. Notable patient encounters included helping a patient assess



Jin-Bae Pak

their insulin sensitivity factor, insulin correction factor and basal to mealtime insulin ratios, and assisting with insulin pump training and integration. Insulin pump training and integration was especially interesting because it was not covered in didactics. In between the patient counseling sessions, we would debrief and discuss the patient further, focusing on clinical pearls and questions about the patient case. These engaging discussions helped to supplement the counseling sessions.

Throughout the rotation, I was also given various tasks that included blood glucose monitor training, taking an online motivational interviewing seminar, and looking

at the logistic side of the clinic, such as billing insurance companies, filling out patient profiles, and organizing physician referrals. I felt a great sense of accomplishment after training my first patient on blood glucose monitoring without supervision. By the end of my rotation, blood glucose monitor training became second nature.

Overall, inControl Diabetes Learning and Resource Center is an awesome learning experience for those that are interested in diabetes education and gives you a great balance of hands-on clinical experience and shadowing a clinician.

Alumni Update:

Dr. Jessica Toyama, Class of 2011 Inaugural Class President

Born and raised on Oahu, I am forever grateful to the Daniel K. Inouye College of Pharmacy as a proud graduate of the inaugural class. The College allowed me to receive a quality pharmacy education at home with the unique opportunity to immerse ourselves in various health care settings across the Pacific Basin throughout the program.

I am currently a pharmacy manager at Walgreens in Wahiawa on Oahu, as well as the Walgreens Hawaii District Diabetes Representative and Medicare D Coordinator. I love being a community pharmacist because of our valuable position as a highly accessible health care provider in the community where anyone can walk in and receive a thorough one-on-one consultation at their convenience.

It is really the simple things that have meaningful outcomes, such as taking the time to sit down with an elderly senior and their caretaker (often their son or daughter) to navigate through the complexities of enrolling in a Medicare D plan, or knowing that my patients are protected against harmful diseases by conducting a patient-specific risk assessment to ensure they receive all recommended immunizations, which fuels my passion as a pharmacist.

The local experiences provided by the College have been instrumental in my ability to improve health and quality of life outcomes while remaining sensitive to patients' lifestyle and culture. I also enjoy precepting pharmacy students (especially UH Hilo students!) because of the positive difference I can make in preparing students for a pharmacy career and hopefully inspire them to develop

the same passion that I have for community pharmacy.

Since graduation, I have served as Secretary of the College's alumni association and am currently serving my second term as a Board Director for the Hawaii Pharmacists Association. I would like to express my deep gratitude to Dean and Mrs. Pezzuto and the rest of the College of Pharmacy 'ohana, for which without their unconditional support and encouragement I would not be where I am today. Along with my fellow alumni, I resolve to continue to enact change, improve healthcare in Hawaii, and better the lives of our kama'aina.



Dr. Jessica Toyama

STAY IN TOUCH

**Note to all DKICP alumni.
Please send updates to
pharmacy@hawaii.edu**