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CAL POLY POMONA Mathematics and Statistics

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Meet Dr. Adam King



The Department of Mathematics and Statistics is happy to announce that Dr. Adam King will be joining the department this fall as our newest faculty member in Statistics.

Adam grew up in Knoxville, Tennessee, where his dad was a law professor at the University of Tennessee and his mom was a math teacher. He majored in math at the University of Georgia, then entered UCLA's math Ph.D. program intending to study logic. However, after a year in the program he decided he wanted to do something more applied, and around that time, by chance, met another graduate student in UCLA's Biostatistics program who convinced him to switch programs. Since then, he's been enjoying applying math, statistics, and computer programming to solve problems in public health and medicine. Also while in the Biostat program, he became friends with another Biostat student working with his advisor. After years of knowing each other, he asked her out on a date, and they were married last summer!

CeMaST Awarded Largest Ever CPP Grant



The Center for Excellence in Math and Science Teaching (CEMaST) successfully authored a proposal for a Math and Science Partnership Grant through the National Science Foundation called RESPeCT: Re-invigorating Elementary Science Education through a Partnership with California Teachers. Congratulations to the leadership team of Professors Nicole Wickler (Cal Poly Pomona, CEMaST, PI), Paul Beardsley (Cal Poly Pomona, Biology and CEMaST, Co-PI), Arlo Caine (Cal Poly Pomona, Mathematics and Statistics, Co-PI), and Dr. Kathy Roth (support partner company BSCS, Co-PI), and Deputy Superintendent Stephanie Baker (Pomona Unified School District, Co-PI). At nearly \$7.8M, this is the largest grant ever awarded to Cal Poly Pomona. This five year project will provide a large-scale long-term sustainable implementation of a proven professional development technique to elementary teachers in the Pomona Unified School District and analyze the breadth of its effect on teachers and students throughout the entire district. The goal of the program is to improve science teaching at the elementary level by coupling science instruction with mathematics teaching and English language arts, a philosophy in line with the Common Core State Standards (CCSS) in Mathematics recently adopted by the State of California. Math & Stat Professor Arlo Caine notes that Professors Wickler and Beardsley and Dr. Roth did the lion's share of the work in getting this proposal composed, polished, budgeted, and ready for presentation, but is eager to work with the Cal Poly Pomona science experts, PUSD teachers, and BSCS curriculum specialists through this enriching partnership for our community.



Sharon Muehlbacher Honored

Congratulations to Ms. Sharon Muehlbacher who received the 2012-2013 Department of Mathematics and Statistics's first Annual Excellence in Teaching Award. Ms. Muehlbacher has taught at Cal Poly Pomona as both a graduate teaching associate and lecturer. She earned her Masters of Science in Mathematics Degree from Cal Poly Pomona in 2010, writing her thesis under the direction of Professor Hubertus von Bremen. Last year, Ms. Muehlbacher became the Department Coordinator of the Preparatory Mathematics Program. The Department Teaching Award Committee, consisting of Professors Berit Givens, Amber Rosin and Jennifer Switkes, made the announcement of Ms. Muehlbacher's Excellence in Teaching Award after reviewing departmental nominations. This Excellence in Teaching Award includes a one-time honorarium of \$200. Congratulations will be extended to the 2013-2014 awardee this fall.

Christina Schwaller Joins Support Staff

At the end of the spring quarter 2013 Ms. Christina Schwaller was hired into the Mathematics and Statistics Department staff at the Administrative Support Assistant I level. Ms. Schwaller graduated from Cal Poly Pomona with her bachelor's degree in Psychology in June 2013. Prior to her ASA I appointment, she worked as a student assistant in the Mathematics and Statistics Department office for two years.



Laurie Riggs named Director of CEMaST

During fall 2013, Mathematics Education Professor Laurie Riggs was promoted to the position of Director of CEMaST. While taking on this new leadership role with CEMaST, Professor Riggs is still maintaining her membership and many of her responsibilities with the Mathematics and Statistics Department. However, Dr. Riggs will scale back on the number of classes she currently teaches. In this regard, her teaching contributions will be dearly missed. On the other hand, as a result of Professor Riggs' experience with the Department of Mathematics and Statistics, we look forward to our Department and the Center working together more closely in the future. Former CEMaST Director, Dr. Nicole Wickler, is now listed as CEMaST Research Director. Professor Wickler is expected to focus much of her attention and time on the \$7.8 Million RESPeCT grant.

Fall Gift of Numbers!

by Greisy Winicki-Landman

In the Fall quarter, the MAT 495 students were engaged in two off-campus activities. They volunteered at the annual conference organized by the California Mathematics Council (CMC-S). The event took place the first weekend of November in Palm Springs.

On November 20, these students were responsible to run our traditional Gift of Numbers event. This time the math night took place at Simons Middle School located in Pomona Unified School District. There were about 150 local kids and several parents. During this event Cal Poly students run mathematical games and hands-on activities for the kids and their families. It was a great success as they had a non-traditional opportunity to review several mathematical ideas like number theory, algebra, geometry and probability.



Winter Gift of Numbers!

by Ann Shedden

The Winter quarter "Gift of Numbers" was held at Barfield Elementary School in Pomona. Cal Poly students in the mathematics education classes (Math 194, 394, 395, and 494) designed games and activities based on the California Common Core Curriculum Standards and took them out to the school for the elementary students. This was the first time that Billy Bronco attended with us, and he was a favorite with the children. The Liberal Studies Club judged the games and awarded prizes for the activities that had the best merits.



From My Sabbatical in Uganda!

by Jenny Switkes

This past Fall, I taught at Makerere University in Kampala, Uganda. I had an amazing semester! I taught two sections of Differential Equations, to a group of Education students and to a combined group of Quantitative Economics and Actuarial Science students. Altogether I had about 280 students! Makerere is the top Ugandan university. My students were very bright and enthusiastic, and they impressed me over and over again. Most of the students grew up in villages, often without electricity. At Makerere, they are capably working on their Bachelor's Degree at a very high level. I remember how one day, as a student finished a complicated problem involving variation of parameters for first-order differential systems, he asked me "when are you going to give us the hard problems?"

Uganda has a difficult history, including both the rule of Idi Amin and the more recent activity of Joseph Kony. It is a former British colony and gained its independence in 1962. English is an official language of Uganda, although for virtually everyone it is not their first language. All the instruction at Makerere University is conducted in English. However, the differences between Ugandan/British English and American English were interesting. Who knew that professors in Uganda do not "proctor" exams but rather "invigilate" exams? Or that "review" is called "revision"?



This photo shows me with a group of children from a children's choir. Thanks to KME, these are some of the recipients of the clothing you donated (whoever donated the blue t-shirts can see those shirts in the picture!). I hosted the children for a visit to campus to encourage them to think big – some of them may end up attending Makerere University when they get older! The children met a couple of my friends, had a snack at a canteen on campus, and even played a mathematical game on the guest house lawn!

On the research side of things, I collaborated with three mathematicians in the department, Prof. Joseph Mugisha, Dr. Betty Nannyonga, and Ph.D. student Julie Nakakawa. We worked on the mathematical

modeling of the tick-borne disease Crimean-Congo Hemorrhagic Fever. Last summer, there were six cases of this disease in Uganda, two of which resulted in death. The disease has had small but deadly outbreaks in a number of countries in parts of Africa, Europe, Asia, and the Middle East. Our models are SIR-type nonlinear systems of differential equations involving populations of ticks, livestock hosts, and humans.

In short, I had a wonderful time with my Ugandan colleagues and students, and I look forward to my continuing connections with them!

Summer 2013 Student Research Experiences

Last summer, many of our students had the opportunity to attend various summer REU programs around the country. Below are descriptions from two such students.

Alicia Arrua

I was at MSRI-UP in Berkeley for six weeks. The program was on algebraic combinatorics.

The academic and research portion of the 2013 MSRI-UP was led by Prof. Rosa Orellana from Dartmouth College. Professor Orellana has supervised over 30 undergraduate student research projects, several of which resulted in senior thesis containing original research. Many of her students have continued their mathematical education in PhD programs.

Algebraic combinatorics is an area of mathematics that studies objects that have combinatorial and algebraic properties. An example of such an object is the ring of symmetric functions. In algebraic combinatorics, we use algebraic methods to answer combinatorial questions, and conversely, apply combinatorial techniques to problems in algebra.

My group's abstract is:

Consider the sequence $[x, f(x), f(f(x)), \dots, f^{n-1}(x)]$ where f is a real-valued function and $n > 1$. We can associate a permutation to every such sequence by comparing it with $x_1 < x_2 < \dots < x_n$, where $x_i = f^{j-1}(x)$ for some $j = 1, 2, \dots, n$. Permutations that arise from these sequences are called allowed permutations and those that do not are called forbidden permutations. For example, the logistic map, $f: [0, 1] \rightarrow [0, 1]$ is defined by $f(x) = rx(1-x)$ where $0 < r < 4$, for any x . We focus on enumerating the number of forbidden permutations for the logistic map and other functions, including trigonometric functions. For example, for the $n=3$ case, we have found that the one-line permutation (321) is a forbidden permutation for the function $\sin(\pi x)$.

Natalie Gasca

I participated in the Diversity Summer Internship Program at Johns Hopkins University this summer. At the Bloomberg School of Public Health, I learned about the breadth of public health and its many applications that interest me. My project was regarding the contraceptive practices of women in Africa, and it involved lots of coding using Stata. After my 9 weeks there, I created a poster, presented my work to interested individuals, and practiced writing a scientific article. Apart from listening to numerous professionals, it was wonderful meeting the other 20 students from across the country. I even got to visit DC and Virginia since I was staying in Baltimore. I got to return for the first 3 weeks in September since I received an NIH Diversity Supplement Grant, and I am currently working on finishing up our article so that it can get published. This internship was extremely helpful, as I plan on studying biostatistics and behavioral health after Cal Poly Pomona.

Another Great Year for KME

by Vanessa Salvary

It was our goal to expose new, and returning members, to the vast job opportunities that involve mathematics. Whether or not people are going into a field that directly involves math, we wanted to educate members on how a wide breadth of topics can take them a long way, maybe somewhere they didn't know would be possible.

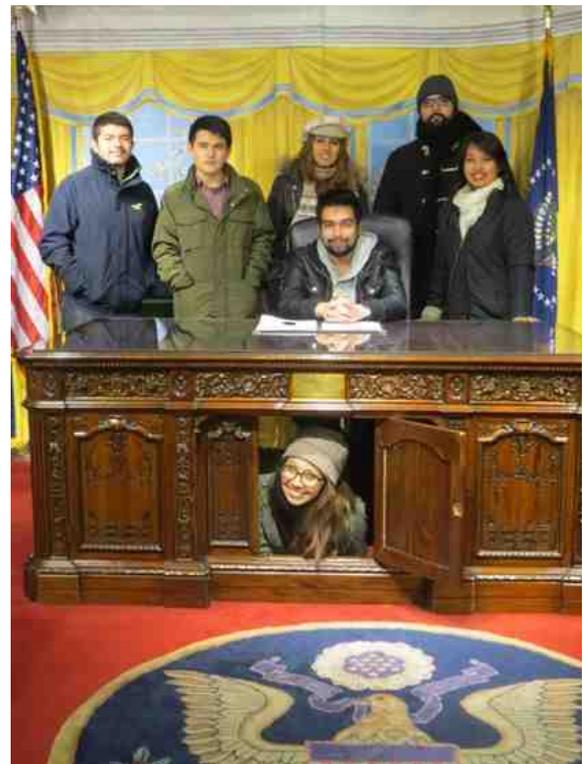
Another one of our goals was to establish a greater sense of community among the students and faculty members, which is why we had the ice cream social as our first meeting. Sometimes, the faculty are thought of just as exam and homework dishing robots. They're real people too with hobbies, interests outside of math; their passion just happens to reside in mathematics. We're all taking the same core classes, so it was important to us to promote those bonds. With the addition of the SIAM chapter, it was our pleasure and important to us to support and encourage members to seek opportunities with them.

We had a large group attend the JMM conference, given its distance in Baltimore, MD. We updated our case display with events, contact information and picture of the current serving e-board. We even participated in the annual competition against the physics club in a game of broomball, which was a much larger turnout than last year!

All in all, it was a very successful year and next year's board has high hopes to keep expanding the club membership and keep the tradition going.

Our new executive board for the 2014-2015 year is:

President- David Contreras
 Vice President- Walter Prado
 Secretary- Diana Curtis
 Treasurer- Xavier Pantoja
 Social Chair- Ustena Tawfik
 Science Council Representative- Elizabeth Ramirez
 WebMaster- Malakai Unland



SIAM Student Chapter Initiated

by Grace Lim

The main purpose of SIAM is to expose students to the things they can do with their Math degree, such as research or working in industry. Our Lecture Series this year consisted of 4 speakers: 1) Dr. Louis Komzsik, chief numerical analyst at Siemens, 2) Dr. Wlodek Proskurowski, Math professor at USC and the person responsible for getting Professor von Bremen involved with SIAM, 3) Dr. Marco Quadrelli, from the Jet Propulsion Laboratory, California Institute of Technology, and 4) Dr. Arlo Caine. Other activities include a Hike, the Mission Tiki Drive-in, fundraiser at Golden Spoon, workshops (May 29th), and a tour of JPL (June 6th). We hosted a blood drive which resulted in beating Mt. Sac! We started a SIAM library containing about 100 SIAM journals. We also participated in Science Council events such as the Science Olympics and won first place! We will continue to stay this active with new future plans including mentoring and possibly a student research conference. In addition, we are looking at collaborating with other chapters in the area, as well as giving back to the community.



Next year's executive board is:

President: Grace Lim
 Vice President: Michelle Leslie
 Treasurer: Alex Zadeh
 Secretary/Scheduler: Talin M
 Fundraising Chair: Theresa Taing
 Social Chair: Ustena Tawfik
 Science Council Representative: Mariana Morales

Department Scholarship News



On Friday, November 15, 2013, the department hosted a scholarship reception to celebrate our students' achievements. Attendance included the dean, faculty, students, and friends, as well as some of the donors. Dr. Flaig attended the scholarships bearing his name and Adrienne Spina represented the Gallegos scholarship. Thank you to the department for supporting this event and to all those that helped make it a joyous occasion.

Congratulations to the recipients:
 Adriana Granados - Bogue
 Miguel Rodriguez - Boeing
 Heren Wei - Gallegos and Herzog
 Natalie Gasca - Friedman
 Grace Lim - Bogue
 Emily Jasien - Kriege
 Kristin Dettmers - Flaig
 Janice Ashlee Spradley - Herzog
 Thu Dinh - Herzog
 Nicolette Mitchell - Gendelman
 Noel Somoza - Herzog

Recipients for this year's scholarships will be selected and notified during the summer. Expect another celebration for our amazing students in the Fall quarter!

Department Colloquium

by Dr. Arlo Caine

One of my favorite aspects of the colloquium is that it reminds me of the breadth of mathematical investigations and the personal nature of the subject. Our classes and textbooks often concern subjects that were settled, refined, and polished more than 100 years ago and it is easy to forget that mathematics still has frontiers to explore and that some of those frontiers are not that far away. The winter and spring colloquium series this year illustrated this beautifully, showcasing some of those frontier and introducing us to their explorers. We heard about new advances in statistics from several speakers including our new faculty member Dr. Adam King and our own Dean Brian Jersky. There were talks on number theory and combinatorics, computational complexity and operations research, real analysis and fractal geometry, and research on professional development of statistics teachers. We also heard from our own Prof. Jennifer Switkes about her recent sabbatical at Makerere University in Kampala, Uganda where she taught courses in differential equations and worked on mathematical modeling of hemorrhagic fevers. The year concluded with a Distinguished Lecture by Prof. Francis Edward Su from Harvey Mudd College, the president-elect of the MAA, on applications of set theory and convex analysis to voting theory. With the new SIAM student chapter bringing additional mathematical speakers to campus, there are now ample opportunities for sampling the frontiers of mathematics and its applications and research into its teaching. I'm looking forward to another great year.



Notes From the Chair

Professors Lilian Metlitzky and Jennifer Switkes capably co-chaired the Mathematics and Statistics Department during Summer quarter 2013. Thank you for a job well done!

College of Science 2011-2012 Distinguished Alumnus Dr. John Jay Flaig (class of 1968) has generously agreed to donate an estate gift of \$1.2 million to the Cal Poly Pomona colleges of science and engineering. His contribution will endow scholarships for future academically qualified, financially in-need students majoring in mathematics, statistics and mechanical engineering. "I picked two scholarship areas," Dr. Flaig says. "One for my late wife in the mathematics department, and one for my father and mother — dad was a mechanical engineer — one in their name in mechanical engineering." After earning his bachelor's degree in mathematics (major) and economics (minor) from Cal Poly Pomona in 1968, Dr. Flaig went on to graduate

school earning a master's degree from the University of California, Santa Barbara, and his doctorate degree in engineering and technology management from California Southern University. He ended up in Silicon Valley working in various high-tech industries supporting the operations and engineering functions. Dr. Flaig also taught mathematics at community colleges in the evenings. During his career, Dr. Flaig worked at some well-known companies such as Apple, Applied Materials and finally for Hewlett-Packard before retiring in 2007. Dr. Flaig is a fellow of the American Society for Quality, an organization that advocates for quality-control standards in industry, and he is managing director of Applied Technology, a consulting, training and publishing company. He has presented annual colloquia in the Cal Poly Pomona Department of Mathematics and Statistics starting in 2011.



Epsilons and Deltas

- Joseph Jefferson (CPP math major), Sam Lako (CPP math grad student), Dr. John Rock, and his niece Aleena Argott (senior at Santa Fe High School) played in the Pumpkin Tournament at Carlsbad Crossings. Their team tied for first with their raw score of 61 (11 under par), but lost the tie-breaker due to a frustrating bogey. It was a lot of fun!

- MathByFives, Frank Ives's YouTube channel (www.youtube.com/MathByFives), passed 1.5 million views! Over the last 365 days MathByFives has had 700,000 views resulting in 1,746,813 minutes watched which is equivalent to 3 years 117 days of continuous watching.