



California Mathematics Council Community Colleges

CMC³ NEWSLETTER

The President’s Message

Mark Harbison, Sacramento City College

Here are two really big announcements (I think that they are unrelated):

1. Susanna Gunther now has a new healthy baby boy! She’s a proud Mom. Yay! While Susanna continues her maternity leave, I continue to fulfill the duties of CMC³ President.
2. CMC³ now has a new hotel for the fall conference! I am a proud President of our organization. The next two Annual Fall

Conferences will be held at the Hyatt Regency Monterey Hotel and Spa: Dec. 13 – 14, 2013 and Dec. 5 – 6, 2014 (see my “Fall Conference” article in this newsletter). The 2013 program is now full, but please consider speaking at the 2014 one. You can submit speaker proposals at:

<http://www.cmc3.org/conference/callForProposalsMonterey.html> .

In other announcements: thanks to Larry Green for hosting a fantastic conference last month in Tahoe (see Larry’s article in this newsletter). Proposals are now being accepted for Recreational-Math-style presentations for the next spring conference on April 26, 2014. Email me <harbism@scc.losrios.edu> if you'd like to give a talk. New faces are always welcome!

Table of Contents

President’s Message-----	1
Fall Conference-----	3
Everyone Enjoyed another Great Conference at Lake Tahoe-----	4
Distinguished College or University Teaching Award-----	5
Sacramento Valley CC Mathematics Conference-----	6
CMC ³ Foundation Report-----	7
Mathematics for the 80%-----	8
Pre-Stats Courses-----	11
CMC ³ Elections Coming Up!-----	14
Through the History Glass-----	15
Math Nerd Musings-----	17
Calendar-----	19

The CMC³ Board continues to meet three times per year to organize our two annual conferences, maintain a budget, and discuss other issues that affect the Mathematics Education community at California Community Colleges. Barbara Illowsky <illowskybarbara@deanza.edu> is still collecting nominations (Aug. 31 deadline) for people interested in joining our merry Board.

All members are also welcome to join the Facebook.com “CMC3” group. It’s a spam-free place to get connected with colleagues.

Thanks to all of you for supporting CMC³. I look forward to seeing you at the Hyatt Monterey on Dec. 13 – 14, 2013.

Executive Board & Special Committees

President: Susanna Gunther, Solano Community College,
(707) 864-7000, ext. 4614,
SusannaElizabeth2020@gmail.com

Past President: Barbara Illowsky, De Anza College
(408) 864-8211, illowskybarbara@deanza.edu

President-Elect: Mark Harbison, Sacramento City College
(916) 475-9461, harbism@scc.losrios.edu

Secretary: Greg Daubenmire, Las Positas College
(925) 373-3085, gdaubenmire@laspositascollege.edu

Treasurer: Rebecca Fouquette, De Anza College
408-864-5522, fouquetterebecca@fhda.edu

Members-at-Large:

AMATYC Liaison: Marcella Laddon, Cabrillo College
(831) 479-5734, maladdon@cabrillo.edu

Adjunct Advocate: Tracey Jackson, Santa Rosa Junior
College, tkkjackson@yahoo.com

Articulation Breakfast: Steve Blasberg, West Valley
College
(408) 741-2564, steve_blasberg@westvalley.edu

Awards Coordinator: Katia Fuchs, City College of San
Francisco, (510) 325-1616, efuchs@ccsf.edu

Business Liaison: Randy Rosenberger, Sacramento City
College, rosenbr@scc.losrios.edu

Campus Reps Coordinator: Tracey Jackson, Santa Rosa
Junior College, (707) 527-4356, tkkjackson@yahoo.com

CMC Liaison: Jenny Freidenreich, Diablo Valley College,
(925) 685-1230 x2302, JTheSmith@comcast.net

Conference AV Specialist: Larry Green, Lake Tahoe
Community College
(530) 541-4660 ext. 341, drlarrygreen@gmail.com
and Steve Blasberg, West Valley College
(408) 741-2564, steve_blasberg@westvalley.edu

Fall Conference Chair: Mark Harbison, Sacramento City
College
(916) 475-9461, harbism@scc.losrios.edu

Fall Conference Speaker Chair: Wade Ellis, West Valley
College (retired), (408) 741-2568, wellis@ti.com

Foundation President: Debra Van Sickle, Sacramento City College,
(916) 558-2476 vansicd@scc.losrios.edu

MAA Liaison: Wade Ellis, West Valley College (retired)
(408) 741-2568, wellis@ti.com

Membership Chair: Joe Conrad, Solano Community College,
(707) 864-7000 x 4372, Joseph.Conrad@solano.edu

Monterey Hotel Chair: Rob Knight, Evergreen Valley College,
robknight@charter.net

Newsletter Editor: Jay Lehmann, College of San Mateo,
(650) 863-5305, MathNerdJay@aol.com

Spring Conference Chair: Larry Green, Lake Tahoe Community
College
(530) 541-4660 ext. 341, drlarrygreen@gmail.com

Spring Conference Speaker Chair: Mark Harbison, Sacramento City
College
(916) 475-9461, harbism@scc.losrios.edu

Web Page Coordinator: Larry Green, Lake Tahoe Community
College
(530) 541-4660 ext. 341, drlarrygreen@gmail.com

Follow us on Facebook



Call for Board Members

Contact Past-President Barbara Illowsky (illowskybarbara@deanza.edu) before August 31 if you are interested in being on the ballot for a CMC3 board member position. Elections will be in Fall, 2013.

Volume 42, Number 2

Summer 2013

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.

Copyright© 2013 California Mathematics Council,

Fall Conference

Mark Harbison, Sacramento City College

The 41st annual CMC³ Fall Conference will be on Friday and Saturday, December 13-14, 2013 at a new hotel! We are happy to move to the Hyatt Regency Monterey Hotel and Spa, especially since they just completed a \$5 million renovation last month.



The move is being done out of necessity. The Portola gave away our keynote and exhibitor rooms for years 2013 and 2014. It would have cost more than \$2200 each year for another keynote room and would have made the exhibitor room too uncomfortably crowded with 150-person maximum occupancy. Reservations can now be made at <https://resweb.passkey.com/go/CMC3AnnualMeeting> or by mentioning “CMC3 Annual Meeting” when calling 1-888-421-1442.

There are so many good things about this new location. For basically the same cost at the Hyatt (\$130 room + \$10 resort fee) as at the Portola (\$139+0) up to double occupancy, we get

- * free self-parking
- * free wireless internet in all guest rooms
- * free wine tasting samples
- * an in-room safe
- * an in-room mini-refrigerator

- * a \$10 credit towards Spa service
- * two swimming pools
- * two jacuzzi's
- * a fire pit gazebo
- * free tennis courts
- * free golf bag storage and shoe shine
- * the best-rated sports bar in Monterey county
- * tee times for the oldest-running golf course West of the Mississippi
- * indoor activities like monopoly, scrabble, yoga and Sony Playstation
- * outdoor games like ping pong, shuffleboard and foosball
- * kids under 17 stay complimentary.
- * kid-size chess pieces by one of the swimming pools

Each guest room even comes with a free tube of AquaFresh toothpaste! It sounds too little to be listed with the other great perks already mentioned, but how many hotels do you know that automatically provide toothpaste? That's pretty special.

There will be a free shuttle to Fisherman's Wharf every few hours, but it's also just a two-mile drive to there (or a 1/2-mile drive to the Bay) from the Hyatt.



You can hear Hwy 1 traffic from just a few of the rooms, but most of the rooms are quiet.

The Hyatt will provide seating for at least 50 people in each of the six breakout rooms and 300 people for the keynotes. There will be room for up to 20 exhibitors again. We will have the entire first floor of the building to ourselves—exclusive space dedicated to mathematics and

statistics professional development! Other than one trip upstairs for a keynote address, we will mingle in just one place now (not waiting for elevators to get from the first to third floor and back).

It's a dream come true for me, and I couldn't have done it without the help of my colleagues. This took a lot of work researching and negotiating. I want to thank Rebecca Fouquette who visited the Hyatt in-person with me recently. I also want to thank Rob Knight, Larry Green, Barbara Illowsky and Joe Conrad for serving on the executive committee by offering many helpful suggestions over email.

Please consider speaking at this Fall's conference. You can submit speaker proposals at: www.cmc3.org/conference/callForProposalsMonterey.html .

It would also help me if every one of you reading this article would kindly **mention the new location** to at least one colleague over the summer. Please try to spread the news early, so that there are fewer surprises in the fall. It would be awkward if anyone showed up at the old hotel and asked their staff "where's CMC³".

I'll see you on Dec. 13-14 at the Monterey Hyatt! Thank you very much.

Everybody Enjoyed another Great Conference at Lake Tahoe

By Larry Green, Lake Tahoe Community College

Nearly 100 CMC³ members and guests attended the Recreational Mathematics Conference last month to get their annual dose of math puzzles, art, applications, and intrigue. Robert Lang demonstrated how math is used to create intricate origami. We learned about the equations that produced feathered papers birds and detailed insects out of a single piece of paper.

On Saturday morning, everyone was awed by presentations on the mathematics of geography, intriguing ways of using proportions to solve familiar problems, creating mathematics artistically and computationally, and how the ancient Japanese spent their time on mathematical puzzles. After lunch, we were entertained by Bernt Wahl who showed us how fractals have been used in some of the highest fashion. This was followed by another round of

(see "Tahoe Conference" on p. 17)



Surrounding area of Hyatt Regency Monterey Hotel and Spa

Distinguished College or University Teaching Award

John Thoo, Yuba College

The MAA Golden Section held its annual section meeting at UOP last February 23, 2013. After lunch, it presented the 2013 Award for Distinguished College or University Teaching of Mathematics to...

STEVEN BLASBERG

Here is the citation:

“Steve is an exceptional educator with a natural feel for where mathematics education is now, how it can be improved, and the talent to find and implement ways to improve it.” (Most of this citation, including that sentence, is quoted directly from students' and colleagues' testimonials.)

Steven Blasberg has been teaching mathematics at West Valley College since 1975. He earned master's degrees in mathematics, computer science, and mathematics education from Stanford University and belongs to their chapter of Phi Beta Kappa.

Steve is widely recognized as an extraordinarily successful teacher. The hallmark of his teaching is the clarity of his explanations and the depth of his knowledge, both mathematically and pedagogically, and Steve has shared his teaching expertise with the wider community through numerous presentations at many conferences. During the 1980s, Steve developed and taught the first discrete mathematics course to be offered at a community college in Northern California. He also co-authored a textbook on learning programming with the TI-92 calculator and has

authored solution manuals for several textbooks.

Steve has always been an innovator---in every semester he tries something new that may improve his classes. A dynamic communicator with a gift for making complex topics seem clear, Steve is always ready with several explanations of every concept. If a student were not to understand one explanation, Steve would offer a second, or a third, or a fourth. Mathematics faculty members also go to Steve with mathematical or pedagogical questions across the broad spectrum of courses and mathematical topics.

Students flock to Steve's classes and his retention rates are very high. Students who have had him for one course are eager to take him for another; often his student evaluations include comments like “Steve Blasberg is the best math teacher I've ever had!” His teaching schedule always includes at least four different class preparations because he enjoys teaching a wide variety of courses; and he has even taught multivariate calculus and linear algebra at the local high school. Steve is also known in the department for spending extended time with students in office hours. According to one colleague of over thirty years, “He literally leaves his half-eaten lunch in the staff break room to help a student in his office.”

Steve has served the mathematics community not only through his general involvement, but also by being on committees and boards of many local, state, and national organizations. A big part of Steve's career has been his involvement in student mathematics competitions. He has developed tests and chaired committees for several competitions, such as the AMATYC Student Mathematics League, that are too many to list here. Steve also coaches students for competitions, including the Putnam Competition. He believes that students of all

(see “Teaching Award” on p. 14)

Sacramento Valley CC Mathematics Conference

Mark Harbison, Sacramento City College

The Sacramento Valley Community College Mathematics (SVCCM) Group has organized a one-day conference every year since 2004. It is always on a Saturday in late February or early March, and is always free to participants—typically from about 8 am to 4 pm. Publishers visit and cover all costs for breakfast snacks and a full lunch.

This web page works best if copied and pasted into a browser's address window:
<http://ms.yccd.edu/math/sacvalleyccm.html>

Different volunteers organize the conference slightly differently each year. There are usually 1 or 2 keynote talks from local UC or CSU Math or Stats departments. Commercial publishers typically host a couple of sessions. Then there are from 6 to 20 other speakers or panels discussing a wide variety of issues affecting our students, classrooms and colleges.

Our definition of "Sacramento Valley" originally included (alphabetically) American River College (ARC), Butte College (BC), Cosumnes River College (CRC), Folsom Lake College (FLC), Sacramento City College (SCC), Sierra College (SC) and Yuba College (YC). Recently, Woodland Community College (WCC) has been added to this list. Participants are welcome from any part of Northern CA, but these 8 colleges are our priority (our focus) since they rotate the hosting each year.

A recent SVCCM conference was held on Saturday, March 9, 2013, at SCC. Ninety-five people pre-registered, minus 11 no-shows, plus 6 walk-ins totaled approximately 90 people enjoying the sunny weather in the 60s. John Thoo (YC) and Mark H. (SCC) were co-hosts.

Patrick McKeague of xyzTextbooks spontaneously gave a 2nd presentation to fill the spot left by a speaker who had to fly back to Illinois for a family emergency. His company was one of 5 major sponsors that made SVCCM possible; xyzTextbooks, Cengage, Pearson, Macmillan and Hawkes Learning System generously sponsored all of the food and beverages.

Two other sponsors were Professors Who Publish (PWP) and the California Mathematics Council of Community Colleges (CMC³).

Thanks to the speakers from ARC, UC Davis, CCSF, Los Medanos College, FLC, Solano CC, UOP, CRC, and Cabrillo College. Please contact Matt Clark for speaker suggestions for SVCCM 2014 at WCC; his email address is mclark@yccd.edu.

Thanks to the following people for volunteering as presiders: Rory Kinoshita, Larry Green, Mark Webster, Mary Martin, Michelle Brock, Michael Papin, Murray Navarro, Mike Challender, John Thoo and Robert Crawford. It means so much to a conference host to know that someone will take responsibility for distributing handouts and starting/stopping each session fairly close to on-time. It also means that each speaker will have at least one attentive person in the audience listening to their talk. You're the best!

There are also many other people worth mentioning who made this event possible:

- Thanks to John Thoo for organizing a very educational and entertaining program.
- Thanks to Erna Harbison for shopping for breakfast food and drinks. She's awesome.
- Thanks to Phuong Le (math instructor) for washing strawberries and setting up other snacks in both room 101 and 103.
- Thanks to Anne Licciardi (SCC Dean of Mathematics, Statistics and Engineering) who welcomed everybody.

(see "Sacramento Conference" on p. 10)

CMC³ Foundation Report

Debbie Van Sickle, CMC³ Foundation President, Sacramento City College

Scholarships

We have completed the process of awarding our CMC³ Scholarships for the 2012/2013 academic year. This year we awarded a \$400 scholarship to one outstanding student at fourteen of our member colleges. Faculty at each college selected their student recipient using criteria we provided (see <http://www.cmc3.org/foundation.html#scholarships>).

Here are this year's winners:

American River College	Yael Nefertiti Numark
Butte College	Ami Rose
Chabot College	Jingwei You
College of the Redwoods	Michael White
College of the Sequoias	Caleb Price
College of the Siskiyous	Nicholas Stalder
Evergreen Valley College	Gary Wilkin
Feather River College	Kristin Jacobs
Fresno City College	Ricky Martinez
Hartnell College	Alex Cota
Mendocino College	Greg Shelton
Monterey Peninsula College	Christian Ortega
Ohlone College	Michael Dizon
Sacramento City College	Stanislav Oleynik

We will also be awarding scholarships to the three students at our member colleges who achieved the highest scores in annual Student Mathematics League Math Competition as soon as the results are posted.

Fundraising

The Tahoe conference provided a successful end to our 2012/2013 fundraising season. I would like to thank Foundation board members Barbara Illowsky from De Anza College, Bic Ha DoVan from Santa Rosa Junior College, Hsiao Wang from

Sacramento City College and our treasurer Rebecca Fouquette also from De Anza College for all their hard work and great ideas. Thanks also to our members who donated prizes including Barbara Illowsky, Bic Ha DoVan, Paul Manriquez, Steve Blasberg, and Jenny Freidenreich. And a very special thanks to our corporate donors Pearson Publishing and the MontBleu Hotel. Thanks to CMC³ for donating a free registration to the Monterey conference. And finally, thanks to all of our members for buying raffle tickets and tee shirts and other merchandise. All together we were able to raise about seven hundred dollars at the Tahoe conference. As always, all money raised will be used to fund student scholarships.

Student Speaker Competition

The Foundation was once again delighted to facilitate the annual Student Speaker Competition made possible by a generous gift from past CMC³ president Debra Landry. This year's winner Gabriel McHugh from Santa Rosa Junior College was mentored by John Martin, also from Santa Rosa Junior College. Thanks to Larry Green for running the competition. See his article on the Tahoe Conference for more information on the student speaker.

AMATYC CONFERENCE
is at Anaheim, CA this
year!

October 31-November 3, 2013
See the Calendar for details.

Mathematics for the 80%

Wade Ellis, West Valley College

Somewhere around 70% ($\pm 10\%$) of the California community college students at your college are pursuing careers that require very little mathematics. In fact, these careers require at most the standard mathematics outlined in the [Common Core State Standards for Mathematics](#) (CCSSM) for the 8th grade. I hasten to say that the 8th grade mathematics includes a deep understanding of fractions, proportional reasoning, solving linear equations and linear systems of equations, graphing linear equations, and basic data analysis. The CCSSM Introductions to 7th and 8th grade mathematics appear below:

Mathematics | Grade 7

In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

Mathematics | Grade 8

In Grade 8, instructional time should focus on three critical areas: (1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems

of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

Moreover, much of the mathematical thinking students need to develop for careers involving geometric visualization, schematic diagram analysis, and complex applications of measurement does not occur in the school or community college mathematics curricula.

Unfortunately, our community college degree requirements in mathematics start at Intermediate Algebra (physical science degrees often require more). The National Center on Education and the Economy (NCEE) has just rolled out a booklet entitled “[What Does it Really Mean to be College and Work Ready?](#)” that documents this situation and makes recommendations on how to address these issues. A concluding statement in the preface to this document is, “. . . we do not teach what they need, while demanding of them what they don’t need: furthermore the mathematics that we do teach and that they do need, we teach ineffectively.”

This concluding statement is based on an analysis of courses from randomly selected community colleges in 7 representative states. These courses were introductory courses in nine disciplines – Accounting, Automotive Technology, Business, Computer Programming, Criminal Justice, Early Childhood Education, Information Technology, Nursing and Biotech/ Electrical Technology – as well as introductory

mathematics courses, i.e., Intermediate Algebra courses. The analysis was performed by a panel of mathematics experts drawn from community colleges as well as four-year institutions and other venues (I was a member of the panel). The panel was uniformly surprised by the low level of mathematics involved in the introductory career discipline courses and the mismatch between Intermediate Algebra topics and the mathematics appearing in these career discipline courses.

I and many other Northern California community college mathematics instructors doggedly and successfully sought over many years to make Intermediate Algebra a community college graduation requirement. The argument was that requirements for graduation from a community college should be at least as demanding as graduation from high school. Also, now that this requirement is in place, weakening it could be seen as a way to create a cadre of community college graduates who are unable to participate fully in the economic and political life of California – could create second class citizenship. I still agree with these arguments with some addenda.

First, Intermediate Algebra has symbolic manipulation at its core. We need an “Intermediate Algebra” course that has at its core the idea that mathematics makes sense and that sense-making includes a deep understanding of fractions (quotients of positive integers with non-zero divisors). The CCSSM states in its Introduction, “One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student’s mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from.”

Second, we should demand a certain level of symbol “moxie” and symbol manipulation skills, but these skills should be based on an understanding of the underlying mathematics. And perhaps “Intermediate Algebra” courses should include some data analysis, graphical interpretation, and the

investigation and resolution of extended problem situations. Such topics are currently not part of the Intermediate Algebra course that is usually taught in California community colleges. The final examinations given at most community colleges (perhaps even online multiple-choice final examinations) are evidence of the absence of such topics. Take a look! Not just at your examinations, but at all the Intermediate Algebra examinations given at your college this 2013 Spring semester. Do the words *explain*, *justify*, *interpret*, *verify*, and *why* occur? Or are the only words in the examination *solve*, *graph*, *factor*, and *simplify*?

I am not advocating for a reduction in standards. I am advocating for a careful, thoughtful analysis of what we are asking of our students and what they will need for a full and useful life. Fractions and proportional reasoning are tough stuff. If they were easy concepts, then more elementary school teachers and our students, faculty and administrators would understand and be able to use ratios and percents.

There is good news. The ongoing efforts of California community college mathematics faculty working with the Statway and Quantway Projects underwritten by the Carnegie Foundation for the Advancement of Teaching and the Bill and Melinda Gates Foundation, the New Mathways Project of the Charles A. Dana Center, and The Maricopa Mathematics Consortium funded by the National Science Foundation are developing or have developed materials that support the 7th and 8th grade standards of the CCSS along with sense-making and problem solving. Books by Jay Lehmann of the College of San Mateo, Katherine and Bruce Yoshiwara of L.A. Pierce College, Alice Kaseberg of Lane Community College, Gary Rockswold of Mankato State University, and Dave Sobacki of Miami University and other authors also support sense-making at their core.

None of these materials, however, can be effectively taught without both significant rethinking of the learning outcomes that we expect as well as professional development to provide training in working with new materials in new ways.

A final note. Proportional reasoning has a learning projector that should play out over many years. What students understand and are able to do in 8th grade is not what we would expect of our students in community college. Just because the words “understand proportional relationships” appear in an 8th grade standard does not mean that proportional reasoning is just an 8th grade topic. The same could be said for data analysis and problem solving. Together we, as a community of scholars, should continue our quest for the best mathematics for our students, taught in the most effective way. This is indeed a challenge in these tough economic times here in California. It is a challenge we can meet.

The URLs for the hyperlinks appearing in the text are given below:

Common Core State Standards for Mathematics
http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf

What Does it Really Mean to be College and Work Ready?
<http://www.ncee.org/college-and-work-ready/>

Sacramento Conference

(continued from p. 6)

- Thanks to Debbie VanSickle for making hot water for tea.
- Thanks to Martha Goff and Carmen Hirkala of the SCC Biology Department for sharing their space.
- Thanks to Frank Malaret of the SCC Sociology Department for sharing room 101 and its data projector cart.
- Thanks to Amy Virdure of the SCC Operations Department for coordinating all spaces.
- Thanks to Michael Harvey of the SCC Receiving Department for moving so many boxes of books across campus.
- Thanks to Randy Clem of the SCC Bookstore for the donated door prizes (t-shirts and mugs).
- Thanks to Hawkes Learning Systems for donating an Amazon gift card door prize.
- Thanks to Texas Instruments for donating a calculator/software bundle door prize.
- Thanks to Robert Burks and the rest of the Aramark at SCC food service for nice coffee, tea and lunch.
- Finally, thanks to the Los Rios Police Department for coming to unlock doors twice that I should have been able to unlock myself if I remembered to pick up a key on Friday like I intended to pick up.

It was very nice to see interesting people from so many places sharing a love of mathematics education and a spot in the sun at lunch time. Don't forget to THANK our publisher sponsors! Here's looking forward to SVCCM continuing in 2014 at WCC.

Pre-Stats Courses

Ken Bull, College of San Mateo

Something we never do . . . well, hardly ever.

Several years ago, a friend of mine in England had an opportunity to do something most of us will never do. He was part of a team designing a new degree program in the Biological Sciences, so his team got to decide just how much and what kind of chemistry the students needed, how much mathematics, what kind of biological field course the students should have. And so on. Lest you get the wrong idea, this was not a matter of making a list of “courses” (in our American sense) to make up the program. No; degree programs in the UK are considerably more specialized than ours, and what we would call courses (which he will have called “modules”) were freshly designed.

We do not get much opportunity to design or even to evaluate new “programs” and to think about their implications. Being squeezed between the secondary system and the bachelor’s degree granting institutions, we seldom get to mount new courses or programs, and if we do it seems to be a matter of making lists of courses to be completed. Within programs and courses there is innovation, but rarely are there new combinations of what is being taught. We may not have a clear idea how such new programs should be evaluated.

We now have a chance to think about “new courses” because two new programs involving statistics have been developed and are being used in community colleges in Northern California.

Background to the initiatives

We know that the overwhelming majority of our students have studied algebra in their lives. We also see that many of these students have forgotten what they once learnt. Or perhaps they managed to “pass the courses” without really learning. Or possibly it is some combination of

these. It is not really surprising that students lose what they have learned, since apart from taking mathematics courses, they have little occasion to use what they knew. Even arithmetic can be ignored -- and it is. Our placement tests reveal how much students have either forgotten or never learned. We have these placement tests to reduce the already great variability in knowledge and skills that we see in the class room (even with the tests) and because we have evidence that students lacking the skills or knowledge are unlikely to succeed in the course they wish to take. Of the students who are one, two or three levels below transfer level preparation, we find that a large proportion fail to make it to qualifying for transfer level. It is a big problem -- perhaps the biggest problem that we have to solve at present as a community.

One answer that seems to have some success are what can be called “boot camp” methods, or intensive courses, where students spend more than the normal number of hours doing mathematics in a community where counseling support is also given.

The situation with statistics is somewhat different. Noting that much of what is taught in Beginning and Intermediate Algebra is not used directly in the Intro Stats course, one idea is that a more relevant pre-requisite course than the traditional algebra sequence to Intro Stats can be designed. Alternately, a program can be that takes students from a level lower than Intermediate Algebra through the content of Introductory Stats. While the content of algebra courses is relevant to students going on to Trigonometry, PreCalculus, and Calculus, much of what is taught in algebra courses is not relevant to Statistics. It could even be argued that the algebra sequence typically gives students the idea that what is necessary and important is to be able to manipulate symbols and follow algorithms. This is a lesson they will have to

unlearn if the stats course is more than a course in pushing numbers through formulas.

The two recent initiatives for statistics have very similar names: one is called Path2Stats and the other is called Statway™. Moreover, the creators of Statway™ also have a companion course called Quantway™ (to take students through Quantitative Reasoning, whereas Statway™ takes students through Intro Stats.) and together they call these two “Pathways.” (I am waiting for the day when our nomenclature can be at least as imaginative as Apple’s for their operating systems -- and especially for the day where things on line are not automatically prefaced with “my.”)

Los Medanos’ (et. al) Path2Stats

At the CMC³ conference in Monterey in December 2012, there was a presentation by Hal Huntsman, Tue Rust and Myra Snell on PreStats course they have mounted at CCSF and Los Medanos as alternatives to the usual algebra sequence as a preparation for the Introductory Stats course. (See <http://www.cmc3.org/conference/Monterey12/Monterey12.html>, for the handouts given at the presentation.)

Much of the Path2Stats course consists of material that the students will see in the first part (descriptive statistics) of the Intro Stats course. The Path2Stats course introduces students to much of the terminology that they will use in the actual statistics course, with algebra and arithmetic suited to the usage in Intro Stats. From the examples given at the presentation many of the exercises focus on matters that weaker students find troublesome in descriptive statistics, such as deciding which variable is the explanatory, which variable is the response, and the correct direction to calculate conditional probabilities. Moreover, and perhaps most importantly, much of the material (including testing material) concentrates on translating language into calculation and the results of calculation back to language, in the way that one does that in a statistics course. This is exactly the

right introduction to statistics, and one that is generally not gained in most algebra sequences unless the courses are heavily geared to “word problems” and applications. To interpret findings in the context of the data and the statistical questions about the data is the task students find hardest, and the Path2Stats course appears to give ample practice doing this. It also appears that the courses employ statistical software (Tinkerplots), so the students may be getting a better introduction to data analysis than they will get in many actual stats courses.

After taking the first term, which tends to be six units, students then enroll in an Intro Stats section that has an Intermediate Algebra prerequisite, along with students who placed into the course either through testing or through the traditional sequence of basic skills courses.

Huntsman et. al. presented data showing that students at Los Medanos College enrolled in their Path2Stats completed a transferable math course (presumably Statistics) at much higher rates than those with similar low placement levels. They also showed that the proportion passing Statistics amongst the students who came from the Path2Stats course is almost the same as for those who completed Intermediate Algebra, and is also similar the proportion passing for those who had no remedial courses at LMC (the figures are 0.73, 0.74 and 0.69).

Statway™ from the Carnegie Foundation

The Statway™ initiative is sponsored (if that is the correct word) by the Carnegie Foundation for the Advancement of Teaching, and takes a different tack from Path2Stats (see <http://www.carnegiefoundation.org/statway>). Students enter what is typically a year long program (although this varies slightly amongst institutions) that integrates the necessary algebra and statistics material. Some idea of the plan can be got by looking at the course outline which is available along with other informative

materials in a zip file available on the website (under “Resource Materials”). The course outline and the materials themselves are impressive, and reflect some careful thought and planning. From the example materials (which are available under a “Creative Commons for Non Commercial use license” [CC by NC]) a guided inquiry method seems to be employed. I did not see any evidence of the use of software, however.

Where Statway™ is used, the curriculum materials appear to be those developed by the Carnegie team. A quick check of some (but not all) of the institutions that have this course had no text listed.

The Carnegie Foundation have recently published a report² in which they show an overall successful completion of the entire course -- that is, completion of transfer level statistics -- at 51%. At the same institutions, the percentage of “developmental mathematics” students who completed a transfer level math course in one year (apart from Statway™) was 5.9%. This 5.9% is taken by the researchers as a baseline. Hence, the data show quite a difference in success rates.

Articulation anxiety

A concern that some have about either plan is whether the resulting courses will be accepted by four year institutions. As far as I can determine at this writing (Cinco de Mayo) both the UC system and the CSU system are considering the Statway initiative, although the CSU system does recognise Statway, “on a limited, pilot basis, and only from certain community college districts.”³ Both systems maintain that Intermediate Algebra is the prerequisite for Introductory Stats, but appear to leave what constitutes “Intermediate Algebra” or its equivalent to the colleges’ judgement. As it stands, those colleges that use something like

Path2Stats use the challenge process for admission to Intro Stats. On that aspect, Ken O’Donnell, Senior Director of Student Engagement and Academic Initiatives & Partnerships for the CSU Office of the Chancellor, wrote:

Finally, we recognize that resorting to the challenge process isn’t an ideal situation. The CSU is encouraging community colleges who experiment with accelerated math remediation to share with us what they learn, to inform any later reconsiderations of our current policy. The ball seems to be in our court.

Some questions

The two initiatives operate differently. Statway™ integrates algebra and statistics into a one year program. In one way, it is a more straightforward approach. I suspect that the Path2Stats approach will appear more attractive to many simply because it leaves the existing structure of Intro Stats (with its choice of teaching materials) in place. In that respect, the Path2Stats approach is less radical, but potentially more flexible.

A question: For the students coming through Path2Stats, much of the first part of the Intro Stats course should appear familiar. Is there any evidence that those coming from Path2Stats are better prepared to tackle the hard ideas of inferential statistics, because they have experienced a semester of “statistical thinking” -- or not? Or, on the contrary, having seen the material in the first part of the course previously, are they lulled into thinking that they have it made? Or are other things going on? With enough sections and a common program for Intro Stats, one might be able to get some evidence from test scores at various points in the Intro Stats course.

It is interesting that in the analysis of the Statway™ program data, the biggest drop in success is at the end of the first term. Can they tell us more?

Second question. In one way the Statway™ program is the more straightforward in that is necessary is in a kind of integrated whole, even though for most colleges, it is broken into two parts. However, there may also be some inflexibility; even though the Statway™ materials are CC by NC, it appears that one would not be able to run an integrated program along these lines and still come under the articulation umbrella that is now under consideration. The materials on the Statway™ are nicely done, but in Intro Stats teaching there is much innovation, and I wonder whether the structure allows for this?

Third question: is there a role for CMC³? Picking up on the comment of Mr O'Donnell: "resorting to the challenge process isn't an ideal situation" does that imply that colleges should be able to show that their PreStats courses are "equivalent" to Intermediate Algebra? And if so, how does one do that? And who should do it? Is it to be done on each campus? Is there a place for a committee of CMC³? Has CMC³ (or AMATYC) done anything like this in the past? What does it look like? Is there any scope for a body of "recommendations of good practice" that colleges and the UC and CSU could refer to in determining whether a PreStats course actually meets the prerequisite for a transfer level course?

Teaching Award

(continued from p. 5)

levels can benefit from the creative problem-solving skills they learn from that experience. In fact, it was through such an experience that one of his former students, who was a high school dropout, was inspired to pursue a Ph.D. in mathematics and is now an assistant professor of mathematics at the University of Wisconsin--Madison and is now himself a Putnam coach.

We are proud to present this year's Section Award for Distinguished College or University Teaching of Mathematics to an extraordinarily effective and inspiring teacher, Steven Blasberg.

CMC³ Elections Coming Up!

Barbara Illowsky, De Anza College

As I wrote for the spring newsletter, CMC³ elections for the general board and the Foundation board will take place in October. Our organizations appreciate those of you who contacted me with questions and your willingness to serve. (Plus, being on the board is so much fun!!!) We have several volunteers to run for positions. However, not all elected positions have candidates. We still need YOU!

To learn about the responsibilities associated with each position, read the by-laws on the CMC³ web site: <http://cmc3.org/news/CMC3BylawsAndConstitutionApproved.pdf>.

If you are interested in running for a position, please email me by August 31st. Once you decide definitely to run, you will also need to email me a candidate's statement (maximum of 500 words) so other members can get to know you before voting. If you would like a specific position, please let me know. Maybe you do not know what position you would like, but just want to get involved. That is great, too! You could run for "at-large" for the general board or the Foundation board, or ask to be appointed in January. Contact me and we will set up a time to chat.

illowskybarbara@deanza.edu)

I will submit the slate of candidates to the current board at its September board meeting. The actual ballots will be mailed to the membership in early October along with the conference mini-program.

Please contact me with any questions about joining the board. This is a fabulous organization. It is YOUR organization. I hope you consider becoming a leader in it.

Through the History Glass

J. B. Thoo, Yuba College, jthoo@yccd.edu



[This is the third of three in a series on logarithms.]

In the last installment we gave Napier’s definition of logarithm that appears in his 1614 work, *The Construction of the Wonderful Canon of Logarithms* [5, p. 19].

The logarithm of a given sine is that number which has increased arithmetically with the same velocity throughout as that with which radius began to decrease geometrically, and in the same time as radius has decreased to the given sine.

This is what Napier had in mind when he constructed his table of logarithms, which results in essentially that

$$\text{Nap log } x = y \quad \text{if} \quad x = 10^7(0.999999)^y.$$

A portion of a page from Napier’s logarithm table is shown in Figure 1, where we see in the first row that the logarithm of 5000000 (*Sinus*) is 6931469 (*Logarithmi*). This compares very well with $5,000,000 = 10^7(0.999999)^{6,931,469}$ rounded. Moreover, in the last installment, we showed that¹

$$\text{Nap log } x = 10^7 \log_e \left(\frac{10^7}{x} \right),$$

and we find that

$$\text{Nap log}(5 \times 10^6) = 10^7 \log_e \left(\frac{10^7}{5 \times 10^6} \right) = 6931472$$

¹The choice of base 10 is substantially due to Henry Briggs (1561–1631), who was a professor of geometry at Gresham College, London, and who worked with Napier. That is why the base 10 logarithm is called the *Briggsian logarithm*. E. T. Bell relates a very colorful account of Briggs’s first encounter with Napier [1, p. 526].

138

CATALOGUE.

Gr.	30		+	–	
30 min	Sinus	Logarithmi	Differentia	logarith	
0	5000000	6931469	5493059	14384	
1	5002519	6926432	5486342	14400	
2	5005038	6921399	5479628	14417	
3	5007556	6916369	5472916	14434	
4	5010074	6911342	5466206	14451	
5	5012591	6906319	5459498	14468	
6	5015108	6901299	5452792	14485	
7	5017624	6896282	5446088	14501	
8	5020140	6891269	5439387	14518	
9	5022656	6886259	5432688	14535	
10	5025171	6881253	5425992	14552	

Figure 1: A portion of a page from Napier’s logarithm table [5, p. 161].

rounded. We note that the relative error comparing the value of the logarithm of 5,000,000 in Napier’s table to $\text{Nap log}(5 \times 10^6)$ is about -4.3×10^{-7} using the rounded values.

Napier’s entire construction was more elaborate. He actually constructed three tables: basically, he constructed a first table with 101 terms for $N = 10^7(0.999999)^L$, that is, a geometric progression with ratio $r_1 = 0.999999$; then, he constructed a second table with 51 terms for $N = 10^7(0.99999)^L$, where the ratio $r_2 = 0.99999$ is approximately the ratio of the last term to the first term of the first table; and, finally, he constructed a third table with 21 rows and 69 columns. In the third table, the first column contains 21 terms for $N = 10^7(0.9995)^L$, where the ratio $r_3 = 0.9995$ is approximately the ratio of the last term to the first term of the second table; the first row contains 69 terms for $N = 10^7(0.99)^L$, where the ratio $r_4 = 0.99$ is approximately the ratio of the last term to the first term of the first column; and the remaining 68 columns were then filled in with geometric progressions using the ratio r_3 . Carslaw [3] explains the construction of Napier’s three tables fully; he tells us that “Napier thus obtained in his Third Table a set of numbers lying between 10^7 and very nearly $\frac{1}{2}10^7$, and these numbers form a set dense enough to al-

low this Table to be used in dealing with the sines of angles from 90° to 30° . The numbers are not exactly in a Geometrical Progression, but each of the 69 columns of this Table is a Geometrical Progression of 21 terms.”

It is worth noting again that it is remarkable that Napier (and Bürgi) invented logarithms without the advantage of our modern notation for exponents. On exactly this point, Cajori [2, pp. 328–329] quotes J. W. L. Glaisher, who marvels at how Napier, during whose time “there was practically no notation,” was able to discover or invent logarithms “by mind alone without any aid from symbols”:

*J. W. L. Glaisher*² emphasizes the important rôle which notations have played in the development of mathematics: “Nothing in the history of mathematics is to me so surprising or impressive as the power it has gained by its notation or language. No one could have imagined that such ‘trumpery tricks of abbreviation’ as writing + and – for ‘added to’ and ‘diminished by,’ or x^2 , x^3 ,... for xx , xxx ,... , etc., could have led to the creation of a language so powerful that it has actually itself become an instrument of research which can point the way to future progress. Without suitable notation it would have been impossible to express differential equations, or even to conceive of them if complicated, much less to deal with them; and even comparatively simple algebraic quantities could not be treated in combination. Mathematics as it has advanced has constructed its own language to meet its need, and the ability of a mathematician in finding the true means of representing his results as in the discovery of the results themselves.

“When mathematical notation has reached a point where the product of n x ’es was replaced by x^n , and the extension of the law $x^m x^n = x^{m+n}$ had suggested $x^{\frac{1}{2}} \cdot x^{\frac{1}{2}} = x$ so that

²J. W. L. Glaisher, “Logarithms and Computation” from the *Napier Tercentenary Memorial Volume* (ed. Cargill Gilston Knott; London, 1915), p. 75.

$x^{\frac{1}{2}}$ could be taken to denote \sqrt{x} , then fractional exponents would follow as a matter of course, and the tabulation of x in the equation $10^x = y$ for integral values of y might naturally suggest itself as a means of performing multiplication by addition. But in Napier’s time, when there was practically no notation, his discovery or invention [of logarithms] was accomplished by mind alone without any aid from symbols.”

Logarithms proved to be extremely helpful in reducing lengthy calculations, so much so that Laplace (1749–1827) is noted to have said that logarithms “by shortening the labors doubled the life of the astronomer” [4, p. 185].

Previous columns are on the Web at <http://ms.yccd.edu/~jb2/histglass.html>.

References

- [1] E. T. Bell, *Men of Mathematics*, Simon and Schuster, New York (1937).
- [2] Florian Cajori, *A History of Mathematical Notation: Two Volumes Bound As One*, Dover Publications, Inc., New York (1993).
- [3] H. S. Carslaw, “The discovery of logarithms by Napier,” *Math. Gazette*, Vol. 8, No. 117, May 1915, pp. 76–84.
- [4] Howard Eves, *Great Moments in Mathematics Before 1650*, Dolciani Mathematical Expositions No. 5, The Mathematical Association of America, Washington, D.C. (1983).
- [5] John Napier, *The Construction of the Wonderful Canon of Logarithms*, William Blackwood and Sons, Edinburgh and London (1889). Translated from Latin into English with notes and a catalogue of the various editions of Napier’s works by William Rae Macdonald. In the public domain at <http://books.google.com/books?id=Z1u4AAAAIAAJ>.

Tahoe Conference

(continued from p. 4)

mathematical exploration in the world of the Maya, a quick tour of mathematical technology, why we lie, and problems that our best students were given in a recent competition. Fortunately the world did not end on December 12, 2012, but now we all understand why there may have been concern.

The conference culminated with our student speaker, Gabriel McHugh, from Santa Rosa Junior College. Gabriel impressed us with a journey of prime factorization, the Euler ϕ function, and cryptography. His presentation was at a level on par with what we would expect from a seasoned CMC³ member. Please encourage your students who will be at your college next year to begin thinking about applying for next year's Tahoe Student Speaker award. We have the generosity of Debra Landre, the leadership of foundation president Debbie Van Sickle, and the hard work from the rest of the foundation for making the student speaker scholarship a reality.

I want to give special thanks to Mark Harbison who stepped up this year as the speaker chair for the conference. We had the best collection of talks yet and I heard only words of praise from attendees about the content and presentation of all of the talks that were given. I also want to thank all of our attendees who contributed to the CMC³ foundation by purchasing raffle tickets, T-shirts, mugs, or just giving a donation. All the money that was raised went towards our student scholarships.

Mark your calendars for the eighteenth annual CMC³ recreational math conference at Tahoe in 2014. The dates next year will be April 25 and April 26 and will be held at the same place, the MontBleu Resort Casino and Spa in Tahoe. I am sure it will be as wonderful as Tahoe 2013 was.

Math Nerd Musings

Jay Lehmann, College of San Mateo



We've got an awesome job, teaching at community colleges. There are so many reasons, but I'm completely focused on just one of them these days. Right now, I'm in the midst of infinite summer, where I can do all the non-teaching stuff I normally do during the school and so much more.

It's important to take a step back and see how great it is that many of us have the option of taking our summers off. Otherwise, it might slip by without us noticing. After all, happiness does not depend on the good things that we have but on the good things that we *notice* that we have.

So, at the risk of being self-indulgent and a bit corny, here's what I love about summer:

- Seeing my fifteen-year-old son, Dylan, lounging on the couch and realizing I don't have to tell him to go do homework.
- Getting so relaxed that when I'm driving, my wife, Keri, has to tell me to speed up, because I'm way under the speed limit.
- Thinking it might be cool to learn how to surf and going ahead and taking some lessons and actually getting up on the board.
- Talking on the phone for hours with a buddy of mine from back home without having to give a second thought about what grading I have to do.
- Writing a chapter in my latest novel in a matter of days, which would take weeks during the semester.
- Vacating in Mexico, San Diego, Napa Valley, and still having tons of time to hang out in Pacifica.

- Having the time to take our dog, Bosco, for walks on the beach, where he maniacally digs a thousand holes without a bone in sight.
- Buying a stand-up bass and taking lessons so I can add a jazzy element to my rock band.
- Having the time to meet up with friends in San Francisco and meander about a neighborhood like the Mission, checking out weird shops.

There's only one problem with summer: it eventually comes to an end. And with only four weeks to go, each day is feeling more precious than the last. But if we live our summers to the fullest, and *notice* the abundance of time and opportunity, we'll be that much more recharged and excited to teach in the fall once again!

Calendar

September, 2013 11th

International Conference on Technology in Mathematics Teaching (ICTMT-11), Bari, Italy. Contact: TBA

September 28, 2013:

WisMATYC Fall Conference, Waukesha County Technical College, Pewaukee, WI.
Website: www.wis.matyc.org

October 4-5, 2013:

MichMATYC Fall Conference, Oakland CC - Orchard Ridge Campus.
Website: bit.ly/MichMATYC13

October 11, 2013: IMATYC Conference, North Iowa Area Community College (NIACC), Mason City, Iowa.

Contact: Kathy Rogotzke.

Website: www.imatyc.org

October 23-25, 2013 NCTM

Western Regional Meeting, Las Vegas, NV. Contact: NCTM Office (703) 620-9840, email: regconf@nctm.org

October 31-November 3, 2013

AMATYC 39th Annual Conference, Anaheim, CA. Contact: AMATYC Office, (901) 383-4643, email: amatyc@amatyc.org

December 13-14, 2013

CMC³ 41st Annual Conference, Hyatt Regency Hotel and Spa, Monterey, Monterey, CA. Contact: Mark Harbison, (916) 558-2687, email: harbism@scc.losrios.edu

April 4-6, 2014: 47th

NYSMATYC Annual Conference, Treadway Inn, Owego, NY. Contact: Russ Penner. Website: www.nysmatyc.org

April 25-26, 2014: CMC3

18th Annual Recreational Mathematics Conference, MontBleu Resort Casino and Spa, South Lake Tahoe, NV. Contact: Dr Larry Green. Website: www.cmc3.org

May 8-10, 2014: Washington

Community College Math Conference (WCCMC), Wenatchee, WA. Website: www.wamatyc.info

Jay Lehmann

Editor

CMC³ Newsletter

MathNerdJay@aol.com