

EQUADRANGLE

A Newsletter
for
Alumni and Friends

Spring 2004

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The QUADRANGLE is published three times per year by the College of Engineering. It is named after the College's first four one-story concrete structures built in 1928.

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Vassilis Syrmos

Interim Assistant Dean

Tep Dobry

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Todd Reed (EE)

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Editor

Marvin Nitta

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Dr. Roger Babcock working with Ph.D. student Sumon Kanpirom in the Environmental Engineering Laboratory.

A Clean Look at Environmental Engineering

ON THE FIRST DAY OF INSTRUCTION DURING THE FALL 2002 SEMESTER, the Civil Engineering Department officially changed its name to the **Civil and Environmental Engineering Department (CEE)**.

"The reason for the name change was to better publicize our department and our environmental engineering program," says **Dr. Ronald Riggs**, Civil and Environmental Engineering Department Chair. "Over the past two years, a couple of major events have happened with our environmental engineering program. Recently, the department added environmental engineering as one of its undergraduate tracks and last year the Environmental Engineering Laboratory was renovated."

Work on the much-needed renovations to the 4,500 square-foot Environmental Engineering Laboratory began in July 2002. It was funded by an \$840,000 special allocation from the state legislature for repair and maintenance through the Capital Improvements Program Fund.

The Environmental Engineering Laboratory is designed for both instruction and research in physical, chemical and biological treatment of water, wastewater, and soil. The laboratory includes wet chemistry facilities, microbiology facilities, and space for water and wastewater operations research and fate/transport processes in soil.

The renovation project, which was completed in January 2003, involved replacing all workbenches, cabinetry, sinks, safety fume hoods, and lighting.

"It's very nice. We're very happy with it," says Civil and Environmental Engineering Associate Professor **Dr. Roger Babcock**. "It's a huge difference, in terms of the feel of the room, it's much more usable now."

While the renovations were going on, Dr. Babcock and the other researchers conducted their work in other labs, like the Water Resources Research Center (WRRC) laboratory on the first floor of Holmes Hall.

—continued on page 2

One of the unique aspects about the environmental engineering program is its relationship with the Water Resources Research Center (WRRC), which is an independent research unit that involves faculty and researchers from various departments around campus collaborating with each other. Three of the CEE Department's faculty (Dr. Babcock, Dr. Clark C.K. Liu, and Dr. Chittranjan Ray) have joint appointments with the WRRC.

"One of the great things that has come out of this relationship is that I've graduated more than 30 graduate students as a thesis advisor and all of them were civil engineering students, who received all their support and funding from WRRC projects," Dr. Babcock said.

Environmental engineering research at the College focuses on four areas: *water and wastewater engineering, hydrology and hydraulics, environmental fluid mechanics, and coastal engineering and marine environment.*

Many of the research endeavors are supported by national agencies, such as the National Science Foundation, National Oceanic and Atmospheric Administration, U.S. Navy, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Geological Survey, and the U.S. Department of Agriculture.

However, many research projects also receive funding from state agencies like the Hawaii Department of Health, Department of Transportation and Department of Agriculture. "Almost all the projects have a local impact, there are very few projects that

don't," says Dr. Babcock. "However, most of them also have a national and international impact, as well."

One project that is having an international impact is the work of Associate Professor **Dr. Chittranjan Ray**, who received a prestigious Fulbright Senior Research Fellowship Award to study the potential of riverbank filtration to produce drinking water for selected large cities in the Ganges Plains of Nepal, India, and Bangladesh.

Another achievement for the CEE Department was establishment of an environmental engineering track for undergraduate students. Within the upcoming year, the department hopes to get it up and running by offering the classes necessary for the track and to promote it as an option for undergraduates.

With all that has been accomplished over the past two years, the future of the environmental engineering program at the College of Engineering looks bright.

"We hope to expand the department's stature and be recognized, not only locally, but also nationally as a place to come and study and do top-notch research in environmental engineering," Dr. Babcock said. 🌱

ENVIRONMENTAL ENGINEERING FACULTY

- **Roger Babcock Jr., Ph.D. (UCLA 1991), P.E.;** Associate Professor; Joint Appointment - Water Resources Research Center - Biological wastewater treatment, membrane bioreactors, bioaugmentation, wastewater reuse, fate of contaminants in irrigation leachate, activated carbon regeneration.
- **Edmond D.H. Cheng, Ph.D. (Utah State 1970);** Professor - Flood hydrology, unsteady subsurface flow, streamflow and extreme wind modeling and simulation, extreme winds regionalization.
- **Robert A. Grace, Ph.D. (MIT 1966);** Professor - Offshore and underwater engineering design and construction, ocean outfalls, marine environment.
- **Albert Kim, Ph.D. (UCLA 2000);** Assistant Professor - Membrane separation processes, hydro-dynamics of porous fractal aggregates, computational environmental molecular science using distributed parallel processing.
- **Clark C.K. Liu, Ph.D. (Cornell 1976), P.E.;** Professor; Joint Appointment - Water Resources Research Center - Fate and transport of agriculture residues in upper soils, watershed hydrology and modeling, river water quality modeling, ground water management modeling, artificial upwelling and deep ocean water application, wind-powered reverse osmosis.
- **Chittranjan Ray, Ph.D. (Illinois Urbana-Champaign 1994), P.E.;** Associate Professor Joint Appointment - Water Resources Research Center - Water quality engineering with emphasis on groundwater, pesticides, flow and transport processes in variably-saturated media, surface and ground-water interaction.
- **Michelle H. Teng, Ph.D. (Caltech 1990), P.E.;** Associate Professor - Hydrodynamics, coastal and hydraulic engineering, water wave generation and propagation, coastal flooding due to storm surge and tsunamis, sediment transport in tidal inlets, bridge scour, numerical simulation.



Photo at Left - Seabury Hall places first overall.

Photo Below Left - Students from Waipahu High School having fun at TEAMS.

Photo Below - A student looks over her team's exam.

The Test of **TEAMS**

COMBINING THE KNOWLEDGE OF MATHEMATICS, CHEMISTRY, PHYSICS, BIOLOGY, AND COMPUTER APPLICATIONS, the **Tests of Engineering Aptitude, Mathematics and Science (TEAMS)** competition is a unique and challenging academic program that allows high school students to apply the knowledge gained in their schoolwork to solve real-world engineering problems.

The 2004 TEAMS competition, held in the University of Hawai'i Campus Center Ballroom in February, brought together nine schools from Oahu and two schools from Maui to participate in the half-day competition.

... a unique and challenging academic program that allows high school students to apply the knowledge gained in their schoolwork to solve real-world engineering problems.

The TEAMS exam is given in two 90-minute parts. Part One consists of a series of objective multiple-choice questions related to various engineer-



ing situations. Part Two requires students to describe and defend their solutions to open-ended subjective questions related to problems from part one.

This year's competition exam consisted of ten problems on various topics, which included hydrostatic bearing, design of flying machines, fire protection engineering, auditory feedback techniques in stuttering, wireless communications, distributed renewable energy system analysis, green design of a high school, nuclear engineering, fast food, and welding products.

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A Sticky Lesson in Engi

It's usually rude to play with your food, except when it's for the sake of engineering.

ON FEBRUARY 7TH, OVER 50 YOUNG WOMEN BECAME ENGINEERS for a day at the **2004 Sacred Hearts Academy Science Symposium** for Girls when they designed and constructed a tower using only uncooked spaghetti noodles and marshmallows.

It was the fourth year in a row that the University of Hawai'i Engineering Alumni Association and the College of Engineering had been invited to participate. This year, UH Engineering Alumni **Kelly Cruz** from the City and Country of Honolulu Transportation Services, **Jamie Hikiji** from M & E Pacific, **Lori Nishida** from Austin, Tsutsumi and Associates, and **Ryan Sugamoto** from the College of Engineering volunteered for the event.

The annual Science Symposium for Girls is open to young women from public and private schools. It introduces them to all the opportunities available in the fields of science and technology through various workshops.

This year's engineering workshop was called "Sticky Spaghetti Tower," which turned out to be one of the most popular workshops.

The students were placed into groups and each group was given 50 mini marshmallows and 50 pieces of uncooked spaghetti.

After a short presentation about engineering and the rules of the competition, the groups had 25 minutes to construct their tower. Towers were judged on height and stability, which was measured by how long the structures could stand, with

Photo Above - A girl building a base for her structure.

Photo Above Right - A group attempts to make their tower taller.

Photo at Far Right - Adding the finishing touches to their structure.

a maximum of 30 seconds. If there was a tie, the most efficient tower (the tower that used the least amount of materials) was declared the winner.

In both 50-minute sessions, girls learned the basic concepts of designing, building, and testing structures. They also used teamwork and time management to accomplish their goal.

In the first session, the winning tower stood 18 inches tall and held up for the maximum 30 seconds. In the second session, two groups constructed a tower that measured 20 inches and stood for the maximum 30 seconds.

It was fun event for all who participated. The girls got to meet young, successful female engineers,

neering

found out what engineering is all about, and got a first hand look at what engineers do.

And, of course, they got to play with food. 🍴



Teamwork is essential to be successful at TEAMS.

*TEAMS—
continued from page 3*

Each school spent months preparing for the event. However, many teams had a mentor from the engineering community to help them along the way. Local engineering companies and organizations donated their time and money to schools participating in TEAMS.

At the competition, schools are separated into different divisions based on enrollment and whether the school is an open or selective enrollment school.

Seabury Hall took first place overall for the third year in a row, beating out Punahou School by one point. The top scoring teams in the other divisions included Punahou School, Kailua High School, and Mililani High School. Another team from Punahou School placed first in the Junior Varsity division.

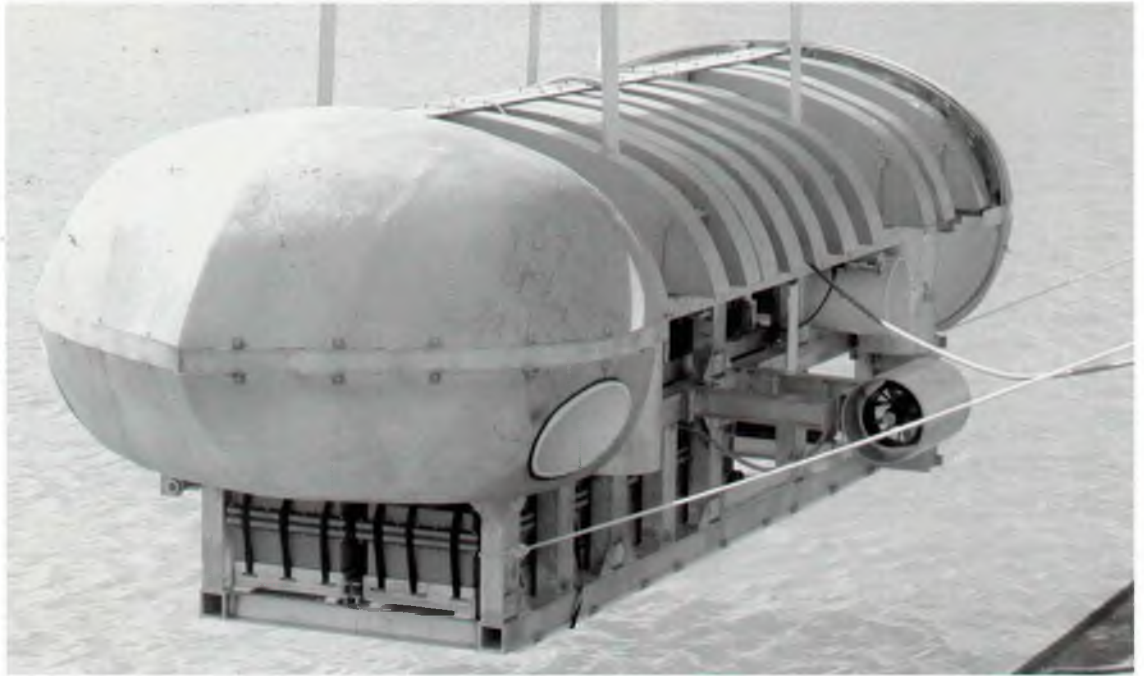
Events like the TEAMS competition introduce hundreds of students to the types of problems engineers face and how they use mathematics

and science to solve them. They see first hand how exciting engineering can be. Hopefully, it encourages them to be engineers in the future. 🚀

2004's TEAMS sponsors included:

American Society of Mechanical Engineers, C. Ino Design, Engineering Alumni Association of the University of Hawai'i, Engineering Concepts, Hawaii Water Environment Association, Institutes for Electrical & Electronics Engineers, Inc., KAI Hawaii, Inc., Kokea Engineering, Inc., The Limtiaco Consulting Group, Inc., M&E Pacific, Inc., R.M. Towill Corporation, and the Society of American Military Engineers.





SAUVIM: A Big Fish in the Sea

“**D**EEP-SEA ENVIRONMENT CONSISTS OF THREE HAZARDS FOR ELECTRONIC AND MECHANICAL COMPONENTS,” says Mechanical Engineering Assistant Professor and Associate Director of the Autonomous Systems Laboratory, **Song K. Choi**. “The water itself, which is corrosive, the salt content of the water, and the pressures created by the water as you go deeper and deeper.”

There are a variety of vehicles used in the deep-sea environment. They are either manned vehicles or remotely operated vehicles. However, with these types of vehicles there are a number of safety and logistic issues. Also, accuracy and efficiency is uncertain due to a variety of factors, like human operator fatigue and response time from the remote control.

Since 1997, researchers from the Mechanical Engineering Department’s Autonomous Systems Laboratory (ASL) have been developing a *Semi-Autonomous Underwater*



Vehicle for Intervention Missions (SAUVIM) to overcome these issues.

Currently, most autonomous vehicles are used just for mapping. What makes SAUVIM stand out is its robotic arm, which will

allow it to perform tasks other vehicles can’t.

SAUVIM is about the same size as a sport utility vehicle and weighs around 6 tons. Over a ton of that weight can be contributed to the twelve large batteries, which provides enough power to run SAUVIM for 24 to 72 hours.

Choi says SAUVIM will see an increase in battery power where you can go from days to months at a time as battery technologies evolves, especially with fuel cells.

The on-board computer system is fairly extensive, consisting of several computers used to extract and process information from sensors and two main computers, which use the data extracted to autonomously control the vehicle.

The frame, which holds the batteries and computer system, consists of aluminum I-beams, which allow the vehicle to work at depths up to 6,000 meters (about 20,000 feet). The entire unit will be wrapped in an outer shell made out of fiberglass.

Over the past seven years, over \$8 million of funding has been provided by the Office of Naval Research for the SAUVIM project. In the next few years, the project will receive several million more.

Another underwater robot the ASL works with is the *Omnidirectional Intelligent Navigator (ODIN)*, which was created with a National Science Foundation Presidential Young Investigator grant presented to Mechanical Engineering Professor, **Dr. Junku**

Yuh, the Principal Investigator of the SAUVIM project. Designed and fabricated by Dr. Choi in 1992, ODIN is used as a vehicle to test control, navigation, and localization algorithms. These tests are done in the University of Hawai'i Duke Kahanamoku Pool.

The ultimate goal of this research is to develop a production-based vehicle that will be capable of autonomous underwater navigation and intervention tasks for the military, academic, and industrial sectors.

Choi says SAUVIM technologies could be used for wreckage recovery, mine detection, or homeland security by the military. In the academic sector, it could be used to autonomously retrieve water and soil samples or do underwater maintenance work. Commercially, SAUVIM could be used for mineral location and extraction, rescue missions, or even tracking fish migrations.

Along with the research, a spin-off company called *Marine Autonomous Systems Engineering (MASE)* was established. "It's one of the first direct spin-off companies from the College of Engineering and it allows us to do collaborative work between the Autonomous Systems

Laboratory and the company, as well as outside agencies, like the Naval Undersea Warfare Center in Newport, Rhode Island," says Choi, who also serves as director of the new company.

MASE will primarily concentrate on the technological development of the vehicle, novel sensor research, vehicle monitoring research, vehicle testing, and its ongoing maintenance and upkeep.

Interest in SAUVIM has also peaked the interest of the National Aeronautics and Space Administration (NASA). "The water environment is the closest you can get to the space environment in terms of zero gravity, except the water environment is much more complex," Choi says. "However, all the



motion controls and everything you do in terms of moving things and locating things is very similar to space because everything is free suspended. NASA gets a lot of pertinent data from us that they can use with their space technology."

The work on SAUVIM has been a total group project. The contributions from the two Seniors Researchers, **Dr. Tae Won Kim** and **Dr. Giacomo Marani**, have advanced the project to where it is today. A number of graduate and undergraduate students have also helped move the endeavor forward. Even several high school interns have made contributions.

Right now SAUVIM is a big fish in the sea, but over the next few years researchers plan to make the final production vehicle a significantly smaller and more efficient vehicle.

To learn more about the Autonomous Systems Laboratory and SAUVIM, visit their website at www.eng.hawaii.edu/~asl.

Photos at Far Left - (Top) SAUVIM being lowered into Snug Harbor for testing; (Bottom) SAUVIM without its shell. Photo Above - ODIN being tested at the UH pool.

Photo at Right - A bottle rocket being launched.

Photo at Far Right - Hundreds of students attended this year's Expo.

Photo Below - Engineering students test the popsicle stick bridges.



Excitement @ the Expo!

THERE WERE ROCKETS
FLYING INTO THE AIR,
drag racing down the sidewalk, bridges being
destroyed, and motors being revved.

Sounds like parts of a good action movie?

It wasn't an action movie, but it was just as exciting. It was the **2004 Engineering Expo at the University of Hawai'i College of Engineering.**

The event, put on by the various student organizations at the College of Engineering, is one of the largest events the College hosts every year. This year's Expo attracted about 500 students from over two-dozen middle and high schools.

The popularity of the event has also attracted a number of schools from the neighbor islands, like Hilo High School from the Big Island, Baldwin High School from Maui, and Waimea High School from Kauai.

The Expo serves as an excellent opportunity for students to learn what is happening in the field of engineering through student and faculty exhibits and creative engineering competitions.

This year, the middle schools were able to participate in one event, while the high schools participated in five separate events.

The **Popsicle Stick Bridge Competition**, sponsored by the American Society of Civil Engineers (ASCE), had half a dozen middle



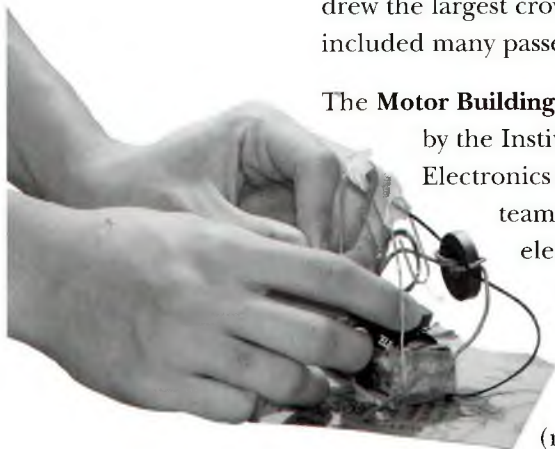


school teams construct popsicle stick bridges that had to span over a two foot gap. Bridges were judged on their ability to carry the heaviest load. Three of the bridges pulled off the task of supporting the maximum weight of 211 pounds.

The **Paper Column Competition**, sponsored by Chi Epsilon (Civil Engineering Honor Society), had several teams construct paper columns using two sheets of paper and glue prior to the event. Columns were judged on their efficiency, workmanship, and their report about their construction process.

The **Bottle Rocket Challenge**, sponsored by the American Society of Mechanical Engineers, had teams design and construct rockets using a plastic bottle, prior to the Expo. The objective was to build a simple water rocket, designed to stay in the air as long as possible. Many of the bottle rockets reached heights of over 50 feet. This event drew the largest crowds of the day, which included many passersby.

The **Motor Building Competition**, sponsored by the Institute of Electrical and Electronics Engineers (IEEE), had teams design and build an electric motor within 30 minutes, using only the materials provided. Each motor was judged by maximum RPM (rotations per minute),



innovation, construction quality, and speed with which the motor was built.

The **Kamikaze Design Competition**, sponsored by Eta Kappa Nu (Electrical Engineering Honor Society), had each team create a paper airplane out of only one sheet of paper. With their paper airplane, each team had one attempt to hit a target 50 feet away. The plane that landed closest to the target was declared the winner.

The **Rubber Band Racer**, sponsored by Pi Tau Sigma (Mechanical Engineering Honor Society), had teams construct racers that are internally powered by a rubber band, prior to the event. Each racer made three runs down the 15-foot track. The racer with the quickest total of those three runs was named the victor.



At the end of the day, the winning schools were awarded trophies for their efforts. Also, all of the middle school students received special "Popsicle Bridge" t-shirts. However, the most important thing the students received was an introduction into what it's like to be an engineer and how exciting it can be. 🌱

Above Left Photo - An electrical engineering student explaining micromouse.

Above Photo - A student prepares his rubber band racer.

Photo at Left - A high school student works on a motor.

Student News. . . .

Kurt Boehm,

a senior in Mechanical Engineering, was recognized as the **2004 Student Engineer of the Year** by the **Hawaii Society of Professional Engineers**. He is a member of the Society of Automotive Engineers Mini Baja team and has earned a 3.81 GPA. Kurt is also on the University of Hawai'i swim team and has broken school records in two events. He won two events at the 2002-2003 conference championships. He also earned honorable mention Academic All-American status during the 2002-2003 season.



Blaine Murakami,

a junior in Electrical Engineering, received a **Spring 2004 Undergraduate Fellowship** from the **Hawaii Space Grant Consortium**. He will continue to work with mentor **Dr. Wayne Shiroma** of the Department of Electrical Engineering on satellite-to-satellite communication techniques. Blaine's project, titled "Retrodirective Antenna Array Design for CubeSat Applications and CubeSat Program Management" will emphasize simulation and design of the experimental antenna arrays that serve as the satellite payload. In addition to his technical responsibilities, Blaine serves as Program Engineer leading the 30+ students on the UH CubeSat/NanoSat Program.



Kristina Wong, a junior in Electrical Engineering, will embark on an interdisciplinary research project involving physics, engineering, and materials science. Kristina's project, titled "Study of Micro- and Nano-cracks in Fatigued Advanced Materials" is being conducted under mentor **Dr. Murli Manghnani** of the Hawai'i Institute of Geophysics and Planetology. She will use a variety of advanced microscopes in her study of the elastic properties of ceramic fiber-reinforced composite materials and ceramic sensors that are important in the building of space vehicles.

Lance Yoneshige, a junior in Mechanical Engineering, will continue his work on structural dynamics, vibration, and thermal stress analyses with mentor **Dr. Mehrdad Ghasemi Nejjad** of the Department of Mechanical Engineering. Lance's project, "Design, Analysis, Manufacture, and Test of the Structural Housing of the University of Hawai'i NanoSat," is part of a larger research program involving Electrical, Civil, and Mechanical Engineering students and mentors. As leader of the Mechanical Structures and Analysis team, Lance will help design the NanoSat structure with space qualified materials.

Alumni News

Ted S. Kawahigashi (CE, 1957) received the 2004 Hawaii Council of Engineering Societies Lifetime Achievement Award, which recognizes the lifetime achievements of retired engineers.



Mr. Kawahigashi's career began with the US Navy in District Public Works Office (now called Naval Facilities Engineering Command) at Pearl Harbor as a civil engineer prior to serving two years of active duty as a 2nd Lieutenant in the US Army.

In 1962, he relocated to Southern California and worked as a highway engineer with the California Department of Transportation (CalTrans). While there he was instrumental in CalTrans' acceptance of the use of the "Pressure Momentum Theory" for open channel flow of on-site drainage designs for California's freeways and highways. He also was selected to become the project engineer for California's experimental Traffic Surveillance and Control project, which pioneered today's computerized traffic surveillance and control project ("Intelligent Transportation System") for California.

In 1972, he joined Austin, Smith & Associates, Inc. (which is now Austin, Tsutsumi & Associates, Inc.) as the Principal Traffic Engineer. In 1975, he became a principal in the firm and served as its corporate secretary. In 1987, he was selected as the company's President and CEO until his retirement in September 2001.

The annual HCES Lifetime Achievement Award is given to an individual who has contributed significantly to the development of engineering in the State of Hawaii and who has made a noteworthy impact on the local engineering community.

Dennis K.W. Lee

(CE, 1970) was recognized as the 2004 Engineer of the Year by the Hawaii Society of Professional Engineers. Mr. Lee



began his career as a Civil Engineer I for the County of Hawaii and worked his way up to Chief of Operations for the Department of Water Supply and Director of Public Works. He also served as Supervisory Civil Engineer, Directorate of Facilities Engineering for the U.S. Department of the Army at the Pohakuloa Training Area on the Big Island.

Mr. Lee has volunteered his time for numerous professional and community causes. One very special moment was the success of the 1993 National Society of Professional Engineers (NSPE) Annual Meeting, held in Kona, Hawaii. As Chair for Events and Tour Activities, he arranged various local events and activities for the 650 attendees, the second largest meeting in its history. As the result of his success, funds were raised for a Special Scholarship Fund. In addition, for the first time ever, a local chapter made a \$10,000 contribution to the NSPE Scholarship. Also, with Mr. Lee's leadership, the 2003 Mayor's Cup raised \$80,000 for the Hawaii Island United Way.

He also participates in the Civil Engineering Exam Committee of the National Council of Examiners for Engineering and Surveying, participating in the production of the annual exams for licensure.

In 1998, he was recognized as the County of Hawaii Supervisor of the Year, while serving as the DWS Water Quality Assurance and Control Section Head.

The annual HSPE Engineer of the Year award is given to an individual who has made contributions to both the engineering profession and the community.

Westley K.C.

Chun (CE, 1978) has been elected president for 2003-2004 of the Hawaii Section of the American Society of Civil



Engineers. He is a principal of Engineering Solutions, Inc., a Hawaii-based civil/sanitary engineering company. He is a professional engineer in Hawai'i, Guam, and California. He received his B.S. in Civil Engineering from the University of Hawai'i, and his M.S. and Ph.D. in Environmental Engineering from the University of California at Davis, and is a diplomat of the American Academy of Environmental Engineers. He has worked on water and wastewater projects throughout the Western U.S., Alaska, Hawai'i, Guam, Southeast Asia and Eastern Europe.

Lorna K.F.L. Heller

(CE, 1993) was the recipient of the 2004 Young Engineer of the Year award by the Hawaii Society of Professional



Engineers. Ms. Heller is currently employed by the Honolulu Board of Water Supply as a Civil Engineer. She serves in a supervisory position with the Board's Water Resources Unit, Long-Range Planning Section.

Ms. Heller is an active member of ASCE, previously serving as Director of the Society's Younger Member Forum (YMF). During her term as YMF president, the membership grew substantially, and she established a number of projects that the YMF continues to participate in. Also during her term, she received several awards from the National Society: Outstanding Young Civil Engineer In Public Section at the 1997 Western Regional Younger Member Council Conference, the 1998 Hawaii Section YMF nominee for Outstanding Young Civil Engineer In a Community Activity, and the 2001 Young Government Civil Engineer Award for Zone IV (Washington, Idaho, Montana, Oregon, California, Nevada, Utah, Arizona, and Hawaii).

At the community level, Ms. Heller is active in supporting the Muscular Dystrophy Association of Hawaii, USS Missouri Restoration Foundation, and the United Cerebral Palsy Foundation.

The annual HSPE Young Engineer of the Year award is given to an individual who has made contributions to both the engineering profession and the community.

Fall 2003 Graduates



CIVIL AND ENVIRONMENTAL

Master of Science

Jennifer A. Arinaga
John F. Farmer
Tieshi Huang
Scott F.H. Kidani
Mike H. Orimoto
Richard L. Pringle
Kealohi G. Sandefur

Bachelor of Science

Jeffery T. Arizumi
Yong Yang J. Chang
James E. Frame
Jennifer R. Gallego
Devin R. Hiranaka
Nicole L. Kikuchi
Todd S. Kuniyoshi
Sherrie M. Lum
Ryan K. Matsuo
Waylen H. Miyashiro
Kason H. Pacheco
Joseph R. Salvador
Matthew T. Sekiya
Reuben Siatuu
Franklin W. Sue
Lisa Y. Takushi

Jason T. Tateishi
Lauren M. Tokura
Brad J. Uemoto
Rhen D. Yamamoto
Jill M. Yamanouchi
Derek Y. Yonemura

ELECTRICAL

Doctor of Philosophy

Jinghu Chen

Master of Science

Ashok Balasubramanian
Martian Binonwanwangsn
Ramesh Kandula
Wei Su
Xudong Wang
Bolin Zhao

Bachelor of Science

Khristine Ann C. Agbayani
Donald B. Braithwaite-Ahuna
Kelly H. Cripps
Delon J. Cuizon
Beauregard A.D. Domingo
Jason S. Ebisu
Keith T. Igawa

Franklin R. Johnston
Gordon J.J. Li
Daniel P. Ling
Kam Tou Man
Laine T. Murakami
Sharilyn H. Nakayama
Brandon S. Ramo
Patrick A. Reyes
John D. Roeder
Derek A.K. Rompasky
Denise K.Y. Shankles
David C.K. Tam
Michael A.M. Tamamoto
Michael V. Varela
Byron L. Wolfe
Herman C.M. Yee

MECHANICAL

Bachelor of Science

Arnold R. Dawang
Sage T. Kiyonaga
Randy K.H. Sakagawa
Karl J. Santa
Miko A. Suzuki
Stan I. Tomimoto
Justin D. Wade



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