Polymath

Fall 2011, Number 33
Mathematics Department Newsletter

(*Pol'e math*) A person of much or varied learning;
one acquainted with various subjects of study.

Cal Poly Mathematics Department Hosts Permutations Patterns Conference

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CAL POLY
SAN LUIS OBISPO

Contents

Letter from the Department Chair
Dr. Don Rawlings

There were many highlights in the Mathematics Department this year. For starters, our Putnam Competition and Mathematics Modeling Contest teams did exceptionally well. Out of 546 participating universities throughout the United States and Canada, our Putnam Competition team finished in 62nd place (which ranked us in the top 12 percent). In the annual International Mathematical Modeling Contest, one of our teams was deemed a Meritorious Winner (a designation which is limited to the top 15 percent of competitors).

The Department also had the honor of hosting the ninth annual international conference on Permutation Patterns this past summer. We had participants from several countries including France, Italy, Germany, the United Kingdom, New Zealand, Iceland, South Korea, and, of course, the United States.

Don Rawlings in front of the construction site for the new Center for Science and Mathematics

The eighth annual Mathematics Department Scholarships and Awards banquet was a great success. We packed the banquet room at Café Roma, and, unfortunately, even had to turn some away. Besides having more donors in attendance, we also recognized more students (44 total) than usual. The monetary value of the evening's scholarships and awards funded by our donors was a little over $43,000. In addition, seven Noyce Scholarships funded by the National Science Foundation and worth a combined value of $110,000 were also awarded. So the total amount given out in scholarships and awards topped $150,000! The only disappointment of the evening came when Dr. Dylan Retsek backed out on his promise to give a karaoke performance.

There are a few personnel changes to report. We have two newcomers: Carly Eggleston joined our administrative support staff in July, and Dr. Robert Easton is a new assistant professor as of this fall. They are both great additions to the department and we feel fortunate to have them. As for retirements, Dr. Stephen Agronsky has opted for the Faculty Early Retirement Program.

On a personal note, I plan to enter the Faculty Early Retirement Program next fall. As I begin my fourth and final year as chair, I have just started to fully appreciate the privilege I have had in serving our community. Our enthusiastic and talented students, our dedicated alumni and supporters, and our wonderful faculty and staff have made my time as chair a real pleasure.

As always, there is nothing we enjoy more than hearing from you. If you are ever in the area, please drop in and say hello. I also invite you to keep in touch by submitting a note to our newsletter.

Finally, I want to express our deep gratitude to those who have supported us through their donations. Your thoughtfulness, much appreciated by students and faculty alike, helps support many important activities in the department.

Thank you!

Cover Article: Cal Poly Mathematics Department Hosts Permutations Patterns Conference

The ninth annual international conference on Permutation Patterns (PP2011) was hosted by the Cal Poly Mathematics Department from June 20 through June 24, 2011. Previous sessions have been held in Canada, Iceland, Italy, New Zealand, and the United States. Professors Jeffrey Liese, Anthony Mendes and Don Rawlings served as the local organizers. They were awarded a grant from the National Science Foundation to hold the conference and to support travel for participants.

During the conference, specialists discussed the latest developments in the field and collaborated on unsolved problems. Thirty different research talks were given. Additionally, plenary talks were given by Igor Pak from the University of California, Los Angeles and by Jeffrey Remmel from the University of California, San Diego. Conference proceedings have appeared as special editions of high quality journals such as the Electronic Journal of Combinatorics, the Annals of Combinatorics, and Advances in Applied Mathematics. The proceedings of PP2011 will appear as a special edition of Pure Mathematics and Applications.

A permutation of n is a rearrangement of 1, 2…, n. A permutation contains the pattern 132 if there are three integers a, b, and c such that

(1) a appears before b which appears before c in the permutation, and
(2) a, b, and c have the same relative order as 1, 3, and 2.

For example, the permutation 2413 contains the pattern 132 because the integers 2, 4, and 3 have the same relative order as 1, 3, and 2. The permutation 3421 does not contain the pattern 132. Challenge 1: Find a permutation of 8 with 31 different occurrences of the pattern 132.

A first problem in the study of permutation patterns is to count the number of permutations of n which do not contain the pattern 132. The answer is the famous Catalan number $C_n = (2n)!/(n+1)!n!$. Challenge 2: Prove this fact about C_n.

The permutations with or without the pattern 132 are fairly well understood. However, there is still much unknown about permutations with or without different patterns. Even the analysis of a simple-looking pattern like 1324 can be tricky.

The study of permutation patterns arose from two independent research streams in the 1960s and 1970s. One stream concentrated on the enumeration of pattern-avoiding permutations while the other focused on sorting mechanisms arising in theoretical computer science. The past decade or so has seen a confluence of these streams, creating new and developing avenues of research in mathematics, theoretical computer science, computability and complexity theory, and computational algebra.

More information about this conference may be found at http://math.calpoly.edu/PP2011

New Faculty - Robert Easton

Dr. Robert Easton is quite excited to join the Mathematics Department at Cal Poly. “It’s hard not to be excited to have the opportunity to work at one of the happiest places on Earth, not to mention in such a lively and talented department,” Easton says. He originally grew up in the thumb area of Michigan, a region not especially noted for its temperate climate, so the weather here is a pleasant change for him. Growing up in Michigan, it probably comes as no surprise that he is a huge University of Michigan football fan. If you happen to see him around town sporting maize and blue, please know it’s only because he hasn’t had a chance yet to stock up on gold and green. Lucky for him, Cal Poly and Michigan never play each other.

Professor Easton attended the University of Michigan as an undergraduate, and graduated expecting to specialize in number theory. Upon arriving at Stanford, however, his interests quickly changed to algebraic geometry, no doubt due in large part to the incredible enthusiasm and energy of his future advisor, Ravi Vakil. After graduating in 2007, Easton took a three-year VIGRE post-doc position at the University of Utah. “In many ways, it felt a lot like being back in Michigan,” he says “After my first year at Utah, I took a one-year leave to visit, in turn, the University of Washington and the Mathematical Sciences Research Institute. I hereby confirm that San Luis Obispo has the best weather of them all.”

Easton looks forward to getting to know everyone in the department, and promises to do his best to contribute to our already excellent department. One day he might even try his hand at croquet.

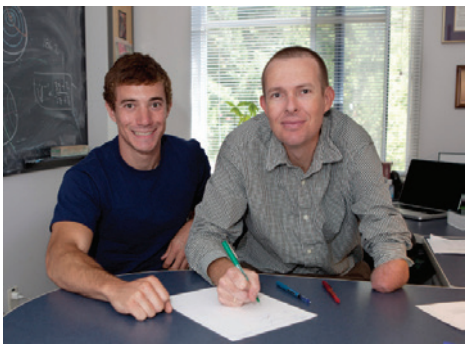
New Staff - Carly Eggleston

Meet Carly Eggleston, our new Administrative Support Assistant in the Mathematics Department. She was born and raised in San Diego. At the age of 19, she moved to Sacramento to attend Sacramento State where she earned her bachelor’s degree in Sociology. After graduating she landed a job working for the Communication Studies Department at Sac State and worked for them for more than five years. Dying to move back to the coast, she took a camping trip in search for a beach town to call home. She found Cayucos and moved there in November 2010 with her fiancée. She was able to get her foot in the door here at Cal Poly working part-time in the Grants Development Office. Finally, she found her home here with us in Mathematics.

Summer Research Program 2011

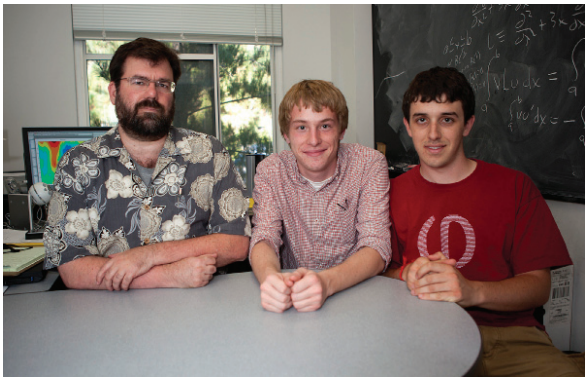
Five Mathematics Department faculty members and 11 undergraduate and graduate mathematics majors worked on research projects during the spring and summer of 2011. These projects were funded by the Cal Poly College-Based Fee Initiative.

Dr. Dylan Retsek worked with undergraduate Trevor Jones on Linear fractional mapping. Given a linear fractional map j, the composition operator Cj is a bounded linear operator on the Hardy space H^2. Calculating the norms of such operators is generally difficult. When the norm calculation appears to be out of reach, one can settle for estimates instead. In this project, the professor and the student considered the lower bound on Cj given by the quantity $Sj:=\sup_{weD}||Cj\ k_w||$ where k_w is the normalized reproducing kernel at the point weD.



Professor Retsek and Jones

For a given rotational family j_q of linear fractional maps of the disk, calculating Sj_q is a complicated optimization problem. Maximizing on well chosen fibers" of the disk yields a formula for the quantity Sj_q in terms of the parameter q and, as a corollary, lower bounds on $|| Cj_q ||$.



Professor Camp with students Gerber and Rodrigues

Undergraduates Matthew Rodrigues and Alex Gerber worked with Dr. Charles Camp on the development and implementation of time series analysis techniques and their applications to paleoclimate records and to recent satellite records of the Earth's atmosphere. Various paleoclimate records, including Antarctic ice cores and benthic records from oceanic sea-floor cores, were analyzed to identify the response of the Earth's climate to variations in the Earth's orbital parameters (the Milankovitch cycles).

In a separate project, satellite records of ozone concentrations in the atmosphere were analyzed to isolate the response to decadal oscillations in the solar forcing. Research on both projects is continuing during the 2011-2012 academic year with support from the NSF grant for the Mathematics and Climate Research Network.

Dr. Todor Todorov and undergraduate James Hall worked on a joint project for a research monograph titled An axiomatic approach to non-linear theory of generalized functions. Two chapters were completed. The work will continue during the academic year.

One joint paper, closely related with this project, was completed and submitted for publication: Completeness of the leibniz field and rigorousness of infinitesimal calculus [http://arxiv.org/abs/1109.2098]

Professor Todorov with Hall

Summer Research Program 2011 (Continued)

Professor Shapiro students Grantham, Birdsall, and Gagne

Dr. Jonathan Shapiro worked with undergraduates Neal Grantham, Derik Birdsall, and Matthew Gagne on projects involving finding properties of composition operators. They investigated the norms and numerical ranges of composition operators and found some results for the numerical ranges of certain composition operators with linear symbols. They also used matrix representations to show that certain composition operators with linear symbols are weakly asymptotically Toeplitz.

Dr. Linda Patton worked with undergraduates Elizabeth Owens and Kristen Field on a conjecture involving an upper bound for the norm of the matrix p(T) where T is a matrix and p is a polynomial with maximum value 1 on a the numerical range of T. They produced numerical estimates for the upper bound for when T is a 3 by 3 matrix whose numerical range has a certain symmetry property.

Professor Patton with students Owens and Field

Professor Patton with students Lossing and Campbell

Professor Patton also worked with undergraduates Logan Lossing and Michael Campbell to study various eigenvalue distributions for a special class of random matrices. They created a collection of general programs in the statistical programming language R that can be used in the future to analyze many different statistical properties of these matrices.

2010 - 2011 Honor Roll

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The Department of Mathematics is grateful to the following corporations, foundations, and organizations who made gifts for general and special purposes and for matching gifts.

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2010 - 2011 Honor Roll Continued

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2010 - 2011 Graduates

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Jonathan Kyle Biddle
Scott Raymond Butler
Emily Ruth Callahan
Caitlyn L. Carmody
Heather R. Clements
Brent R. Davis
Jason Steven Del Aguila*
Wade Thomas Dillon**
Preston C. Doris
Justin R. Ferguson*
Jessica Jean Freedman
Joseph Patrick Horton
Arianna Jovanina Kinsella*
Anna Marie Kopcrak
Jeremy J. Kun**
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Cammie Lorraine Ortel
Natasha Duque Ortega
Emily C. Peterson*
Joshua Hans Pollitz
Alberto J. Reynoso
Zareen Fatima Rydhan
Samuel Yoshiro Saiki**
Jose A. Valdez Jr.

* ***Cum laude***
** ***Magna cum laude***
*** ***Summa cum laude***

Master of Science

Elizabeth Anne Czapla
Wade Thomas Dillan
Sean J. Gasiorek
Matthew Glavan
Samuel Yoshiro Saiki
Kathryn Ann Vaughan
Joon Young Jung

Graduating with Distinction

Alumni News

Ryan Botts - B.S. Mathematics, Cal Poly, 2001; M.S. Mathematics, Cal Poly, 2003; Ph.D., Mathematics, Ohio University, 2009; Tenure-track faculty at Point Loma Nazarene University in San Diego.

I just wanted to give an update and express my gratitude. I graduated from Poly with my bachelor's degree in mathematics in 2001 and master's in 2003. Last year I completed my doctorate in mathematics at Ohio University. I completed a dissertation titled "Recovery and Analysis of Regulatory Networks from Expression Data Using Sums of Separable Functions." This year I accepted a tenure-track position at Point Loma Nazarene University in San Diego.

This last weekend I had the chance to talk to Dr. Agronsky and it made me recall when I was sitting in his office at the end of my sophomore year inquiring about becoming a math major. I am very thankful for that conversation and the many other conversations with faculty in the department. When I began my career at Ohio University I immediately knew that my previous training was far better than average. The depth and breadth of coursework required in Cal Poly's Math Department is far beyond what other universities require. This background was key in helping me be successful during my time at Ohio University.

To this day the professors from the department have left a lasting mark. I still find myself consulting the notes I have from their classes as I try to find better ways to present the material in the courses I teach. I find myself using the skills from Dr. Basor's undergraduate analysis and Dr. Alongi's graduate level analysis, the creative types of thinking I learned in Dr. Sze's Combinatorics class, the challenges I faced in Dr. Delany's group theory courses, foundational constructions in Dr. Lewis's geometry courses, applied math in Dr. O'Neil's problem solving course, really enjoying math in Dr. DeKleine's Game Theory course, the nine courses I took with Dr. Agronsky (I literally would not be here if it weren't for those and his suggestions to become a math major) and the writing skills I learned in Dr. Greenwald's Methods of Proofs course. I am sure there are people I am forgetting, but it is amazing how often I think back to those courses and the skills I learned in them. The Cal Poly Math Department and the outstanding faculty in it really make it a wonderful place. I hope that everyone there knows how much their work and time is appreciated. Thank you for that!

Eric Schadt - B.S. Mathematics, Cal Poly, 1991; M.A. Pure Mathematics, UC Davis; Ph.D., Biomathematics from UCLA. Chief Scientific Officer Pacific Biosciences. Director of the Institute for Genomics and Multiscale Biology and Chair of the Genetics Department, Mount Sinai School of Medicine.

Dr. Schadt was the Honored Alumnus for the College of Science and Mathematics in Fall 2011. He delivered a talk at Cal Poly titled "A Systems Biology Framework for Understanding the Complexity of Living Systems."

It has been said of him: He is a true thinker, an innovator, and a salesman (not unlike Steve Jobs). A recent article in Esquire Magazine described him as a "cross between Galileo and a guy hawking ultra-high end copier" and as "the biggest thinker in biology." In bringing Schadt to Pacific Biosciences, the head of research told him "You're either completely full of 'it' or the smartest person on earth. We're not smart enough to know. But we're willing to bet that you're the smartest person on earth."

Prior to his work at Pacific Biosciences and Mount Sinai, Schadt was the founding member of Sage Bionetworks, Executive Scientific Director of Genetics at Rosetta Inpharmaics, subsidiary of Merck, and Senior Research Scientist at Roche Bioscience.

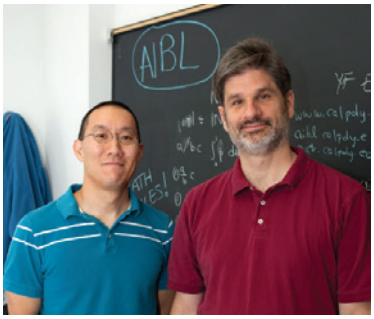
2011 Department Photo

Front Row - Left to Right:
Stan Yoshinobu, Carole Simard, Lawrence Sze, Staci Pearson, Katie Vaughan, Suzanne Lavertu, Kendall Rosales, Erin Kelly, Anna Kopcrak, Elsa Medina, Sheryl O'Neill, Carly Eggleston, Tim McCaughey, Caixing Gu, Marian Robbins, Christy French, Paul Choboter, Ray Terry.

Middle Row:
Jonathan Shapiro, Rob Easton, Vincent Bonini, Emily Martin, Isaac Comelli, Joe Borzellino, Anton Kaul, Bill Hesselgrave, Linda Patton, Cami Reece, Harvey Greenwald, Steven Tartakovsky, Adrienne Riley, Don Rawlings, Garrett Bates, Todor Todorov, Richard Neufeld, Anthony Mendes, Jeff Liese.

Back Row:
Morgan Sherman, Dylan Retsek, Myron Hood, Sean Gasiorek, Ben Richert, Cristian Ponder, Mark Stankus, George Lewis, Charles Camp, Jim Mueller, Kate Riley, Al Jimenez.

2011 AIBL Program



The Academy of Inquiry-Based Learning (AIBL) had a productive and active 2010-2011 academic year. AIBL supported dozens of mathematics faculty across the nation in a variety of projects, including developing Inquiry-Based Learning (IBL) course materials, mentoring new IBL instructors, providing speakers to travel to give talks at conferences and universities, and supporting a small project with San Luis Coastal Unified School District.

AIBL Director Stan Yoshinobu and Co-Director Mark Stankus (pictured at right), traveled to Washington, D.C. to attend the 14th Annual Legacy of R. L. Moore Conference, co-hosted by the Mathematical Association of America. At the conference, Dr. Stankus and Dr. Yoshinobu gave talks and provided support for new IBL instructors. Dr. Yoshinobu also traveled to Kutztown University, Stephen F. Austin State University and the University of Michigan to give talks about what IBL is and how one can get started using it.

2011 Noyce Scholars

Participants at the 2011 Noyce Scholarship Summer Workshop

The Math Department is looking to expand a scholarship and training program for new math teachers funded by a $425,000 grant from the National Science Foundation.

The Noyce Scholars program is helping Cal Poly retain top students and train them to be math teachers in high schools and middle schools in disadvantaged districts. The NSF grant program offers scholarships of $10,000 a year for one or two years to students seeking California math teaching credentials. Recipients also get additional training and support on how to successfully teach math to underprivileged teens.

The Noyce Scholars, in return, agree to teach from two to four years in "high needs" school districts – those having one or more schools with more than 50 percent of students qualifying for the federal free lunch program. So far, Cal Poly's Noyce math teachers have gone to high schools and middle schools throughout California including Oxnard, Bakersfield and Santa Maria.

Led by math professors Todd Grundmeier and Elsa Medina, the math department has awarded 19 Noyce Scholarships during the four years of the program. The department is going to reapply for the grant and hopes to expand the program.

In addition to producing top math teachers, "We're trying to keep our really strong math teaching students here for our credential program. A lot of them leave after graduation because it's expensive to live here," Grundmeier said. The approach is working – the average undergraduate GPA of Noyce Scholars is 3.4, and top students from the math teaching concentration are making the cut to receive a Noyce Scholarship.

"We've had two engineering majors and one statistics major also receive scholarships, but the rest have been math majors. And all of them want to teach math," Grundmeier said.

The NSF Noyce grant also includes funding for the department to host a summer workshop for Noyce credential candidates and "Noyce alumni" who are now practicing teachers. Participants receive a $500 travel stipend to come to Cal Poly for the three-day event. In July, Cal Poly held its fourth Noyce workshop and hosted 15 practicing teachers and 12 prospective teachers from Cal Poly and other CSU campuses. Medina, Grundmeier and four workshop participants led exercises designed to illustrate practical math lessons that work in high-needs districts.

"The focus is on creating materials the Noyce Scholars can take into the classroom with them," Grundmeier said.

2011 Noyce Scholars (continued)

This year, the workshop started out with catapults. Participants broke up into teams of three, assigned to foot-long wiffle-ball catapults clamped to tables. Their task: to determine how the resistance of the catapult's rubber bands and the catapult arm angle affected the wiffle-ball projectile's arc and range. The Noyce Scholars also had to predict outcomes for a series of catapult angle and tension settings.

Professor Grundmeier with Noyce Scholars Garrity, Hamlin, and Eubank

"The ball makes a parabola – a curve – as you change resistance and angles. The exercise lets you see patterns, and ask questions about what settings will allow the ball to reach specific heights," explained Alyssa Eubank, a Cal Poly math senior and workshop participant.

Eubank and math seniors Alyssa Hamlin and Shawn Garrity are among the most recent Noyce Scholarship recipients. Each received $20,000 in scholarship funding to pay for their senior year at Cal Poly and for their year of coursework in the Cal Poly College of Education credential program. All are committed to teaching math to teens in underprivileged school districts for at least four years.

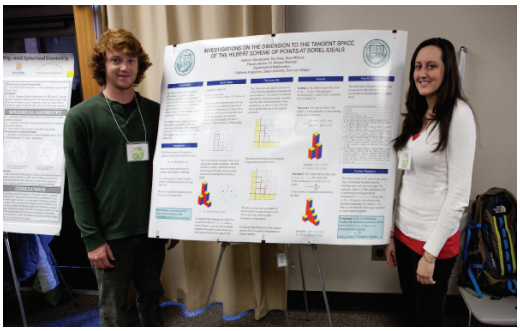
"I grew up in Tulare, which is definitely a high needs area," said Eubank. "I've been in that environment my whole life. Teaching in a high needs area would be a good fit for me."

Garrity grew up in Manhattan Beach, but has no qualms about teaching in a high-needs district. "I like everything about math. It's just really, really fun. It's like solving puzzles to me. And you can apply problem solving skills to other areas of your life."

Hamlin grew up in Lompoc and wants to return there to teach at her old high school. "The logic of math appeals to me, and I enjoy finding solutions to problems. For a lot of students, that's their hardest subject," she said. "I want to be that one teacher who teaches your hardest subject, but makes it not quite so bad."

For more details about the Noyce Math Scholars program at Cal Poly, visit:
http://www.cesame.calpoly.edu/noyce/noyce-math-program-description.html

Students Attend Northern California MAA Meeting



Faculty member Jonathan Shapiro took seven students to the 2011 Northern California sectional meeting of the Mathematics Association of America (MAA) in Santa Rosa, CA. Two of the students, Erin Kelly and Ryan Milhous (shown with poster to the left), presented work they had done with fellow student Alex Bozarth and faculty member Morgan Sherman.

Faculty Publications and Activities 2010-2011

Publications:

Dr. Paul Choboter with undergraduates **Dana Duke** (Physics), **J.P. Horton** (Math) and **Paul Sinz** (Math): Exact solutions of wind-driven coastal upwelling and downwelling over sloping topography, Journal of Physical Oceanography, vol. 41, July 2011, pp. 1277-1296. DOI: 10.1175/2011JPO4527.1

Dr. Linda Patton with **Ilya Spitkovsky** and Cal Poly undergraduates **Thomas Ryan Harris**, **Michael Mazzella**, and **David Renfrew**: Numerical ranges of cube roots of the identity, Linear Algebra and its Applications vol. 435 (2011) 2639-2657.

Dr.Todor Todorov: An axiomatic approach to the non-linear theory of generalized functions and consistency of Laplace transforms, Integral Transforms and Special Functions, Volume 22, Issue 9, September 2011, Pages 695-708 (available at ArxivMathematics: [http://arxiv.org/abs/1101.5740]).

Talks and other activities:

Dr. Charles Camp and undergraduate **Michelle Lea** participated in the Paleoclimate Workshop sponsored by the Mathematics and Climate Research Network at the University of Chicago in January 2011. This was a small meeting of approximately 40 mathematicians, scientists and students focusing on paleoclimate issue.

Dr. Charles Camp was one of 40 U.S. scientists selected by the U.S. National Academy of Sciences (NAS) to participate in the 12th Japanese-American Frontiers of Science (JAFos) Symposium held in Chiba, Japan in December 2010. This symposium is part of the Kavli Frontiers of Science program which is jointly sponsored by the NAS and the Kavli Foundation; the JAFoS symposia are also co-sponsored by the Japan Society for the Promotion of Science. The Frontiers of Science symposia bring together outstanding young scientists to discuss exciting advances and opportunities in a broad range of disciplines. U.S. symposium participants are selected from among recipients of prestigious fellowships, awards, and other honors, as well as from nominations by NAS members and other participants.

Dr. Kate Riley was awarded a $250,000 Improving Teacher Quality grant in August 2011. This federal grant is awarded through the California Postsecondary Education Commission. It offers professional development that helps K-12 mathematics teachers understand and strengthen their content and pedagogical knowledge in mathematics. It is intended to help teachers gear up for implementation of the new California Common Core State Standards in Mathematics.

The project, entitled Critical Foundations of Algebraic Reasoning (CFAR), will serve 36 mathematics teachers in grades 5-8 in the Santa Maria-Bonita School District. The CFAR goals are to improve mathematics teachers' content and pedagogical knowledge, help teachers prepare for implementation of the new standards, and to build and enhance professional learning communities that will help teachers build the foundational skills necessary to prepare all students for success in algebra. Project activities will include monthly workshops and institutes throughout the 2011-2012 academic year and a summer 2012 institute at Cal Poly. At the summer institute Dr. Riley, principal investigator for the grant, will be joined by Mathematics Department faculty **Dr. Elsa Medina, Dr. Todd Grundmeier** and **Dr. Amelie Schinck**. The CFAR project is a one-year project.

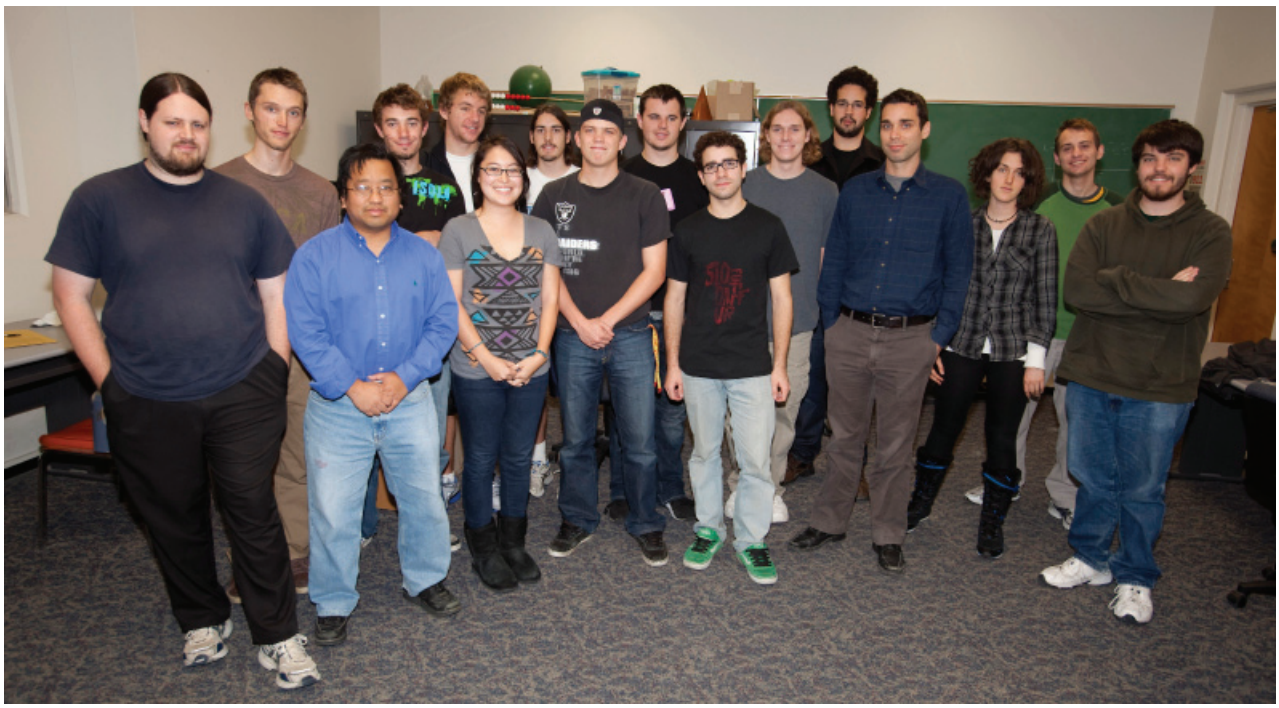
Summer Workshop for Teachers

In August 2011, professors Elsa Medina, Linda Patton, Marian Robbins and Stan Yoshinobu conducted a three-day inservice teacher professional development workshop for 25 sixth through 12th grade San Luis Coastal Unified School District math teachers. The objective of the workshop and seven follow-up meetings is to increase student engagement in mathematics courses at the upper elementary and secondary levels through guided inquiry.

The summer workshop and evening follow-up sessions consisted of a combination of discussions and reflections on teaching practices and student learning, development of course materials, and problem solving sessions to provide the teachers with the opportunity to actively engage in mathematics. Teachers were involved in problem-solving sessions based on the Math Teacher Circle program. They also read and discussed relevant articles from the Mathematics Education Literature, analyzed videos of children doing mathematics, and developed activities for use in their classrooms. In short, teachers were learning about inquiry through inquiry.

This project was funded in part by generous donations from Harry Lucas, Jr., chairman of The Educational Advancement Foundation. San Luis Coastal Unified also provided funds, resources, and facilities to support this project. The Academy of Inquiry-Based Learning provided some funding for materials and infrastructure support.

Putnam Math Competition 2010



In December 2010, the Cal Poly team, coached by professor Lawrence Sze, ranked 62nd out of 546 teams competing. The high scorers from Cal Poly were Paul Coombs, second from the right, and Matthew Tytel, seventh from the right, who tied with a score of 38, placing them in the top 400 (out of 4,296 students competing).

Cal Poly Math Student in Budapest - Jermey Kun

Jeremy Kun - upper left in the purple shirt - spent fall 2010 in Budapest. Below, he writes about his experiences.

This past fall I had the honor of attending the Budapest Semesters in Mathematics program in Hungary. Intellectually, culturally, and socially, it was quite the adventure. I arrived in mid-August at my host-mother Klara's house knowing only the Hungarian words for "yes," "no," and "dog." I found that Klara spoke about as much English. She promptly grabbed my arm to convey that I was much too skinny, and she handed me a plate of strawberry pastries. I later learned this was typical of Hungarian hostesses.

The next morning brought the first day of a two-week language course, during which I met half of the new students and explored Budapest while attempting to pronounce words like bélyeggyűjtemény. We went to folk festivals at Buda Castle, lounged in the thermal baths, and tried out the bakeries and sweet shops on every corner. We started a weekly game of ultimate frisbee, we sought out late-night jazz cafes and we acquired a taste for palacsinta. So, the first two weeks were basically characterized by overeating and getting lost. By the end of the language program, I was eager to dive into some math.

The most novel difference in university education in Hungary is the registration. The student doesn't sign up for any classes until the end of the third week, and before then he may attend any lectures he wants. I may have gone overboard, but I was sitting in on ten classes during the first week. There was just so much good stuff! Hypergraph combinatorics, non-Euclidean geometries, algebraic number theory, and measure theory to name a few. All were topics that made me feel like I was atop a crest overlooking vast undiscovered valleys of mathematics, not knowing which trails to blaze but hasty to pick one. Though some of the topics were far above my level, I found some lectures which initially sounded boring to be quite exciting. I finally settled on five classes, though it broke my heart to give up hypergraph theory for the required complex analysis. With class sizes averaging ten students, we all became friends within a few days.

And so the semester went, spending afternoons and evenings tossing ideas back and forth. We'd work sprawled across someone's bedroom or in our favorite restaurants. If I was alone and stuck on a problem, I'd often hop on the metro or the bus, get off at a stop I'd never been to before and wander to a quiet cafe to continue working. I think the change of setting induced new mental perspectives, but it also made me learn the city like a native.

And of course the more I wandered, the more I found. Outside of classes, my friends and I went to the opera, went caving under the Buda hills, and watched the amazing fireworks show on St. Stephen's Day. I traveled to Croatia and Romania and hiked around the national parks, and my friends who had lighter workloads traveled as far as Poland, Turkey, and Spain.

My father's side of the family is Hungarian, and it just so happened that I lived a 20-minute walk from my grandmother's apartment. I brought her flowers on weekends, but since she speaks English as poorly as I speak Hungarian, we conversed in German, which we could both speak just well enough. She showed me the house that she and her late husband had built for their family after WWII and told me stories about my father as a child. As the semester came to a close, she fell ill and my father came to visit. Despite the morose occasion, he was delighted to introduce me to my distant Hungarian relatives.

I ended up graduating from the program with honors, and covered about 28 units worth of Cal Poly credit (about seven classes worth). So in addition to improving Cal Poly's reputation and international presence, I got to stuff my head with all the math I wanted, and I sped up my graduation schedule. I couldn't imagine a more fulfilling semester. It had everything a student could want: friends, family, culture, adventure, pastries, and of course, hardcore mathematics.

Mathematical Contest in Modeling 2011

The Mathematical Contest in Modeling took place in February. Cal Poly fielded two teams of three students. One team consisted of Matthew T. Murachver, Kelly J. Odgers, and Tanner J. Gibson. They worked on the problem of finding the number of repeaters that would be needed to create a VHS network to cover a circular region of radius 40 miles and simultaneously serve first 1,000 then 10,000 users.

The other team consisted of Max C. Bigras, Josh M. Fernandes, and Austen T. Greene. They worked on the problem of how to design and construct a snowboard course. The goal was to design a course that allows participants to achieve the largest possible vertical jump. The problem also required the team to identify issues associated with allowing athletes to perform other tricks and identify potential trade-offs for other considerations. The team received an award of "Meritorious." Only 15 percent of the teams received a meritorious or better ranking.

You can see all of the results of the Mathematical Contest in Modeling at the following website:
http://www.comap.com/undergraduate/contests/mcm/contests/2011/results/

Alumni Notes

We would love to hear from you. Please drop us a line and let us know what you're up to and how you are using your Cal Poly degree. Please include your degree, your graduation year, and any professional and/or personal information you wish to share with the Cal Poly mathematics community in our Alumni News column. A picture of you or your family along with your story would be great!

Please email your Alumni News submission to math@calpoly.edu OR mail to:
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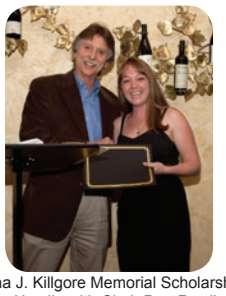
We are "Going Green" with our Polymath newsletter. Please update your contact information at www.subsrcibe.calpoly.edu so you can receive the electronic version of our e-newsleter in the future.

Eighth Annual Math Awards Banquet

Robert P. Balles Mathematics Scholarships
Shawn Garrity and Trevor Jones, with
Chair Don Rawlings

Raytheon Company Scholarship
Therese Redlinger, with
Chair Don Rawlings



Katrina J. Killgore Memorial Scholarship
Alyssa Hamlin with Chair Don Rawlings

Ed Glassco Memorial Scholarship
Blanca Lopez, with Julie Thompson

W. Boyd Judd Award
Erin Kelly, with
Chair Don Rawlings

Ralph M. Warten Memorial Scholarship
Chad Duna, Dana Hipolite, Khoa Nguyen, Katherine Chiccone,
Marino Romero, Michael Ion, (not shown is Andres Rodrigues)

Volmar A. and Viola I. Folsom Scholarships
Kristin Symer, Allison Scheppelman, Lumin Sperling,
Leah Avila, Adrian Tamayo (not shown are Jordanne
Adamsky, Kathryn Burton, and Zeno Muskarella)

George H. McMeen Scholarships
Erin Kelly, Eric Cramer, Michael Mogull,
and Isaac Comelli (not shown is Logan
Lossing)

George C. Laumann Scholarships
Alyssa Eubank (not shown is Ian Painter)
with Chair Don Rawlings

Robert Noyce Scholarships
Jason Del Aguila and Cammie Oertel (left) Alyssa Eubank, Shawn Garrity, Alyssa Hamlin, and
Dara Stepanek (right - not shown is Ben Johnson)
with Professors Todd Grundmeier
and Elsa Medina

Marie Porter Lehman Math Educator Scholarship
Suzanne Lavertu shown with Professors Todd
Grundmeier and Elsa Medina

Ralph E. Weston Memorial Award
Matthew Tytel and Paul Coombs with
Chair Don Rawlings

Kappa Mu Epsilon Founders Award
Casey Kelleher with
Chair Don Rawlings

TC Reece Mathematics Award
Kevin Lamb with Cami Reece

Carol S. and W. Boyd Judd Scholarships
Cassandra Guido and Kristina Dyer with
Carol Judd

Outstanding Students

Outstanding Teaching Associates
Wade Dillon, Sean Gasiorek, and Kathryn Vaughan, with Professor Dylan Retsek

Charles J. Hanks Excellence in Mathematics Award
Jeremy Kun and James Hall, with Marjorie Hanks

Outstanding Mathematics Educator Awards
Jessica Meyers with Chair Don Rawlings,
Elsa Medina, and Todd Grundmeier

Outstanding Junior in Mathematics
Trevor Jones
with Chair Don Rawlings

Outstanding Seniors in Mathematics
Jeremy Kun and Jessica Meyers with
Chair Don Rawlings

Bryant Russell Memorial Award
Hugo Campos, with
Chair Don Rawlings

Charles J. Hanks Scholarship
Kendall Rosales with Marjory Hanks

End-of-Year BBQ and Softball

Undergraduates
vs.
Faculty and Grads

The Faculty Team won this round 16-13 in seven innings. This extended the Faculty Team's winning streak to three games.