

# CRDG

*Year in Review 2009*





## mission

The Curriculum Research & Development Group (CRDG), with its associated Laboratory School, is an organized research unit in the College of Education at the University of Hawai'i at Mānoa that contributes to the body of professional knowledge and practice in teaching and learning, curriculum development, program dissemination and implementation, evaluation and assessment, and school improvement. CRDG conducts research and creates, evaluates, disseminates, and supports educational programs that serve students, teachers, parents, and other educators in grades pre-K–20.

## vision

CRDG, a learner-centered community of educators—recognized locally, nationally, and globally for quality research, design, and curricula—that inspires dynamic teaching and learning.

# Director's Message

On behalf of the Curriculum Research & Development Group (CRDG) in the College of Education at the University of Hawai'i at Mānoa, and its affiliated University Laboratory School (ULS), I am pleased to present the *Year in Review 2009* describing highlights of faculty and staff accomplishments. In this report we once again emphasize the theme of partnerships and our valued collaborations.

While 2009 was a most challenging year with severe budget reductions, the shift in employment of the Laboratory School faculty and staff from CRDG to the charter school's Local School Board, and the loss of beloved colleagues, we have maintained focus on our mission to improve education in Hawai'i and elsewhere.

As is often the case, change brought new challenges and new opportunities. The new employment status of the ULS personnel reduced by about half the number of CRDG faculty and staff, resulting in a period of reorganizing, refocusing, and rebuilding. I am pleased to say the organization remains strong, and the changes have opened new opportunities for partnerships and collaborations with the College of Education faculty, the Hawai'i Department of Education (HIDOE), and others.

In this annual report, we highlight some of the exemplary work of our faculty and staff. We have continued partnerships and collaborations with HIDOE, charter schools, Texas Instruments, the Pacific Circle Consortium, and others and forged new partnerships with the National Oceanic and Atmospheric Administration, the University of Hawai'i's School of Ocean and Earth Science and Technology, the Hawai'i Institute of Marine Biology, the John A. Burns School of Medicine, the U.S. Department of Justice, and the Department of Defense Education Activity. Of particular note is the partnership with Hawai'i Department of Education to streamline the Hawaii Content and Performance Standards III in English language arts, mathematics, science, and social studies and to begin work on creating a guide to designing effective professional development.

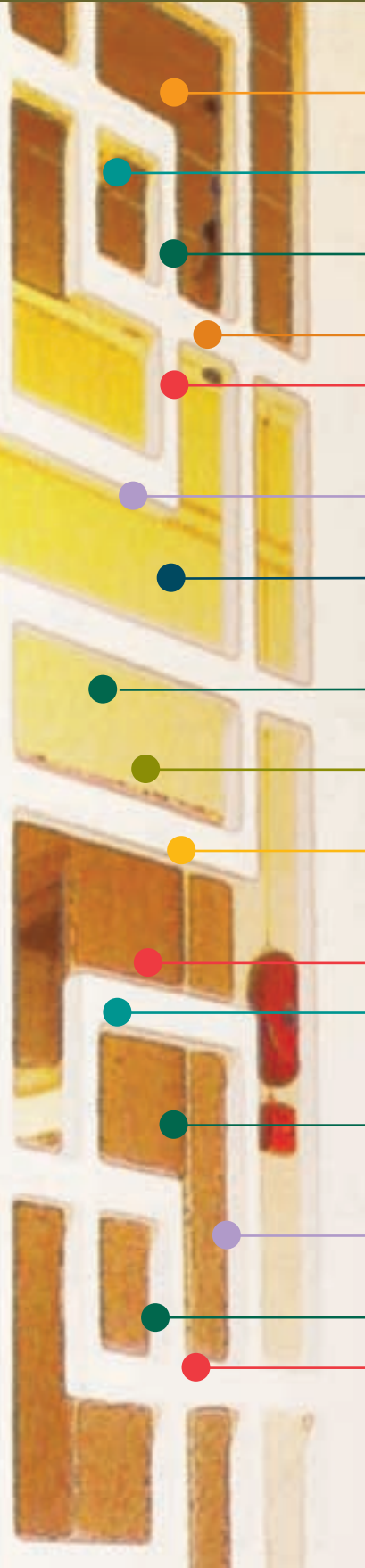
We are grateful for the ongoing support from our various funding agencies including the University of Hawai'i, Hawai'i Department of Education, INPEACE, Pacific Resources for Education and Learning, Harold K. L. Castle Foundation, U.S. Department of Education, U.S. Department of Justice, National Science Foundation, Johns Hopkins University, and the UH Sea Grant College Program.

While these have been challenging times, they have brought out the best in all of us, and we look forward to even better things to come.



Donald B. Young  
Director, CRDG  
Professor of Education

# CRDG Our Roots

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- 1895 A teacher training department is formed at Honolulu High School, located in Princess Ruth's former mansion (now Central Intermediate School).
  - 1896 The teacher training department moves to Victoria and Young Streets and is renamed Honolulu Normal and Training School.
  - 1905 After annexation, Hawai'i becomes a U.S. territory. Honolulu Normal and Training School is renamed Territorial Normal and Training School and is moved to Lunalilo and Quarry streets.
  - 1930 Benjamin Wist (later dean of Teachers College) becomes the principal of the school.
  - 1921 The school moves to a new 15-acre site (once a pig farm) adjoining the University of Hawai'i at Mānoa. The university's Department of Secondary Education becomes the School of Education.
  - 1931 The legislature transfers the Territorial Normal and Training School to the School of Education. The School of Education is renamed Teachers College.
  - 1939–1941 An elementary school (University Elementary School) is built on Metcalf Street as part of Teachers College. Construction begins on Castle Memorial Hall, a training center for kindergarten and nursery school teachers.
  - 1941–1945 Punahou School, displaced by the military occupying its campus, moves into Castle Memorial Hall and other buildings, but Teachers College continues to operate.
  - 1943 University High School Building 1 on the Metcalf Street side of Teachers College is completed as an intermediate school.
  - 1948 University High School Building 2 is constructed adjacent to Building 1. The schools now offer a complete K–12 curriculum. Hubert Everly (later dean of the College of Education) becomes the principal.
  - 1959 Teachers College becomes the College of Education, and Hawai'i becomes the fiftieth state.
  - 1966 The schools become part of a new entity, the Hawai'i Curriculum Center. This is a joint operation of the Hawai'i Department of Education and the University of Hawai'i to develop curriculum programs and materials for schools.
  - 1969 The Hawai'i Curriculum Center is phased out and the University Laboratory School (ULS) comes under a new College of Education unit known as the Curriculum Research & Development Group (CRDG).
  - 1996 CRDG, along with other research units, reorganizes under the UH Office of the Senior Vice President for Research.
  - 2000 CRDG merges with the College of Education. ULS applies for charter school status.
  - 2001 ULS becomes a charter school and continues to serve as a laboratory for curriculum R & D in partnership with CRDG.

# Curriculum Research & Development Group

While CRDG and the University Laboratory School's roots go back more than a hundred years, the research partnership in its current form dates to 1966 when CRDG's founding director, Arthur R. King, Jr., was given the charge of creating a center for curriculum research and development. This was the beginning of the research partnership that has allowed CRDG and ULS to influence change in curriculum, instruction, assessment, and school systems by creating programs and practices that result in improved student learning. CRDG assembles teams of academic scholars, teachers, design specialists, evaluators, and others to create instructional programs and professional development services that improve learning, teaching, and assessment. The collaborative nature of the work means that CRDG faculty are continually reaching out and forming new partnerships with researchers both in education and in the various disciplines; with individual schools as well as departments of education in Hawai'i and elsewhere; with community organizations and educational service providers; and with public and private funding agencies.

CRDG's work is focused on these five interrelated fields of educational endeavor, each of which addresses a central issue facing education in Hawai'i, on the U.S. mainland, in American overseas schools, and in other nations.

- ∞ Science, Technology, Engineering, and Mathematics (STEM) Education
- ∞ Hawai'i, Asia, and the Pacific
- ∞ Serving Diverse Learners
- ∞ Educational Technology Development
- ∞ Designing Educational Systems

CRDG concerns itself with the preschool through graduate school (P-20) continuum of education, including those who receive and those who deliver educational programs and services. While CRDG faculty are concerned with and address current needs, their primary focus is on creating innovations that by their very nature are intended to go beyond current practice to investigating and creating quality programs and materials for the future.



# University Laboratory School



A. Keoni Jeremiah  
Principal, ULS

The long-standing partnership between CRDG and the University Laboratory School (ULS) entered a new phase this year with a change in administrative structure, but as Principal Keoni Jeremiah wrote in his back-to-school letter, the fundamental partnership between COE/CRDG and ULS remains unchanged.

The ULS serves two interlocking missions: to design and deliver to its students the best possible education and to serve the educational research and development community through the invention and testing of high quality educational programs. The student population is randomly selected from among applicants to represent a broad cross section reflecting the state population distribution of gender, academic achievement, family income, and ethnicity. All students are in school for 7.5 hours each day and take a challenging comprehensive curriculum that includes English, mathematics, science, social studies, art, and music each year as well as foreign languages and electives beginning in grade ten. The school has no tracking of students. All students take the identical core curriculum in high school in non-segregated classes. All students graduate ready for college, work, and responsible citizenship.

The school curriculum is performance-based and built on multi-year sequences of learning emphasizing creativity, inquiry, problem solving, and active learning. The broad range of activities included in the school's core curriculum allows its students to excel in state- and national-level competitions in all areas. Approximately 80 percent of ULS students participate in activities outside of school in visual and performing arts, speech, mathematics, music, writing, science, social studies, and athletics.

The school is widely recognized as successful with diverse learners, as substantiated by high scores on standardized tests, graduation rates, and post-secondary enrollment. Non-academic indicators that add to this picture of success include daily attendance rates between 95 and 98 percent, and consistent post-secondary acceptance rates in the neighborhood of 98 percent.

Among the changes in the school this year was a new administrative team that saw old friends return to the school to serve in new roles. Keoni Jeremiah, who had served as vice principal from 2004 to 2009, became principal in 2009. In his letter to students and parents, he described his history and connections to the school:

*The University Laboratory School is a very special place to me as I have had the privilege and experience of being a student, coach, and vice principal over the course of the past twenty-four years. All of these opportunities have provided me with many very rewarding experiences and I will do my best to continue these opportunities for all of the current and future University Laboratory School students.*

*It is difficult to express the excitement I am feeling in being the new principal of the University Laboratory School. It is an honor and privilege to be at the service of an outstanding faculty and the wonderful parents and students that make up our school community.*

Joining Jeremiah in the role of vice principal is long-time ULS administrator Peter Estomago. Estomago has served, over the past 19 years, as teacher, assistant athletic director and interim principal. Betty Nakamoto returned to the school office where she had worked from 1988 to 2002. Tracy Teixeira, Dean of Students, and James Bukes, Athletic Director, join these three to complete the administrative team.

# Project Pono, An Environmental Stewardship Program

A new initiative in the school this year, spearheaded by science teacher Miki Tomita, is Project Pono, an environmental stewardship and service-learning elective course that provides opportunities for students to learn about and engage in practices that promote environmental awareness and cultural and environmental sustainability, and to facilitate students teaching themselves and their peers about these topics.

Project Pono students begin by identifying their own environmental interests, then go on to create and participate in educational outreach and community events that are grounded in Hawaiian values and that foster environmental and cultural sustainability.

The fall semester saw the students carry out these projects:

- ❧ The Native Garden at ULS, meant to serve as an outdoor classroom and resource for Native Hawaiian agriculture, medicinal practices, and hula, includes endemic, indigenous, and canoe (early Hawaiian introduction) plants.
- ❧ Students participated in lo'i kalo (taro patch) and loko i'a (fishpond) restoration and cultivation at important historic and cultural sites including Hé'eia and Waikalua fishponds, Ulupō heiau, and Ahupua'a 'O Kahana.
- ❧ The Ma Ka'Āina Ka'Ike project, focused on organizing beach, trail, and park cleanups along the scenic Ka Iwi shoreline, was founded with community partners the Department of Land and Natural Resources, City & County of Honolulu's Parks and Recreation Department, Matson's Ka Ipu'Āina program, and State Representative Gene Ward. There are plans to eventually expand this entirely student-developed, student-run, and student-perpetuated program into an educational and community service outreach for other schools and student groups.
- ❧ Work days were planned and carried out at the Hawaiian Humane Society and Honolulu Zoo.
- ❧ A partnership was formed with Blue Planet Foundation to carry out compact fluorescent lamp (CFL) exchange drives where students helped spread Blue Planet's message of low carbon emissions and energy efficiency through exchanging incandescent lightbulbs for CFLs. Drives were held during school Hi-5 recycling drives and the week leading up to the International Day of Climate Awareness.

In addition to carrying out a wide range of projects, students found time to apply for grants for future projects. Two groups of students received Be the Change grants from the Youth Philanthropy Board for projects that will take place next year.



# Google Education Brings 21st Century Styles to ULS Classrooms



*English teacher Marybeth Hamilton supplements the feedback she has added to the shared document with face-to-face help.*

As the computing world moves from stand-alone programs to cloud computing, Google for Educators (informally known as Google education) is providing a platform for this shift to take place in classrooms. The ULS faculty, along with information technology (IT) and learning technology (LT) staff from CRDG, are using this opportunity to explore all the ways this new technology can support teaching and learning. Research projects range from assembling, or in some cases creating, the hardware and software to build an integrated system within the school, to developing ways cloud computing can enhance classroom activities, to looking at the safety issues this new open environment raises. A key component of the research is to look at whether the new tools are actually enhancing student learning.

Cloud computing offers many advantages for a school environment, both solving problems and creating new opportunities. One of the biggest advantages is that it eliminates the problems associated with transferability between home and school. Going a step further, it allows students to collaborate on a single document no matter where they are, and to have the file waiting for them when they get to school. And all of this happens within a safe online environment, since students' documents or chats can only be shared within the intranet created by the school.

Another big advantage of the Google for Educators system is the tremendous increase in capacity that is created by the allocation of 7.5 giga-bytes of storage space to every student, allowing for new applications in the classroom. As an example of what can be done, as teachers and students mark up a SMART Board during class, all of the notes and drawings are captured back to the computer, which students can then look at and add to at home. "This is an especially good match for our school," said CRDG IT manager Mark Yap, "because of our inquiry approach."

The new cloud computing environment and the possibilities it creates have led to a series of need-based technology workshops for teachers. Six workshops in the spring of 2009 all originated from teachers expressing a need or interest and called on the expertise of the entire CRDG IT/LT team. In addition, a new technology committee made up of ULS teachers along with IT and LT staff from CRDG is examining the way technology is shaping the school and creating a plan for where they want to go.



*Students log in to Google Docs in English class to see the teacher's feedback and continue work on their papers.*





*Eighth grade mathematics teacher Brendan Brennan is using an interactive classroom to transform the way his students learn math. He combines the Google for Educators tools with a TI Navigator system to create a classroom where all kids get involved.*

As the new cloud computing concept starts to take hold in the school, teachers are discovering new ways to solve problems and enhance learning. In English, some students started using Google Docs as a way to address compatibility issues, composing their papers in Google Docs when they couldn't open school files at home. Once students began writing their papers in that format, teacher Marybeth Hamilton began using it to add feedback, and by the end of their first semester, the idea of sharing documents and of doing an entire project, from first draft to finished paper, in Google Docs had caught on and was being used by the entire class. As the year ended, plans were being made to use the new technology for collaborative writing and podcasting projects.

Eighth grade mathematics teacher Brendan Brennan is also using an interactive classroom to transform the way his students learn math. He combines the Google for Educators tools with a TI Navigator system to create a classroom where all kids get involved. The technology changes the focus from what the teacher is doing to what the students are doing, and the quick, spontaneous discussions allow students to interact not only with the teacher, but with each other. Screen capture features allow the teacher to understand at a glance who is understanding the concept, who is close but not there yet, and who is way off base.

Brennan is also collaborating with CRDG mathematics researchers to look at curriculum development that includes technology from the earliest stages. "Too often, the current approach to technology is to put computers into the classroom without planning for how it will fit with what is already being done," says Brennan, "so that teachers end up pairing inappropriate technology with antiquated curricula." Studies show that in this kind of situation, the technology does not improve student learning. As part of a larger CRDG study, Brennan is studying how technology impacts student learning in his sixth grade classes where one group uses computers and the other uses traditional pencil and paper methods. "We want to understand how the new tools change what happens in the classroom. Do they allow for the class to move more quickly through the material? Do students take the lessons in different directions and explore new ideas? Do they gain a deeper understanding of the mathematics?" The goal of the research is to develop curriculum alongside technology to enhance student learning now and to better prepare students for the world they will live in after graduation.

## CRDG Partners with HIDOE on Streamlining Standards



The Standards Streamlining Project (SSP), a partnership with the Hawai'i Department of Education (HIDOE), reexamined and recommended modifications to the Hawaii Content and Performance Standards III (HCPS III) benchmarks in the core areas of English language arts, mathematics, science, and social studies. The primary goal of the project was to better focus teaching and learning by identifying essential core content, reducing the number of benchmarks, and clarifying the language in those benchmarks. Drawing on CRDG's expertise, standards from national organizations and selected highly regarded states, and reviews by content experts, project staff recommended focused changes while maintaining the high level of rigor of Hawai'i standards that compares well to exemplary states.

As part of the streamlining process, CRDG sought the insight and feedback of the product's end user, HIDOE teachers. Formative field reviews of the streamlined benchmarks conducted on O'ahu and Kaua'i between March and May enabled staff to gather data directly from teachers in different schools and complexes. Twenty-three elementary, middle, and high schools were represented with 200 teachers providing valuable feedback that led to final recommendations that were presented to the HIDOE in June.

The second phase of the project, which began in July and will continue through 2010, focuses on creating a systematic approach to designing professional development (PD) that aligns with national PD standards. Using CRDG's PD design expertise and drawing on seminal pieces of research on effective PD, project staff are creating a guide and toolkit to help educators at all levels (school, complex, or state) design, implement, and evaluate PD that results in improved teacher knowledge of content and pedagogy, and ultimately in improved student learning.

Work also began on developing a principal survey and teacher focus group interview questions to gather baseline data about current PD practices. These data will be used in evaluating the utility and effectiveness of the completed PD design guide.



*Social studies researcher Leah Tau and SSP project manager Ricardo Lorenzana work to streamline the social studies standards.*

# Pihana Nā Mamo Continues Long-time Partnerships

The Pihana Nā Mamo project, a collaboration with the Hawai'i Department of Education (HIDOE) and funded by the U. S. Department of Education through the Native Hawaiian Education Act, wrapped up a successful 9-year collaboration in 2009 with impressive results in the classroom and the completion of a ground-breaking series of publications.

The Pihana Nā Mamo project sought to improve the education of Native Hawaiian children through six components: (1) the implementation of research-based reading programs, (2) mentoring and transition support for secondary students, (3) parent and community involvement, (4) project administration, (5) curriculum materials, and (6) program evaluation.

Under a formal memorandum of agreement, the HIDOE was largely responsible for the first three project components, and CRDG was largely responsible for the last three. All six components were designed and carried out with an emphasis on cultural appropriateness, particularly for Native Hawaiian students.

Pihana Nā Mamo served large numbers—50 schools, 500 teachers, 9,000 students (5,500 Hawaiian/Part-Hawaiian), 50 administrators, and 600 parents and community members—each year, and despite being mostly in high-poverty schools, has produced excellent graduation rates; reading scores well above normative expectations, including in AYP terms; and sustainable results. Every Pihana school succeeded far beyond expectations.

In addition to their work in the schools, the project worked for several years to publish a series of eleven books on Native Hawaiian virtues and values by noted cultural specialist Malcolm Nāea Chun and published the final title, *Hō'ōnohono*, in 2009 to complete the series. In addition, ULS English teacher and curriculum developer Bill Teter joined the project team to produce an anthology of current literature that reflects the themes presented in Chun's work. *Hāpai nā Leo* opens with an excerpt from the *Kumulipo*, closes with a piece of award-winning slam poetry, and in between celebrates a diverse range of voices that explore, carry, and regenerate Hawaiian culture.

The success of the Pihana Nā Mamo project has been recognized with the granting of additional funds to carry on the work in two new three-year Native Hawaiian Education program (NHEP) grants (the fourth and fifth grants awarded to this highly successful collaboration).

Kāko'o Ikaika: Supporting Adolescent Hawaiian Students to Achieve High Standards was funded for \$2,485,671 and Heluhelu Maoli: Building Strong Foundations in Reading and Mathematics was funded for \$3,116,859. Both projects continued the strong partnership between CRDG and the Hawai'i Department of Education.

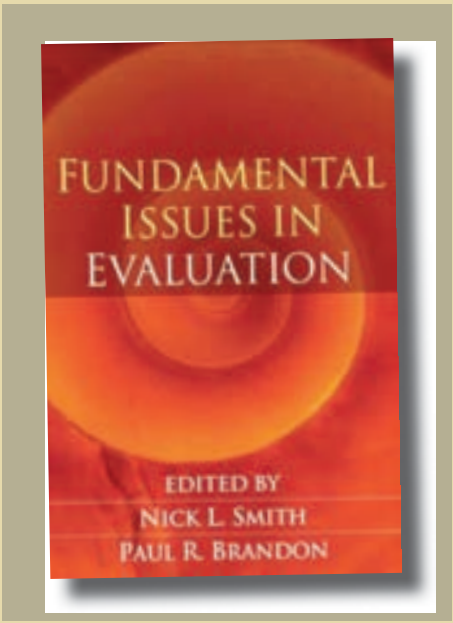


UH and HIDOE project staff, school administrators, teachers, cultural practitioners, and community representatives visited Wai'ānae Coast cultural sites, including Pōka'i Bay.





# CRDG Evaluators Contribute to Body of Knowledge in Evaluation



Every year CRDG’s team of evaluators produces evaluation studies for internal and external projects. But what most people don’t see is the thoughtful reflection that goes on “behind the scenes,” reflection that both informs their work and contributes to the larger body of knowledge on the theory, methods, and practices that make up the profession of evaluation.

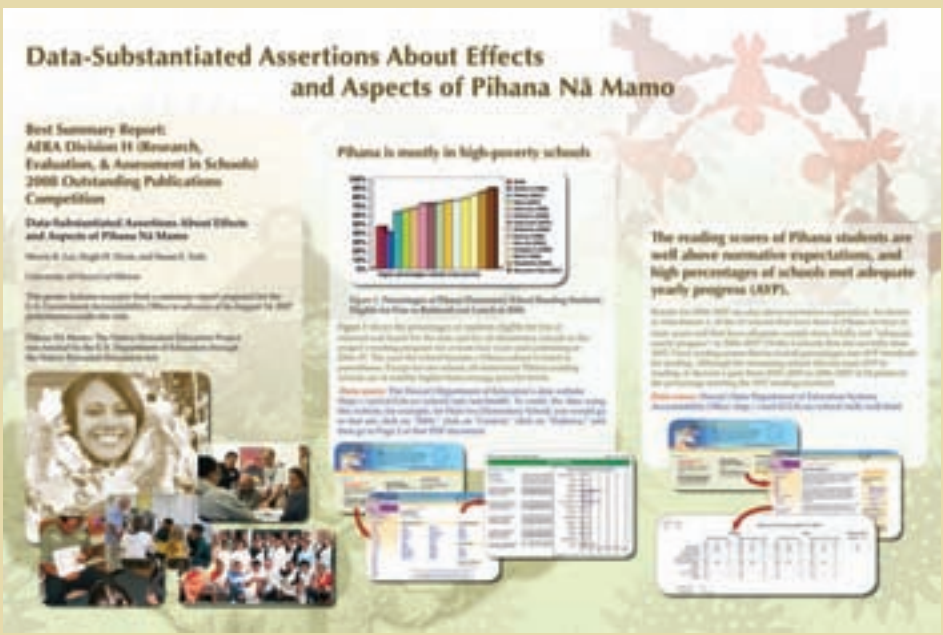
Following the release last year of *Fundamental Issues in Evaluation*, a major book CRDG’s Paul Brandon co-edited with Nick L. Smith of Syracuse University, Brandon has continued his research about the theory, methods, and practice of program evaluation with articles about the methods used in some of his recent evaluation projects. “The Inquiry Science Implementation Scale: Instrument Development and the Results of Validation Studies,” a collaboration with CRDG director Donald Young, evaluator Alice Taum, and science education researcher Frank Pottenger, Brandon discussed both the instrument developed and the uses of final data it produced for their recent project that looked at the scaling up of middle school science programs. Brandon also published an article in the *American Journal of Evaluation* with Malkeet Singh wherein they reviewed and critiqued the literature about the use of evaluation findings by evaluation clients such as program personnel, policy makers, and so forth. The article demonstrated that the research in this area was less comprehensive and less methodologically sound than many in the evaluation community have long believed.

*Morris Lai and the Pihana Nā Mamo team presented a poster on their award-winning evaluation products from previous year’s work on the project at the 2009 American Educational Research Association’s annual meeting.*

Morris Lai, longtime evaluator and principal investigator for the Pihana Nā Mamo Native Hawaiian Education Project, continued his work this year on indigenous approaches to evaluation. Lai is a member of the Evaluation Hui, a group of Māori and Kanaka Maoli (Native Hawaiian) evaluators working on the development and dissemination of methods appropriate for evaluations involving indigenous peoples. Lai’s presentations this year included papers entitled “Time to Stop Privileging the Ways of Cultural Dominators” and “Personal Reflections of Using Indigenous Traditional Cultural Values as a Teaching Strategy in Education” at the Pacific Circle Consortium conference in Taipei, Taiwan; a

workshop entitled “Contextualizing Your Inner Evaluator: Embracing Other World Views” (together with Donna Murtons, Hazel Simonet, and Alice Kawakami) at the American Evaluation Association Annual Conference in Orlando, Florida; and a paper entitled “Empowerment, Collaborative, and Participatory Evaluation: Too Apologetic” with CRDG’s Sue York at the American Evaluation Association Annual Conference in Orlando, Florida.

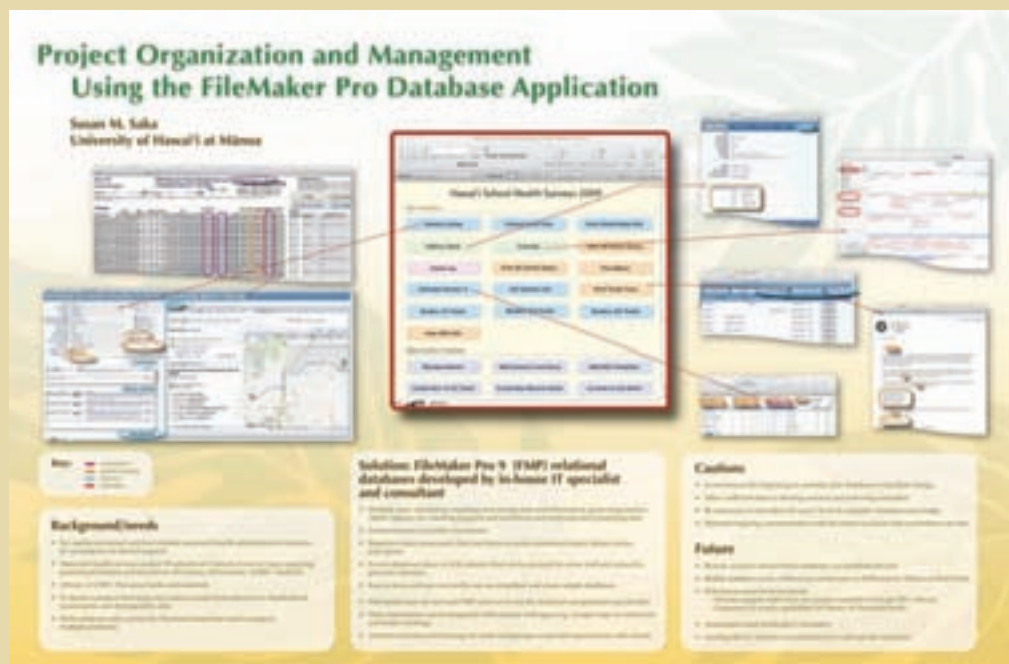
Lai is also a member of the Native Hawaiian Education Council (NHEC), a group that is working to develop indicators for measuring the work done with grants made under the Native Hawaiian Education Act that are culturally and linguistically aligned with the community the grants are meant to serve. In line with these goals, Lai



focuses on approaches to evaluation that honor and respect the world views of the target community and on evaluator-program relationships that encompass respect, trust, honor, and responsibility, all essential elements when considering culturally appropriate evaluations in Native Hawaiian and other indigenous communities.

Terry Higa's work evaluating state- or federally-funded programs in Hawai'i Department of Education schools is based on this same concept of relationships as a key component that determines the success of the project. Her approach, based on the practical participatory evaluation method developed by Brad Cousins at the University of Ottawa, involves project staff in the project evaluation, including, if possible, the initial design. Higa sees her role as a bridge between the project and the funding agency, with her job being to design an evaluation with methods that project staff will understand and use, and that will provide funding agencies with the data they need. Regular contact with project staff helps to develop evaluation capacity in the project by continually increasing the project staff's understanding about the links between the funding agency evaluation requirements, evaluation design, required evaluation data, and quality controls that are in place for the evaluation data. Higa reports that schools have expressed appreciation for this approach because it offers a cost-effective and highly useful evaluation while still respecting their communities and ways of doing things.

Susan Saka strives for this same level of partnership while working with large numbers of teachers and students. Drawing on her years of experience conducting the Hawai'i Youth Risk Behavior Surveys and the Hawai'i Youth Tobacco Survey for the Hawai'i Departments of Education and Health as part of a larger locally coordinated effort funded by the Hawai'i Department of Health and the Centers for Disease Control and Prevention (CDC), she has a long list of lessons learned that all come down to building strong relationships. In order to collect her data, buy-in from the teachers who have to make time in their classes is essential, especially as the focus on testing has taken so much of their time. She incorporates a combination of cultural aspects, personal incentives, and education about the value of the data to get that buy-in. She also makes it as easy as she can for teachers by being very organized, thanks to a FileMaker Pro database created for her projects by CRDG's Derrick Okihara. Saka's poster session at this year's American Evaluation Association Annual Conference in Orlando, Florida highlighted that database, showing how it manages scheduling; stores data and information; generates memos, labels, and forms; tracks progress; analyzes data; and generates reports for a project involving 52 schools, over 500 teachers, and 10,000 students.



Susan Saka presented this poster detailing the collaboration between evaluation and information technology staff that made data collection more efficient and easier for teachers.



# Classroom Makery Enhancing Students' Interest in STEM



*The Makery team created this aircraft simulator using a 54-inch model of a P-40 fighter aircraft for the Pacific Aviation Museum's "barnstorming tour" outreach program for sixth grade.*

In the latest stage in an ongoing process, Neil Scott and his team expanded their Makery project into three charter schools on Hawai'i Island where students and teachers have begun to work in a Makery Cloud.

The Makery concept grew out of a previous National Science Foundation-funded project called the Invention Factory, which found, among other things, that the lack of hands-on and interactive activities within the current curriculum severely hindered students' interest in STEM careers. As a way of addressing this need, the team created the Classroom Makery to provide students and teachers with the resources to design, set up, program, and use computer numerically controlled (CNC) machines to create practical solutions for real problems.

The next step was to apply the concept of cloud computing to allow schools to share expertise and equipment. Students and teachers at one school get experience with using a CNC machine at another school by controlling it over the Internet. A proof-of-concept grant from the NSF this year allowed them to work with three Hawai'i Island charter schools—the Hawai'i Academy of Arts and Sciences in Pāhoa, Connections Public Charter School in Hilo, and West Hawai'i Explorations Academy in Kailua-Kona—and to partner with the UHM College of Tropical Agricultural and Human Resources to run the program in a community setting in Kona.

The project uses a "just-in-time-learning" approach. As students discover a need, the resources are there for them to learn what they need to know to meet that need. The project is based on partnerships rather than mentorships, working with teachers as they use the machines in order to build their confidence and skill levels. At the same time, the project staff is learning from teachers how to better present the process in future teacher sessions. Along those same lines, the team is preparing this group of schools to be a resource for when they bring more schools on board.

"In the Invention Factory we worked directly with students," says Scott. "Now we are enveloping the Invention Factory curriculum into the Makery project as a resource for teachers."

*A Hawaiian steel guitar is one of the most popular projects students have created with the Makery. The Hawai'i Department of Business, Economic Development & Tourism commissioned the Makery team to build and present a steel guitar to Ziggy Marley when he performed on O'ahu in June. (photo by Michael Thornton)*



## Long-time Relationships Support Education for Military Children

With their families' frequent relocations in service to our country, military-dependent children often attend as many as nine different schools from kindergarten to twelfth grade. The problems they encounter with enrollment, eligibility, placement, and graduation have long been a concern of military families and the organizations that support them. CRDG associate director Kathleen Berg, as a former military dependent herself and a thirty-one year veteran of the Hawaii Air National Guard, has brought a level of insight into both the military and educational aspects of these issues in her partnerships with the Hawai'i Department of Education, the U.S. Pacific Command, the Department of Defense Education Activity (DoDEA), the Joint Venture Education Forum (JVEF), and other groups. This year Hawai'i became one of twenty-seven states to join the Interstate Compact on Educational Opportunity for Military Children, which provides for the uniform treatment of military children transferring between school districts and states, and Berg was appointed by the state Board of Education as the first Hawai'i state commissioner. As commissioner, Berg represents Hawai'i and, with the Interstate Compact State Council, facilitates implementation of the compact within Hawai'i public schools. Berg was elected vice chair of the national commission at their November meeting.

Berg has also brought the talents of CRDG to bear on issues involving education for military children through her longtime membership in the Joint Venture Education Forum, a cooperative venture between the military community and the Hawai'i Department of Education in pursuit of quality public schools. Following a CRDG-led 2006 survey on education for military families in Hawai'i, which involved the JVEF and Johns Hopkins University, this year she joined Johns Hopkins researchers in the first year of their longitudinal study of military families. Formerly a member of the JVEF Board of Directors, Berg serves as the co-chair of the JVEF Information and Communications Strategy Group and served as a host for the 2009 JVEF annual meeting in August.

CRDG's long-time relationship with DoDEA, the agency that operates schools for military dependents all over the world, dates back to 2002 with the School Assisted Interactive Learning (SAIL) and School Safety projects. The collaboration continued this year with mathematics education specialist Linda Venenciano's and Berg's invitation to participate in the DoDEA Virtual School Working Group in Utah. In addition, Dr. Marc Mossburg, Chief of Curriculum for DoDEA, served on the Advisory Board of CRDG's Standards Streamlining Project (SSP), while Jean Grice, the DoDEA representative to the U.S. Pacific Command, located in Hawai'i, was a regular participant in SSP project meetings. CRDG hosted Mossburg in May and DoDEA Director Dr. Shirley Miles in December. Standards-based education and teacher professional development are two major areas where CRDG has found networking and collaboration with DoDEA to be invaluable.



While we at CRDG know her as an education researcher and our associate director, Kathleen Berg wrapped up a distinguished career as a traditional member in the Hawai'i Air National Guard (HIANG) in April 2009 when she retired at the rank of brigadier general after 31 years of service. Berg received her commission as a distinguished graduate of the Air National Guard Academy of Military Science in 1977. She served for seven years as the Commander of the 293<sup>rd</sup> Combat Communications Squadron at Hickam AFB, Hawai'i. From 2000 to 2006, she held various positions at HQ HIANG, including Director of Communications and Information and Chief of Staff. Most recently, she served as Mobilization Assistant to the Director, J6, United States Pacific Command (PACOM) at Camp H. M. Smith, Hawai'i.



# STEM Focus Benefits Teachers and Students in Mathematics



*Classroom observations, modeling of effective practices, and strengthening of teachers' content knowledge are all part of the extensive professional development work CRDG's mathematics faculty provides to teachers throughout Hawai'i.*

## *Lesson Study Approach Brings New Insights to Teachers*

A request from the principal of Stevenson Middle School to expand on previous professional development work CRDG had conducted at his school has resulted in another partnership funded by the HDOE Math Science Partnership program. The project, conducted by CRDG's Hannah Slovin and Melfried Olson, goes beyond the whole-school approach to involve all of the mathematics teachers at the middle school plus teachers at two of its feeder elementary schools.

The project, now in its second year, uses a professional development approach known as lesson study, a model first developed in Japan, that guides teachers in planning lessons with a focus on students and their understanding of a lesson. From a teacher's point of view, this is a very different approach from looking at a lesson primarily in terms of what the teacher does to teach the mathematics. In lesson study, a group of teachers collaborate to plan a "research lesson" that becomes the basis for inquiry about their practice.

In creating a lesson, teachers use a planning framework that guides them in formulating specific goals, anticipating student responses including misunderstandings, preparing strategies for addressing student reactions, and formatively assessing learning. This process encourages teachers to continually ask, "why am I doing this—what am I expecting students to do as a consequence of this?" One teacher from the group teaches the new lesson as the others observe, focusing on students' learning, engagement, and reactions to the lesson activities. The group then discusses and revises the lesson for others to teach based on the observations. Thus, the lesson-study process enables teachers to reflect on teaching and learning and the connections between them. Slovin commented that "this approach works well with CRDG's philosophy of teaching and learning because we are not merely teaching teachers about an inquiry approach to learning, but giving them opportunities to use it in their own learning."

## *Combining Learning with Teaching in Algebra Classrooms*

Building on CRDG's many years of research, teaching, and professional development work in algebra, Mike Gilbert is taking the opportunity of revising CRDG's algebra curriculum materials to expand into new areas of research that focus on measuring and improving teachers' content knowledge for teaching mathematics. While many studies say that teachers need to continually learn mathematics content, few programs provide teacher support materials that allow teachers to learn as they teach. Gilbert is involved in two projects in Hawai'i schools that both use this approach.

The Designing Algebra Resources for Teaching (DART) project works with thirty teachers from Moanalua, Mililani, and Washington middle schools. Monthly full-day professional development sessions model mathematical tasks the teachers might use in their classrooms, demonstrating multiple entry points for problems and solutions that may be algebraic, graphical, numeric, visual, and contextual.

As Gilbert puts it, "We do the math then unpack the math, tying it back to teaching practice." Following these discussions, teachers work in groups using the lesson study model to create new lessons.

The College Algebra Readiness for Every Student (CARES) project also uses an educative curriculum approach in working with high school students and their teachers. The goal of the project, which is working with teachers and students in three Hawai'i high schools, is to prepare every student to enter college ready to take credit-bearing courses in



mathematics. In addition to direct interventions such as providing students with access to online placement tests, the project works with teachers to increase their content knowledge for teaching.

### Research Serves Schools in the Community

The story of the *Measure Up* project demonstrates how CRDG's research touches the community and has a direct impact on schools and students in Hawai'i. Based on a program created in Russia, the *Measure Up* project started in 2001 when mathematics researchers at CRDG began adapting the translated materials for a contemporary audience and researching its development of algebraic thinking in children as young as first grade. *Measure Up's* unique approach to learning mathematics not only includes reading, writing, speaking, and critical thinking, but also stresses multiple representations and connectivity.

In 2004, the CRDG mathematics faculty was tapped by the Hawai'i Department of Education to do a series of professional development sessions for all the schools in the Honolulu District, and much of what they did in these sessions came out of the research they were doing in *Measure Up*. These sessions resulted in a number of ongoing relationships that have led to a robust program of professional development for HIDOE teachers.

In the summer of 2009, CRDG's Maria DaSilva and a teacher from Kapālama Elementary School team-taught a two-week summer class for students based on the *Measure Up* curriculum, while CRDG's Claire Okazaki and Fay Zenigami taught a course for teachers. This course included *Measure Up* early grades mathematics content and incorporated observations of learning in the *Measure Up* class being taught to the Kapālama students.

The success of this approach resulted in yet another request from Kapālama that led Melfried Olson to apply for federal funds through the HIDOE Math Science Partnership program. The Kapālama Algebra Readiness in the Elementary School (KARES), a three-year project for the entire faculty of Kapālama Elementary School, is intended to improve teacher content knowledge in mathematics and the process standards.

In addition to serving in-service teachers directly through professional development that brings the latest research into their classrooms, the *Measure Up* project also helps preservice teachers understand how research impacts student learning. Students in the Math 112 classes at UH Mānoa, a required course for all applicants to the College of Education, are now a familiar sight in the *Measure Up* elementary classrooms at ULS. What began as an informal arrangement when UHM mathematics professor Joel Weiner learned about

Another outcome of the *Measure Up* research is the publication this year of *A Unit Story: Dr. Pill's Amazing Vitamin* in print and DVD versions. This fanciful tale about a town of shrimp citizens and their problem-solving doctors helps students develop a conceptual understanding of the number line. Since many elementary textbook series present the number line as a "given," this storybook is a unique resource on the construction of a number line that can be used to supplement any elementary mathematics curriculum.



Students and teachers at Kapālama Elementary School are engaged in a whole-school program to improve mathematics understanding.



Students from Kapālama Elementary School benefit from the research done in the Measure Up program.

Measure Up and wanted his students to see the parallels between what they were learning and how math was being taught to these young children, has grown into a more formal arrangement wherein all Math 112 students are required to visit a Measure Up classroom. It is clear that the visits are an “eye opener,” as one student put it, when we see some of their comments:

- ∞ I believe the most interesting thing about my visit was seeing how enthused the children were. It seemed as if every student was motivated to learn.
- ∞ I was surprised to see how capable these students were in learning what seemed “advanced” to me. I was shocked when I first heard one of the students using the word supplement. I questioned if they actually knew what that meant, but after much observation it was clear that they did.
- ∞ I think the Measure Up program is very similar to our Math 112 class in that we are learning to explain and think about math concepts. It was interesting to see an elementary program so similar to a college program.

### NSF, TI Continue to Support Mathematics Work

An ongoing relationship with Texas Instruments (TI) became formalized when CRDG’s Judy Olson, Melfried Olson, and Hannah Slovin received funding from the National Science Foundation (NSF) to investigate the use of formative assessment practices in mathematics to determine if networked calculator technology created by TI has a positive effect on student achievement. The Formative Assessment in a Networked Classroom (FANC) project, in its third year, involves thirty-one teachers in fifteen middle schools in Hawai’i with a specific focus on algebraic concepts, the use of formative assessment, and the use of the TI-Navigator system and TI 73 calculators in networked classrooms.

The TI-Navigator system allows the teacher to view every student’s progress on the calculator in real time. There are many advantages to this system as a formative assessment tool: information can be transferred between the teacher’s computer and students’ calculators instantly, students’ work can be assessed and displayed for classroom discussion, and teachers can pre-store formative assessment questions and send them to students at the appropriate moment.

FANC research questions address students’ growth in achievement, teacher and student opinions and attitudes, and teachers’ effectiveness in implementing formative assessment and the TI-Navigator system. This is a departure from the bulk of the research on technology systems that focuses primarily on the technology, and much less on the formative assessment strategies it allows to go on in the classroom.

As the FANC project was ending, Melfied Olson applied for and received funding from the HIDOE’s Math Science Partnership program to continue working with teachers at Kalākaua Elementary School. The new project, which leverages the four TI-Navigator-equipped classrooms provided by the FANC project, provides professional development to all mathematics, special education, and English language learner teachers over a full school year.

A second NSF-funded project that was completed this year studied the role of gender in language used by parents and children working on mathematical tasks. Funded by the NSF’s Gender in Science and Engineering program, the three-year study investigated gender-related differences in language and actions of one hundred third- and fourth-grade child-parent dyads working on mathematical tasks, asking to what extent gender-related differences informed children’s self-efficacy in mathematics and parents’ competence beliefs for their children’s success in mathematics.



The TI-Navigator system allows formative assessment to go on in this networked classroom at ULS.

# Marine Science Partnerships Continue Growth and Collaboration

The marine science education efforts of CRDG's Kanesa Duncan continued to expand this year through collaborations with the University of Hawai'i Sea Grant College Program, the Hawai'i Institute of Marine Biology (HIMB), Maui Community College (MCC), and others. In her first full year as director of the Center of Excellence for Marine Science Education, one of four centers of excellence established by the UH Sea Grant College Program, Duncan coordinated two programs for the biennial School of Ocean and Earth Science and Technology (SOEST) Open House. The Ocean Literacy Poster Contest, sponsored by Maui Jim Sunglasses, encouraged teachers and students in grades K-8 to get involved not only in learning about the value of the ocean to all of us, but also in communicating that message to others. The other activity highlighted the center's work with Sea Grant research assistants, all of whom participate in a CRDG-facilitated training that helps them develop outreach programs to share cutting-edge marine science research with K-12 students and teachers and with the community.



Another major thrust of the center's work is providing in-service professional development for teachers in marine science, and this year three new courses were developed.

In partnership with Judy Lemus of HIMB and College of Education doctoral student Kaleo Veary, Duncan adapted a course on communicating ocean sciences developed at the Center of Ocean Science Education Excellence (COSEE) in California for Hawai'i, incorporating material on both the local environment and traditional knowledge. Duncan, Lemus, and Veary co-taught the course for graduate students in SOEST in the fall of 2009 and have worked with faculty at Maui Community College to create an undergraduate course to be

taught in 2010.

The two other courses are part of CRDG's Teaching Science as Inquiry (TSI) series. A new TSI course on physical oceanography was piloted this summer as part of the program to provide practicing elementary, middle, and high school science and mathematics teachers with opportunities to increase their knowledge and understanding of recent developments in science, technology, engineering, and mathematics funded by the Hawai'i legislature. It will eventually become part of the comprehensive marine science educator course that is the focus of an upcoming three-year project.

The other new TSI course was a collaboration with the Maui Economic Development Board (MEDB) that focused on energy sustainability. The jam-packed course combined



science, ecology, and social science as teachers learned what energy is, and how utilities produce, store, and distribute energy in our communities. A new grant will allow Duncan to modify the course for other islands and teach courses on O'ahu, Hawai'i, and Kaua'i in 2010.

*Students create miniature "healthy ocean environments" (left) and display a finished product (above) at the SOEST Open House.*



The love of the ocean that Kanesa Duncan brings to her work is evident in her personal time as well, where she is the seven-time winner and women's record holder of the Moloka'i Challenge, a Moloka'i to O'ahu paddleboard race. Sponsored by Rainbow Sandals and Maui Jim sunglasses, the Moloka'i Challenge is what is known as unlimited traditional style paddleboard. This style involves laying on very large boards that are designed to catch open ocean waves. "I get to combine a lot of what I do for work with what I do for pleasure, as I educate people about the marine environment," Duncan said. She started paddleboarding nine years ago, and entered the Moloka'i Challenge from her first year. She says paddleboarding is a "wonderful combination of swimming and surfing out in the open ocean. There are days when the water and the sky are so beautiful, it just makes you happy."





# NSF Program Brings Graduate Students into Hawai'i Schools



Teachers study the behavior of waves as part of a marine science educators' workshop.

CRDG's 10-year partnership with the University of Hawai'i's interdisciplinary Ecology, Evolution, and Conservation Biology (EECB) program in the National Science Foundation's Graduate Teaching Fellows in K-12 Education (GK-12) program came to an end this year just as CRDG's Linda Venenciano began work on another GK-12 collaboration, this one with UH Mānoa's Department of Mathematics.

The GK-12 program is designed to create partnerships among graduate students in science and mathematics and classroom teachers and their students. The partnerships serve to bring original research into K-12 environments in engaging and meaningful ways while providing the fellows with valuable teaching experience. Among NSF's primary goals is that fellows learn how to communicate their research to the general public and connect to a lifetime of service to education. Graduate fellows and classroom teachers in the Hawai'i public school system are partnered to engage in a unique collaborative experience that allows students to see and experience research first-hand. In both of these projects, CRDG brought its expertise in education and its experience working directly with K-12 schools to the partnership.



The collaboration with the Ecology, Evolution, and Conservation Biology program has left a legacy that promises continuing interaction between fellows and K-12 schools. The OPIHI (Our project in Hawai'i's intertidal) project, initiated by a GK-12 fellow working with the ninth grade class at ULS, is now in its seventh year as one of the few ongoing conservation and monitoring efforts in Hawai'i's intertidal zone, and it continues to grow and expand. The EECB GK-12 faculty and fellows also produced two articles this year that highlight the many innovative ways the fellows were able to bring cutting-edge science into classrooms. CRDG's Kanesa Duncan and GK-12 fellow Kimberly Tice, who went on to become a marine science educator at the brand new Center for Microbial Oceanography: Research and Education (C-MORE) at UHM and is now a biologist with the National Park Service at Kalaupapa on Moloka'i, published "The Case of the Sick Coral," a series of inquiry lessons that guide high school students in developing and testing hypotheses about the susceptibility of corals to bleaching, in *Current, The Journal of Marine Education*. The second publication, "Sorting out Sediment Grain Size in Sand," which presents a series of three lessons on density, published in *Oceanography*, was a collaboration between Duncan, GK-12 fellow Heather Spalding, and UH Sea Grant coastal geologist Zoe Norcross-Nu'u.



Teachers in the SUPER-M GK-12 program work with fellows to bring current research in mathematics into their classroom

The newly funded, five-year, GK-12 project in the UH Mānoa Department of Mathematics, known as School and University Partnership for Educational Renewal in Mathematics (SUPER-M), began in 2009 with six fellows working on three islands in schools that include elementary, middle, and high schools and public as well as Hawaiian culture-based charter schools. CRDG's Linda Venenciano brings her background as a classroom teacher, curriculum developer, and longtime teacher trainer to the project and serves as a bridge between the university and the K-12 schools in her role as program manager. The project's objectives include contributing to the formation of highly qualified teachers; providing students, especially in under-represented groups, with an enriching learning environment where mathematics is interesting and dynamic and that provides a solid grounding in mathematics, thereby increasing their opportunities to pursue careers in STEM disciplines; and providing fellows with a better understanding of the K-12 education system and how they can positively impact it.

## Early Childhood Education Curriculum Revisits Inquiry Theory

In 1966, Arthur R. King, Jr. and John A. Brownell articulated a theory of curriculum practice founded on the idea that the basis for liberal and general education should be a community of learners engaging in inquiry. King was given the opportunity to test this hypothesis when he became the founding director of CRDG, and over forty years later, the idea of inquiry practiced among a community of learners is still the foundation upon which CRDG's curricula are built. The extension of the inquiry framework into pre-K in the new early childhood project gave the science team of Frank Pottenger and Carol Brennan, who helped create the elementary curriculum *Developmental Approaches in Science, Health and Technology (DASH)*, the opportunity to apply their many years of experience in learning how inquiry actually works classrooms and extend this knowledge into the development of a curriculum for even younger children.

Pottenger is engaged in developing a deeper understanding of the theory of inquiry. As a basic introduction, he writes that “inquiry is a cognitive survival mechanism of our species, the mechanism by which we humans know and make sense of our surroundings. Inquiry begins with needs, questions, or problems and ends with products that attempt to provide satisfaction, answers, or solutions.” His hierarchy of inquiry describes multiple modes of inquiry beginning the most fundamental—curiosity—and moving through increasingly complex modes to culminate in the experimental and theoretical.

Brennan is collaborating with teachers Yukyong Hwang and Jeffrey Bock and director Wayne Watkins at the University of Hawai'i at Mānoa Children's Center (UHMCC) and with teachers Jolynn Komada, Maki Hohnstein, Shane Joyce, and Courtney Brown and principal Sheri Gulledge at the Navy Hale Keiki School (NHKS) to study potential elements for an inquiry-based curriculum that addresses the developmental stages of three- and four-year-olds.

Brennan is developing an activity modeled on the DASH Learning Calendar. Contributions and feedback from the UHMCC and NHKS teachers drive the modifications that allow it to be used with young students. The learning calendar concept promotes learning in several areas including language and literacy and developing the concept of time. Another inquiry learning strategy being investigated is the use of concept mapping with young children. Using the existing research on forms of and uses for concept maps, and drawing on her extensive experience both as curriculum developer and teacher as well as her dissertation research on the use of concept maps in the *DASH* program, Brennan has worked together with teachers to develop and implement concept mapping techniques with pre-K children. Concept maps are used to assess students' prior knowledge of a topic; summarize, organize, and assess ongoing learning about a topic; and assess and record class knowledge of a topic. Teachers lay a foundation of pre-mapping skills such as sorting, classifying, patterning, and sequencing, before introducing concept maps. Children are initially engaged in the creation of maps using concrete objects such as the map of musical instruments created by Yukyong Hwang's class at UHMCC. Photographs and pictures are used extensively as the children transition to more abstract maps, culminating with an almost traditional version of a concept map on paper as illustrated by Hwang's class concept maps about composting. To enhance literacy development, teachers, and children as they are able, add words to the concept maps. Jeffrey Bock of UHMCC invented a technique using the connecting lines on a map to record students' reasons and ideas about item placement into particular categories. “The evidence of inquiry skill and language development in these young learners is just astounding,” reports Brennan.



Preschool children at the University of Hawai'i at Mānoa Children's Center create a concept map to summarize and organize what they already know about a topic.

## Asia-Pacific Region Still a Strong Focus



### *Pacific Circle Consortium*

As a founding member of the Pacific Circle Consortium (PCC), CRDG has had a long-standing commitment to education in and about the Asia-Pacific region. This year CRDG helped improve communication within the PCC and helped them gain an online presence with the development and hosting of a new PCC website. The Pacific Circle Consortium was established in 1977 as an initiative in international co-operation among educational research and development institutions in the Pacific Region and now draws members from Australia, New Zealand, several Pacific Islands, China, Hong Kong, Japan, South Korea, Malaysia, Taiwan, Thailand, Sri Lanka, several states of the United States, Vietnam, Canada, Latvia, and Mexico. Conference attendees have also come from Europe, the United Kingdom, Russia, Nepal, and Ecuador. The 2009 conference was held in Taipei, Taiwan, and included presentations by five CRDG faculty members.



*CRDG's long-time commitment as a founding member of the Pacific Circle Consortium continued with a delegation's attendance at the 33rd annual conference in Taipei, Taiwan.*



### *Strengthening Teacher Education for Chinese Language*

CRDG director Donald Young is working with School of Pacific and Asian Studies Dean Ned Schultz in collaboration with the University of Hawai'i's Center for Chinese Studies (CCS) and the Confucius Institute on the Chinese Language Teacher Education program (CLTE). Funded by the Freeman Foundation, CLTE is specifically designed to increase demand and provide qualified teachers to teach Chinese language in Hawai'i and beyond. It brings together expertise from the College of Education, the School of Pacific and Asian Studies, the Center for Chinese Studies with its Confucius Institute, and the Departments of East Asian Languages & Literature and Second Language Studies. CLTE recruits and provides support for a non-licensure certificate program as well as a post-baccalaureate certificate program that prepares teachers for a Hawai'i teaching license. The grant also supported a series of six workshops in the fall of 2009 for pre- and in-service Chinese language teachers. The series offered advanced training in a range of specific topics to further develop effective teaching skills in Chinese language.

### Modern East Asia Instructional Materials

CRDG's Linda Menton and Noren Lush completed the writing of instructional materials on modern East Asia that focuses on China (including Hong Kong and Taiwan), North and South Korea, and Japan as a region in the modern world. Funded by the U.S. Department of Education, *East Asia Since 1945* will be the latest in CRDG's series of high school texts on Asia and the Pacific. Other titles in the Asia series include *China: Understanding Its Past* and *The Rise of Modern Japan*, both award-winning high school social studies texts that are activity-oriented and enhance students' understanding of the history and culture of the region through maps and timelines, archival photographs, literary excerpts, first-person accounts, diary entries, songs and poems, charts and graphs, and political cartoons. This series, which responds to a particularly acute need in high school social studies, carries on a long tradition in CRDG of producing curriculum materials that address the Asia and Pacific regions and their diverse cultures.



### CRDG Partners with JABSOM to Expand Science in the Pacific

CRDG became a partner with the John A. Burns School of Medicine (JABSOM) this year on the Pacific Education and Research for Leadership in Science (PEARLS) project, which seeks to help middle school students in Hawai'i and the Pacific region learn more about scientific inquiry and the kinds of careers available to them in science and technology. The five-year project will train a cadre of teachers in the use of CRDG's award-winning *Foundational Approaches in Science Teaching (FAST)* middle school science program. *FAST* covers the full three-year middle school span with inquiry-based investigations that teach foundational concepts of physical, biological, and earth sciences, providing a strong foundation for students to succeed in high school and post-secondary science courses. CRDG's marine science curriculum for ninth grade will complete a four-year program of science for schools and districts participating in the program.

The PEARLS project worked with their initial group of twenty teachers from Hawai'i, Yap, Phonpei, and American Sāmoa in its first year. Teachers came to O'ahu in the summer for the initial training institute, and follow-up has been carried out both in person through site visits by CRDG staff and through monthly meeting via Skype.

A new group of teachers will be added each year of the five-year project.

*Teachers in Phonpei learn inquiry strategies for teaching science, then take them back to their own classrooms.*





# Computer Literacy and Computer Safety Go Hand-in-hand



*Computer literacy for today's students goes well beyond learning to use hardware and software. Students at ULS participate in the research that will inform future efforts.*

In 2004, CRDG's Truc Nguyen began work on a computer literacy curriculum that was no longer just about programming, but about the effective, efficient, and responsible use of software as well as behaviors online. In addition to technology skills, she wanted to incorporate internet safety and ethics. The result is a computer literacy and ethics curriculum that was piloted at ULS in 2004 and, in partnership with the ULS teachers and students, has undergone five years of revision and refinement. The course develops W.I.S.E. (Web and Internet Safe Educated) kids and has attracted the attention of both the Hawai'i Department of Education and the Hawai'i attorney general's office.

The soon-to-be finished curriculum addresses such topics as information validity, internet safety, online fights, plagiarism, sexual predators, and copyright infringement. The five years of input from the students and teachers at ULS have been critical to the development of the instructional materials since the perspectives of thirteen- through seventeen- years-olds are, and will continue to be, central in refining discussions surrounding the ethical dilemmas children face. Nguyen is currently developing a teacher-training course in preparation for a scale-up to HODOE schools in the fall of 2011. The course is designed, in part, to meet the No Child Left Behind requirement that all students be computer literate by the end of eighth grade, a goal that all HODOE schools are also striving to meet.

Nguyen's curriculum development led, this year, to a grant from the U.S. Department of Justice (DOJ). The collaboration, begun in the fall of 2009, funds baseline data collection about the habits and patterns of internet media usage by juveniles so that law enforcement can better prepare themselves for prevention of crimes. During her research and development work with the ULS students, Nguyen began to see large gaps of understanding among the students, their parents, and even the teachers. A research study of the ULS community revealed some significant divides in beliefs about the computer's role in educational and social settings. For the DOJ study, Nguyen is using the questionnaires developed in that smaller study and scaling those instruments up to distribute to over 30,000 students, parents, and teachers across four states.

Another partnership that came out of her curriculum development work is a project with Infragard Hawaii, the FBI, and the Internet Crimes Against Children Task Force to develop community outreach materials for adult learners. Nguyen is reviewing the materials, which are meant to provide parents and community members with more knowledge and skills to help children stay safe online. With her colleagues, Nguyen is looking to present the statistics and some appalling stories of online crimes against children in a way that promotes critical thinking from the standpoint of Bloom's taxonomy and Gagne's nine stages of adult learning. As Nguyen put it, "We want to help people to learn, not just scare them!"



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- Higa, T. F. (2009). *An internal evaluation report about the Pihana Nā Mamo project in 2007–2008*. Honolulu: Curriculum Research & Development Group.
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- Lawton, B. E., & Brandon, P. R. (2009). *Evaluation of the second year of the Arts and Literacy for All research project*. Honolulu: Curriculum Research & Development Group.
- Nakamura, A. D. H., Sagaysay, L., Oshiro, E. M., & Higa, T. F. (2009). *The Campbell complex's 21st Century Community Learning Center project*. Honolulu: Curriculum Research & Development Group.
- Nakamura, A. D. H., Sagaysay, L., Oshiro, E. M., Higa, T. F. (2009). *The Central Kauai complex's 21st Century Community Learning Center project*. Honolulu: Curriculum Research & Development Group.
- Nakamura, A. D. H., Sagaysay, L., Oshiro, E. M., Higa, T. F. (2009). *The Hana complex's 21st Century Community Learning Center project*. Honolulu: Curriculum Research & Development Group.
- Nakamura, A. D. H., Sagaysay, L., Oshiro, E. M., Higa, T. F. (2009). *The Kabuku complex's 21st Century Community Learning Center project*. Honolulu: Curriculum Research & Development Group.
- Nakamura, A. D. H., Sagaysay, L., Oshiro, E. M., Higa, T. F. (2009). *The Kekaulike complex's 21st Century Community Learning Center project*. Honolulu: Curriculum Research & Development Group.
- Olson, M., Olson, J., & Slovin, H. (2009). *The effects of formative assessment in a networked classroom on student learning of algebraic concepts*. Honolulu: Curriculum Research & Development Group.
- Olson, M., Okazaki, C., Olson, J., La, T., Sova, J. (2009). Parents' reactions before and after interacting with their children on mathematics tasks. *Proceedings of the 7th Annual Hawai'i International Conference on Education* (pp. 4413–4424).
- Olson, M., Slovin, H., and Zenigami, F. (2009). The importance of using models for solving worded fraction problems. *Proceedings of the 7th Annual Hawai'i International Conference on Education* (pp. 5190–5206).
- Sorensen, C., & Young, D. B. (2009, February 1). Education in need of strong leaders. *Honolulu Advertiser*, pp. B2, B4.
- Young, D. B. (2009, November 1). Building upon standards-based progress. *Honolulu Advertiser*, pp. B1, B4.
- Zenigami, F., Okazaki, C., & Olson, M. (2009). An examination of students' understanding of equality through a measurement context. *Proceedings of the 7th Annual Hawai'i International Conference on Education* (pp. 3806–3820).

## Grants and Contracts

- Berg, K. Hawai'i Quality of Life Survey: A Study of Military Families on Tour in Hawai'i. Johns Hopkins University Bloomberg School of Public Health. \$35,984. 2009–2012.
- Berg, K. No Child Left Behind—Meeting Science Standards. U.S. Department of Education. \$112,482. 2008–2009.
- Brandon, P. R. Evaluation of the Arts and Literacy for All Project. Hawai'i Alliance for Arts Education. \$330,000. 2006–2010.
- Brandon, P. R. Mathematics and Culture in Micronesia: Integrating Societal Experiences. Pacific Resources for Education and Learning. \$230,000. 2009–2014.
- Brandon, P. R. Arts First Evaluation. Hawai'i State Foundation on Culture and Arts. \$30,000. 2008–2009.
- Duncan, K. Bishop Museum Service Agreement. Bishop Museum. \$18,157. 2007–2009.
- Duncan, K. Island Energy. U. S. Department of Education. \$53,388. 2009–2010.
- Duncan, K. UH Sea Grant Center for Marine Science Education. National Oceanic and Atmospheric Administration (via UH Sea Grant Program). \$150,000. 2009
- Gilbert, M. Designing Algebra Resources for Teaching. Hawai'i Department of Education. \$150,000. 2009–2010.
- Gilbert, M. College Algebra Readiness for Every Student. Hawai'i Department of Education. \$85,857. 2009–2012.
- Higa, T. F. An Evaluation of the Campbell Complex's 21st Century Community Learning Centers in 2008–2009. Hawai'i Department of Education. \$83,000. 2007–2008.
- Higa, T. F. An Evaluation of the Kekaulike Complex's 21st Century Community Learning Centers 2008–2009. Hawai'i Department of Education. \$67,492. 2008–2010.
- Higa, T. F. An Evaluation of the West Kauai Complex's NCLB Consolidated Grant in 2008–2009. Hawai'i Department of Education. \$80,000. 2006–2009.
- Higa, T. F. An Evaluation of the Central Kauai Complex's NCLB Consolidated Grant in 2008–2009. Hawai'i Department of Education. \$30,000. 2008–2009.
- Higa, T. F. Evaluation of Integrated Training in Ecology, Conservation, and Biology. National Science Foundation. \$64,800. 2007–2009.
- Higa, T. F. An Evaluation of the Hana Complex's 21st Century Community Learning Centers in 2007–2008. Hawai'i Department of Education. \$62,000. 2006–2009.
- Higa, T. F. An Evaluation of the Hana Complex's 21st Century Community Learning Centers in 2008–2009. Hawai'i Department of Education. \$50,000. 2007–2009.
- Higa, T. F. An Evaluation of the Kahuku Complex's 21st Century

- Community Learning Centers in 2008–2009. Hawai'i Department of Education. \$58,000. 2008–2009.
- Higa, T. F. Hawai'i Demonstration to Maintain Independence and Employment (HI-DMIE) Project Evaluation. Human Services, Dept-Med-Quest Div. \$10,550. 2009.
- Lai, M. K. Kāko'o Ikaika: Supporting Adolescent Hawaiian Students to Achieve High Standards. U.S. Department of Education. \$2,485,671. 2009–2012.
- Lai, M. K. Heluhelu Maoli: Building Strong Foundations in Reading and Mathematics. Johns Hopkins University Bloomberg School of Public Health. \$3,116,859. 2009–2012.
- Lai, M. K. Coordination of Evaluation of SPARK-Hawai'i. Institute of Native Pacific Education and Culture. \$25,000. 2007–2009.
- Lai, M. K. Ready Kids Follow-up. Institute of Native Pacific Education and Culture. \$36,700. 2009–2010.
- Lai, M. K. Pihana Nā Mamo: The Native Hawaiian Special Education Project. \$14,089,200. U.S. Department of Education. 2000–2009.
- Menton, L. Modern East Asian Curriculum Materials. U.S. Department of Education. \$455,589. 2004–2010.
- Nguyen, T. T. Multitmedia Juvenile Victimization: Insights into Youth Behavior to Help Law Enforcement. U.S. Department of Justice. \$435,689. 2009–2011.
- Olson, M. The Effects of Formative Assessment in a Networked Classroom on Student Learning of Algebraic Concepts. National Science Foundation. \$988,250. 2007–2010.
- Olson, M. Mathematics Professional Development. Hawai'i Department of Education. \$22,400. 2008–2010.
- Olson, M. Middle School Mathematics—Talk Communities. U.S. Department of Education. \$73,169. 2008–2009.
- Olson, M. Math LINC: Mathematics Learning and Instruction in a Networked Classroom U.S. Department of Education. \$89,808. 2009–2010.
- Olson, J. The Role of Gender in Language Used by Children and Parents Working on Mathematics Tasks. National Science Foundation. \$547,851. 2009–2010.
- Pottenger, F. M. Background Enrichment for Out-of-Field Teachers Assigned to Physics-Based Courses. U. S. Department of Education. \$47,783. 2009–2010.
- Pottenger, F. M. Background Enrichment for Technical Education Teachers Assigned to Physics-Based Courses. U. S. Department of Education. \$41,581. 2009–2010.
- Pottenger, F. M. Pacific Education and Research for Learning Science (PEARLS). U. S. Department of Health and Human Services-NIH. \$28,404. 2009–2010.
- Pottenger, F. M. Pacific Education and Research for Learning Science (PEARLS). U. S. Department of Health and Human Services-NIH. \$47,809. 2008–2009.
- Pottenger, F. M. Pacific Education and Research for Learning Science (PEARLS). U. S. Department of Health and Human Services-NIH. \$44,064. 2009–2011.
- Saka, S. M. Evaluation of TOTAL program, Year 01. Hawai'i Department of Education. \$98,400. 2007–2009.
- Saka, S. M. 2005 Hawai'i School Health Surveys. Hawai'i Department of Health. \$369,995. 2005–2009.
- Saka, S. M. Hawai'i Youth Survey. Hawai'i Department of Education. \$192,475. 2006–2010.
- Scott, N. EAGER: Makery Cloud. National Science Foundation. \$176,352. 2009–2010.
- Slovin, H. Measure Up Project. University of Hawai'i Foundation. \$4,500. 2007–2009.
- Slovin, H. Measure Up Project. University of Hawai'i Foundation. \$5,500. 2009–2010.
- Slovin, H. Mathematics Professional Development. Connections Public Charter School (CPCS), School Improvement Project. \$47,000. 2008–2009.
- Young, D. B. Standards Streamlining Project. Hawai'i Department of Education. \$1,212,807. 2008–2011.
- Young, D. B. The Education Laboratory School: A New Century Public Charter School. Hawai'i Department of Education. \$3,232,707. 2008–2009.
- Young, D. B. STEM Professional Development. Act 111, Hawai'i State Legislature. \$175,000. 2009.
- Young, D. B., & Duncan, K. D. The GK–12 Program in Hawai'i: A Model for Intergrating Research in K–12 Science Education. National Science Foundation. \$509,300. 2008–2009.

## Presentations

- Berg, K., Towata, C., Teixeira, T., Kitamura, D., Haberman, M., Williams, J., & Birkett, F. (2009, January). *A University Laboratory School experiment: Expanding the ULS School Success Program*. Presented at the 7th Annual Hawai'i International Conference on Education, Honolulu, HI.
- Berg, K. (2009, February). *University Laboratory School: The Education Laboratory: A Hawai'i New Century Public Charter School*. Presented at the 2009 Charter School Administrative Conference, Honolulu, HI.
- Berg, K., & Birkett, F. (2009, February). *The ULS School Success Program*. Presented at the 2009 Charter School Administrative Conference, Honolulu, HI.
- Berg, K. (2009, May). *The charter school as laboratory: An ongoing experiment in theory to practice*. Presented at the 2009 Pacific Circle Consortium Conference, Taipei, Taiwan.
- Brandon, P. R., & Lawton, B. (2009, April). *Evaluation of the final year of the ARTS FIRST Windward Research Project*. Presented at the 2008 AERA Division H poster display at the annual meeting of the American Educational Research Association, San Diego, CA.
- Brandon, P. R., & Lawton, B. (2009, April). *An empirical basis for interpreting effect sizes: Distributions of between-school effect sizes in seven grades*. Presented at the meeting of the American Educational Research Association, San Diego, CA.
- Brennan, C. A., Bock, J., & Hwang, Y. (2009, November). *Concept mapping with preschoolers: Using this strategy in multiple ways to promote, enhance, and record the developing learning, social, and literacy skills of young children*. Presented at the National Association for the Education of Young Children Annual Conference, Washington, D.C.
- Brennan, C. A. (2009, March). *The multiple dimensions of scientific inquiry in the preK–12 school setting*. Presented at the National Conference of the National Science Teachers' Association, New Orleans, LA.

- Brennan, C. A., & Davis, B. (2009, March). *The outdoor class study area: An integrated learning experience*. Presented at the National Conference of the National Science Teachers' Association, New Orleans, LA.
- Brennan, C. A. (2009, March). *Puppets, writing, and elementary science: A terrific trio*. Presented at the National Conference of the National Science Teachers' Association, New Orleans, LA.
- Brennan, C. A. (2009, August). *Using inquiry in elementary science education*. Presented at Aina Haina Elementary School, Honolulu, HI.
- Canada, D., & Gilbert, M. (2009, April). *The mystery mix: Using Fathom to encourage inferential reasoning*. Presented at the National Council of Teacher of Mathematics Annual Conference, Washington, D.C.
- Canada, D., & Gilbert, M. (2009, April). *Every data picture tells a story: Middle school teacher's informal inferences about data distributions*. Presented at the American Educational Research Association Annual Meeting, San Diego, CA.
- Canada, D., & Gilbert, M. (2009, April). *Distributional reasoning of middle school teachers in a sampling context*. Presented at the National Council of Teachers of Mathematics Research Presession, Washington, D.C.
- Duncan, K. (2009, March). *University of Hawai'i at Mānoa GK-12: A bridge to teaching science as inquiry?* Invited presentation to the symposium on integrating research and teaching at the National Science Foundation annual meeting of the Graduate K-12 program, Washington, D.C.
- Duncan, K. (2009, October). *Integrating marine science research in the classroom*. Presented at the Oceania Chapter of National Marine Educators Association Conference, Honolulu, HI.
- Duncan, K., Spalding, H., & Gupta, A., (2009, August). *Graduate K-12 Program: Integrating research with environmental education through student-scientist-teacher partnerships*. Presented at the Hawai'i Conservation Conference, Honolulu, HI.
- Duncan, K., Lemus, J. Cooper, P. Coopersmith, A., & Strang, C. (2009, July). *Hawai'i Collaboration with COSEE-CA*. Presented at the National Marine Educators Association Conference, Pacific Grove, CA.
- Duncan, K. (2009, July). *Connecting students with science and building literacy through ocean literacy*. Presented at the National Marine Educators Association Conference, Pacific Grove, CA.
- Duncan, K. (2009, February). *Connecting students with science and building literacy through ocean literacy*. Presented at the Hawai'i Educational Research Association Conference, Honolulu, HI.
- Dunn, H. (2009, April). *Data-substantiated Assertions About Effects and Aspects of Pihana Nā Mamo*. Presented at the American Educational Research Association Annual Meeting, San Diego, CA.
- Dunn-Rankin, P., & Hamilton, M. (2009, February). *A New Word Preference Inventory*. Presented at the Hawai'i Educational Research Association Conference, Honolulu, HI.
- Gilbert, M., & Canada, D. (2009, April). *Proportional reasoning conceptions and misconceptions of elementary preservice teachers*. Presented at the American Educational Research Association Annual Meeting, San Diego, CA.
- Gilbert, M., & Gilbert, B. (2009, April). *Communities of practice to press content knowledge for teaching mathematics*. Presented at the National Council of Supervisors of Mathematics Annual Conference, Washington, D.C.
- Lai, M. K. (2009, April). *Data-substantiated assertions about effects and aspects of Pihana Nā Mamo*. Presented at the American Educational Research Association Annual Meeting, San Diego, CA.
- Lai, M. K. (2009, May). *Personal reflections of using indigenous traditional cultural values as a teaching strategy in education*. Presented at the 33rd Pacific Circle Consortium Annual Conference, Taipei, Taiwan.
- Lai, M. K. (2009, February). *Statistical significance testing as widely practiced and published: An illogical procedure in educational research*. Presented at the annual conference of the Hawai'i Educational Research Association, Honolulu, HI.
- Lai, M. K. (2009, May). *Time to stop privileging the ways of cultural dominators*. Presented at the 33rd Pacific Circle Consortium Annual Conference, Taipei, Taiwan.
- Lai, M. K., Kawakami, A, Mertens, D. Symonette, H. L., & Wagner, D. (2009, November). *Contextualizing your inner evaluator: embracing other world views*. Presented at the American Evaluation Association Annual Conference, Orlando, FL.
- Lai, M. K., & York, S. (2009, November). *Empowerment, collaborative, and participatory evaluation: Too apologetic*. Presented at the American Evaluation Association Annual Conference, Orlando, FL.
- Lenges, A., Coomes, J. & Gilbert, M. (2009, February). *Characterizing specialized content knowledge for teaching mathematics*. Presented at the Association for Mathematics Teachers Educators National Conference, Orlando, FL.
- Nguyen, T. T. (2009, June). *The podcast, the PowerPoint, and the pie-in-the sky website*. Presented at ED-MEDIA World Conference on Educational Multimedia, Hypermedia & Telecommunications 2009 International Conference, Honolulu, HI.
- Nguyen, T. T. (2009, June). *Leaping the digital divide with online social networking*. Presented at ED-MEDIA--World Conference on Educational Multimedia, Hypermedia & Telecommunications 2009 International Conference, Honolulu, HI.
- Nguyen, T. T. (2009, May). *Websites as optimal project and collaboration point for students*. Presented at 2009 Pacific Circle Consortium Conference, Taipei, Taiwan.
- Nguyen, T. T. (2009, March). *Internet safety: Readiness and responsibilities*. Presented at 2009 Society for Information Technology and Teacher Education Conference, Charleston, SC.
- Nguyen, T. T., Mark, L., & Duque, C. (2009, February). *Internet safety: Implications for teacher education*. Presented at the 30th annual meeting of the Hawai'i Educational Research Association, Honolulu, HI.
- Okazaki, C., & Zenigami, F. (2009, January). *Developing mathematical understanding without number*. Presented at the Spring Conference of the Hawai'i Council of Teachers of Mathematics, Honolulu, HI.
- Okazaki, C. (2009, April). *Introducing the concept of unit to young children*. Presented at the Annual Meeting of the National Council of Teachers of Mathematics, Washington, D.C.
- Okazaki, C. (2009, January). *Parents' reactions before and after interacting with their children on mathematics tasks*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.
- Olson, M., Olson, J., & Okazaki, C. (2009, April) *An examination of*

- gender differences in language used by parents and children working on mathematical tasks. Presented at the Annual Meeting of the National Council of Teachers of Mathematics, Washington, D.C.
- Olson, J., Olson, M., & Okazaki, C. (2009, April). *Gender differences in language used by parents and children in mathematics*. Presented at the Research Pre-Session, Annual Meeting of the National Council of Teachers of Mathematics, Washington, D.C.
- Olson, M., Olson, J., Okazaki, C., La, T., & Sova, J. (2009, January). *Positive modeling observed when parents and children interact on mathematics tasks*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.
- Olson, M., Slovin, H., and Zenigami, F. (2009, January). *The importance of using models for solving worded fraction problems*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.
- Olson, M. (2009, June) *The role of gender in language used by children and parents working on mathematical tasks*. Presented at the Joint Annual Meeting, National Science Foundation Division of Human Resource Development, Directorate for Education and Human Services, Washington, D.C.
- Olson (2009, April). *Fraction fundamentals: Actions implied in worded problems can guide student's understanding of operations on fractions*. Presented at the Annual Meeting of the National Council of Teachers of Mathematics, Washington, D.C.
- Olson, M., and Slovin, H. (2009, January). *Formative assessment in middle grades mathematics*. Presented at the Hawai'i Council of Teachers of Mathematics Conference, Honolulu, HI.
- Pottenger, F. M. (2009, January). *Standards project-education laboratory: A special workshop*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.
- Pottenger, F. M. (2009, February). *Inquiry and informal and formal knowledge making*. Presented at the annual conference of the Hawai'i Educational Research Association, Honolulu, HI.
- Pottenger, F. M. (2009, April). *Inquiry in science education*. Presented at the STEM-MET Pre-service Workshop, Honolulu, HI.
- Pottenger, F. M. (2009, May). *Disciplinary communities as civic models of cultural harmony*. Presented at the 33rd Pacific Circle Consortium Annual Conference, Taipei, Taiwan.
- Pottenger, F. M. (2009, May). *CRDG science programs*. Presented at the 2009 Charter School Administrative Conference, Honolulu, HI.
- Saka, S. (2009, November). *Project organization and management using the FileMaker Pro database application*. Presented at the American Evaluation Association Annual Conference, Orlando, FL.
- Saka, S., & York, S. (2009, February). *Workgroup solutions for data collection, storage, analysis, and reporting with FileMaker Pro 9*. Presented at the Hawai'i Educational Research Association conference, Honolulu, HI.
- Slovin, H., Venenciano, L., & Da Silva, M. (2009, April). *Challenging but accessible: Young children make sense of algebraic relationships*. Presented at the Annual Meeting of the National Council of Teachers of Mathematics, Washington, D.C.
- Slovin, H. (2009, October). *Symbolic expressions and the representation process*. Presented at the Hawai'i Council of Teachers of Mathematics Middle-Grades Mini-Conference, Honolulu, HI.
- Southworth, J. H. (2009, January). *From Russia to Ethiopia to Hawai'i and beyond: International case studies of the FAST science curriculum and distance learning enrichment experiences*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.
- Southworth, J. H. (2009, February). *From Russia to Ethiopia to Hawai'i and beyond: International case studies of the FAST science curriculum and distance learning enrichment experiences*. Presented at the Charter School Administrative Office Conference, Honolulu, HI.
- Southworth, J. H. (Panelist). (2009, May). *From Russia to Ethiopia to Hawai'i and beyond: International case studies of the FAST science distance learning enrichment experiences*. Ed-Media World Conference on Educational Multimedia, Hypermedia & Telecommunications, Honolulu, HI.
- Southworth, J. H. (2009, May). *HIA cluster model of the ICT-based school transformation process*. Presented at the Ed-Media World Conference on Educational Multimedia, Hypermedia & Telecommunications, Honolulu, HI.
- Southworth, J. H. (Panelist). (2009, May). *Distance learning enrichment: Perspectives from the international handbook of information technology in primary and secondary education*. Ed-Media World Conference on Educational Multimedia, Hypermedia & Telecommunications, Honolulu, HI.
- Venenciano, L. (2009, January). *Effects of learning mathematics through measurement and algebra contexts*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.
- Venenciano, L., Zenigami, F., & Okazaki, C. (2009, October). *Inequalities, intuitive but not trivial: An application of logical thinking*. Presented at the Middle School Mini-Conference of the Hawai'i Council of Teachers of Mathematics, Honolulu, HI.
- Young, D. B. (2009, May 2). *Education in Hawai'i's changing context*. Honolulu, HI: Center for Asian-Pacific Studies Seminar Series.
- Zenigami, F., Okazaki, C., & Olson, M. (January 2009). *An examination of student's understanding of equality through a measurement context*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.
- Zenigami, F., & Okazaki, C. (2009, April). *Introducing the concept of unit to young children*. Presented at the Annual Meeting of the National Council of Teachers of Mathematics, Washington, D.C.
- Zenigami, F. (2009, January). *The importance of using models for solving worded fraction problems*. Presented at the Hawai'i International Conference on Education, Honolulu, HI.

# CRDG Organization

## College of Education

Christine Sorensen, Dean

## Curriculum Research & Development Group

Donald B. Young, Director  
 Kathleen F. Berg, Associate Director  
 Paul Brandon, Interim Associate Director  
 Helen Au, Assistant Director  
 Marcus Hayden, Administrative Officer  
 Ricardo Lorenzana, Special Projects  
 Administrator

## Research and Development Sections

*Art*  
 Val Krohn-Ching, Section Head  
*English*  
 Bill Teter, Section Head  
*Learning Technology*  
 Thomas W. Speitel, Section Head

## Staff

Acord, Suzanne  
 Social Studies  
 BA 1996, St. Edward's; MA 2002, PBCSE 2004,  
 PhD 2008, Hawai'i

Afaga, Lorna  
 Program Research and Evaluation  
 BA 1977, MPH 1981, Hawai'i

Affleck, Christine  
 Diverse Learner Needs  
 BA 2006, Hawai'i

Agena, Darryl  
 Diverse Learner Needs  
 BEd 1980, PD 1981, Hawai'i

Aki, Ty  
 Physical Education  
 BBA 1983, Hawai'i

Allen, Janet  
 Physical Education  
 A A 1978, Leeward CC; BS 1980, Hawai'i

Alvarez, Mahealani  
 ULS Administration  
 BEd 1996, Hawai'i

Anderson, Vaiarii  
 ULS Administration  
 BA 2007, Hawai'i

Asato, Darrell  
 Marketing and Publication Services  
 BFA 1979, Hawai'i

Au, Helen  
 Marketing and Publication Services  
 BBA 1993, MEd 2006, Hawai'i

Bayne, David  
 Diverse Learner Needs  
 BA 2005, Hawai'i

Berg, Kathleen F.  
 Administration  
 BEd 1973, PD 1973, MEd 1980, PhD 1992,  
 Hawai'i

Birkett, Frederick  
 Administration  
 BA 1977, Fordham; MEd Harvard

Bodner, Gustav  
 Science  
 BA 1990, Harvard

Bombeke, Kika  
 Foreign Language  
 BA 1992, Maryland at College Park; MA 2001,  
 Hawai'i

Bourne, Katherine  
 Physical Education  
 BS 1978, Wisconsin

Brandon, Paul  
 Program Research and Evaluation  
 BS 1970, Portland State; MEd 1978, PhD 1983,  
 Hawai'i

Brennan, Brendan  
 Mathematics  
 BBA 1999, Gettysburg College; MEd 2005,  
 Phoenix

Brennan, Carol  
 Science, Early Childhood Education  
 BA 1965, Catholic University of America; MS  
 1984, Nebraska; EdD 1996, Hawai'i

Brown, Boyce  
 Program Research and Evaluation  
 BA 1994, UC Berkeley; Med 2003, MA 2004,  
 Hawai'i

Buchholz, Donald  
 Science  
 BA 1968, MA 1970, UC Berkeley

Bukes, James  
 Athletics  
 BEd 1974, MEd 1985, Hawai'i

Cagaoan, Emma  
 Administration  
 AS 1980, Kapi'olani Community College

Cambra, Darron  
 English  
 BA 2004, Western Washington; PBCSE 2008,  
 Hawai'i

Chang, Nancy  
 Cafeteria  
 BS 1973, UC Berkeley

Chun, Malcolm  
 Pihana Nā Mamo  
 BA 1976, MA 1981, Hawai'i

Chun, Thomas  
 Pihana Nā Mamo

Clark, Robin  
 Pihana Nā Mamo  
 BFA 1994, Hawai'i

Cottongim, Laura  
 Science  
 BS 2001, Rutgers; MEd 2008 Florida Atlantic

## Mathematics

Hannah Slovin, Section Head  
 Program Research and Evaluation

Paul Brandon, Section Head  
 Science

Francis M. Pottenger, Section Head  
 Social Studies

Suzanne Acord, Section Head

## Research Support

### Information Technology

Mark Yap

### University Laboratory School

Frederick A. Birkett, Principal, 2008–2009

Keoni Jeremiah, Principal, 2009–2010

Keoni Jeremiah, Vice-Principal, 2008–2009

Peter Estomago, Vice-Principal, 2009–2010

### Marketing and Publication Services (MaPS)

Helen Au

### Summer Programs

Ricardo Lorenzana

- Cruz, Crivir  
ULS Counselor  
BA 2004, UC Santa Barbara; MA 2006, Teacher's College, Columbia
- DaSilva, Maria  
Elementary  
BA 1990, Antioch; Elementary Teacher Certification 2007, Hawai'i
- Doi, Douglas  
Visual Arts  
BA, BFA 1976, MFA 1983, PBCSE 2007, Hawai'i
- Doyle, Craig  
Elementary  
BA 1972, PD 1989, MEd 2002, Hawai'i
- Drick, George  
English  
BA 1966, Yale; MAT 1971, Harvard; MBA 1978, Chicago
- Duncan, Kanesa  
Science  
BS 1999, Cal Poly State; MS 2004, PhD 2005, PBSCE 2008, Hawai'i
- Dunn, Hugh  
Pihana Nā Mamo  
BE 1990, MEd 1999, Hawai'i
- Estomago, Peter  
Administration  
BA 1967, Chaminade; MEd 1998, Hawai'i
- Faure, Laurie  
Elementary  
BA 1994, UC San Jose; MEd 2005, Hawai'i
- Fordham, Cecilia  
Administration  
BS 1959, SUNY Fredonia; MFA 1976, Hawai'i
- Franklin, Marci  
Visual Arts  
BS 1984, PBCSE 2006, Hawai'i
- Fujii, Alycia  
Marketing and Publication Services  
BA 1996, Hawai'i
- Fukata, Laverne  
CRDG Administration  
BA 1972, Hawai'i
- Gabrielli, Sandy  
Learning Technology  
BS 1990, Nevada Reno
- Gilbert, Barbara  
Mathematics  
BA 1996, Arizona State; MEd 2002, Washington
- Gilbert, Michael  
Mathematics  
BA 1991, Arizona State; MA 1999, PhD 2003, Washington
- Gill, Kevin  
Learning Technology
- Gilligan, Cynthia  
Social Studies
- Haberman, Martha  
Foreign Language  
BA 1979, Guam; MA 1985, UC San Jose
- Hamilton, Marybeth  
English  
BA 2000, Seattle; MAT 2003, Portland
- Harpstrite, James  
Social Studies  
BA 1963, Colorado; MA 1967, Hawai'i; PhD 1971, Michigan State
- Harstad, James  
English  
BA 1963, Washington; MA 1974, Hawai'i
- Hartle, Alison  
English  
BA 1992, UC Berkeley; MA 1996, Hawai'i
- Hashimoto, Valerie  
Science  
BS 1993, Hawai'i Pacific; MAEd 2003, Phoenix
- Hayden, Marcus  
Administration  
BAS 2001, MBA 2007, Hawai'i
- Higa, Mie  
Mathematics  
BA 1983, Hawai'i
- Higa, Terry Ann  
Program Research and Evaluation  
BE 1977, MEd 1978, PD 1984, MEd 1994, PhD 2005, Hawai'i
- Hirotsu, Meryle  
Mathematics  
BA 1966, Hawai'i; MA 1976, CSU Los Angeles; MA 1997, CSU Northridge
- Inouye, Byron  
Learning Technology  
BFA 1993, Hawai'i
- Ishihara, Melanie  
Mathematics  
BE 1990, Hawai'i
- Jeremiah, Albert (Keoni)  
Administration  
BA 1993, Hawai'i; MA 2002, San Francisco

## Congratulations to Sensei Jean Sakihara



*Order of the Rising Sun with Gold and Silver Rays*



Jean Sakihara, founder of the Kimono program at the University Laboratory School, was awarded the Imperial Order of the Rising Sun with Gold and Silver Rays from the Emperor of Japan for her work to preserve the kimono culture in Hawai'i. This is truly an honor for Jean Sakihara, the University Laboratory School, CRDG, COE, and the University of Hawai'i. We are the only school in the United States to have a teacher receive this honor.

Sakihara Sensei has been teaching Japanese language and culture to ULS students for twenty-seven years. In Kimono Culture class students are encouraged to share with others what they learn in the classroom. They have taught the students from other high schools how to wear yukata (summer casual kimono) and how to tie obi-sash through hands-on activities at Japan Day, a semi-annual program sponsored by the Japan-America Society of Hawaii, where they have been the only students who participate as presenters. They have dressed more than 700 Punahou seniors over the span of twenty years at the Punahou Kimono Party, in which the Japanese class seniors are dressed in formal kimonos for picture-taking. And they have been in great demand at Shichi-go-san, a children's kimono dressing festival, where they dress about 160 children in formal kimono every year.

Sakihara Sensei elected to receive her award in Hawai'i instead of going to Japan to receive it from the Emperor because she wished to share this award with the volunteers and others in Hawai'i who have helped with this program. She gives all the credit to her beloved students who have showcased the art of kimono dressing for the last twenty-seven years and acknowledges the support from Takayoshi Mizushima, who generously contributed to the Kimono Culture program throughout the years.

## Claire Okazaki retires



Claire Okazaki came to CRDG in 2000 for a sabbatical from her position as a seventh grade mathematics teacher at Nānākuli High and Intermediate School. At the time, she planned to return to her then twenty-one-year career as a mathematics and special education teacher at the end of the semester. But she got involved in an exciting new research project that was just getting started, and, as she says, "What could be hard about teaching first-grade math?" The Measure Up project, based on the work of Russian psycholo-

gists, mathematicians, and educators, was focused on developing algebraic thinking in children as young as first grade. Nine years later, Claire has been instrumental in carrying out classroom research and developing curriculum materials for grades one through five. "I certainly learned a lot of mathematics," Claire says. "Ideas I thought I knew but realized I really didn't understand. I knew how to find answers but didn't understand what the mathematics was about!" Her background had been in elementary education, so it became her mission to assist other elementary teachers in developing their mathematics understanding. Claire was involved in a variety of research and professional development projects during her tenure at CRDG as well as accumulating an impressive list of publications and presentations. We wish her well in her retirement.

Kaupp, Lauren  
Science  
BS 2003, Maryland–Baltimore County; MS 2005, Hawai'i

Keuma, Jeanne  
Pihana Nā Mamo  
BA, Hawai'i; MA, Hawai'i

Kelsey, Deborah Mary  
Performing Arts  
BEEd 1983, Hawai'i

Kido, Lillian  
Pihana Nā Mamo  
BA 1971, Hawai'i

Kitamura, Dayna  
Diverse Learner Needs  
BS 2002, MEd 2004, Hawai'i

Kockler, Philip  
Social Studies  
BS 1984, American University; MAT 1989, Boston College

Krohn-Ching, Tiana  
Performing Arts  
BS 2004, Puget Sound

Krohn-Ching, Val  
Visual Arts  
BS 1968, MA 1969, Eastern Michigan; MFA 1974, Hawai'i

Kuroda, Kathleen  
Performing Arts  
BFA 1971, MFA 1983, Hawai'i

La, Thuy  
Mathematics  
BA 1997, Hanoi University of Pedagogy No. 2; MA 2005, Hawai'i

Lai, Morris  
Program Research and Evaluation  
BS 1965, Stanford; MA 1967, Hawai'i; PhD 1972, UC Berkeley

Lawton, Brian  
Program Research and Evaluation  
BA 2001, Nevada; MEd 2005, Hawai'i

Lee, Aaron  
Marketing and Publication Services  
BFA 1999, Hawai'i

Leong, Jaret  
Marketing and Publication Services

Lindberg, Mark  
Marketing and Publication Services  
BMus 2008, Hawai'i

Lorenzana, Ricardo  
Summer Programs  
BA 2000, UC Irvine; MBA 2004, Hawai'i

Lush, Noren  
Social Studies  
BEEd 1974, Franklin College; MA 1988, Hawai'i

Maedo, Audrey  
Administration  
AS 1970, Kapi'olani CC

Major, Mariann  
Program Research and Evaluation  
BA 2008, Hawai'i

Miller, Matthew  
Visual Arts  
BFA 1984, Hawai'i; MFA 1991, Oregon; PBCSE 2007, Hawai'i

Morehead, Leslee  
Science  
BS 2001, Sam Houston State; MSSE 2006, Montana State

Murchison, Sally  
Visual Arts  
BFA 1955, UCLA; MFA 1966, Hawai'i

Nakamura, Aric  
Program Research and Evaluation  
BA 2004, Hawai'i

Narimasu, Bert  
Marketing and Publication Services  
BA 1976, MFA 1993, Hawai'i

Nguyen, Thanh Truc  
Learning Technology  
BA 1996, MEd 2000, Hawai'i; EdD 2007, Southern California

Nite, Kaimi  
Administration  
BS 2005, Brigham Young

Nunokawa, Shane  
Physical Education  
BA 1995, Purdue; MPT 1997, Northwestern

Oda, Yukari  
Foreign Language  
BA 1985, Junshin Women's College; BA 1997, Bryn Mawr; BA 1998, Hawai'i Pacific; PBCSE 2007 Hawai'i

Okamura, Ana  
Diverse Learner Needs

Okazaki, Claire  
Mathematics  
BA 1970, Washington State at Pullman; MEd 2004, Hawai'i

Okihara, Derick  
Information Technology  
BA 2006, Hawai'i

Olafsson, Kevin  
Performing Arts  
BM 1986, British Columbia; BMed 1987, Simon Fraser; MA 2007 PBCSE 2007 Hawai'i

Olson, Judith  
Mathematics  
BS 1968, Valley City State; MST 1981, Wyoming; EdD 1985, Oklahoma State

Olson, Melfried  
Mathematics  
BS 1968, Valley City State; MS 1972, Arkansas; EdD 1975, Oklahoma State

Oshiro, Elliot  
Evaluation  
BA 1981, PD 1987, Hawai'i

Pottenger, Francis  
Science  
BS 1951, Otterbein; MEd 1957, Xavier; MS 1964, New Mexico Highlands; PhD 1969, Claremont Graduate School

Pottenger, Larma  
Editorial  
BA 1950, Otterbein

Quitan, Walter  
Physical Education

Ramos, Rosemarie  
Clerical  
AS 1976, St. Ferdinand

Redmond, James  
Science  
BA 1968, SUNY; MEd 1979, Pepperdine

Ritts, Lisa  
Social Studies  
BA 1996, The American University of Paris; MA 1998, Washington

Rivera, Grant  
Cafeteria

Romero, Gary  
Information Technology  
BS 1986, DeVry

Sagaysay, Lolito  
Program Research and Evaluation  
BBA 1982, Hawai'i



- Saka, Susan  
Program Research and Evaluation  
BS 1980, BBA 1980, MEd 1994, Hawai'i
- Sakihara, Jean  
Foreign Language  
BA 1958, Jissen Women's University
- Sand, Noriko  
Foreign Language  
BA 1973, MA 1975, Tama University of Arts
- Scarlett, Thomas  
Science  
BE 1973, MEd 1980, MEd 1997, PhD 2008, Hawai'i
- Schlosser, James  
Standard Streamlining Project  
BA 1970, California State; MA 1994, Hawai'i; PhD 1998, BYU Provo
- Scott, Neil  
Learning Technology  
BE 1970, DSc 2006, Canterbury University
- Shibata, Raemi  
Learning Technology  
BS 2006, Portland State
- Shimabukuro, Erin  
Administration  
BE 2001, Hawai'i
- Shimizu, Scott  
Safety Officer  
AA 2004, Hawai'i
- Shishido, Wayne  
Marketing and Publication Services  
BFA 1972, Hawai'i
- Shon, James  
Standard Streamline Project  
BA 1969, Syracuse; PhD 2001, Hawai'i
- Slovin, Hannah  
Mathematics  
BA 1966, Pennsylvania; MEd 1970, Temple; EdD 1996, Hawai'i
- Solomon, John  
Physical Education  
BA 1998, Bluffton; MS 2004, Hawai'i
- Southworth, John H.  
Science  
BA 1961, Pomona; MS 1971, Hawai'i
- Sova, Brian  
Mathematics
- Sova, Jonnine  
Mathematics  
BFA 1992, Curtin University
- Speitel, Tom  
Learning Technology  
BS 1967, Manhattan College; PhD 1975, Hawai'i
- Starko, Terry  
Elementary  
BS 1972, Pacific
- Subedi, Lillette  
Pihana Nā Mamo  
BA, 1977, BFA 1977, MA 1989, Hawai'i
- Tabion, Shannon  
Social Studies  
BA 2005, Hawai'i
- Takehiro, Sage  
Pihana Na Mamo  
BA 2005, Hawai'i
- Tamura, Kaori  
Athletics
- Tassill, Kekoa  
Social Studies  
BA 2002, Northern Colorado
- Tau, Leah  
Social Studies  
BA 2001, PBCSE 2007, Hawai'i
- Teixeira, Tracy Lee  
Administration  
BSW 1981, MSW 1983, Hawai'i
- Teter, William  
English  
BA 1976, San Francisco; MA 1983, Hawai'i
- Tomei, Ivan  
Marketing and Publication Services
- Tomita, Miki  
Science  
BSE 1999, Hawai'i
- Towata, Carolyn  
English  
BE 1967, 5-yr Diploma 1968, MEd 1968, Hawai'i
- Urgelles, Fernando  
Mathematics  
BA 1975, Chaminade; BA 1994, Hawai'i Pacific; MA 1982, Seattle; EdD 2007, Argosy
- Venenciano, Linda  
Mathematics  
BA 1993, MAT 1994, Pacific
- Venzon, Nel  
Mathematics  
BS 2005, Hawai'i
- Ward, Lori  
Editorial  
BA 1983, Hawai'i; MNM 2002, Regis
- Watts, Margit  
Manoa Partnerships  
BA 1970, Michigan; MSW 1974, PhD 1989, Hawai'i
- Williams, Jillian  
Diverse Learner Needs  
BS 2005 Salve Regina
- Wong, Ira  
Performing Arts  
BA 1988, 5-yr Diploma 1991, Hawai'i
- Wong, Kenton  
Science  
BA 2002, Whitman College; MedT 2007, Hawai'i
- Yap, Mark  
Information Technology  
BA 2001, Hawai'i
- Ymzon, Anne-Marye  
Diverse Learner Needs  
BS 2002, San Diego State; MA 2007, Phoenix
- York, Susan E.  
Program Research and Evaluation  
BA 1992, MA 1994, MEd 2001, PBCSE 2007, Hawai'i
- Yoshioka, Darren  
Physical Education  
BS 1993, Fresno State; MS 2004, Hawai'i
- Young, Donald B., Jr.  
Administration  
BS 1968, MS 1969, SUNY; EdD 1986, Hawai'i
- Young, Stephen  
Cafeteria
- Zenigami, Fay  
Mathematics  
BE 1974, PD 1975, MEd 1975, Hawai'i
- Zorn, Chris  
Performing Arts  
BS 1979, Appalachian State; MM 1996, Colorado; PBCSE 2007, Hawai'i

## Valerie Hashimoto receives 20 year service award



Valerie Hashimoto was recognized by the Research Corporation of the University of Hawai'i (RCUH) for twenty years of service. Valerie has been an indispensable part of the CRDG science section, serving as an administrator through the development of three major science curricula. "Val Hashimoto has been the center of our organization, dealing with all of the exigencies of budget, personnel, facilities, and time constraints," said Frank

Pottenger, head of CRDG's science projects. "Her patience and her attention to detail are legend." Valerie has been the face of CRDG to hundreds of science teachers, researchers, and other partners across the country and around the world, and we congratulate her on this milestone.

# In Memoriam



Emeritus professor Dr. Arthur R. King, Jr., visionary founder and long-time director of the Curriculum Research & Development Group at the University of Hawai'i, died February 2, 2009 in Honolulu. He was 87.

King was born and raised in Portland, Oregon. He was the first member of his family to attend college, and he lived his life as a spirited and joyful champion of the best college-preparation, liberal arts education for all students. King was a veteran of World War II and, following the war, remained active in the U.S. Naval Reserve until his retirement in 1981 at the rank of Captain. King earned his BA from the University of Washington and his MA and EdD at Stanford University. In 1955, he joined Claremont Graduate School as an associate professor of education where he remained until 1965.

Joining the research faculty of the University of Hawai'i's College of Education in 1965, King partnered with John A. Brownell in 1966 to produce their groundbreaking book *The Curriculum and the Disciplines of Knowledge: A Theory of Curriculum Practice*, articulating the theory that each of the disciplines of knowledge had its own mode of inquiry, specialized language, heritage of literature and artifacts, and traditions, and that the community of scholars these domains created should be the basis for liberal and general education. King was able to put his theory into practice when Dean Hu Everly charged him with reorganizing and repurposing the University Laboratory School to create a center for curriculum development. The center he created and directed for nearly forty years was based on the notion of the classroom as a community of scholars and cast each student into the role of authentic practitioner. The work that he led, and that CRDG continues to do, has resulted in cutting edge research, curricula based on inquiry within the disciplines of knowledge, and professional development programs that have impacted generations of educators in Hawai'i and around the world.

Following his retirement in 2003, King remained active in the CRDG family, writing a history of the unique experiment that became CRDG and University Laboratory School and developing a thesis on schools as systems. His belief in and commitment to a quality liberal arts education for all sustained him through political and economic challenges and is the foundation of CRDG's enduring success. The depth and breadth of his knowledge and leadership, along with his vision for creating and sustaining a university-based R&D center with a real-time school as a laboratory remain the foundations of the internationally recognized organization he created and led for so many years.



Dr. Diane S. McCoy Witt, who dedicated over thirty years of service to the Curriculum Research & Development Group, passed away on November 17, 2009.

Diane was one of four siblings born into a family where both parents were musicians. Her violin studies at Roosevelt and Punahou schools earned her prominence at an early age, and she earned her performance degree at the nationally renowned Indiana University School of Music. She went on to earn both her master's degree in secondary education and doctorate in educational administration from the University of Hawai'i's College of Education.

Diane's professional body of work, produced during her thirty-two-year career with CRDG and the Laboratory School, includes a comprehensive music education curriculum co-authored with Leon Burton as well as textbooks and teacher training programs for guitar and ukulele. Her later work included another collaboration with Burton to produce a comprehensive kindergarten program that included instruction in the arts along with the usual academic subjects; research on teacher retention; and a variety of projects as an assistant to the CRDG director.

Diane's personal journey included a number of avocations inspired by her twenty-plus-year pursuit of renewal and self-improvement as a student of Buddhism and Gestalt psychotherapy. She counseled bereaved children at Hospice Hawai'i, mentored numerous friends and colleagues, and generously shared her wisdom with all who came to her in need. She was most proud of her accomplishments as a mother of two talented daughters: Heather, a historian and high school teacher, and Jennifer, who is completing her advanced degree in geology.

In her life and in her work, and finally in her struggle against a formidable disease, Diane demonstrated a resiliency and inner strength that serves as a model for all who aspire to live a courageous life.



Dr. Thomas W. Speitel, natural and information sciences professor, U.S. Army veteran, and avid sailor, passed away on September 19, 2009.

Born in New York City, Speitel earned his baccalaureate degree in biology from Manhattan College in 1967. Drawn to Hawai'i's unique flora and fauna, he came to the University of Hawai'i at Mānoa (UHM) in 1967, where he earned his PhD in botanical sciences in 1975. It was in the PhD program at UHM that Speitel discovered the excitement of instilling learning in others, and his interests shifted from the field to the classroom. He would devote the rest of his professional career to CRDG. "For many of us, Tom was someone to look up to and laugh with. He was generous with his expertise and knowledge, no matter the issue," said senior digital arts designer Byron Inouye.

Speitel authored and coauthored numerous scholarly publications and created several software programs for the classroom. In the early 1990s, he developed the Science Web of Instructional Media that connected hundreds of multimedia resources to science curricula developed by CRDG, putting him at the forefront of what the Web could do for classroom learning. In 1999, the Hawai'i Marine Sciences Studies program, which Speitel co-authored, was adopted by the state of Texas. That same year, he became a professor in CRDG's science section and assisted the Space and Naval Warfare Center with human and information system interaction infrastructure development. He led distance learning course development projects for the Department of Defense Education Activity and worked closely with CRDG's Invention Factory to provide hands-on invention activities for schoolchildren and teachers. His most recent work was the development of Automatic Interviewer, an audio-visual recording software that allows users to record interviews or presentations. Thanh Truc Nguyen, assistant specialist in CRDG, said, "Tom was driven to provide as many hands-on experiences in the field of educational technology as possible. His unwavering support in our educational technology efforts will be missed, but not as much as his smile."

University of Hawai'i at Mānoa, College of Education

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