NEWS FROM THE KRAUSE CENTER FOR INNOVATION AT FOOTHILL COLLEGE | SPRING 2017

blueprint for innovation

Microsoft-KCI Innovation Awards Recognize Three Educators

On March 23, the Microsoft-KCI Innovation Awards were presented to three educators who are challenging students to think in new ways and thereby positively impacting their communities. Held at Microsoft, the event showcased the three award winners who submitted innovative teacher-student collaborative projects that fully integrate technology. The awards include cash prizes of $6,000, $3,000 and $1,000.

The first place winner—Bayard Nielsen, Modern Language Department Chair and Spanish teacher at Notre Dame High School in San Jose—designed the project *Day Worker Stories: Using Language & Technology to Advocate for our Community.* The project's goal was to empower students to break down cultural barriers in their communities by using language and technology to advocate for others. Nielsen's students interviewed Spanish-speaking day workers and created a book containing bilingual biographies, superhero comics, and audio-video media. These books were then given to the day workers and their families, as well as the Day Worker Center of Mountain View. The stories focus on the lives of these workers, describing their identity, culture, beliefs and hopes for the future and providing insight into the many different stories and backgrounds that shape this local community. The students managed their projects, with Nielsen coaching from the side. Nielsen saw personal growth in his students, noting: "Some of the most profound learning took place when students took on challenging leadership roles. Roughly 33 students took on additional roles—not for credit, but rather to use their skills and interests to benefit the final product."

Second place winner—Nancy Andrus, Youth Services Librarian at Sunnyvale Public Library—launched the *Make-HER: STEM Exploration for Girls* program. The program goal is to increase girls' interest and confidence in Science/Technology/Engineering/Math through hands-on, project-based learning. Part of the innovation was engaging the mothers of these students as mentors, which extended the STEM learning beyond the workshops and into the home. By tapping into the adventurous spirit of the Maker Movement (designers, inventors and artisans using technology to create new products), the program empowers girls, grades 8 through 12, through process, struggle, iteration, and play. By exposing girls to diverse female STEM educators, *Make-HER* shows these students how to take ownership of their own STEM journeys. *Make-HER* is in its third year at Sunnyvale Library. To reach even more girls, *Make-HER* partners with Columbia Middle School, a Title 1 school in Sunnyvale, to offer after school workshops. *Make-HER* has served over 900 daughters and mothers to date, has received national attention within the library community, and will be featured in the Harvard Graduate School of Education's *IDEABOOK* for family engagement in libraries.

Third place winner—Halina Gallagher, STEAM Educator at Mulberry School in Los Gatos—launched the *Living in the Watershed* project for grades 4 through 6. STEAM adds "Art" to the STEM mix. The goal of the project is for students to understand how pollution accumulates in water streams and to gain awareness of how everyday actions affect wildlife and the quality of watersheds. Additionally, students are empowered to make a difference and to become environmental stewards, and learn that by acting locally they, too, have a global impact.

FAME 2017: Maintaining the Focus on Math Tools & Methodologies for Teachers

For the eighth consecutive year, the KCI has received funding from the Silicon Valley Community Foundation and another family foundation to continue the Faculty Academy for Mathematics Excellence (FAME) program. Since 2010, over 200 educators have participated in the intensive program that focuses on nine topics most difficult to teach and learn in the areas of pre-algebra, algebra, and transformational geometry. During the 72-hour program, 6th through 10th grade math teachers thoroughly explore these topics, improving their own content knowledge, and learning new technology tools and methodologies to engage their students and to improve student math skills. Last year, hands-on computer science and coding activities were included in the program and were a big hit.

For 2017, the KCI will again offer two FAME programs—Blended FAME and Traditional FAME. Blended FAME debuted last summer and received positive teacher reviews. The program will take place the first two weeks in July, and participants will meet for five face-to-face days of the program, with the remaining 30 hours of the summer institute conducted online. The instructional team from last year is returning, with Ed Campos—an experienced math and online educator—at the helm, supported by Lindsey Blass, and Sumi Sukumar, who is the Foothill math instructor for both instructional teams.

Traditional FAME, which consists of ten face-to-face days, will take place the last two weeks in July. Participants always comment on the benefit of working closely with a cohort for the ten-day period, and appreciate the time for collaboration and hands-on practice the program provides. The KCI is fortunate that FAME program director, Cristina Bustamante, will return for the 2017 program. Cristina is a graduate of the 2010 inaugural program, and has been the program director for the last three years. She will be supported by Sumi Sukumar and Chris Bell, a math and computer science teacher.

Both FAME programs are a major commitment for teachers. Not only do they participate in the required 60 hours during the summer, they also attend 12 hours of follow-up sessions during the academic year. This last year, the two instructional teams brought the Blended and Traditional FAME cohorts together for the follow-up sessions to share their experiences. It was so successful that the cohorts will work together again for the 2017 program.

FAME 2017 Blended and Traditional programs will take place during July, and visitors are welcome to attend. Please contact Gay Krause at krausegay@fhda.edu if you would like to join.

KCI Offers Integrated Engineering Camps for Kids This Summer

The KCI is partnering with De Anza College Community Education this summer to offer new engineering day camps for 6th through 9th grade students. The program, *Mechatronics: Electronics, Mechanical Engineering and Coding*, will be offered twice during July. This highly innovative engineering camp is capitalizing on the interest of both students and parents, and provides opportunities for students to have access to creative, hands-on experiences that are fun, educational, and challenging. The camp also supports a project-based learning approach to STEM topics, where students work on creative problem solving.

During the five-day camp, students will design and build intelligent machines by learning to weave professional engineering and development tools together in order to build complex Internet of Things (IoT) machines. All tools introduced in the program are used in professional engineering environments. During the camp, the students will be guided in various areas, from using tools designed for education to more complex tools used in industry. The goal of the camp is for students to learn to see the world of machines as accessible, modifiable, and hackable.

Students will experience a breadth of activities from iterative design to machine control theory and practice, and they will have the opportunity to build their own touchscreen Linux tablet computer. Ultimately, the camp is a crash course in integrated engineering, teaching students to use a variety of tools in conjunction with each other.

What sets this camp apart from others is its integrated focus. Most student camps focus on a single discipline—

for example, coding. During the *Mechatronics* camp, students will learn to handle equipment such as power saws, CNC cutters, soldering tools, and 3D printers. They will also gain experience using hardware like Raspberry Pi, Arduino, and Pulse Width Modulation (PWM) controls. Finally, students will be introduced to coding such as Java and Python.

Consider visiting the Mechatronics camp this July, which will take place at De Anza College, and check out what students are building. To arrange a visit, contact Liane Freeman at freemanliane@fhda.edu.

Register Online for KCI Classes

A variety of online, on-campus, and hybrid classes are offered each quarter. For best course selection register early since classes fill quickly. It's easy! Visit **krauseinnovationcenter.org/classes** to view and register for FASTtech and Community Ed classes.

Next Generation Standards Change the Game for Science Education

It's not news that American students lag behind their international counterparts in math and science. Math and science skills have become essential for most careers, and scientific and technological literacy is increasingly important for an educated society. These facts were the original drivers in developing the Common Core State Standards in math. Transforming science education is now the focus of new standards—the Next Generation Science Standards (NGSS)—which are being implemented in order to address these issues that ultimately affect U.S. competitiveness.

So how do the new standards impact science education, the science classroom, and ultimately students? Every NGSS standard has three dimensions: core ideas (content), scientific and engineering practices, and crosscutting concepts. One of the key principles is ensuring that the teaching of science content is integrated with the practices of scientists and engineers. This approach leads to lessons and projects grounded in real-world practice and applications. Students practice scientific and engineering methods that are more authentic than memorization of content. Science education rooted in real-world context encourages students to understand concepts more deeply, be more engaged in their learning, and gain an appreciation and interest in STEM fields and careers. And it is probably a whole lot more fun.

The Next Gen Standards hold promise for transforming the science classroom if successfully implemented. However, just as Common Core created challenges for educators, NGSS is proving to be an uphill climb for novice and veteran teachers alike. For NGSS to make an impact on lagging achievement, and prepare students for college and career success, teachers need to be trained differently. KCI is addressing this need with a new program: *MADE Science*. *MADE* stands for Modeling, Analysis, Design & Engineering. This 30-hour program leverages low/no-cost technology to tightly link math concepts with science principles and real-world engineering challenges.

KCI ran the beta version of *MADE Science* last summer, hosted by the San Mateo County Office of Education, and is preparing to offer the program again this summer. *MADE* provides teachers with training, high-impact lesson plans, and the coaching needed to implement NGSS. With a project-based approach to science education, teachers learn about design thinking, and each day starts with a design challenge. New for this year, *MADE* will include a day-long "practicum" where teachers work with students to test out NGSS-aligned lesson plans.

To learn more about MADE Science, contact Kyle Brumbaugh at brumbaugh@fhda.edu.

NEXT GENERATION SCIENCE STANDARDS

Program Director Sets New Course in Making Education Relevant & Interactive through Technology

MERIT 2017 is gearing up to be another great opportunity for 50 Bay Area teachers. The cohort has been selected, and planning is well underway for the May start of the program. This year will also see a new program director and assistant director at the helm.

Lisa DeLapo, a graduate of MERIT 2013, is the new program director. Lisa has also been a MERIT instructor and the assistant program director for the last two years. Lisa's career has changed markedly since she graduated from MERIT. Since then, she left the classroom in order to serve as Director of Innovation, Design, and Technology for the Lafayette School District.

Joining Lisa as the assistant director, Brian Briggs hails from the Plumas Lake Elementary School District where he is the Director of Innovation and Instructional Technology. Brian was a guest speaker for MERIT 2016 and made an impression on the group, so we are pleased to have him as a new addition to the instructional team for 2017.

This year's program theme is: "What will your students create today?" Student-centered learning focuses on students as creators and producers of content as opposed to passive learners in a lecture environment. In an active learning classroom, teachers not only have to be experts in their disciplines, but also coaches and facilitators who can guide students through discovery and mastery of content. Lisa commented, "We will concentrate on finding ways to get *all* learners to feel empowered and motivated to learn, as well as tools that *all* students can use to go deep and become great communicators, critical thinkers, and collaborators, while tapping into their creativity." The program will feature elements of personalized learning, project-based learning, design thinking, and genius hour (student-led sessions that delve deeper into specific areas of interest).

Also new for this year, teachers will receive the training required to pass the Google Educator Level 1 and 2 Certifications. Over 80% of districts in California are adopting Google Apps for Education. The Level 1 certification recognizes educators who have learned the fundamentals of Google tools and validates standard technology implementation skills. The Level 2 certification is awarded to teachers who are "super users" and enthusiasts for Google tools, demonstrating advanced technology integration skills.

MERIT 2017 will take place from July 5 through July 14, and visitors are welcome to attend and check out the action. Please contact Gay Krause at krausegay@fhda.edu if you're interested.

KCI Takes the Lead on New Makerspace Grant

Where design, invention and art meet, technology is used to create new products. The Maker Movement is increasingly gaining ground in education as it becomes clear that student interest and engagement levels rise in STEM subjects when there is access to "maker" environments and experiences. Forward-thinking schools and districts are converting unused wood shops and labs to makerspaces, yet teachers don't have ready access to training on how to teach in these new environments.

To that end, the *California Community Colleges (CCC) Maker* initiative has launched with the goal to drive innovation in education, and ultimately to prepare students for success in STEM/STEAM careers that demand 21st century skills. The *CCC Maker* project is awarding grants to community colleges for building makerspace communities, where faculty are trained to embed making into curriculum and employers provide internships—all supporting students as they explore, create and connect with opportunities.

The KCI and Foothill College are fortunate to have secured nearly $40,000 in grant funding from the *CCC Maker* project for creating a KCI makerspace to provide unique, hands-on learning programs for K-14 teachers and students. The funding will also support curriculum development and maker supplies. The *CCC Maker* project is now working with 35 community colleges across the state. KCI is positioned to take a leadership role in supporting Bay Area teachers as they learn about the possibilities and gain the confidence necessary to incorporate maker activities into their curriculum.

In addition to transforming part of the KCI building into a makerspace, KCI will also develop three for-credit course strands in Design Thinking, Computational Thinking/Computer Science, and 3D Design. Imagine classes where educators and students work together to fabricate parts using simple materials like popsicle sticks and hot glue, as well as using more sophisticated tools like 3D printers and programming. In this maker setting, teachers will gain the pedagogical practice to take projects back to their classrooms while working directly with each other and students.

For more information on the KCI makerspace project, contact Kyle Brumbaugh at brumbaugh@fhda.edu.

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