



California Mathematics Council Community Colleges

President’s Report

Katia Fuchs, City College of San Francisco



This being the last President’s report that I will write, I want to start by saying that it’s been an honor and an absolute joy to serve as your president. I have had the pleasure of serving with a team who tackled difficult changes head-on and, together, we provided representation, guidance, and

professional development for our members.

CMC³ continues to embrace inclusivity and diversity. We are excited to welcome our Monterey keynote speakers, Jo Boaler and Omayra Ortega, who are both on the frontier of change in Mathematics education.

Writing this report has me reflecting back on

the time that has passed since the first report I wrote as president-elect. During this time, a partnership between CMC³ and ASCCC culminated in a report which you can read [here](#). I also represented CMC³ on the AB 705 Implementation Committee in Sacramento, and presented on behalf of CMC³ at the ASCCC Curriculum Institute in the summer of 2018. Also that Summer I was able to have a meeting with Jacqui Irwin (author of AB 705) in which I was able to share some of the concerns of our constituents.

We live in what seems like a new reality. With the changes brought about by the implementation of AB 705, much work remains. Here are some questions spinning around in my head:

- While many more students will be passing a transfer level math class their very first semester in college, the number of students experiencing failure in math during their first semester will probably increase; some schools are preliminarily seeing as much as triple the number of students failing. How do we support these students?
- How do we help students make decisions about their first math class in a way that simultaneously emboldens their own belief in their mathematical abilities, and also establishes realistic goals for them as they start college?

(see “President’s Report” on p. 6)

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Volume 48, Number 3

Fall 2019

CMC³ Newsletter is the official newsletter of the California Mathematics Council, Community Colleges, and is published three times a year—in the spring, summer, and fall.

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2019 Monterey Conference Coming Soon!



*Jen Carlin-
Goldberg, President
Elect/Conference
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Junior College*

The 47th annual Fall Conference will be held this year on Friday and Saturday, December 6-7, 2019. We will once again be at the Hyatt Regency Monterey Hotel and Spa. Just like last year, we will have all our conference activities on the upper level of the conference center. We will continue to enjoy the free in-room Wi-Fi and free parking. The “Downtown Monterey” shuttle will be available on Saturday night. The Conference Hotel rate this year is \$155 per night. You can make reservations online at <https://www.hyatt.com/en-US/group-booking/MRYDM/G-C12C> (Note that the hotel services fee will be waived at check-in even though it may appear in the projected costs online.) If making reservations by phone, mention “CMC³ Group Rate” when calling Hyatt Passkey Reservations: 888-421-1442. For more information on the hotel, please see the hotel website at www.monterey.hyatt.com/en/hotel/home/html.

There is an exciting program again this year that will offer a wide range of sessions appealing to many areas of professional development and classroom interests. We have a few AB 705 related sessions at the conference, Larry Green and Cindy Moss will be presenting Open Educational Resources and Online Math Homework for Support Courses, and in our last session of the day the Board will lead a roundtable where we discuss what data our colleges are gathering to study how the curriculum and placement changes are affecting student outcomes. We are very excited about what is sure to be a robust and engaging discussion.

Our Adjunct Advocate, Chantal Cimmiyotti, is planning an exciting Adjunct Session this year. She will have faculty experts on hand to look at resumes and CV’s, do mock interviews, answer questions about the application and interview process, and provide tips and advice to those seeking a full time position.

Our Friday night keynote, titled “47 Ways that Teaching Social Justice Will Make You Rich” will be presented by Dr. Omayra Ortega of Sonoma State University. Using the tools from statistics, mathematics, public health and epidemiology, Dr. Ortega tackles emerging health issues. She is deeply committed to broadening the participation of underrepresented minorities in STEM and mentoring students through the challenges of academia.

Our Saturday keynote, titled

(see “Monterey Conference” on p. 6)

Math Nerd Musings: Organic Affective Domain

Jay Lehmann, Editor, College of San Mateo



Corequisite courses afford us extra time with our students, but how to spend it? Many instructors are facilitating more active learning and affective domain. But what is affective domain? One answer to that question is that we instructors treat our students as *entire*

human beings. Another answer is that we create a greater sense of belonging, hope, and grit.

Okay, but how do we perform *effective* affective domain? Over the past five years, I've been struggling with this question while first teaching prestatistics courses and more recently corequisite courses. From my failures and successes, and discussing this issue at great length with my colleagues at bimonthly community of practice meetings for the past two years, two key themes have emerged: know your students and be connected to your students.

For some students in my corequisite courses, they seem like they are impossible to motivate. I would facilitate typical affective-domain activities, such as have my class read an article out loud about how the brain is like a muscle or watch a video about grit. Then I would have students write reflection papers,

discuss in groups, or we'd discuss as an entire class. Although the activities seemed to generate a good inclusive vibe, they didn't seem to motivate students.

I've found that the turnkey is often that I go the extra mile to get to know students and connect with them.

For example, this semester during roll I unintentionally mispronounced a certain student's name every day. Usually, I have a student repeat his or her name until I get it right, but I was butchering the student's name so badly, I didn't want to embarrass him. I overheard his friend saying that I'd given up. This really got to me. So, one day during break I asked the student if he would mind me recording him saying his name. He said he didn't and let me. I practiced all weekend and nailed it on Monday.

Guess who started asking questions in class? And guess who started visiting my office hours? And guess who moved from the back of the class to the front? And guess whose grades improved?

And it didn't stop there, because when the student visited my office for help, two of his friends came as well, and they've kept coming every Friday. And the student was the first to start offering help to

another group when his group had completed an activity. So, many students have benefited from a little spark of me recording his name. A small action, but something I'd never bothered to do in thirty years of teaching.

Some students who are struggling seem to be holding back, waiting to see how far I'll go to show that I care, and if I make that extra effort, they'll put in more energy toward the course than I could have ever imagined.

I still do standard affective-domain

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activities, but I'm trying to be more inventive. So for the first time ever, I walked my students over to the METAS center so they could learn about their support services.

On other days, I've projected images of successful mathematicians and engineers of various ethnicities and genders and shared a bit about their successes. And I don't shy away from being direct, saying how everyone in the class has a right to succeed in my class, at the college, and their dream careers.

I give a quiz or test every Friday. On Mondays, we have a class discussion about what study practices students used to prepare for the quizzes and tests. These discussions are often heartfelt and inspiring. Students often try out new strategies and credit other classmates for the ideas. Themes develop and I validate and remind students of those effective study practices.

Because of all these sorts of activities, a class culture emerges. Something that makes our class special. The more I lean into affective domain, the more I look out for small gems of the students' personalities that I can help cultivate into a class identity. Students' motivation elevates in kind.

I wish I could say that I reach all my students in my corequisite courses. Just like the rest of us, I have only so much time in the day. And that's one reason why I think it's important that each of us teachers just one corequisite course per semester, if possible. It feels twice as demanding to teach a corequisite course than a traditional one; if I were to teach two corequisite courses in one semester, my efforts would be significantly diluted.

I have much more to learn about affective domain, and that can be a good thing. Because it inspires me to keep trying new things, and trying something for the first time has that wonderful halo effect: students sense that something new is afoot, which can be yet another spark for students' motivation to kick in.

The Pleasures of Problems

Kevin Olwell, San Joaquin Delta



Fall 2019: A parking lot has 12 spaces arranged in a line. A large pickup needs two adjacent spaces in order to park. If 8 of the spaces are already occupied, what is the probability the truck

will be able to park?

I didn't receive any solutions to the summer problem. In case anyone submitted a one, please update my email address: kevin.olwell@icloud.com

Summer 2019: A cross country runner completed a 6 mile race in exactly 30 minutes. Show there must be a one mile stretch which the runner covered in exactly 5 minutes.

Let $T(x)$ denote the elapsed time when the runner arrives at mile x . Then the following function gives the time it took to cover the mile ending at mile marker x :

$$D(x) = T(x) - T(x - 1) \quad \text{for } 1 \leq x \leq 6.$$

By hypothesis the following sum is the total time:

$$D(1) + D(2) + \cdots + D(6) = 30.$$

$D(1), \dots, D(6)$ cannot all be strictly less than 5, nor can all be strictly greater than 5. If none are equal to 5, then at least one is strictly less than 5 and one strictly greater than 5. Because the graph of $D(x)$ is below the horizontal line $D = 5$ at one point and

above this line at another point, it must cross the line somewhere.

All are invited to submit a solution to the Fall 2019 problem via e-mail at the address below:

kevin.olwell@icloud.com



President's Report

(continued from page 1)

- How do we work to improve the numbers of traditionally under-represented students pursuing STEM majors, rather than see these students get further dissuaded from exploring STEM, since the non-STEM math pathway is so short now?
- How do we work with our college research departments to best learn how these changes impact our students?

These questions, though difficult, fill me with excitement about the future. I believe that we are at a point when collegial discussion, exchange of ideas and tools, as well as networking for the purpose of supporting each other morally, can help us navigate these changing times.

As I sign off as your president, I am excited to watch partnerships between CMC³ and organizations that celebrate and empower women and people of color in STEM fields take shape. I look forward to working with all of you as we continue to evolve in ways that best serve our students. Thank you, and I hope to see you in Monterey!

Monterey Conference

(continued from page 3)

“Limitless: Learn, Lead and Live without Barriers” will be presented by Dr. Jo Boaler of Stanford University. She is a Professor of Mathematics Education and the faculty director of YouCubed. Jo is also the author of the first MOOC on mathematics teaching and learning.

Two popular traditions will continue. The Estimation Run/Walk will be first thing on Saturday morning at 7:30 am, as per usual. Game Night will continue as well and I invite anyone who has a favorite game they would love to play to bring it along! I will be there with my origami as well as some of my favorite games, I hope you will join me!

The full list of speakers and their titles, as well as the latest information about the conference, will soon be available at the conference website:

<http://www.cmc3.org/conferences/fall/>

You should soon be getting the official mini-program and registration form via US Mail. Please feel free to disseminate the information and copies of the registration form among your colleagues, both full time and adjunct! We continue to offer online registration! We are excited to see everyone in December!

Keeping Things Lively at SRJC!

Jen Carlin-Goldberg, Santa Rosa Junior College



What do you do when your department has moved into a new, beautiful building and it's not

exactly finished yet? How about when heavy machinery operates outside your classroom or they install fixtures on the external walls all while you attempt to lecture? What do you do when an office (mine) came with no door for the first week, or the wrong whiteboards were installed in all of the classrooms? Then there were a few key cards that didn't work, the faculty bathroom that still doesn't lock, and holes in the ceiling that, one by one, get finished.

Slowly, the sidewalks are getting done, the second stairwell gets opened, and bicycle racks are installed. Piece by piece, things are getting put into place, all while we are teaching our classes.

What do you do? Why, take everything in stride! Pause for a moment and repeat what you were saying after a loud bang drowned you out for a moment. Perhaps you remind yourself that it will all

be over soon, they can't be building all semester, right? And ... perhaps ...



... this little fellow makes its rounds, visiting any office it can be snuck into, eliciting gasps, giggles, and the occasional scream.

Mark Your Calendar:

47th Annual CMC³ Conference

December 6th and 7th, 2019

Hyatt Regency Monterey Hotel and Spa

The History Corner



Joe Conrad, Solano Community College

This semester I am teaching (among other things) two sections of College Algebra and we

reviewed complex numbers the other day. As usual, I motivated the use of complex numbers by the desire to solve a quadratic equation whose roots turn out not to be real. This method of introducing complex numbers works fine with the students and is typical in the textbooks that I have used, but, as many of you know, is not the way the study of complex numbers really got started. So I thought I would use this edition's column to recall the beginnings of the use of complex numbers.

As I wrote in the last installment of this column, people have been solving quadratic equations since the time of the Babylonians thousands of years ago. For most of that time, folks were more than happy to say that some quadratics could not be solved since it would require taking square roots of negative numbers which is impossible. (I imagine that many of our students would be fine with maintaining this perspective!) Indeed, it was not the solution of quadratic equations that led to the use of what we now call complex numbers, but the solution of cubic equations.

Before I get started with cubics, I should also note that it took nearly as long for mathematicians to get comfortable with negative numbers as it did for complex numbers. Even into the sixteenth century, negative roots of equations were referred to as

“absurd” or “fictitious.” I should also note that for this column I will dispense with the usual Reference section as most all of the information (and a whole lot more) can be found in Paul Nahin's book, *An Imaginary Tale, The Story of -1* .

A general cubic equation can be put into the following form: $x^3 + ax^2 + bx + c = 0$. In 1494, the Italian priest Luca Pacioli wrote a book purporting to be a compilation of all that was known in arithmetic, algebra and trigonometry. He declared that the solution of the cubic was “as impossible as the quadrature of the circle.” It did not take too long for Pacioli to be proven wrong! Another Italian, Scipione del Ferro (1465 – 1526) succeeded in solving what had become known as the depressed cubic. The depressed cubic is one of the form $x^3 + px = q$, where p and q are both positive reflecting the concern of the day for negative numbers. In this case, del Ferro found that

$$x = \sqrt[3]{\frac{q}{2} + \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}} + \sqrt[3]{\frac{q}{2} - \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}}$$

Thinking about this for a moment reveals that, since p and q are both positive, there will never be an issue with a square root containing a negative or a negative root of the equation. So, far so good, but what happens if p or q are negative? Because of the aversion to negative numbers, people spoke of additional forms of the depressed cubic, namely, $x^3 = px + q$ and $x^3 + q = px$. It had been known for some time that the general cubic could be reduced to one of the three depressed forms using the substitution $u = x + a/3$.

In our times, if we discover something that is new, we rush to get it published, but in

the 1500's employment in mathematics was problematic. One way to get some money was to participate in math contests where two mathematicians would pose problems to each other and whoever solved the most problems won a cash prize. (Maybe they would even get noticed by someone with real money who would become their patron.) So del Ferro sat on his ability to solve the depressed cubic so he could use it in contests. As he neared the end of his life in 1526, del Ferro's student, Antonio Fiore, managed to get del Ferro to reveal his formula. By 1535, feeling confident, Fiore challenge the better known and better mathematician Niccolo Fontana (1500 – 1577), better known as Tartaglia, to a contest. Tartaglia had announced that he knew how to solve cubics of the form $x^3 + px^2 = q$, but Fiore thought he was bluffing. Tartaglia understood that Fiore could solve the depressed cubic, so he devoted himself to finding a solution and he did! (Why is it easier to find a solution when you know that one exists?) Once Tartaglia could solve the depressed cubic, together with the form he had already learned to solve, he crushed Fiore in the contest.

This story is just getting started! Tartaglia also kept the secret of the solution to himself. With his fame spreading, Tartaglia's ability to solve these equations came to the attention of Girolamo Cardano (1501 – 1576) who was also a very talented mathematician. Cardano (also known as Cardan) approached Tartaglia and hounded him for the solution. Tartaglia eventually relented and, under a vow of secrecy, revealed the formula to Cardano, but not the proof. Knowing the formula, Cardano was able to rediscover the proof. He also found out that Tartaglia was not the first to solve the

depressed cubic, but that del Ferro had done it earlier. He decided that this released him from his vow and he published the solutions to all three forms of the depressed cubic in his *Ars Magna* in 1545 which is why the solution is often called Cardan's formula. Before we castigate Cardano for breaking his vow, it should be noted that in his book, he gave full credit to both del Ferro and Tartaglia. (This did not assuage Tartaglia and he was angry about it the rest of his life.)

What about complex numbers in all this? We have seen that they will not appear in the solution of the original depressed cubic. The depressed cubic of the form $x^3 = px + q$ has this solution:

$$x = \sqrt[3]{\frac{q}{2} + \sqrt{\frac{q^2}{4} - \frac{p^3}{27}}} - \sqrt[3]{-\frac{q}{2} + \sqrt{\frac{q^2}{4} - \frac{p^3}{27}}}$$

Looking at the radicals involved, we can see that depending on the size of p and q , we could get a negative under the square root. Cardano noted this case, the so called *casus irreducibilis*, but avoided it in *Ars Magna*.

It was left to Rafael Bombelli (1526 – 1572), who was a follower of Cardano, to clear up the issue. What was perplexing to him and others was that a cubic which clearly had a positive real root could have a solution that appeared to come from the square root of a negative. Bombelli published his book *Algebra* in 1572. In it he addressed the *casus irreducibilis*. In particular, he examined the equation $x^3 = 15x + 4$. Very little thought reveals that 4 is a solution of this equation. The solution from Cardano's formula is the monstrous

$$x = \sqrt[3]{2 + \sqrt{-121}} + \sqrt[3]{2 - \sqrt{-121}}$$

Could this actually equal 4? In a major advance, Bombelli proved that it was, in fact, equal to 4. He wrote in his book (as quoted in Nahin), “It was a wild thought in the judgment of many; and I too for a long time was of the same opinion. The whole matter seemed to rest on sophistry rather than on truth. Yet, I sought so long, until I actually proved this to be the case.” What he realized was that the two summands must be what we call complex conjugates in order to result in a real value. Equating the summands to $a + bi$ and $a - bi$, cubing and working out the algebra yields the result. So it was the fact that cubics had real roots that could only be approached through the use of complex numbers that forced mathematicians to accept the reality (no pun intended) of complex numbers.

Some additional moments in the history of complex numbers that might interest our students include the fact that the very unfortunate term of imaginary numbers was first used by Descartes (1596 – 1650). (Gauss (1777 – 1855) introduced the term complex number and noted that imaginary was “an unsuitable terminology.”) De Moivre (1667 – 1754) knew and used his formula to compute the complex roots of cubics before 1700, but he mentioned that Newton (1643 – 1727) knew an equivalent expression as early as 1676. Not surprisingly, it was Euler (1707 – 1783) who first denoted -1 with i . He also defined the complex exponential and proved $e^i = \cos + i\sin$ which produces the famous $e^{i\pi} = -1$.

The last classical development that I will mention is the development of the geometrical interpretation of complex numbers. John Wallis (1616 – 1703) made some progress with this (along with giving the interpretation of negative numbers as points on

a line to the left of wherever 0 was marked.) Euler also had some ideas about it, but the first to really get it right was Caspar Wessel (1745 – 1822) who presented a paper in 1797 to the Royal Danish Academy of Sciences which was published in 1799. Unfortunately, he wrote it in Danish and it was unnoticed for 100 years. It was Jean-Robert Argand (1768 – 1822) who produced an anonymous pamphlet in 1806 with the traditional geometry of complex numbers. This, too, would have languished in obscurity had not it taken a strange journey through the hands of several mathematicians until it was published in the *Annales de Mathematiques* by Jacques Francais (1775 – 1833) in 1813 who urged the unknown author to come forward. Argand did come forward and was given credit in the next issue and gave his name to the Argand diagram.

This was the beginning of the study of the complex numbers. This study has developed into an incredibly advanced subject area containing some of the deepest content in all of mathematics. From number theory to fractals to applications in electronics, hydrodynamics and quantum theory, math and science would be far weaker without complex numbers. Here’s hoping we can convince our students of this fact!

Meeting the Need for Statistics Education in Post-AB 705 California

Hal Huntsman, Antelope Valley College



I'm somewhat ashamed to admit that I had never taken a formal statistics course before I first taught statistics about eight years ago. I entered that first semester willing to figure it out, but hampered by a textbook that cost too

much and was filled with content focused on calculations; there were few if any conceptually-oriented questions. Notes from a colleague who had taught the course in the past helped, and the more I learned and taught, the less satisfied I grew with my textbook.

When I found the Open Learning Initiative (OLI) Concepts of Statistics course out of Carnegie Mellon University (oli.cmu.edu), I was delighted. The content was inexpensive, interactive, and very concept-driven. I learned a lot, but *learning* and *understanding* statistics is only the first part of our job. The second, arguably more important part of our job is to *teach* statistics and for students to learn it. The OLI content was a big improvement, but its structure allowed students to skip all the interaction (and thus most of the learning) if they wanted to.

Jump forward to today -- teaching statistics has become even a little more challenging, because statistics may be the first (and only) math class that our students see in college. The need to teach in an active way that engages more of our students has never been more important. We have to meet our students where they are and continue to hold them to high

standards of learning. We must support our students to reach that high level of expectation, or we will not get the results we want.

To meet this need we need interactive materials that focus on both concepts and procedures, with projects based in real life that foster statistical literacy. The materials should be engaging and motivating and include cognitive and affective support for students. Ideally, they would be guided by the experience of community college math faculty who have taught statistics, and who could share their knowledge with the rest of us, but still be adaptable to the needs of individual colleges and classrooms.

The good news is that a team of math faculty from three different CA community colleges have done pretty much exactly that. They have created a new statistics course in Canvas, based on the OLI content, available to both faculty and students for free. They've spent hours coding more than 180 interactive exercises and quizzes with immediate feedback. As a companion for the Canvas shell, Los Medanos College math faculty have made available a student workbook with over 70 class activities, labs, and projects, along with an instructor's manual with *full facilitation notes*. Integrated throughout are activities, strategies and tips for addressing the affective side of learning.

The course can be used for face-to-face or online instruction. All materials are editable in Canvas to meet your college's specific course needs. The course meets standards for accessibility in the CVC-OEI Course Design Rubric and WCAG 2.1 (formal validation is pending).

Rachel Polakoski, who teaches at early-adopter Cuyamaca College, says, "When we were using OLI's standalone platform, students would jump straight to the end of a unit checkpoint quiz, because that's what counted for

their grade. When we put OLI on Canvas and forced students to work through it sequentially, actually doing all of the little checks for learning in a module before the end of unit checkpoint, the students started doing better on the checkpoints. Our success rate improved from 64% to 74%.”

In addition, the immediate feedback students receive, the opportunity to learn from and correct mistakes and the automatic grading of these checks for learning, motivates students without increasing grading time. Polakoski says, “It has decreased my workload. The mini-quizzes and discussions are linked directly to the Canvas grade book. I can tell if they haven't completed something the day before a deadline and message them to remind them of the upcoming due date and offer assistance. Student are motivated when they see the immediate impact on their grade after completing a quiz. I love using OLI on Canvas.”

The timing for offering these high-quality statistics materials through Canvas could hardly be better. Around the country education is moving toward the use of free, open educational resources (OER). In California the College Textbook Affordability Act of 2015, AB 798, created the California OER Council (<http://icas-ca.org/duties-of-coerc>), whose mission “is to save college students money by empowering professors and local campuses to adopt high quality, free and open educational resources for course materials.” As much as I support this goal, every time I've tried to get my department to adopt an OER textbook, we run into poorly-developed content that has barely been edited or proofread. Problem sets are often incomplete or just plain wrong.

Another factor making this course's development timely is the huge increase in the number of sections of statistics we are teaching across the state – at my college, alone, we went from teaching 23 sections in Fall 2018, to 44

sections this fall – means a larger and larger number of us are teaching statistics. And, as I've talked to other statistics instructors in our CA community college system, I've found that my experience is not uncommon. On the contrary, I think I'm the norm: most of us are not trained statisticians.

I have always benefited from hallway conversations with my colleagues to troubleshoot classroom issues, to discuss how to teach a difficult concept, to compare exams – and this is particularly true in statistics. This new course, created by and shared among CA community college faculty, takes hallway conversations to a whole new level.

Consider all that is now available: The free OER material offered via an editable Canvas shell, content based on the reputable Open Learning Initiative and customized for CA community colleges by community college faculty, a class-tested activity packet, and an instructor's manual. This is the future of the type of collaboration that will support our students to succeed.

All materials are available online (<https://4cd.instructure.com/courses/48111>) under a CC BY license – which means you may use and adapt it freely, as long as you give attribution credit.

CMC³ Foundation Report



*James Sullivan,
Foundation
President, Sierra
College*

The CMC³ Foundation is currently accepting proposals for the 2019 Student Poster Contest. Please encourage your exceptional students to take advantage of this special opportunity. Every student team (with a maximum of two students per team) that presents their Poster at the Monterey Conference Student Poster session will share a \$150 scholarship and compete to receive a portion of an additional scholarship pool of \$500.

To be eligible to present their Poster Contest entry, students must (1) be enrolled in a Mathematics course at a California Community College in the Fall of 2019, (2) be accompanied by their faculty sponsor who is registered for the Monterey Conference, and (3) submit their Student Poster Contest proposal online at http://www.cmc3.org/students/posters/call_for_posters/ by November 11, 2019.

Members of the CMC³ Foundation Board will evaluate each proposal and select four entries to present their poster at the Student Poster Contest session in Monterey. In addition to receiving their share of a \$150 scholarship, students selected to participate in the poster session will be registered for the conference which includes lunch, but they must arrange for their own transportation and accommodations at the conference.

Student posters can focus on any topic belonging to the fields of pure mathematics, applied mathematics, mathematics history, or mathematics education. Each Student Poster

Contest team will be given 10 minutes to present their entry during the student poster session.

These presentations will be evaluated by a panel of judges on the accuracy of the mathematical content, the quality of the student presentation of their poster, and the overall poster design. The judges' rankings will determine the additional scholarship amounts awarded. Refer to the Student Poster Session section of the CMC³ website <http://www.cmc3.org/students/posters/> for more information and poster guidelines.

The CMC³ Foundation is able to offer scholarship opportunities, such as the Student Poster Contest, to our students thanks to the generous donations and support of our members like you. Please consider supporting our scholarship fund benefiting deserving California Community College Mathematics students by making a tax deductible donation today either by credit card or PayPal using the "Donate" button on the CMC³ Foundation website <http://www.cmc3.org/foundation/donate/> or by mailing a check to Leslie Banta, CMC³ Treasurer, Mendocino Community College, 1000 Hensley Creek Rd, Ukiah, CA 95482. You can also support our scholarship fund by attending the Annual Fall Conference held in Monterey this year on December 6th and 7th and purchasing raffle tickets or merchandise (sweaters, shirts, and hats) at the CMC³ Foundation booth. This year the Foundation raffle will feature themed baskets filled with a variety of interesting items. Be sure to drop by and check them out.

Calendar

November 14–17, 2019: 45th AMATYC Annual Conference, Milwaukee, WI. Website: <https://amatyc.site-ym.com/page/2019ConfHome?>

December 6–7, 2019: CMC³ 47th Annual Conference, Hyatt Regency Monterey Hotel and Spa, Monterey, CA. Contact Jen Carlin-Goldberg, Santa Rosa Junior College (707) 527-4746, jcarlingoldberg@santarosa.edu

December 6—8, 2019: CMC North 62nd Annual Conference, Embracing Cultural Diversity in Mathematics, Pacific Grove, CA. Website: www.cmc-math.org/conference-overview

January 14—18, 2020: MAA-AMS Joint Mathematics Meetings, Denver, CO Website: <https://www.maa.org/meetings>

February 21 - 22, 2020: MAA-Florida Section and FTYCMA Joint Conferences, University of West Florida, Pensacola, FL Contact: Cengiz Ozgener Website: <http://sections.maa.org/florida/newsletter/calluwf.htm>

February 29, 2020: MAA Golden Section Meeting, Mills College. Website: www.sections.maa.org/golden/index.html.

February 29, 2020: SOCAMATYC 2020!, Tri-County Technical College Contact: Tracy McCoy Website: <http://www.soca.matyc.org/>

March 12—15, 2020: ICTCM, Orlando Florida Website: <https://www.pearson.com/us/about/news-events/events/2020/03/ictcm-2020-conference.html>

April 1—4, 2020: NCTM, Chicago Illinois Website: <https://www.nctm.org/Conferences-and-Professional-Development/Annual-Meeting-and-Exposition/Past-and-Future-Annual-Meetings/>

April 3, 2020: ALAMATYC Conference: Shooting for the Stars, Contact: Dr. Nathan Winkles Website: <https://alamatyc.wixsite.com/alamatyc>

April 17 - 19, 2020: 53rd Annual NYSMATYC Conference, Best Western Plus, Kingston NY. Contact: Jayashree Hurlburt Website: www.nysmatyc.org

April 23 - 25, 2020: MinnMATYC/MCTM Conference, Duluth, MN Contact: Mel Taylor Website: <http://www.minnmatyc.org/conferences>

April 24-25, 2019: CMC³ 23rd Annual Recreational Mathematics Conference, Lake Tahoe CC, South Lake Tahoe, CA. Contact: Larry Green, Lake Tahoe Community College, (530) 541-4660 ext. 341, drlarrygreen@gmail.com

Jay Lehmann

Editor

CMC³ Newsletter

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