Report on [CMC3 Fall 2008 Conference](#) 12/11-12/13

-by Geoff Hagopian

I arrived late in the afternoon of Friday the eleventh of December at the Monterey Portola Hotel and was exploring the conference grounds when I passed someone and sensed an aura of peculiar intensity, so I turned, as did he, and it was Joe Vasta! Well, I was delighted to see someone I knew and this set the tone for what turned out to be a productive conference.

Joe and I met again later at that evening's Dessert Reception where Millie Johnson gave the keynote speech on *The Mathematics of Meanders: Rivers, Channelization, Floods, and the Environment*. The conference was very well attended and there was no place to sit, so Joe and I ducked into the back and brought out some chairs to sit at the dessert table, which had been cleared of most of it's delectable offerings and was right in the middle of the room so we ended up with the best seats in the house.

I've seen Millie Johnson speak before, so I knew it would be entertaining and I wasn't disappointed. She began by describing her early fascination with the meandering paths of raindrops on a window and how this leads to the idea of channelization and sine generated curves. She described how the flow patterns of rivers exhibit some interesting patterns:

1. No river runs straight for more than 10 times its width.

2. The radius of a river bend is 2 to 3 times the width of the river.

3. The wave length is 7 times the river's width.

She supported these claims in an engaging manner, doing quick scribblings over transparencies of various actual river paths. She showed that a function called a [sine-generated curve](#) closely approximates the natural path of a river. Apparently as a river flows it is constantly trying to minimize its change of direction, its total effort in turning and the erosion that occurs. When a river is allowed to flow and meander in this fashion, it remains a stable entity. When the natural flow is disrupted, major

problems like the Mississippi river floods occur. By using the sine-generated curve, mathematicians can help predict more stable, future river paths and plan for them. There is quite a bit of applications of curvature [here](#).

She wound up with a fascinating bit about her experiments placing beaded chains on stretched pantyhose (which she milked for its full feminine charm) and observing the shapes beaded chains form when white noise is blasted at the pantyhose membrane. Showing a video of the experiment you could see the chain wriggling around into a meandering curve illustrating minimization of energy per unit length somehow.

The first [Saturday session](#) was loaded with enticing titles and abstracts. I missed Santa Rosa's Glenn Caesar talking on *[The Mathematics of RSA Encryption Over the Internet](#)*, but if you follow the hyper-link, you'll see a web stream of what I gather was the same talk given at Sonoma State. I also missed RCC's Bob Prior discussing the [Order of Operations](#) and [Divisibility Rules,](#) but the links give you a pretty good idea of what that was about.

I started the Saturday session in Bruce Edwards' How Calculators Calculate which gave a brief overview of the fascinating and mysterious world of the CORDIC algorithm, the method calculators use to compute. The method involves only the computer friendly operations of (1) recall a number from memory, (2) multiply or divide by 2 (a bit shift), and (3) find sum or difference of two numbers. There is some secrecy behind the particulars and the original paper written by the inventor, on J.E. Volder, is fairly impenetrable, but there is now some quite accessible literature on the subject, including Bruce Edwards' [web site](#). Some useful references not included in his paper are (1) *CORDIC: Elementary Function Computation Using Recursive Sequences* by Neil Eklund in The College Mathematics Journal, Vol. 32, No. 5 (Nov., 2001), pp. 330-333 and (2) *Calculator Algorithms*: by James C. Kropa in Mathematics Magazine, Vol. 51, No. 2 (Mar., 1978), pp. 106-109.

When the CORDIC session ended I scooted over and caught the end of Yuba's [John Thoo](#) talking on *[Normals to Parabolas](#)*. At the point I came in he was discussing how Bombelli and his crowd were motivated to study complex numbers, not so much because they were needed to solve some quadratic equations, but because

some real zeros of cubic equations with rational coefficients can only be represented using complex numbers. I found this particularly interesting because of my discussions last year with some colleagues at COD re this subject. A related paper at Thoo's site is the paper he wrote with Santa Rosa's Richard Kavinoky, *The Number of Real Roots of a Cubic Equation*, wherein the analysis of how all cubics can be written in the canonical form $x^3 + qx + p = 0$ then the number of real roots is characterized by the discriminant, $D = \dfrac{q^2}{4} + \dfrac{p^3}{27}$.

Setting the discriminant to zero and plotting the semi-cubical relation in the *p-q* plane yields some interesting results relating to the number of normals to a parabola passing through a particular point: read the paper for more.

One of the impressive aspects of Thoo's work is his use of presentation software such as xfig. This is a Cygwin product I've now installed on my PC.

Second session topics weren't nearly as attractive to me – somehow I found myself in a talk entitled *Workplace Bullying and Mobbing*. It may be my experiences at COD – the over-exposure after whistling on the pyramid, the weird innuendo about having caused the ruin of an administrator on account of his public attack upon my person with profane insult and threatening verbal tirade and, etc. – that these prompted me to attend. Well, after a short while the presenter had his back turned and surreptitious stealing away through the exit occurred.

I don't know why I didn't attend *Finding the Radius of the Earth* by Harris Shultz, in the first place but to compound the error, I went next instead to *And the Textbook is … free? Open Educational Resources*, presented by Susan Dean of De Anza College. The issue is how to make textbooks more affordable. One venue for pursuing this is the Community College Consortium for Open Educational Resources (CCCOER) which manages the Community College Open Textbooks Project (CCOTP) which funded by the Hewlett Foundation and includes a bunch of member organizations like CALPIRG, the Monterey Institute for Technology and Education (MITE) and more. MITE has, among other things, the National Repository of On-line Courses (NROC)which offers an elementary algebra course through their amusingly named Hippocampus.

Exploring the MITE site, I came across the University of California College Prep program, which looks to be a pretty solid, free, on-line resource for AP type courses such as AP Calculus.

The CCCOER, a natural response to increasingly over-

priced and shoddy textbooks/internet services such as Cengage/Pearson/Blackboard etc, is officially endorsed by a resolution of CMC3. The fire hose of nascent development in this area also includes Connexions, "a place to view and share educational material made of small knowledge chunks called modules that can be organized as courses, books, reports, *etc*. Anyone may view or contribute."

Finally, I chatted with Nicole Allen of CALPIRG, who is advocating for make textbooks affordable, I signed a statement of support for that (you can too) and looked at her collection of free text books on-line. She showed me Strang's Calculus, freely available on-line. That's impressive! She offered to visit COD and make a presentation – anyone interested in that? Last, but not least, she recommended MERLOT.

At lunch I sat with Richard Kavinoky, Gaeir Dietrich, Sean Keegan, Joe Vasta, and some of Joe's colleagues from Cuesta. I took the opportunity of this terrific company to share my adventures of the early morning, when I had intended to participate in the *Estimation Walk/Run*. The idea of this competition is to make the best estimate of the time it takes you to traverse a prescribed course along the bay at any rate of speed you like. I just missed the departure time: hey, I thought community college math profs would be a tad more slack, but no! These guys are a serious bunch!

The CMC3 Newsletter editor, Jay Lehman is on the right and the first returnee in the middle: I don't know his name, but he made good time (though his estimate was off by tens of seconds.) On the left is none other than Joliet Junior College's Michael Sullivan, III, author of the Intermediate Algebra text that has pervaded our IA offerings since

MyMathLab and CourseCompass curriculum has held sway at COD. I am just now preparing to use it in my classes for the first time this spring[1] - and on-line too.

Having missed the starting bell, I thought I'd follow along the path and take some pictures. I believe this is Santa Rosa's Richard Kavinoky (whom I met again at lunch) and a fellow walker. I asked them if they had the time – just testing to see if they were cheating – and got a big laugh.

I went on to describe to my luncheon companions my continued walk further down by the Monterey Bay and taking pictures of some amazing pelicans. Then how I headed up the hill a block and got to a place where the sidewalk ends and there was a sign saying "Sidewalk Ends, Go Back," so I took a picture of that. Then I darted across the street and there was a light rain - just a beautiful Monterey morning and the most beautiful perfect rainbow appeared - you could see the entire arc and the colors just as crisp and clear as could be, so...well, naturally, I took a picture of it. At this point it began to dawn on me that this was the Monterey Presidio entrance I was at and, at some distance there was a military uniformed person gesturing...at me!   He was motioning for me to approach him. I did, and he informed me that I was not to take pictures and that I was to wait until the authorities that he had summoned arrived. Then he asked me for my driver's license ID and so, being a good citizen, I reminded him of his oath to uphold the constitution, and in particular the 1st, 4th and 5th amendments and

---

1   Am I imagining it, or is that a smirk that says, "You sucker! You gotta use my book whether you like it or not and I am getting fabulously wealthy because of it!" ?

that I was going to exercise my (imagined?) right to not be searched. I amicably told him that I would not cooperate in that. But he was a nice enough fellow and we got to chatting a bit. I gave him a quick lesson on rainbows and why all rainbows have the same angle of inclination. Then the MPs arrived in a big armor-clad SUV and they repeated the request for my ID and I again asserted my supposed constitutional right to not be searched. All this time I was acutely aware that I had my conference name tag slung about my neck in full view...I even pointed it out to them as some explanation as to what I was doing in Monterey, though, to my way of understanding the U.S. Constitution, I needn't have and probably shouldn't have, but these guys were clearly not the sharpest axes in the shed and seemed to suffer from a deep-seated unhappiness somehow, so I thought I'd be friendly and hoped to cheer them up a bit. They informed me that (1) had they been regular police, I would surely have to comply with their requests (this struck me as a lame argument) and that (2) I was on federal property, so the U.S. Constitution didn't apply? They wanted me to delete the pictures on my camera. I was willing to oblige them in this, though, again, I probably should have asserted my rights further, though I wasn't so sure about the pictures. However, it's a new camera, and I didn't really know my way around the menu system very well, so when I went to look for the pictures, I couldn't find them! This created further agitation in the ranks and there was phone calling to headquarters and some grizzled leers of deep suspicion. So the guys were crowded around my camera, watching my search through all the pictures of pelicans, my wife, fuzzy-headed mathematicians – going back to thanksgiving festivities with my friends and family...but no Presidio. Finally, by going to "slide show" the pictures miraculously appeared and I was able to delete them to their satisfaction. So there you have it. They let me go on my way without increasing their military intelligence as to my driver's license number, though my name...I don't think they ever got that either, despite its prominent display on my breast. So I maybe upheld one tiny tattered scrap of constitutional vestige. How quaint, huh? Further research has shown that a recent ruling by the Supreme Court has struck down some relevant provisions of the US Constitution, so maybe it's a

good thing to be a geeky math prof in a situation like that – otherwise it's Gitmo!

This tale prompted others at the table to share their own brushes with involuntary trespass in militarized zones. Joe Vasta shared his story of a tour of a men's jail and being scared straight by the sight of the toilet facility there. He will never commit a crime.

Gaeir Dietrich and Sean Keegan, who gave the presentation on T*eaching Math to Students with Visual Impairments OR What Do You Do When a Blind Student Comes to Class*, described their experiences teaching how to write math in Braille to federal penitentiary inmates. Gaeir strikes me as very brave to endure the gauntlet of entering this environment and doing this specialized work which will all inmates to reenter society with a valuable skill.

After lunch I went to Joe Vasta's presentation, *Math to Math Resuscitation: Ideas to Bring Your Class Back to Life*. His wife, Tammy, and newborn son, James, were in attendance, so I took a picture.

He blasted through a lively grab bag of neat ideas which you can see at his web site. He has an engaging, disarming and teacherly manner which is now well-known among this group – the room was packed with standing room only. Joe's showmanship includes dispensing transparencies from the overhead with flourish sending acetates in orbit. After a time, the area around Joe's feet became littered with these slippery bits, causing mumbled concern in the audience for his welfare as he marched back and forth with agitation. I was

reminded of Rosencrantz's remark in Shakespeare's Hamlet: "O, there has been much throwing about of brains.[2]"

One of the ideas Joe tossed out like an anchovy to seals was circular chess. This is the kind of idea that I can sink my mental molars into: I set up a board and played with the family over the holiday and found it quite engaging.

Since the more than 52 people in attendance exceeded the standard Bicycle deck count, Joe had to switch to plan B and choose random prize winners by reaching into a bag containing all 365 days of the year written on slips of paper, picking out a date and asking if that was someone's birthday. Since there were about 70 people in the room, I figure the probability of success is about

$$\frac{70}{365} + \binom{70}{2}\left(\frac{1}{365}\right)^2 \approx 0.21$$ but a weird thing

happened. It was like in the Stoppard play, Rosencrantz and Guildenstern are Dead, when Guildenstern repeatedly flips a coin and each time it comes up heads. Joe pulled more than 10 dates out of the bag without getting someone's birthday. This is so unlikely that it can only be attributable to the autistic nature of mathematicians who will not acknowledge their participation with the world of dates directly...or rather, that mathematicians are not so much born as are made to spontaneously appear.

For the fourth session, I attended Marty Triola's talk, *Statistical Mythbusters*. Discussion in the session focused on what sorts of changes technology will make in the teaching of a traditional first course in statistics. M. Triola (the author the stats text we use) sent me a copy of his Power Point presentation. It's a very probing and provocative collection of statistical fallacies and amusing anecdotes. If you're interested in that, let me know and I'll put you in touch with Marty who can send it to you ;-).

2   *Hamlet,* 2.2.359-66