CAL POLY POMONA
Mathematics and Statistics

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Message from the Chair

Berit Givens

As this school year and my first four-year term as chair draws to a close, I am truly astonished (in both good and bad ways) at how it is ending. I never imagined that we would be dealing with a pandemic, teaching and learning in an entirely virtual mode, and social distancing from our friends and loved ones. I always describe Cal Poly Pomona as a cruise ship – powerful, but slow to change course. Semester conversion took years of preparation, years to implement, and the jury's still out on how long it will take to fully complete. But this coronavirus crisis showed that we actually can make rapid changes when an emergency strikes.

I am so grateful to the faculty, staff, and students for their work ethic and attitude over the last 6 weeks. In particular, I am grateful to:

- Faculty – for working so hard to learn many new things; for talking with me about your concerns for students; for the can-do attitude so many of you brought; and for your collegiality.
- Students – for your patience as faculty made the oftentimes difficult transitions; for hanging in there even as I know many of you are facing major challenges; and for your enthusiasm for mathematics and statistics.
- Staff – for your innovation and imagination in creating solutions so that our office can keep running; for your constant willingness to jump in and help out; and for meeting with me every day so that we can still work as a team.

I appreciate the whole Cal Poly Pomona Mathematics & Statistics community.

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Message from the Chair

Berit Givens

At the same time, I find myself struggling sometimes. I know that I have it relatively easy – my family is safe and healthy, I still have my job, and my loved ones are all okay. But it's hard to have your life upended, and I very much miss being on campus. I am sad that we don't get to celebrate our graduates in the usual way. I took the selfie below on campus on March 20, as the office staff and I were wrapping up our preparations to work from home. I've made it into my Zoom profile photo, because it reminds me of how beautiful our campus is. I am working on reminding myself that we can find new ways to celebrate our graduates, and we *will* be back to campus someday.

I always like to have a math problem in my chair report. Here is one that is related to physical distancing: Suppose you have a row of computer desks and students must always leave at least one unoccupied desk between themselves. In how many ways can any number of students occupy these desks? For example, given 3 desks, there are 5 ways for students to occupy the desks: all empty desks; a single student at desk 1, desk 2, or at desk 3; and, two students at desks 1 and 3. I'm cheating, because I made a video on this same problem a month ago, but I like it, so I'm going to use it again!

Finally, I am grateful that the Department's full-time faculty voted for me to have a second term as chair. Let's hope the next four years are less eventful than the first four years! Have a great summer and I hope to see many of you next fall!

MESCal "Unconference"

Anne Cawley

Excited chatter, inspirational ideas, equitable teaching practices, and networking. These are just a few things that were shared at this year's Mathematics Equity in Southern California (MESCal) *unconference*. On February 22, 2020, over 60 mathematics faculty, graduate students, and administrators from around Southern California met at Kellogg West to discuss important issues around equity and inclusion in the teaching and learning of the mathematical sciences. The *unconference* format, which is a participant-driven meeting in which the topics and schedule (among other things) are determined by the participants, provided space for those interested in mathematics equity to have a chance to share ideas, classroom practices, and resources.

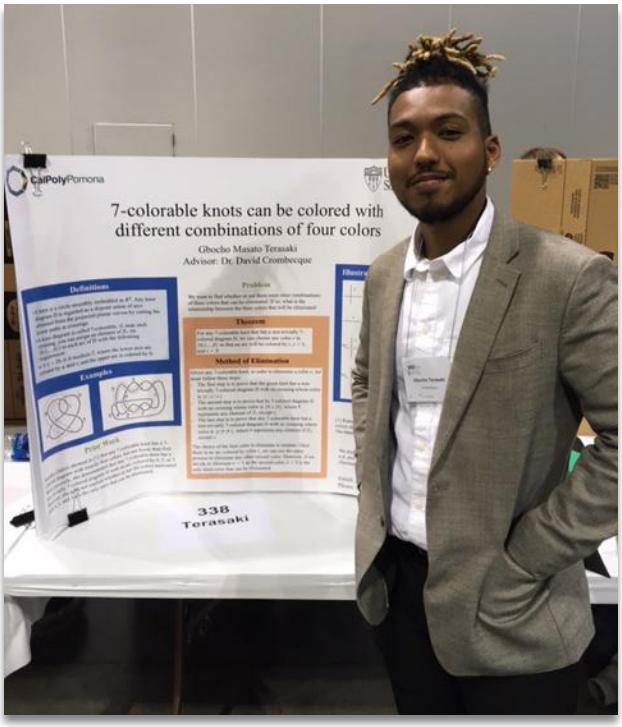
Topics discussed at this year's unconference included ways to include social justice in the teaching of university level mathematics courses, conversations around equitable hiring practices, and the psychology around students' brain development and thinking. A special session was led by faculty at Pasadena City College who have been reading the book *Grading for Equity* by Joe Feldman in a reading club. At the end of the day, the faculty were grateful for a space to meet others who are interested in finding the best ways to support their students' success.

Given the advent of COVID-19, the MESCal group has continued to provide support for one another by hosting Friday online "happy hours" to discuss issues of equity that have arisen from the challenge of teaching online. The group plans to continue informal group gatherings once we are able to see one another again.

Meetings at the 2020 Joint Math Meetings

Photos submitted by Robin Wilson

There were lots of friendly Cal Poly Pomona faces to be found in Denver this January! The 2020 Joint Math Meetings were held January 15-18 in Denver, Colorado. Several faculty and students (both current and former) attended the conference. Dr. Robin Wilson has provided us with the following photos to share these meetings at the Joint Math Meetings.



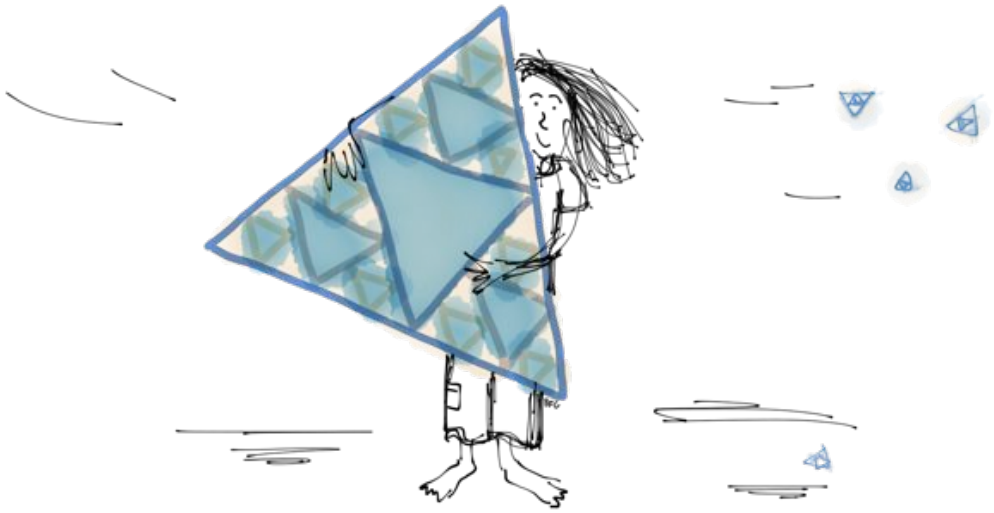
Clockwise starting at top left: (a) Kristin Kurianski-Dettemers, Robin Wilson, Rolando de Santiago, and John Rock (b) Masato Terasaki (c) Ryan Morruzi, Keshet Weinstein, David Perez.

Sonia Kovalevsky Day

Keshet Weinstein

Sonia Kovalevsky Day is a mathematics event geared towards providing support to underrepresented groups in STEM, especially girls, who deserve to feel encouraged to pursue mathematics and other related fields. Middle school and high school students are invited to attend, along with parents and other chaperones, to learn about mathematics outside of the traditional classroom through math activities. The event is being rotated between Pomona College, Cal State Fullerton, and CPP with this year being CPP's turn. Undergraduate and graduate math majors from CPP, Cal State Fullerton, and Pomona College were given the opportunity to lead and create activities surrounding various math topics as well as assist with miscellaneous tasks on the day of the event. The day was scheduled to begin with a keynote speaker (Dr. Alissa Crans) and end with a panel comprised of amazing women who use mathematics in their careers.

I had the opportunity to become the head student organizer and with great help from Dr. Cristina Runnalls, Dr. Lily Silverstein, Dr. Robin Wilson, Becki King, Breanna McBean, and Evelyn Guerra the event was revving up to be a great success with around 215 attendees in total. There were going to be around 146 high school and middle students, and around 40 volunteers. Sophie's Circle, the women in mathematics club, was the hosting club for the event, devoting time to behind-the-scenes paperwork and fundraising. So far, fundraising efforts between the Cal State Fullerton and CPP activity leaders had brought in around $2,033. The California Mathematics Council, Mathematics and Statistics Department, and the College of Science Dean's Office were going to co-sponsor the event as well. Sonia Kovalevsky Day was to take place on Saturday, April 25th but unfortunately had to be cancelled due to the cancellation of all events in an effort to reduce the spread of COVID-19. The plan is for the event to eventually take place at CPP whether that be next year or a couple of years from now.



Special thanks to Dr. Foster-Greenwood for allowing us to use her art (pictured above) for the promotional material and t-shirts.

Sophisms and Erroneous Resolutions

Andrew Aguilar

Dr. Fernando López-García, Jocelyn Haro, Brandon Wallace and I have been studying the use of sophisms and erroneous resolutions in teaching math. The purpose of the project is to develop a supplementary resource for use in the classroom that will foster self-reflection, critical thinking, an embrace of mistakes, and argumentation while also provoking discussion and collaboration in the classroom.

These sophisms and erroneous resolutions, which are fallacious arguments that use false logical claims or common misunderstandings, largely focus on Calculus and emphasize a deeper understanding of the concepts. Below are examples of a sophism and an erroneous resolution our group has developed.

Claim. The sum of positive numbers can be negative.

Argument. Let us consider the sum of $1+2+4+8+\cdots$, which is a sum of positive numbers. Then

$$1+2+4+8+\cdots=\sum_{n=0}^{\infty}2^n=(2-1)\sum_{n=0}^{\infty}2^n=\sum_{n=0}^{\infty}2\cdot 2^n-\sum_{n=0}^{\infty}2^n$$

$$=(2+4+8+\cdots)-(1+2+4+8+\cdots)=-1.$$

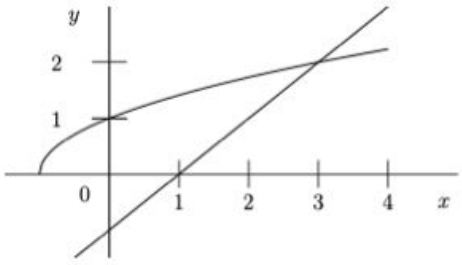
Then $1+2+4+8+\cdots=-1$.

The claim in this sophism is clearly incorrect, but where is our mistake? It's not immediately obvious. We also want to ask other questions. How does convergence relate to this problem? How does a series behave differently than a finite sum?

So, where did we make a mistake in this erroneous resolution? Was it even a mistake? Which step of our example added the erroneous solution? Any algebra student would suggest that we "back-check" our answers, but is "back-checking" sufficient? If we added solutions, do we know that we didn't remove any? How?

We wish to find solutions to the equation $\sqrt{x+1}=x-1$. We begin by squaring both sides,

$$(\sqrt{x+1})^2=(x-1)^2$$
$$x+1=x^2-2x+1$$
$$x^2-3x=0$$
$$x(x-3)=0.$$



Thus, we have solutions $x=0,3$. But graphing both sides of the equation shows that there should only be one solution. What is happening?

The purpose of this project is to ask questions beyond "what is correct?" and emphasize how else to think about a problem.

Student Shoutouts

Contributors: Alak Krinik, Cristina Runnalls

We want to congratulate all of the students below on their amazing accomplishments!

Marina Girgis
McPhee Scholar & Valedictorian

Masato Terasaki
McPhee Scholar & Valedictorian

Thuy Vu Dieu Lu (left)
Accepted, UCI Statistics PhD Program

Jeremy Lin
Accepted, UCI Statistics PhD Program

Student Bring Math Fun to Local Communities

Greisy Winicki-Landman

It is our tradition that the first Wednesday of February we spend at Pioneer Junior High in Upland. The students of MAT 4960 bring math games to be played with the school students. This year there were 26 CPP students - all future mathematics teachers – and about 200 kids. As usual, we came very encouraged and happy to work in collaboration with our local community.

Additionally, five students from that course volunteered to run a math booth at the Extreme STEA^{2}M Fair that took place at the Fairplex on March 6-7. We were part of the College of Science representation and these students kept the visitors involved with interesting strategy games suitable for all the members of the family.

Engaging Girls in STEM

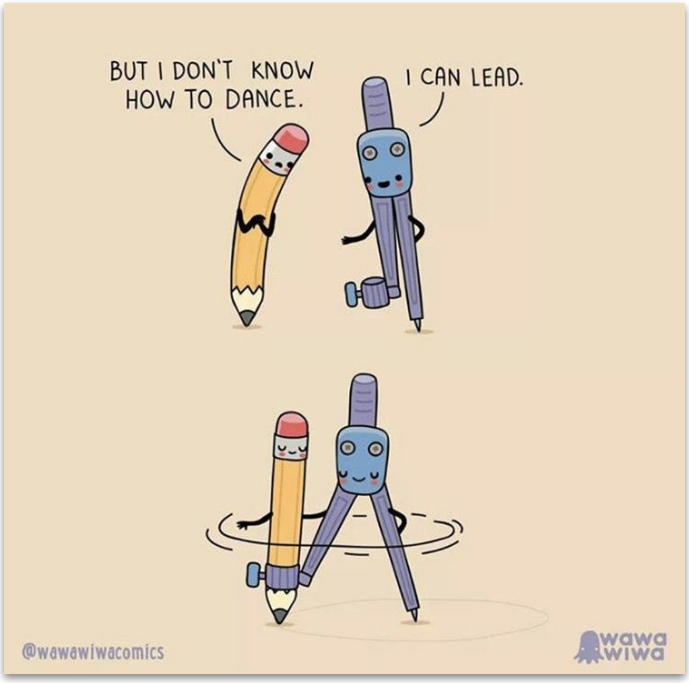
Stacy Musgrave

I had the opportunity and privilege to represent Cal Poly at the Fourth Annual "Engaging Girls in STEM" event, hosted by the Los Angeles County Office of Education. This year's event was attended by over 250 girls in 6th - 12th grade, from over 25 district/charter/private organizations. The goal of this event was to expose girls to different career paths in STEM.

This event has been very successful for four years already. If you are interested in serving as an Ambassador next year (as an individual or a team), let me know (smmusgrave@cpp.edu) and I will connect you with the organizer

Mathematical Dancing

Submitted by Alexander Hamedaninia



We welcome news from faculty, students, and alumni.

Please contact
Dr. Cristina Runnalls at
ccrunnalls@cpp.edu
for information on how to be included in upcoming issues.

In Memoriam

Cristina Runnalls

Creative and brilliant mathematical "mathemagician" John Conway recently passed away due to complications with COVID-19. Dr. Conway was renowned for his *many* mathematical contributions, exceedingly creative mind, and fantastic mathematical puzzles. In memory, I share a fun mathematical puzzle of his design:

Conway's Wizard Puzzle

Last night I sat behind two wizards, Azemelius and Bartholomew, on a bus. I heard this conversation:

Azemelius: *I have a positive integer number of children, whose ages are positive integers. The product of their ages is my own age, and the sum of their ages is the number on this bus.*

Bartholomew *(looking at the number of the bus): Perhaps if you told me your age and how many children you had, I could work out their ages?*

Azemelius: *No, you could not.*

Bartholomew: *Aha! At last I know how old you are! (Bartholomew had been trying to find Azemelius's age for a long time.)*

What is the number of the bus?

This issue was produced by the 2019-2020 Newsletter Committee:
Cristina Runnalls, Fernando Lopez-Garcia,
and Stacy Musgrave