

futures in Urban Ed



$a + b = c$

THE STEM ISSUE

calculating the needs; multiplying the solutions

Change Agents Wanted



At the University of Southern California's Rossier School of Education, we continue to build upon our exceptional reputation as a leader in urban education with these core commitments:

- Guaranteeing a diverse school community
- Offering a personalized student experience
- Seeking innovative approaches to learning
- Providing opportunities for global exchange
- Uniting theory and practice

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(anticipated offering for 2012)
- Education Counseling
- Postsecondary
Administration and Student
Affairs
- Marriage and Family
Therapy
- School Counseling
- Teaching
(offered on campus and online)
- Teaching English to
Speakers of Other
Languages
(offered on campus and online)

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Fully-funded four-year program
preparing faculty and
educational researchers

If you or someone you know has the potential to be an educational leader, please email rossier.info@usc.edu. A Rossier staff member will follow up with information about our programs.

America's future is on the line 7

USC and Rossier are stepping up in science, technology, engineering and math.

By Dr. John Brooks Slaughter



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In this issue you will notice several QR (Quick Response) codes, like the one pictured here, which direct you to additional information online. Download a free QR code reading app, activate your phone's camera, and hold it up to the code to scan. **Enjoy!**

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Dear Friends of Rossier,

PRESIDENT OBAMA HAS MADE IT CLEAR: "Strengthening STEM education — Science, Technology, Engineering and Math — is vital to preparing our students to compete in the 21st century economy."

He has identified three overarching priorities for STEM education, necessary for laying a new foundation for America's future prosperity:

- Increasing STEM literacy so all students can think critically in science, math, engineering and technology;
- Improving the quality of math and science teaching so American students are no longer outperformed by those in other nations;
- And expanding STEM education and career opportunities for underrepresented groups, including women and minorities.

The Rossier School is outpacing most Schools of Education in embracing this national priority, and this issue of *Futures* documents a remarkable roster of work that supports our President's goals in STEM.

Rossier benefits from having a number of faculty members who have spent time teaching STEM subjects in K-12 classrooms. Gary Scott taught both math and science at the elementary and secondary levels, Fred Freking taught high school science, and Laila Hasan started her career as a middle school math and science teacher. While they have left their STEM classrooms, they are having an even greater impact by preparing new STEM teachers through our online and on-campus Master of Arts in Teaching program, which currently enrolls over 1,600 students — with over 200 of them in STEM fields — from all over the country.

I currently represent our school in a groundbreaking cross-sector partnership to reach President Obama's goal of bringing 10,000 new STEM teachers into American classrooms in two years, and 100,000 in ten years. The online MAT@USC makes this an attainable aspiration.

Rossier is also leading the way to enhance our nation's capacity in STEM fields by addressing challenges in higher education, such as growing the number of underrepresented minorities who pursue an education in STEM and enter STEM fields. The research of John Slaughter, Alicia Dowd, Tatiana Melguizo and Gisele Ragusa, for example, informs and impacts postsecondary STEM education.

Two of our newest faculty members bring unique perspectives to the school with their STEM research as it relates to educational psychology. Gale Sinatra's work focuses on understanding the cognitive and motivational processes that lead to successful learning in science. The research of Brendesha Tynes, who will join us in January, explores African American girls' gaming and computing as a gateway to STEM.

Rossier's commitment to STEM education is perhaps epitomized by its leadership in the organization of a university-wide consortium to encourage interdisciplinary collaboration and communication across schools for the most impactful research in Science, Technology, Engineering and Math.

I welcome your involvement in this critical work.

Sincerely,

KAREN SYMMS GALLAGHER, Ph.D.

EMERY STOOPS AND JOYCE KING STOOPS DEAN





On May 12, more than 130 doctoral candidates were hooded at the 2011 Rossier Doctoral Commencement Ceremony in Founders Park. And on May 13, about 500 master's candidates – an unprecedented number – walked in the 2011 Rossier Master's Commencement Ceremony. Los Angeles Unified School District Superintendent Dr. John Deasy (*pictured left*) delivered the commencement address.



Use your smart phone to scan this code to watch Dr. Deasy's Commencement Address at the 2011 Rossier Master's Commencement Ceremony.

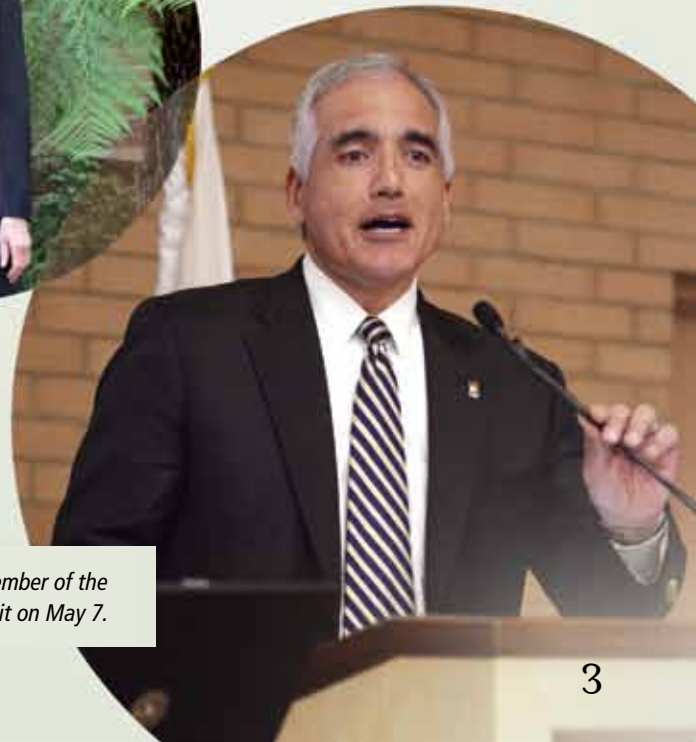


2011 commencement & careers

Dr. Susan Moore Johnson, Jerome T. Murphy Professor in Education at the Harvard Graduate School of Education, spoke at the second annual "In Tribute to Teaching" lecture, part of MAT Trojan Pride Day on May 11.



Dr. Rudy Castruita addressed nearly 150 participants at the first Rossier K-12 Leadership Development Conference for school leaders and educators on July 14.



Dr. Mark Rocha, superintendent/president of Pasadena City College and member of the Rossier Board of Councilors, gave the keynote at the first Ed.D. Research Summit on May 7.



Rossier Faculty Honored at AERA

Dozens of Rossier faculty, students and alumni headed to New Orleans to present their research at the 2011 Annual Meeting of the American Educational Research Association (AERA) in April. A special USC Rossier School of Education reception was held on Bourbon Street in celebration of several faculty members who received significant honor and recognition by the 25,000 member organization.

Dr. William G. Tierney (*above left*) was inducted as the first scholar from USC to be AERA President-Elect, and also received the Distinguished Research Award in Postsecondary Research. Dr. Estela Mara Bensimon (*bottom right with Dean Gallagher*) and Dr. Dominic Brewer were named AERA Fellows. Dr. Morgan Polikoff was honored with the Outstanding Dissertation Award in Education Policy, and Dr. Ron Avi Astor received the Promise Award from the Conflict Resolution and Violence Prevention Special Interest Group of AERA.

USC Rossier School of Education received its highest ranking by *U.S. News & World Report* in the history of the School, in the magazine's Best Graduate Schools 2012 issue.

Rossier made an unprecedented jump to **#14 among the best graduate schools of education**, from #27 last year. The dramatic jump is due in part to a large increase in research funding for the School, as well as higher GRE scores, among other achievements.

Rossier also was ranked **#10 in education administration and supervision**, and **#7 in higher education administration**.

"The increase in funded external grants – both federal and from foundations – speaks to the quality and significance of the important research being conducted by our faculty," said Dean Gallagher.

Rossier Gets Highest U.S. News & World Report Ranking in School's History

Wendy Castillo, an LAUSD graduate attending Brown University in the fall, and 90 other local graduates spent their summer preparing for college in the renowned SummerTIME program. The Center for Higher Education Policy Analysis' 10-year-old program builds students' writing and college-going skills.



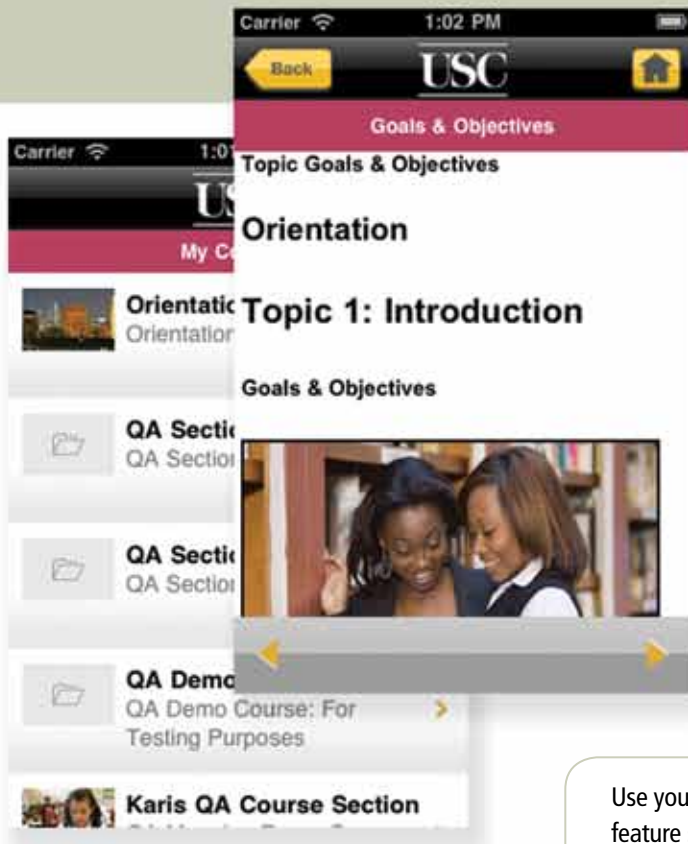
MAT@USC Wins Innovation Award and Launches iPhone App



MAT@USC, Rossier's online Master of Arts in Teaching program, was the recipient of the 2011 International Award for Innovative Practices in Higher Education. The award, which was created by the University Design Consortium, a project of Arizona State University and Sichuan University in China, was presented to the MAT@USC for fusing new technologies with hands-on classroom teaching experiences.

In March, the MAT@USC released a native application for the iOS platform, which brings the program's groundbreaking online learning platform to the iPhone and iPad. The feature-rich learning system is the first of its kind to be released on behalf of an elite research university.

"This new app gives our MAT@USC students the ability to do their learning from almost anywhere, while preserving the quality of the learning environment our faculty and administration have worked so hard to create," Dean Gallagher said.



Use your smart phone to scan this code and read a feature story about MAT@ USC in *The Atlantic*. MAT@USC students can visit <http://itunes.apple.com/us/app/mat-usc> to get your free app.



Pullias Lecture *Focuses on Learning in Games*

The 33rd Earl V. Pullias Lecture on April 4 featured Keynote Speaker Dr. James Paul Gee, Mary Lou Fulton Presidential Professor of Literacy Studies at Arizona State University and a renowned author on video games and learning. In his remarks titled “Games, Learning and the Looming Crisis in Higher Education,” Gee spoke about the meaningful learning that occurs in games and that has been largely untapped by colleges and universities. Dr. Henry Jenkins, USC Provost’s Professor of Communication, Journalism, Cinematic Arts and Education, cited the power of play and the interactivity of online communities in his remarks that followed.



Dr. Eugenia Mora-Flores and her daughter Emilia at the panel.



Rossier Panel Gives Reading Tips at L.A. Times Festival of Books at USC

Four literacy experts on the Rossier faculty held a panel discussion as a “Bookends” event in conjunction with the first L.A. Times Festival of Books hosted at USC in April. The panel, titled “What Did I Read? Parents and Children Read Together: Important Interactions, Longstanding Positive Consequences,” featured insight into children’s and adolescent literacy and tips for parents from Dr. Eugenia Mora-Flores, Dr. Gisele Ragusa, Dr. Paula Carbone and Dr. John Pascarella.

Mora-Flores talked about how to cultivate a future reader in early childhood with speech and other activities in the home; Ragusa offered techniques for engaging school-aged children in reading for pleasure; Carbone discussed what teens and adolescents are reading today and how to encourage them to read more; and Pascarella shared how kids are developing literacy skills through online activities.

energy, climate, communications, security... AMERICA'S FUTURE IS ON THE LINE

OVER THE PAST SEVERAL YEARS, the world, and certainly America, has become increasingly aware of the importance of a strong national capability in **science, technology, engineering and mathematics**, the STEM disciplines. Given the confluence of the rapid demographic changes that are occurring in this country, the tremendous progress in scientific and technological endeavors that are taking place in developing countries, the serious shortcomings of our public education systems, shifting immigration policies, and the historic under-representation of sizable elements of our population, our nation must act quickly on a number of fronts to maintain a strong position of leadership in STEM in order to ensure a future of prosperity and security. Leadership in innovation and entrepreneurship will reside in the hands of those nations that are the most adept at educating, supporting and retaining talent. Other countries, and not just China and India, are moving faster than we are. This is the dilemma facing America today.

The report that the U.S. ranks 16th among the 21 OECD countries with respect to high school graduation rates has raised the level of alarm about our public education systems. We know that large gaps in performance and educational achievement exist between groups defined by race and ethnicity, country of origin and socioeconomic status. It is estimated that one-third of fourth graders and one-fifth of eighth graders lack the competence to perform basic mathematical computations and our 12th graders rank well below the average of the 21 OECD countries in math and science.

Why can't we produce adequate numbers of people with the highly developed analytical and quantitative skills necessary for the technology-intensive jobs that are required to be filled? One reason is that teachers without the appropriate college major or minor are teaching a quarter of all students in mathematics and more than half of all students in physical science in grades 7 to 12. Most of them are teaching in schools with the greatest needs. It is an equally sad fact that many well meaning teachers and counselors are woefully ignorant about the STEM professions and, therefore, unable to guide students in any meaningful way toward such careers. The Obama administration has called for 100,000 new STEM teachers in the next decade. A major effort will be needed to secure them (*See Rossier's work to increase the supply on page 8*).

The launch of Sputnik by the Soviet Union in 1957 triggered a national focus on math and science education in the United States. The excitement associated with space exploration inspired countless numbers of young people to embark on preparation for careers as scientists or engineers. Today, however, in spite of the remarkable technology developments available in the devices and software apps that are rapidly becoming necessities for life in the 21st century, a smaller proportion of American youth is pursuing studies and careers in STEM than was the case 20 years ago. Unless the trend is reversed, America will face a future in which it no longer has the skilled workforce to compete effectively in the global marketplace of innovation and technological artifacts. It will not have sufficient capacity to adequately address the crucial issues of energy independence, climate change, infrastructure renewal, sustainable broadband communications, and national security. Nor will it have a populace with enough understanding of these issues to participate in the discussions of policies to deal with them.

In order to avoid the arrival of such a future, it is imperative that the nation act now and aggressively to improve STEM education and make it a higher priority for all. ■

by DR. JOHN BROOKS SLAUGHTER,
Professor of Education, USC Rossier School of Education
Professor of Engineering, Viterbi School of Engineering

Slaughter began his career as an electrical engineer and in 1980 was appointed as the first African American to direct the National Science Foundation (NSF). He has also served as president and CEO of the National Action Council for Minorities in Engineering (NACME), whose mission is to increase the number of engineers of color.



STEM Education

Rossier rallies a national STEM commitment

President Obama's two-tiered goal for the influx of new STEM teachers in American schools – 10,000 in two years and 100,000 in 10 years – has been taken up by an elite national partnership of some of education's most influential leaders, including Rossier Dean Karen Symms Gallagher.

At the first meeting of the "100K in 10" partnership in January, the Dean represented the first School of Education to join with the Carnegie Corporation, the NewSchools Venture Fund, and Opportunity Equation in founding the unusual public/private collaboration to tackle the challenge. Its *Blueprint for Action* addresses three key goals: **INCREASING THE SUPPLY** of new teachers in STEM fields by both recruiting and preparing highly skilled individuals, many of whom will ultimately work in high-need schools; **RETAINING EXCELLENCE** in the field of STEM teaching by sharing best practices, building professional development opportunities, and recognizing and supporting excellence; and **BUILDING THE MOVEMENT** by finding and supporting innovative techniques, and funding appropriate preparation and training.

Over the spring, the cross-sector partnership has grown to include corporations, philanthropists, thought leaders and education practitioners from across the country. The distinguished list now includes the Clinton Global Initiative (CGI), President Bill Clinton's international effort to forge solutions to the world's most pressing problems. At CGI's first domestically focused conference, CGI America, held in June, Dean Gallagher and a dozen of her "100K in 10" partnership colleagues were acknowledged by the former President for their commitment to building the pipeline of STEM graduates in America. The Dean was also one of the representatives from the partnership who presented the *Blueprint for Action* to U.S. Secretary of Education Arne Duncan and his staff members at a gathering in May.

Other members of the partnership now include the National Science Foundation, Google, the Broad Institute, the Woodrow Wilson National Fellowship Foundation, the S.D. Bechtel, Jr. Foundation, Teach for America, LAUSD, National Math and Science Initiative, Denver Public Schools, EnCorps, American Museum of Natural History, Changemakers, Baltimore City Public Schools, Citizen Schools, Creative Commons, IDEA Public Schools, KIPP: Houston, New Teacher Center, The New Teacher Project, New York Hall of Science, Relay School of Education, University of Chicago, and University of Washington College of Education.

The USC Rossier School has set as its own goal to grow by 10 times the number of STEM teachers currently being prepared in the School. Rossier's ability to achieve that growth is tied to the award-winning MAT@USC program, the online Master of Arts in Teaching, which has increased the School's overall teacher preparation student population tenfold in less than two years. The program currently enrolls over 1600 students, with over 200 of them in STEM fields, a number that already places Rossier as one of the largest preparers of STEM teachers. USC Rossier is also home to Math for America Los Angeles, whose fellows will play a key role in meeting this commitment.

— Barbara Goen



Dean Gallagher (L) and members of the "100K in 10" partnership are recognized by President Clinton (R) at CGI America.

A SILICON VALLEY PERSPECTIVE

a

S FOUNDER OF SEVERAL SUCCESSFUL technology start-up companies in Silicon Valley, Steve Poizner knows firsthand what it takes to build a business on innovation. He started SnapTrack, which pioneered the technology that put GPS receivers into 700 million cell phones, and Strategic Mapping Inc., which assists police departments and utilities and transportation companies with strategic planning and logistics. Key to the innovation fueling the technology industry and the global marketplace are the people who generate the ideas of the future. They are engineers, scientists, and technology specialists like Steve, and the 21st century economy increasingly depends on their skills.

A report released by the U.S. Department of Commerce in July noted the growth in STEM jobs has been three times greater than that of non-STEM jobs over the last 10 years and is projected to grow by 17% in 2018.



*Rossier Board Member Steve Poizner
has built businesses based on innovation*

"The world has really changed in the last 20 to 30 years," says Steve, a member of the Board of Councilors for both the USC Rossier School of Education and the Viterbi School of Engineering. "There has always been a demand for engineers and scientists, but now it's a very competitive landscape."

Steve developed an interest in building things at a young age. That initial curiosity was nurtured by the right teachers, who ignited his lifelong enthusiasm for engineering. "I was always interested in the application of technology. Growing up in Texas, going to Radio Shack was my favorite outing," he says. "I was really into ham radio, electronics, and building things as a kid. Later, I wanted to apply technology to solve problems."

A similar passion needs to be cultivated in future generations in the U.S., or we risk falling even further behind. He notes that India and China are graduating four to five times more engineers than America.

"It's intensely competitive now, which makes for more innovation, but also means our universities and K-12 institutions need to step up to the realities and the competitive challenge," Steve says. "We need to attract more students into these fields."

The work of Rossier, particularly through its Master of Arts in Teaching program, has the potential to fill that gap by supplying more excellent teachers to science and mathematics classrooms. Many of these future teachers may already have careers in the STEM fields, he says. "I'm extremely impressed with what Rossier is doing with the MAT program. It opens the door for people with STEM expertise in the industry to do a one-year program to go into K-12 public schools," Steve says.

"A lot of people lost their jobs or are switching careers and they always wanted to teach, and they have STEM subject matter expertise. Rossier is providing them a fantastic online education wherever they live that shatters all their barriers to being a teacher in math or science."

These new teachers can begin to fill the STEM pipeline with high-quality graduates that innovators and entrepreneurs like Steve need.

The gap between the current supply and demand is especially evident in the technology fields in Silicon Valley, Steve says. "There's a shortage of capable, competitive technical people," he observes. "In Silicon Valley, we have a 10 percent unemployment rate, but if you're a web designer or an engineer, the unemployment rate is zero." ■

— Andrea Bennett

USC Dornsife College of Letters, Arts and Sciences
USC Rossier School of Education
USC Viterbi School of Engineering
Keck School of Medicine of USC
USC School of Cinematic Arts

from STEM to STERN collaboration across the university

THE NEED TO IMPROVE SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS education and increase U.S. entry into careers in STEM fields has never been greater. At USC, a number of researchers are already conducting groundbreaking research in these areas, but many of their efforts had been isolated within their respective schools and disciplines – until now.

With the university's growing emphasis on interdisciplinary research, and federal agencies prioritizing funding for collaborative research across disciplines, USC has launched a new initiative to bring researchers together for a more concentrated and collaborative effort to improve the STEM education and career pipeline.

Under the leadership of Drs. John Brooks Slaughter and Gisele Ragusa, both USC faculty with joint appointments in the Rossier School and Viterbi School of Engineering, the USC STEM Education Pipeline Consortium recently received funding from the Research Collaboration Fund and support from the USC Provost's Office. The Consortium currently includes faculty from five different schools across campus and aims to increase federally funded interdisciplinary research that advances the STEM pipeline from Pre-K through university education and into STEM careers.

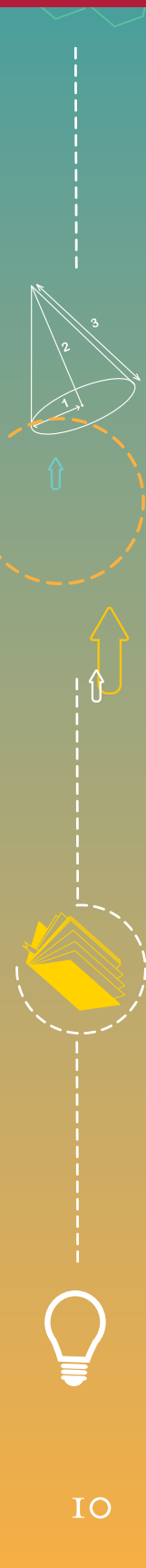
The goal of the Consortium is to make USC a national clearinghouse for STEM research, and the initiative aims to complete two large-scale federal proposals for funding in STEM education during 2011-2012. A web portal will be developed for colleagues to share best practices and success stories in STEM pipeline research.

The Consortium will hold a series of bi-monthly lunch discussions for faculty, students and local experts to present their research related to STEM education. In addition, quarterly think meetings for invited faculty will be held in the following focus areas: 1) Pre-K to 6th grade STEM Education, 2) Secondary School STEM Education, 3) Undergraduate STEM Education, and 4) Graduate Level STEM Education and Careers.

A one-day symposium featuring lectures and panel discussions on STEM education, innovation and collaboration will take place in January 2012 and involve the greater USC community. A high-profile public lecture held at the end of Spring semester will highlight the work of the Consortium to a wider audience.

Currently, more than 30 faculty members from across USC are involved in the initiative, which will hold its official kick-off in September. ■

— Andrea Bennett





RAGUSA

Among the faculty participating in the USC STEM Education Pipeline Consortium:

DR. GISELE RAGUSA is Research Associate Professor with a joint appointment in the Rossier School of Education and the Viterbi School of Engineering, and is Director of the Center for Outcomes Research and Evaluation. She has led a number of research studies in both K-12 and university STEM education. She specializes in teacher education and retention, literacy education, teacher education supervision, content literacy, early childhood special education, deaf education, engineering education, and assessment and measurement in STEM education. *(See page 22)*



DAPKUS

DR. JOHN BROOKS SLAUGHTER is Professor of Education at Rossier School of Education and Professor of Engineering at Viterbi School of Engineering. His education research has been in the areas of higher education leadership, diversity and inclusion in higher education, underrepresented minorities in STEM, and access and affordability. With a joint appointment at Rossier and Viterbi, Slaughter focuses on the intersection between engineering and education, with the goal of increasing minority participation in the science and engineering fields. *(See page 7)*



BAEZCONDE

DR. LOURDES BAEZCONDE is Associate Professor in Preventive Medicine and Sociology at the Keck School of Medicine. Her work focuses on community-based research and public health initiatives that explore the role of culture in health behaviors, with an emphasis on the elimination of health disparities.



FULLERTON

DR. P. DANIEL DAPKUS is the William M. Keck Professor of Engineering and the Director of the Photonics Center at the Viterbi School of Engineering. His research includes the development of photonic materials and devices.



TRACY FULLERTON, MFA, is Associate Professor in the Interactive Media Division of the School of Cinematic Arts, and Director of the Electronic Arts Game Innovation Lab. She is a game design expert and author specializing in game innovation, video game aesthetics and next generation games and entertainment.

LEE

DR. TED LEE is Associate Professor for the Mork Family Department of Chemical Engineering and Materials Science at Viterbi. His research is in the broad area of responsive surfactant systems, namely systems that are tunable through manipulation of some external variable.



PARKER

DR. ALICE C. PARKER is Professor of Electrical Engineering in the USC Ming Hsieh Department of Electrical Engineering at Viterbi. She is a former Division Director for Computer Engineering, a former Dean of Graduate Studies, and a former Vice Provost for Research at USC. Parker studies biomimetic synthetic neural circuits, network synthesis, and heterogeneous multiprocessor synthesis.

SHIH

MARK REDEKOPP, MS, is Associate Professor of Engineering Practice and Senior Lecturer in the Ming Hsieh Department of Electrical Engineering at Viterbi. His research is in computer architecture, high performance computing, parallel and distributed systems, multicore and multiprocessor systems.



DR. JEAN SHIH is University Professor and Boyd & Elsie Welin Professor at the Keck School of Medicine and School of Pharmacy. Her work focuses on monoamine oxidase, also known as MAO, an enzyme that regulates brain chemicals like serotonin, dopamine and norepinephrine.

STOTT



DR. LOWELL STOTT is Professor of Earth Sciences at Dornsife College of Letters, Arts and Sciences. His research seeks to understand what factors govern the behavior of Earth's climate system.

an mat stem grad passes the passion on

I'VE NEVER UNDERSTOOD WHY so many students shy away from careers in STEM. Growing up, I was always a tinkerer. I designed and built alarm systems for my bedroom; I built my own furniture and fixed our household electronics. In school, I loved and excelled in math and science. In high school, I even wrote programs to create my own computer games.

I graduated with degrees in Biomedical and Electrical Engineering and Mathematics at USC, and landed my dream job working for Hughes Aircraft Company as an engineer designing components of radar systems. One day, at a networking meeting, I was asked if I would be interested in teaching computers to gang members. So I started volunteering at an alternative high school after work, trying to teach the students how to program and network computers. However, because the students lacked math skills, they couldn't grasp concepts such as logic and numerical operations. As a result, I started tutoring the students in math. Within weeks, I had a number of students coming to my evening math tutoring class, eventually outnumbering the students that were coming to school during the day!

Most of these students had the ability to learn math, but weren't in the classrooms where excellent math teaching was occurring. And I was finding it difficult to continue to provide the students with successful tutoring and still meet the demands of my engineering job. I realized that I had to make a choice.

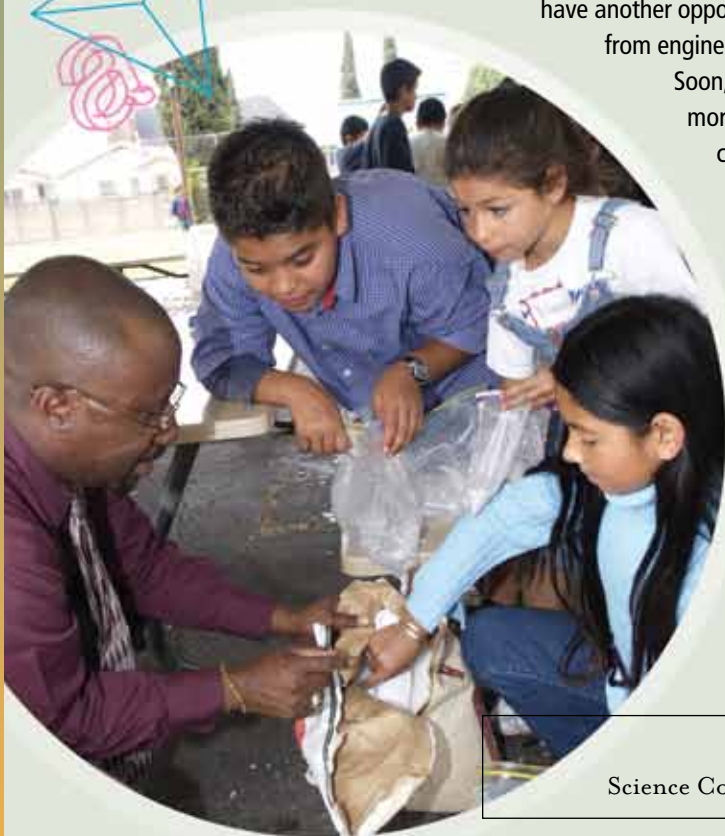
I knew that my employer could find another engineer, but these students may not have another opportunity to have an engineer as their math teacher. So I retired from engineering to become a teacher at the alternative school.

Soon, I was not only teaching math, science and computers in the mornings, but I also started teaching algebra II, calculus, physics, chemistry and computer programming in the afternoons at a private school. A few years later, I was asked to conduct hands-on science workshops in a Mission Science afterschool program for elementary school kids around the USC campus.

After teaching for 20 years with very positive feedback and what I felt were good results, I enrolled in the MAT@USC program. After only my first semester, I altered my practice of teaching STEM courses. I started videotaping my lectures so that students could review them and use them as a guide in their studies. In my science programs, I added skill-building activities to complex STEM projects

Darin Gray and students in the USC Viterbi Mission Science Program make ice cream

by DARIN GRAY (MAT '11),
Science Coordinator, USC Viterbi School of Engineering



a more engaging experience

to provide scaffolding for students' learning. I incorporated guided student collaboration and cooperation to include the social context of learning. Students now regularly work in groups, discuss their results with each other and thus learn from each other.

By the end of my first year in the MAT@USC program, I was redesigning my approach to lesson planning to identify the main ideas and concepts I wanted students to learn. Now, as an MAT@USC graduate, all of my STEM courses and my science programs are developed by first identifying my desired learning goal around a main concept, determining how to assess if learning has taken place and then creating a teaching plan. I assist students to master content by using skill building activities, multimedia presentations and formative assessments, and I encourage students and teachers to learn from each other.


As a result, my high school students understand and solve challenging science and math concepts and my science program participants are able to build projects, understanding their complex scientific and engineering principles.

STEM education is essential to the economic future and national security of this country. While it seems that student interest in STEM careers has been declining, teaching approaches such as I learned in the MAT@USC can change that by adding conceptual learning to procedural learning, providing support for learners whose interest in STEM may not match their abilities, and taking advantage of the growing trends of social interaction as a means of acquiring knowledge. ■

SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) education has been a national need for decades though it has been more recently framed as an urgent national priority. At the Rossier School, we are helping to boost the numbers of STEM workers by better ensuring that K-12 in-service and pre-service Master of Arts in Teaching (MAT) candidates have opportunities to design and deliver innovative science and mathematics lessons and instructional units. As many of our candidates reflect upon their early science and mathematics educations, they express the desire to offer their students a different, more engaging mathematics or science learning experience than they recall.

With this in mind, we have integrated STEM topics into our science education curricula hoping to inspire STEM teaching and learning by encouraging the use of technology, engineering and mathematics to support inquiry-based instruction. For example, in our MAT science and mathematics courses we have introduced innovative, research-based methods for teaching and learning. We touch on engineering by having students build models to test hypotheses. MAT candidates are immersed in information and communication technologies while taking classes where new digital media literacies are stressed. We present mathematics as one of many ways to symbolize, characterize and model real world phenomena.

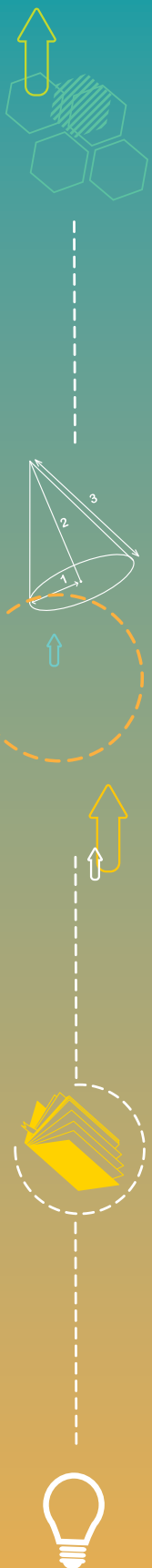
By integrating STEM into our teacher education curriculum we are anticipating and preparing MAT graduates for a future quite different than the one any of us may imagine now. As a school of education, Rossier will continue to leverage and nurture talents and interests in STEM while advancing the teaching profession in K-12 schools and impacting the national STEM workforce. ■



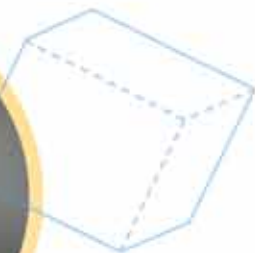
by DR. ANTHONY MADDOX
Professor of Clinical Education,
USC Rossier School of Education

Use your smart phone to scan this code for more information about Rossier's Master of Arts in Teaching program.





inventive ways to intrigue



Dr. Gary Scott



R. GARY SCOTT, Associate Professor of Clinical Education, is using the wonder of invention to spark an interest in STEM among local Los Angeles Unified School District students. His idea for what he calls the “Inventatorium” came about a year ago.

kids

“If students don’t have an emotional connection to STEM concepts, why should they care about performing well in these domains or consider STEM careers?”

(Top and Middle) Students designed and built their own pop-up books. (Bottom) Students work on a design challenge.

“I had one of those cognitive disequilibrium moments where it occurred to me that the engaging aspects of the Exploratorium in San Francisco needed to be connected to students’ creativity and invention abilities,” Scott said.

“Once students were awed and dazzled by the beauty and mystery of displays and exhibits representing STEM concepts, we needed to funnel that energy and motivation based on students’ interests.”

Scott brought the idea to 93rd Street School sixth grade teacher LaNelle Harvey, and with support from Principal Sharon Katz, they piloted the Inventatorium as an afterschool program in January.

The Inventatorium lets kids invent, design and build structures, mechanisms and devices based on their interests and creativity. Building on students’ inherent curiosity and desire to create, the Inventatorium incorporates art and patterns; building structures; motion and machines; and navigation-stargazing into activities.

For Mother’s Day, for example, students learned paper engineering by designing and creating their own pop-up books for their mothers. Students also recently engaged in a series of design challenges involving toy vehicles that included testing automotive safety with raw eggs instead of dummies; coordinating a three-car collision model for a movie scene; and designing a vehicle tug-o-war.

There is no question that the afterschool program is engaging and motivating students. “These kids really look forward to it, and as other kids hear about it, they start showing up,” Harvey said. “These kids never want to leave.”

Next fall, the program will expand to include 5th grade, and be integrated into the students’ mathematics curriculum during the school day as well. Scott said the activities help bring the creativity, imagery and emotion that is often absent from teaching practices and curricula found in K-12 educational settings.

When kids establish emotional connections to STEM concepts through their inventions, they will be more likely to fully engage in STEM subjects in school, and consider careers in STEM fields later in life, he said. “If students don’t have an emotional connection to STEM concepts, why should they care about performing well in these domains or consider STEM careers?” he asked.

Harvey said she has seen the Inventatorium ignite a passion – for these subjects in many of her students over the past year. “I’ve seen an increase in their perseverance in math. It’s been very positive in terms of developing critical thinking skills and a sense of ownership of their learning,” Harvey said. “It is coming from them, not a book or a teacher. That’s the goal – that these kids become independent thinkers.” ■

— Andrea Bennett

ADDING+MULTIPLYING "A" STUDENTS

A STEADY STREAM OF STUDENTS visited Hannah McDowell after the last day of classes at the East L.A. Performing Arts Academy. "Have a good summer, Miss!" they said, "You'd better come back next year!"

Luckily for them, Hannah is looking forward to her second year of teaching at this brand-new school. She loves her job, the students, the school, and she loves math. Her Rossier MAT ('10) and Math for America Los Angeles participation have prepared her well for the rigors and joys of teaching math in an urban setting.

Hannah majored in theater and minored in math at Occidental College. But her career aspirations crystallized when she took an undergraduate class titled, "Math Education & Access to Power," which included working with community organizers and helping to teach algebra at nearby Franklin High School. She discovered how much she adores the patterns and structure of algebra, and realized how important it is that students understand it in order to graduate. She was also thrilled to find a way to integrate her interest in performing with teaching in a way that would make math fun. "I find that there's a lot of theater in teaching," she said.

Being a first-year teacher in a brand-new school was a challenge at times. Hannah said that although Rossier prepared her well pedagogically, when she entered her own classroom she had to quickly learn school policies and procedures, and develop her own effective style of discipline. As the only remedial math teacher, she spent

many late nights developing her own curriculum. She eventually learned to take others' lessons, including many from Math for America LA, and modify them to suit her needs. Hannah also encountered a language barrier. Almost all of her students are Latino/a, and although most of them speak English quite well, many of their parents don't. Hannah grew up in Portland, where she didn't learn Spanish. She's having a friend tutor her in Spanish this summer.

The joys of teaching math at East L.A. Academy more than make up for the challenges. "This school has a strong sense of community," Hannah said. "The teachers are committed to students. We may not all have the same pedagogy, but all the teachers care and want the students to succeed. It trickles down to the students."

Hannah's eyes light up when she describes how she uses what she learned at Rossier to teach math. "First, I use a scenario that's familiar to students. Then, I ask them to represent it with pictures or symbols," she said. "Finally, I show them how a mathematician would do it."

One of Hannah's favorite moments this year involved a boy who transferred into her class for the second semester because he had done poorly in his first semester math class. He would do his work, but he'd give up if he didn't get the correct answer right away. Hannah worked with him to develop his perseverance, teaching him to solve problems one step at a time. A month before school ended, he'd brought his grade up to a C. He was very proud of himself, because he said he'd failed every math class since second grade. He aced the final, received an "A" and was named the Most Improved in the class.

It's easy to find Hannah's classroom: just look for the big USC symbol on the wall. Students created it in honor of Hannah and her neighboring teacher Brittany Silverstein, who also attended Rossier's Math for America LA program. ■ —Kathy Hernandez



Hannah McDowell surrounded by her students.

Math for America Los Angeles (MfA LA) launched in 2008 with the goal of recruiting and supporting highly skilled secondary school mathematics teachers to improve math education and address the critical shortage of math and science teachers in the region.



Use your smart phone to scan this code for more information about Math for America Los Angeles.

Rossier's APRISE global study tours find our teaching and learning commonalities and distinctions

How China Tackles STEM *a visitor's perspective*

A STRONG STEM WORKFORCE is viewed as an indicator of a nation's ability to sustain itself. The Program for International Student Achievement (PISA) is one assessment of STEM outcomes. Students in Shanghai recently surprised the world by coming out on top in both math and science, with U.S. students scoring well below that mark. While it can be argued that a single measure does not tell the whole story, is there something to be learned from these results in terms of STEM education?

The Asia Pacific Rim International Study Experience (APRISE) offered a glimpse of urban education in China and an opportunity to connect with like-minded professionals interested in curricular reform. In May 2011, I traveled with Rossier faculty and doctoral students to visit schools in Shanghai and Beijing. While we traveled across the Pacific to learn from their successes, our Chinese counterparts welcomed us with hopes of learning how the American education system fosters creativity and innovation.

Academic achievement is valued in China, yet education is compulsory only through ninth grade. In order to attend secondary school, students must pass rigorous exams. High expectations are explicit and public. Student grades are posted at the entrance of each school. The school day is full and long with little unstructured time. Curriculum is issued by the state, and texts have a simple format. Students sit in rows with the teacher at the front of the class delivering the lesson. Lessons are well organized and brisk. Not a moment of instructional time is wasted.

The efforts of Chinese curricular reform became obvious when we visited an experimental elementary school affiliated with Tsinghua University. In front of a large audience of university faculty and teachers from area schools, one brave teacher taught a demonstration math lesson to her third-grade students. The focus of this professional development session was to observe the use of exploratory learning. The student objective of the lesson was to discover the rule for the sum of the interior angles in all triangles. Students worked in groups, folding and cutting paper to solve the problem. They

argued, discussed and defended their thinking. It was a lively lesson that contrasted from what I saw in the other schools. While debating their findings, the students demonstrated facile understanding of basic geometry and numeracy. At the conclusion of the lesson, the teacher told the children about the mathematician Pascal who had developed rules for solving geometry problems.

While debriefing the lesson, the teacher revealed her reluctance to try a lesson with such undetermined outcomes. She admitted that only after having taught all the lessons in the math textbook was she willing to risk trying a differentiated approach. The teacher demonstrated courage, allowing her students to flounder with solutions that did not work. In the United States, STEM education embraces the mistakes made during exploration. Chinese students seem more comfortable with direct instruction from teachers who are respected for the knowledge they impart. Taking risks is not typical of Chinese learning. So in terms of STEM, what is the best pathway to understanding? Did the third graders internalize the concept from the exploration or from the teacher's revelation of Pascal's work? In a country where the teacher's voice is paramount, I wonder about the efficacy of such constructivist practice.

The APRISE trip to China opened my eyes to variables about excellence in STEM. While students in urban China are outperforming other industrialized nations, it is important to keep in mind that this level of academic achievement is only accessible to elite students. This homogeneity and systematic sorting of students are phenomena that U.S. schools strive to avoid. Both countries have cultural assets that contribute to student performance in STEM. Educational partnerships across the Pacific will be the key to supporting an international cohort of students in a rapidly changing, globalized world. ■

Nadia Hillman and students at Cannes experimental school in Shanghai.

Use your smart phone to scan this code for more information about the APRISE tour in China.



by NADIA HILLMAN, Rossier Ed.D. Candidate and Principal of Foothills Middle School in the Arcadia Unified School District

GREAT ALGEBRA TEACHERS^{SQUARED}

Boeing funds
online network
for Algebra
instructors.

TEACHERS WHO GET FEEDBACK from and share strategies with their peers are more likely to continue to improve than those who work in isolation. Unfortunately, teachers work alone over 80 percent of the time, and do not reap the benefits of learning from their fellow instructors. Assistant Professor Laila Hasan is determined to change that. With the help of a \$50,000 grant from Boeing, she is developing a program which will connect high school Algebra I teachers to each other online to share best practices and improve their teaching strategies. Algebra I was chosen because it has emerged as an academic gatekeeper. Students who fail to master the higher level abstract thinking skills required in Algebra I are far more likely to drop out, so it is imperative that their teachers are able to help them achieve mastery.

The program will launch this fall with 12 math teachers from four members of the USC Family of Schools: Manual Arts High School, Foshay Learning Center K-12, the Los Angeles Performing Arts Magnet and 32nd Street (K-12). They were issued webcams and earphones that work with the laptops they already use, as well as video cameras which they can use to film themselves and their students in class.

The teachers will access a custom learning portal after school hours from home. "When adult learners get to select their environment, they're more productive," said Hasan. "Teachers will be more inclined to participate when they're more comfortable and if sessions take place at a more convenient time of the day. We want to remove obstacles, and create a safe place where teachers can be critiqued and learn how to critique others."

The group will meet online with a Rossier professor to share strategies and videos of their in-class lessons and to discuss student work. They will convene both as a large group and as smaller groups in virtual "rooms" that the professor can monitor. They will also meet weekly to discuss ways to improve the program. When needed, USC student workers will help with filming and uploading videos.

This revolutionary type of hybrid learning environment has been used successfully in the MAT@USC program, but it is seldom used in schools with low-income students who are not technologically savvy. All of the participating schools face overcrowding, high teacher turnover, and a high percentage of novice teachers as well as teachers who are teaching in areas outside of their credentialed area of expertise. "These schools are very typical of urban schools," said Hasan. "The advantage we have is that we already have a relationship with these schools. This grant will allow us to do more."


An extra benefit of the program is that pre-service MAT teachers will also be able to participate in the online sessions. They will be able to observe class lessons, participate in discussions, and observe how experienced teachers evaluate their own practices. "They usually don't have access to this," said Hasan.

Hasan has long had a passion for STEM instruction. She taught middle school math for 15 years, and has also taught at the high school and elementary levels. She believes that this program could be perfect for middle school teachers, and hopes that once the program matures, it will be expanded to include more teachers and schools. ■

—Kathy Hernandez



Dr. Laila Hasan



I**N MY 12 YEARS IN URBAN SCIENCE EDUCATION**, I have observed effective science teaching and learning when teachers work together to provide engaging, meaningful science curriculum for their students and support for each other when their teaching doesn't turn out the way they planned. I have also witnessed bright young teachers who struggle to connect science content to their students and, without a support network to improve their practice, leave the teaching profession. Since the Rossier Master of Arts in Teaching contains both a small on-the-ground and a larger but geographically dispersed online cohort of pre-service science teachers in Los Angeles and across the nation, plans are underway to create the online USC Urban Science Teacher Network.

Angela and across the nation, plans are underway to create the online USC Urban Science Teacher Network.

Beginning science teachers need a variety of measures to support and retain them in the science teaching profession. Our network brings MAT students, their mentor teachers, scientists and science educators together with the goal of improving science instruction in our partner districts that serve high needs students, including Los Angeles Unified School District. Long-standing partnerships with local neighborhood schools and burgeoning relationships with the USC Biology Department and the Natural History Museum are key to this network. As the program grows, similar online professional science teaching communities will be developed in the key urban districts across the country where MAT science students live and will ultimately teach. The MAT students and their mentors in their respective schools are at the core of this network, along with USC's science education faculty. Faculty and informal science learning experts will become key sources of science process and content knowledge to provide network participants with innovative ideas to engage their students.

Many science teachers struggle to plan and implement inquiry-based science lessons in their classrooms. We know that an inquiry-based approach is important for students to understand the nature of science. The USC Urban Science Teacher Network will provide additional support as our MAT students and their mentors design meaningful experiences so that their own students learn science by doing science. Synchronous online meetings will create a space for participants to share lesson plans, content ideas, experiments, or any other topic these science teachers deem necessary. The technology that supports the online MAT@USC will also support the network. On this platform, each user creates a profile that includes contact information and geographic location, interests, and key media that he or she would like to share with the group. We will also utilize an asynchronous online forum where teachers and scientists can ask questions that are answered by the network, reducing the day-to-day feeling of isolation experienced by many beginning science teachers.

Participation in the USC Urban Science Teacher Network can add more real-world examples to the preparation program for new MAT science candidates while providing a forum for experienced science teachers to participate in a professional science teaching community. ■

High Tech Help *for science teachers*

“Our network brings MAT students, their mentor teachers, scientists and science educators together with the goal of improving science instruction...”

by DR. FRED FREKING,
Associate Professor of Clinical Education

diversity in STEM education

fixing



“Improving diversity in STEM has been overly focused on the ‘demand’ side of the problem... ‘fixing’ presumed student deficits... (We) focus on fixing the ‘supply’ side of the problem by improving the quality of STEM education.”

IT IS RARE THAT EDUCATIONAL EQUITY and workforce needs intersect, but in the past decade the education of Latina and Latino students in STEM has become a priority on both agendas. Dr. Alicia C. Dowd, associate professor and co-director of the Center for Urban Education (CUE), has spent her career advocating for equity in education. Now she’s a resource for members of Congress, federal granting agencies and individual institutions as they struggle to reconcile the nation’s needs for a STEM workforce with the realities of higher education.

Dowd and CUE Co-Director Dr. Estela Mara Bensimon’s current work focuses on transfer in STEM, particularly for Latina and Latino students. *The 2011 Expanding Underrepresented Minority Participation: America’s Science and Technology Talent at the Crossroads* report cited transfer from community college to four-year public and private institutions as one of the key barriers in the educational conduit for future scientists, doctors and engineers. While both transfer pathways and success for Latina/o students have been ongoing areas of concern for higher education, it is through work such as Dowd’s that the full extent of the challenge of these combined issues – transfer for Latina/o students – is brought to light.

Last year, Dowd testified before the U.S. House of Representatives Subcommittee on Science Research and Education. Asked to speak on the topic of broadening participation in STEM, Dowd highlighted that though Latino/a participation in STEM fields has risen, it has not kept pace with their growth within the general population. In 2007, Latina/os were awarded less than 8.2% of STEM bachelor’s degrees.

To determine practical ways of increasing Latino/a access to and success in STEM fields, CUE conducted a three-year research project funded by the National Science Foundation, titled *Pathways to STEM Bachelor’s and Graduate Degrees for Hispanic Students and the Role of Hispanic Serving Institutions*, for which Dowd served as the principal investigator. In that study Dowd examined exemplary STEM policies and programs at a variety of institutions, including Hispanic-Serving Institutions (HSIs). She sought to understand the academic options available to, and choices made by, Latina/o students.

One troubling finding of the study was that most Latina/o STEM transfer students were earning degrees in social and behavior sciences, not the “hard” sciences, which are the area of critical workforce need. Dowd along with Dr. Lindsey Malcom, a former Rossier School of Education doctoral student who is now faculty at George Washington University, found that HSIs graduate a substantially larger percentage of STEM transfers in computer science and mathematics than non-HSIs. On the other hand, HSIs are considerably behind non-HSIs in terms of awarding bachelor’s degrees to Latina/os in the biological, agricultural, and environmental sciences as well as engineering. Findings from the study were cited in congressional debate over the America COMPETES Act, which allocated funding to HSIs.

Under Dowd’s guidance, the study findings and recommendations have been picked up by federal law and policymakers and transformed into actionable items that are not only practical and responsive to current education and political realities, but maintain a commitment to equity. This equity-minded approach focuses on innovation

the supply side



and institutional responsibility. In her final remarks to members of Congress, Dowd said, “For too long, our approach to improving diversity in STEM has been overly focused on the ‘demand’ side of the problem, or ‘fixing’ presumed student deficits through attempts to improve their aspirations, motivation, or willingness to succeed. In contrast [my] recommendations focus on fixing the ‘supply’ side of the problem by improving the quality of STEM education.”

Dowd has called for bold experiments in curriculum and instructional reform, grounded in an understanding of the students themselves, known as culturally responsive practice. CUE developed an Institutional Agent’s Toolkit along with Dr. Ricardo Stanton-Salazar, designed for use by faculty, staff and administrators. The toolkit uses self-appraisal to help practitioners understand the ways in which they are acting as agents of change for Latina/o students in STEM.

Rather than expecting students to navigate complex transfer agreements, Dowd has also recommended the formation of consortia involving two- and four-year institutions in regional service areas to improve transfer access for Latina/o students from community colleges to STEM bachelor’s and graduate degrees. Last August, CUE brought together practitioners from over 15 two- and four-year colleges from across California as well as state education leaders to identify common challenges and serve as a foundation for collaborative relationships between universities and community colleges. Individuals from California Polytechnic State University, San Luis Obispo, Allan Hancock College and Bakersfield College attended. With support from the National Science Foundation, professors from Cal Poly, SLO are partnering with the community colleges to examine the STEM curricula and transfer pathways between their institutions.

In an academic climate that demands results, but not necessarily thoughtful results, Dowd has called for more comprehensive evaluation systems that measure program and cost-effectiveness, student outcomes, faculty development and changes in organizational policies. This kind of evaluation cannot be done without institutional data. CUE’s development of data tools which make the data real, actionable and accessible has made Dowd’s recommendation practical and realistic. These data tools, including the Equity Scorecard™, the Vital Signs™, and the Benchmarking Equity and Student Success Tool™, aid institutions in pinpointing the chokepoints cohorts must navigate and looking at institutional responsibility and possibility for improvement.

With critical shortages projected in the STEM workforce and ongoing need for both practical and equity-minded solutions to educational issues, the work of the Center for Urban Education and Dowd will remain at the forefront of the national dialogue on STEM education reform. ■



Dr. Alicia C. Dowd

Use your smart phone to scan this code for more information about the work of the Center for Urban Education.



global preparedness

mixing and matching

THE ENGINEERING EDUCATION RESEARCH of one Rossier professor informs university faculty about how their programs can both cultivate creative and innovative thinking among students and prepare them for the global marketplace. Graduates of STEM programs are expected to be innovative and entrepreneurial in their jobs, but no studies have explored how these programs develop such traits and constructs in college and university students.

Dr. Gisele Ragusa, Research Associate Professor in the Rossier School of Education and Viterbi School of Engineering and Director of the Center for Outcomes Research and Evaluation (CORE), designed and tested an instrument to measure the creativity and propensity for innovative thinking and design in undergraduate and graduate engineering students, which is currently being used in programs nationally.

The Engineering Creativity and Propensity for Innovation Index (ECPII) looks at self-confidence, self-strength, artistry, intellectuality, flexibility, fluency, environmental sensitivity, imagination, initiative and inquisitiveness in students.

Ragusa conducted a pilot study using the instrument with engineering students in three universities. The preliminary results revealed the subjects were both creative and innovative, with graduate students more advanced in all areas than their undergraduate counterparts. The study also indicates that creativity and innovative thinking may be nurtured in particular pedagogical contexts.

"Historically, creativity has been considered static, but this research shows pedagogical practices can nurture creativity," Ragusa said.

Her study and the ECPII have the potential to help educators design engineering programs that inspire creativity and innovation.

In another recent study, Ragusa took on another critical component to success in STEM education and careers – preparation for global workforces.

"Global preparedness is on the minds of people who are leaders for ABET, Inc. (Accreditation Board for Engineering and Technology), and one of the main expected outcomes for undergraduates," she said. "For the last 10 years, engineering programs nationally have done things like Engineers Without Borders, but they haven't measured their effect on preparing engineers for global workforces."

With the growth of technology and the global economy, American engineers need to be ready to work with team members around the world and solve problems with global impact. The National Academy of Engineering has urged universities to prepare engineers for the skills necessary to excel in diverse, globally-focused engineering environments.

Ragusa assessed engineering students with an Engineering Global Preparedness Index to gauge their competencies in these "soft" and highly relevant globally-focused engineering skills. The index, which is now used at 17 universities, looks at engineering ethics or moral responsibility, engineering efficacy or belief that one can make a difference, and engineering community connectedness.

Her study revealed that when international students were mixed with U.S. students from diverse, urban areas, the group increased in global preparedness levels as a whole.

Internationally experienced engineering students studying in the U.S. had high levels of engineering ethics and community connectedness, while students who grew up in small towns in America had lower levels in these areas.

Finally, her study found that students were best prepared for a global workforce when they had international experiences extending beyond two weeks with immersion in relevant contexts, suggesting the value of international study experiences to engineering education. ■

— Andrea Bennett



PEOPLE OF COLOR, who will make up the majority of the country's population by 2050, continue to be underrepresented in STEM fields. USC Rossier Assistant Professor Tatiana Melguizo believes this could change if they knew how much more money they would make in these fields.

Research shows that when selecting a college major, people are influenced by how much money they can ultimately make. Melguizo, along with Gregory Wolniak of the University of Chicago, examined the economic benefits among low-income and high-achieving minority students who major in a STEM field in college and how these students fair once in the labor market. The study is forthcoming in the journal *Research in Higher Education*.

The study was conducted as part of a program to promote the use of data from the Gates Millennium Scholarship (GMS) program funded by the Bill & Melinda Gates Foundation. Its findings provide policymakers and college administrators with evidence suggesting the importance of major field of study and occupational congruence in terms of economic returns to education. In other words, it pays off when STEM college graduates get jobs in STEM fields.

Based on the study of more than 1,000 GMS program applicants over a nine-year period, Melguizo found these low-income and high-achieving minority students made more money in their careers when they majored in STEM fields and even more money when they both majored and pursued jobs in STEM fields.

Students who majored in STEM, biological sciences and professional fields earned between 26 percent to nearly 40 percent more than students who majored in humanities and education fields. But Melguizo also found that some students with degrees in STEM majors end up in careers in other fields, affecting their earning potential.

A STEM major with a job in another field still has an earnings premium of about 25 percent, according to Melguizo's research, but a STEM major with a job in a STEM field has a premium in excess of 50 percent. Major-job congruence affected income across disciplines, and graduates who got jobs in the fields they studied in college made more than those who did not in all cases, except for the social sciences.

"It would be good if universities and potential employers became aware that they have to educate students that if they get a job in a STEM-related occupation, they have an even higher earning premium," Melguizo said. "Otherwise, the

students are not reaping the economic benefit of all of the pain and hard work they went through as undergrads."

Melguizo also discovered some interesting discrepancies by minority group worth further research.

In terms of earnings, African American STEM majors made less money than any other minority group in the same field, but African Americans who majored in education made more than other minority groups in the same field. In the study, African Americans were also the least likely group to get a job in the field they studied, which could be due to a number of factors – from individual preferences to occupational discrimination, Melguizo noted.

The Big Payoff *for studying STEM*

Melguizo said universities may need to use tailored strategies to reach out to and provide career and occupational development to students of different racial/ethnic groups.

A more holistic approach to increasing the number of minorities entering STEM careers would strengthen the STEM pipeline and better help America meet the growing demand for an educated workforce with the skills needed for its future success.

"The STEM pipeline will only be truly strengthened when students pursue occupations and advance to positions of power that will enable them to succeed economically, contribute to society, and generate the critical mass necessary to encourage other low-income and minority groups to pursue this track," Melguizo said. ■

— Andrea Bennett



Dr. Tatiana Melguizo

New Faculty at Rossier



Dr. Gale Sinatra

Dr. Gale Sinatra joined the Rossier faculty as Visiting Professor of Education in July. She comes from her previous appointment as Professor of Educational Psychology at the University of Nevada, Las Vegas, where she served on the faculty since 2000.

Sinatra is the outgoing Editor of the American Psychological Association (APA) Division 15 journal, *Educational Psychologist*. She is currently Vice President of the American Educational Research Association (AERA) Division C, Learning and Instruction, and a Fellow of both APA and AERA.

Her recent research focuses on understanding the cognitive and motivational processes that lead to successful learning in science. Specifically, Sinatra focuses on the role of motivation and emotion in teaching and learning about controversial topics, such as biological evolution and climate change.

Sinatra developed a model of conceptual change learning, which describes how motivational factors contribute to the likelihood that individuals will change their thinking about a scientific topic. Her co-edited volume with Dr. Paul Pintrich, *Intentional Conceptual Change*, examines the students' role in facilitating their own knowledge change.

Sinatra received her B.S., M.S. and Ph.D. in Psychology from the University of Massachusetts, Amherst.



Dr. Brendesha Tynes

Dr. Brendesha Tynes joins Rossier as Associate Professor of Education in January.

Presently, Tynes is an Associate Professor of Psychology, Educational Psychology, and African-American Studies at the University of Illinois, Urbana-Champaign. She was a UIUC Distinguished Scholar from 2010-2011, and was named one of *Diverse: Issues in Higher Education Magazine's* Top Emerging Scholars for 2010.

Her research focuses on adolescent and emerging adult constructions of culture, race and identity in online settings, and associations between online victimization and psychological adjustment.

Tynes was awarded a grant from the National Council of Black Studies to explore African American girls' gaming and computing as a gateway to STEM participation. Although African Americans play video games at higher rates than the general population, their use is not translating into STEM interest and performance as may be the case for white youth, according to Tynes. Research on African American boys suggests that this may be due to different situated practices while playing games.

Tynes received her B.A. from Columbia University, M.A. from Northwestern University, and Ph.D. from UCLA.

Faculty News

Dr. Rob Filback was elected as Assistant Chair of the College and University Division for 2011-2012 and Chair for 2012-2013 for the California Teachers of English to Speakers of Other Languages (CATESOL) Association.

Dean Karen Symms Gallagher was awarded the Phi Delta Kappa International Service Key by the USC chapter of PDK. The service key is awarded to members who have contributed meritorious service, outstanding leadership or significant research to PDK.



*Dr. Mary Helen
Immordino-Yang*

Dr. Mary Helen Immordino-Yang was featured in the May/June 2011 issue of the *Association for Psychological Science (APS) Observer* as a "Rising Star." Immordino-Yang was also elected to the Board of Directors for the International Mind, Brain and Education Society (IMBES).



Dr. Darline Robles

Dr. Darline Robles was appointed to President Obama's Advisory Commission on Educational Excellence for Hispanics in May. Robles served as the first Latina Superintendent of the Los Angeles County Office of Education from 2002 to 2010 prior to joining Rossier as Professor of Clinical Education. The prestigious commission is charged with advising the President and Secretary of Education on matters pertaining to the educational attainment of the Hispanic community.



Dr. Sylvia Rousseau

Dr. Sylvia Rousseau was honored with the Distinguished Alumni Award from Wake Forest University, where she earned her B.A. in English with a minor in French in 1968. She was selected for her career as a teacher and education administrator, her work to unite communities in support of public education, and her work on behalf of schools facing deep challenges.

Dr. John Brooks Slaughter was conferred an Honorary Doctor of Science at Howard University at its 2011 Commencement Convocation. It was Slaughter's 30th honorary degree. (See page 7)



Dr. Kristan Venegas

Dr. Kristan Venegas was among 12 Trojans to receive the 2011 Remarkable Women Award, which recognized her accomplishments in the field, her contributions to USC and her commitment to issues involving students and women.

Dr. Priscilla Wohlstetter delivered the prestigious Tisch Lecture at Teachers College, Columbia University in March. Wohlstetter served as 2010-2011 Distinguished Tisch Lecturer and Visiting Professor at the college. Her lecture highlighted how schools and school systems are forming strategic partnerships with government, non-profit and for-profit groups, as well as each other, to solve financial, political and capacity challenges.

Center for Higher Education Policy Analysis
and Game Innovation Lab

Pioneer College Knowledge Game

\$1 Million Bill & Melinda Gates Foundation Grant is added to previous funding

***“We know we
need more
people to
become college
educated...
And we know
there are
people in high
school today
who could go
to college but
don’t know how
to do it.”***

Researchers at USC’s Center for Higher Education Policy Analysis and the University’s Game Innovation Lab will soon debut a new card game that seeks to link underserved high schoolers with college-going knowledge.

Application Crunch will be available through online purveyors including Amazon.com in September. USC gave away 1,000 free copies of the first edition of the game to college counselors in high-need schools across the country, and the USC Rossier School’s Center for Outcomes Research and Evaluation has been testing and tracking results.

“We’re trying to reduce the mystery in the college application process,” said USC University Professor William G. Tierney, director of the Center for Higher Education Policy Analysis.

“We know we need more people to become college educated,” he said. “And we know there are people in high school today who could go to college but don’t know how to do it.”

The suite of games – called *Collegeology* – seeks to increase college-going rates among underserved students who may be the first in their families thinking about going to college. They may also lack meaningful college guidance as students in overcrowded high schools, Tierney said.

The *Collegeology* project began with internal support from the Provost’s office of the University of Southern California and grants from The Rosalinde and Arthur Gilbert and TG Foundations. In recent months, the project received \$1.5 million in funding from the U.S. Department of Education’s Institute of Education Sciences (IES).

In July, the project got another big boost: A \$1 million grant from the Bill & Melinda Gates Foundation to kick off the development of two additional games aimed at helping students hone their college knowledge. One will be aimed at middle schoolers with the second focused on educating students in high school and beyond about financial literacy and college choice.

In January, *Application Crunch* will be available to an even larger audience as an online game on the social networking site Facebook.com. ■

— Merrill Balassone



Major Faculty Grants *February to June 2011 (in alphabetical order)*

Dr. Alicia Dowd was awarded \$250,000 from The Teagle Foundation for the project, "Expanding Transfer Pathways into Private Postsecondary Institutions for Underrepresented Community College Students: A Pilot Study." The pilot project is expected to expand the transfer pipeline for and success of historically underrepresented students from public two-year community colleges into private nonprofit four-year institutions. The project involving Whittier College and Loyola Marymount University launched this summer. The goal is to scale up this pilot to include other private four-year colleges through the Council of Independent Colleges.

Dr. Sandra Kaplan was awarded a subcontract for a \$300,000 grant from the Department of Education as part of a Magnet School Assistance Program grant awarded to LAUSD to promote desegregation and enhance student achievement in four schools throughout the district. USC's affiliation is with the Tom Bradley Elementary School, which will focus on Politics and Government within the larger framework of Globalization. Curriculum units inclusive of the prompts of depth and complexity, thinking like a disciplinarian, and critical and creative thinking will be developed. The Tom Bradley school will become a demonstration school for professional development and Guided Practice (student teaching) for the MAT and MAT@USC online programs.



Dr. Sandra Kaplan



Dr. Julie Marsh

Dr. Julie Marsh received a grant of \$344,000 from the Spencer Foundation for "Bridging the Data-Practice Divide: How Coaches and Data Teams Work to Build Teacher Capacity to Use Data." The study will examine how data coaches, literacy coaches and data teams are used in a sample of middle schools to build teacher capacity for using data to guide instruction. Drawing on socio-cultural learning theory and building on past research, this exploratory study will attend to individual and contextual factors and conditions that likely mediate the work of these capacity-building agents (CBAs) and how teachers learn to interpret and act on data, paying particular attention to CBA expertise, domains of support (e.g., filtering, modeling), and type of data (e.g., test score results, student work). The study is being conducted in partnership with Jennifer McCombs at RAND.

Dr. Sylvia Rousseau received a \$200,000 grant from The Ford Foundation for her project, "Extended Learning for Teachers and Students," connecting Crenshaw High School students and teachers to the community. The intent of this grant is to expand the capacity of teachers to plan and implement interdisciplinary problem-based learning in two of the school's small learning communities: the Business and Entrepreneurship Academy and the Social Justice Academy. Students will develop identities as critical thinkers and problem-solvers in the context of the classroom, community-based organizations, corporations, small businesses, their neighborhoods, and the world through real-life experiences and technology.

Additional Grants *February to June 2011 (in alphabetical order)*

Dr. David Dwyer was awarded \$27,000 from the USC Neighborhood Outreach program to create an introductory project for all future incoming USC Hybrid High School students.

Dr. Sandra Kaplan was awarded a \$30,000 grant from the California Foundation for the Gifted for the purposes of studying the contemporary attributes of giftedness.

[*Continued on page 28*]

Grants *Continued from page 27*

Dr. Adrianna Kezar received a \$12,000 grant from the 2011 John Randolph Haynes Foundation Faculty Fellowship to support her study of non-tenure track faculty and positive policies and practices. She also received \$30,000 from The Teagle Foundation for the project, "Student Success as Faculty Profiles Shift: Creating Institutional Solutions for Non-Tenure Track Faculty Majorities."

Dr. Tatiana Melguizo was awarded a \$40,000 grant from the Spencer Foundation for her study, "Evaluating the Effectiveness of a National Level Financial Aid Program on Increasing Access to Postsecondary Education for Low-Income Students," which looks at the effect of receiving an ACCESS grant and/or loan on the enrollment and persistence rates of low- and middle-income students in Colombia.

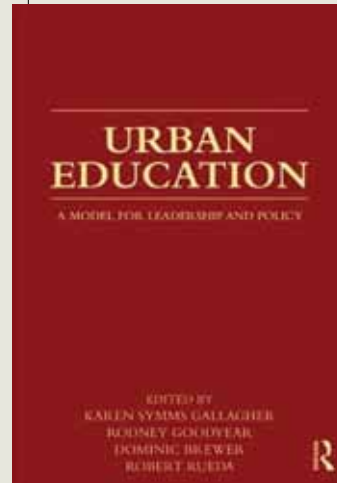
Dr. Morgan Polikoff received a \$24,000 grant from USC's Advancing Scholarship in the Humanities and Social Sciences (ASHSS) program for his proposal, "Content and Instructional Strategies for Students with Special Needs."

Dr. Katharine Strunk was awarded the 2011 National Academy of Education/Spencer Postdoctoral Fellowship for her proposal, "Changing Collective Bargaining Agreements in California Public Schools." She is one of 20 early career scholars working in critical areas of education research who were selected for the \$55,000 award this year.

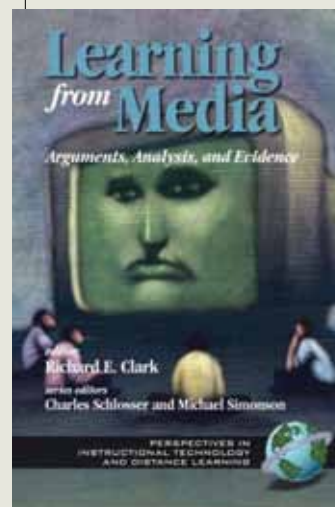
Dr. William G. Tierney received an Angell Foundation grant of \$50,000 and an Ahmanson Foundation grant of \$50,000 for SummerTIME 2011 (see page 4). Tierney also received a \$10,000 Sterling Foundation grant in support of Increasing Access Via Mentoring 2011.

Publications

Dr. Karen Symms Gallagher, Dr. Rodney K. Goodyear, Dr. Dominic Brewer and Dr. Robert Rueda are editors of a new book out this fall, published by Routledge. The book, *Urban Education: A Model for Leadership and Policy*, examines leadership, accountability, and learning and motivation in the context of urban education settings. Each chapter within the book addresses the current status of equity and issues related to helping urban educators achieve equity.



Dr. Richard Clark edited the new book, *Learning from Media: Arguments, Analysis, and Evidence*. The volume incorporates essays questioning the meta-analyses of computer-based instruction research, Robert Kozma's counterpoint theory of "learning with media," science-based technology versus experience-based craft, and science-based "authentic technologies."





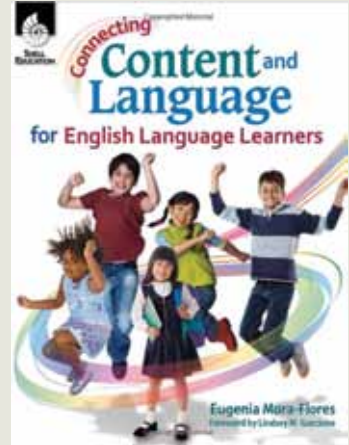
Dr. William G. Tierney and Dr. Guilbert Hentschke co-authored a report on ways non-profit and for-profit higher education must change to meet the demand for an educated workforce. The new report, "Making It Happen: Increasing College Access and Attainment in California Higher Education," makes eight key recommendations. These include having private schools teach

classes on public campuses, and state funding for non-profit private schools to grow their enrollment by up to 10 percent.

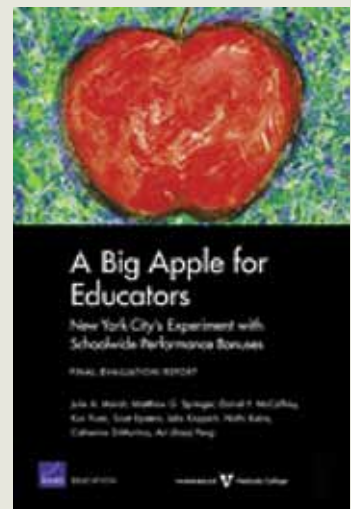
Dr. Priscilla Wohlstetter and the Center on Educational Governance (CEG) released the fifth annual "USC School Performance Dashboard" (formerly CSI-USC), which ranks California charter schools based on academic ratings, financial health and school productivity indicators, and compares charter and non-charter public campuses during the 2009-10 school year.



Dr. Eugenia Mora-Flores published her third book on English Learners. *Connecting Content and Language for English Language Learners* shares with teachers how to support the needs of English Learners across the curriculum. It begins with essential features of literacy and English language development for ELs, and goes on to address academic language development in the content areas.



Dr. Julie Marsh was lead author of a RAND study titled "A Big Apple for Educators: New York City's Experiment with Schoolwide Performance Bonuses." The report found that a New York City schoolwide performance bonus program had no effect on students' test scores, on grades on the city's controversial A to F school report cards, or on the way teachers reported doing their jobs. New York City ended its program as a result of the report's findings.





Brent Noyes and his daughter Alexis at a USC game

Brent Noyes (B.S. '75, M.S. '79) is one of the more recognizable faces at USC Rossier School of Education gatherings, including Board of Councilor meetings, alumni events and Homecoming tailgates. The fourth-generation Los Angeles-born and second-generation USC graduate, with 35 Trojans in his family, has a long and loyal history with his Alma Mater.

With his recent retirement as Principal of Arroyo Vista Elementary School in South Pasadena Unified School District, Brent expects to get even more involved.

"After 37 years in education, I felt it was time to do my own thing, do more alumni activities, and be available for Dean Gallagher if she needs anything, because I really believe in what she does and the direction the school is headed," said Brent, who has been a member of the Rossier Board of Councilors since 2007.

He fell in love with education while student teaching as a music major, and while searching for a teaching job, it didn't take long to witness the impact his USC education and the Trojan network would have on his life.

"I stopped by Glendale (Unified School District) to put in my paperwork, and the head of HR asked if I went to 'SC and if I wanted to go on a job interview right then, so I did," he recounts. He had not even driven all the way home before the district called him to say he was hired. "It's been that way my whole career. It's the true connections you make at USC."

Similar connections led him from teaching to administration for the Glendale district. While there, he helped move a Glendale school to a year-round schedule to accommodate a huge influx of Armenian immigrant students – from 400 to 1200 – seeking

Another Alumnus Continues the Tradition of Giving Back

refuge from the devastating Armenia earthquake.

Later, his network recruited him to be Principal in La Canada Unified School District (Palm Crest Elementary), then Principal in Las Virgenes Unified School District (Willow Elementary and Yerba Buena Elementary), where he served for 11 years and oversaw the construction of a new school – to which he added some Trojan Spirit. "We used 'SC colors," Brent slyly acknowledges, "but we didn't tell people. Then we built an amphitheater that looked like the Los Angeles Coliseum. So there was an 'SC touch there."

Two years ago, Brent received another call about an opening in South Pasadena where he served until his recent retirement.

In addition to increasing his already heavy involvement with Rossier, Brent plans to continue with his music – he regularly sings at Saint Sophia Cathedral at Pico and Normandie, he's looking into opening a charter school locally, and he and his daughter Alexis will likely be spotted at many of the USC football games.

Brent is a member of the USC Alumni Association Board of Governors, past president of the USC Rossier Alumni Support Association, former president of the USC Education Alumni Association and former member of the USC EDUCARE Board of Directors.

For the last several decades, Brent has underwritten all of Rossier's Homecoming tailgates, which bring together alumni from throughout the years to celebrate. He is also committed to supporting and mentoring incoming and current students, stating: "We don't just graduate and leave. We graduate and then help others graduate, too."

He is excited about the strength of Rossier's leadership. "The dean is a visionary person who gets the best people around her to support her vision, and she continues to raise the bar," he said. "We can all be conduits and connectors to deliver on these dreams – whether it's financially or to give advice or to organize a meeting. It's about listening to what is needed and giving back any way you can.

"That's what the Trojan Spirit is." ■

— *Andrea Bennett*

The Annual Fund for Rossier

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The Academy

The Academy brings together Rossier's most generous and loyal alumni and friends who support the School through a yearly contribution of \$500 or more. Gifts can be designated to the Annual Fund or other Rossier programs. Your leadership level investment helps maintain the highest level of excellence that produces innovative thinkers, global leaders and pioneering change agents in the world of education. Academy members receive special recognition and are invited to key events throughout the year.

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*Total gift amount may include matching funds to Rossier.

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Donors that make a lasting commitment by including the USC Rossier School of Education in their estate plans are recognized during their lifetime in The Legacy Society. If you have included Rossier in your estate plans, we would like to honor you. Please let us know by contacting Anne Wicks, Assistant Dean for Advancement, at awicks@usc.edu or 213.740.3498.

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New Staff Members

Join Advancement Team



Clyde Derrick



Diana Hernandez



Kathy Hernandez



Sean Stowe

THE ROSSIER OFFICE OF ADVANCEMENT welcomed several new team members in recent months. Led by Assistant Dean for Advancement **Anne Wicks**, the office heads Rossier's fundraising efforts and alumni outreach in support of the school's expected growth.

CLYDE DERRICK is Director of Foundation Relations. He is responsible for identifying and cultivating foundations that can support faculty projects and research, contributing to the philanthropic income of Rossier.

Clyde is an alumnus of Pomona College (BA, English and Creative Writing) and USC (MFA, Cinema). He worked in the film industry as a story analyst and development executive on films including *The Sixth Sense* and *The Curious Case of Benjamin Button* before transitioning to nonprofit fundraising. In his first development position at the Autry Museum, he was responsible for securing a \$250,000 Getty grant and most recently was Associate Director of Foundation Relations at Art Center College of Design in Pasadena, where he increased foundation giving over one year by 32 percent.

DIANA HERNANDEZ is Director of Annual Giving. She manages the annual giving program, and works with leadership giving, telemarketing and direct mail campaigns for Rossier. She comes from UCLA, where she was Development and Events Manager for the Henry Samueli School of Engineering and Applied Science.

Diana's experience in higher education advancement includes annual giving, volunteer and event management, and

communications. At UCLA, Diana exceeded annual fund goals, strengthened alumni participation and revitalized the student giving program. In her spare time, she enjoys volunteering with elementary and high school youth. Diana received her BA from UCLA, but has a Trojan in the family – one of her brothers is a USC senior.

KATHY HERNANDEZ is Social Media Strategist, dividing her time between Rossier's communications and advancement departments. In this capacity, she helps the school leverage new media tools for communications efforts and alumni community building.

Kathy has designed over 150 websites for a variety of clients over the past 10 years. She has also served as a PTA President in the La Canada Unified School District at the elementary, junior high and high school levels, and served as the President of the local educational foundation. She's been a member of the Governing Board of the Stanford Associates, and has written a class notes column for the *Stanford Magazine* for over 20 years. She and her husband live in Pasadena, and have two children, one a USC sophomore.

SEAN STOWE is Administrative Assistant for the Office of Advancement. She provides support to Anne Wicks and is responsible for day-to-day administrative and operational procedures. Most recently, she was the Assistant to the Dean, Library and Information Access at San Diego State University.

Upcoming Events

Global Conference Panel *Oct. 13-15, 2011*

The Rossier School will be partnering with the USC Marshall School of Business' Society and Business Lab (SBL) to sponsor a panel discussion that is part of the University's Global Conference, to be held in Hong Kong October 13 to 15.

The panel, titled "Harnessing Technology and Scale for the Common Good," will explore how to create and maintain an environment that facilitates innovation, and will address the limitless possibilities that come from technology, entrepreneurship and leaders dedicated to impact in their sector.

Among the panelists will be Rossier Dean Karen Symms Gallagher; Josh Cohen, City Light Capital; Tracy Fullerton, Director of USC Game Innovation Lab; and Steve Atamian ('04), co-founder of Global Brigades. SBL's founding director, Adlai Wertmann, will moderate. All Global Conference attendees are invited.

Rossier Homecoming Tailgate *Nov. 12, 2011*

This year, Rossier School of Education will host its annual Homecoming Tailgate before the Saturday, November 12, game against Washington.

Stay tuned for more details.

Trojan League of O.C. Fundraiser *March 28, 2012*

The Trojan League of Orange County, a 50-year-old University alumni association, has designated the Rossier School to be the recipient of proceeds from its annual spring fundraiser, themed "OC Educators: Top of the Class."

The event, scheduled for Wednesday, March 28, will be held at the Turnip Rose banquet facility in Costa Mesa. Invitations will arrive in January and ticket prices will be \$100 per person. The event will feature both a live and silent auction, and all money raised will go to support scholarships for Rossier Master of Arts in Teaching (MAT) students.

For an invitation, please go to www.tloc-usc.org.

USC Rossier School of Education

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We are very honored to have a group of board members who support, advise, advance, promote and advocate for the USC Rossier School of Education in the fulfillment of our mission.

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