

# Sinclair Mathnet

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## FROM THE CHAIR



It was 1972 and I was in the living room of my apartment in Buckeye Village at Ohio State University. That was before it was renamed *The Ohio State University* to eliminate the confusion with all of the other Ohio State Universities. The telephone rang. It was a call from Sinclair Community College in Dayton, Ohio. I had applied for a faculty position at Sinclair and I wanted to move back to my hometown and I wanted to teach mathematics. So I was a little nervous because I knew this phone call would tell me my fate. "We've interviewed twenty-five candidates and your application is a strong one," she said. This could be either good or bad, I thought. "We've discussed this and . . ." She paused . . . Yes? yes? You discussed it and? "And this is very embarrassing to say, but . . ." Yes? yes? But what? "This isn't necessarily my view you understand, but . . ." Yes? It's not your view, but what? "But I am authorized to offer you a faculty position on the condition that you shave off your beard," she sheepishly concluded.

Was I really hearing this? Maybe so. After all, this was in the days when beards were a symbol of youthful rebellion and radical opposition to the "establishment" and Sinclair was part of the "establishment." Well I may have been youthful at the time, but I was neither rebellious nor opposed to the establishment. And a radical for me was something to be simplified. But I needed the job and I didn't need the beard so I accepted the offer and the condition. When I went to Sinclair to sign the papers I met a number of people and was told that the president was very conservative and would never hire a faculty member who wore a beard. Well the president's assumed position was respected at the expense of my six year old beard. This was my first lesson in passing the buck.

About six months later I stepped into the elevator in the Otterbein Building. This was in the days when Sinclair's buildings had names. Come to think of it, I guess they still have names. The Otterbein Building is now named Building 9. I guess I should be happy that numbers are now used as names. I do like numbers. But the building seemed to have a lot more character back when it was named the Otterbein Building. Anyway, as I entered the elevator (with my clean-shaven face) there, standing right in front of me, was the president. I exchanged a few cordialities with him thinking he must be terribly happy to know by looking at my clean-shaven face how conservative I was. We quickly ran out of things to talk about. So we both listened carefully to the whirr of the elevator motor until, in a fit of uncontrolled frenzy I suddenly blurted out, "Would you care if I grew a beard?" Oh my gosh! What had I said? Now he would think I was a radical hippie and I would lose my job! "Well of course not. Why would I care if you grew a beard?" he replied. I couldn't think of a good answer so I mumbled something unintelligible (as a math teacher I was pretty good at this) and got off the elevator at the next available floor. This was my first lesson in . . . well, never mind.

I suppose I have learned quite a few lessons since I've been at Sinclair. But I've taught a few too. I calculate that in the thirty-four years I've been here, I've taught approximately 7,248 students approximately 12,042 lessons ranging from addition of decimals to solving Initial Value Problems using Laplace Transforms. I don't know how many lessons I've learned, but they range from the first one about passing the buck to the most recent one about what happens to you when you decide to retire. Yes, that's right, in case you haven't heard, I am planning to retire after the Winter Quarter. And the most recent lesson I am learning is that when you are facing retirement you start thinking about all the things that have happened and all the people you have known and all the mistakes you have made and all the changes you have seen since you

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## Faculty Feature - Kinga Oliver

The Math Department has two new annually contracted faculty (ACF) members this fall, one of whom is Kinga Oliver. Kinga comes to us from the ranks of Sinclair part-time faculty.

Kinga earned both her Master's and Bachelor's degrees in Mathematics and Mathematics Didactics from Adam Mickiewicz University in Poznan, Poland, which is her native country. She also studied two years at the Academy of Economics in Poznan, but she says, "I didn't finish my bachelor there because I came over here, and I was supposed to go back home after only one year. That was four years ago." She has also completed some Ph.D. classes at the University of Cincinnati.

Kinga began her teaching experience while in college, where she did a large amount of private and group tutoring. During summers while in college, she was a supervisor at a camp in her hometown that was known as "Horses and Mathematics." The top math students throughout Poland came to camp there for free, and enjoyed swimming, horseback riding, and daily math lessons. Kinga has also taught a cooperative learning calculus class at UC, where she has been involved in the Emerging Ethnic Engineers Program for two years. As part of this program, she prepared minority high school graduates coming into the engineering college during a "Summer Bridge Program."



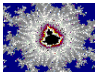
Before being hired by Sinclair, Kinga came to Sinclair as a student studying English as a Second Language (ESL), and English. She is excited about the possibility of teaching classes in Lebanon (Warren County) when Sinclair opens facilities there, as she lives in Lebanon with her husband and daughter.

Kinga's husband Dan founded a technology company in Lebanon nine years ago. Their daughter Izabella is ten months old, and Kinga adds, "I have already begun teaching her Algebra and Calculus 😊." When you see Kinga, ask her to tell you how it is that she and her husband have actually gotten married three times! Kinga's parents and two brothers still live in her hometown of Miedzyrzecz, Poland. Her older brother is an environmental engineer, and her younger brother is studying computer science in college.

When asked what other things she might like her colleagues to know about her, she says, "I went to music school (parallel to my normal school) and finished six years of mandolin, four years of classical guitar classes, music theory, choir, and band playing and piano basics." She also adds, "I like swimming, volleyball and dancing. I like movies and am hooked on the TV show House. I also like *Grey's Anatomy* and *24*." In addition to her native tongue of Polish and her adopted language of English, she also has a good understanding of German and Russian.

Welcome to the Math Department, Kinga!

Susan Harris ■



## Fast Cars and Card's Tricks: A Few Unfinished Thoughts from My Colloquium

by Karl Hess

This past winter quarter, I enjoyed the privilege of giving a colloquium for my friends, colleagues, and students from the Math Department. I hope you didn't miss it—there may never be another opportunity to see me wearing fake satin. My wife was kind enough to make my costume. I may have trouble, however, gaining the same favor next time—I was considering a talk on Sophie Germain. If wardrobe becomes an issue, I may talk about my favorite Greek mathematician, Archimedes. That would eliminate the need for a seamstress.



Karl decked out in 16<sup>th</sup> century style

The purpose of this article is to complete some thoughts from winter's talk about Gerolamo Cardano. With a substantial amount of rushing, I was able to get through 39 slides out of 55. I didn't really expect to get through them all, but I was disappointed to have to stop where I did. The things that intrigued me most were on the last 16 slides. I was very pleased when Lyn Keeler offered me a chance to finish



Gerolamo Cardano

my talk on paper. There is still too much to say to finish in one article, so this will be the first in a series.

My talk ended at the year 1545, with the publication of a book called *Ars Magna* by Cardano, who was a medical doctor by training. This book completely resolved the question of how to solve cubic and quartic equations. *Ars Magna* (lit. "Great Book") established Cardano as the foremost mathematician of his time (granted, this was perhaps easier in the 1540s than in any decade after the 1580s). Like many great scholarly works, however, it is more memorable for the questions it brought forward than for the questions it actually answered. In fact, the problem of solving cubics was only an intellectual curiosity in 1545 (as most new ideas in mathematics are when they are developed).



The title page of *Ars Magna*

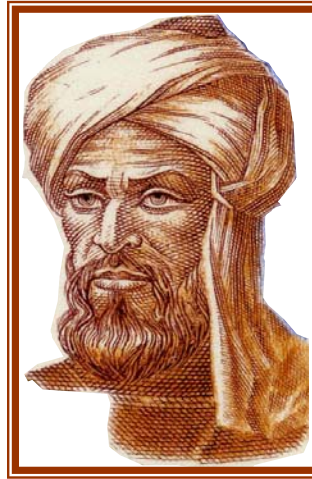


On the other hand, modern scientists might encounter the need to solve cubics and much more exotic types of equations. They would likely rely on a piece of computer software, however, with a root-finding algorithm akin to Newton's method.

In the 1690s the introduction of Newton's method resolved the question of solving equations of *any* degree. Even though Newton's method only approximates solutions to equations, it can do so to any degree of accuracy desired. A purist would point out that Cardano's method solves cubics exactly. However, if one's only interest is in solving cubics, there is no practical distinction here. Cardano's method gives solutions in radical form. To get these solutions into a usable decimal form, you have to compute square and cube roots, which requires an iterative method akin to Newton's. (Incidentally, this does beg the question of how Cardano extracted roots. He probably used the ancient Babylonian algorithm for square roots, but I honestly don't know how he got cube roots. I would only know how to do it with Newton's method, but since Cardano died 66 years before Newton was born, I guess that's not how *he* did it. I don't know how cube roots were computed prior to 1691, but I know that methods were known long before the Italian renaissance.)

And yet, there was something special about Cardano's solution. It was an algebraic method—it pinpointed solutions with a *finite* number of algebraic operations (which include the taking of square and cube roots). The algebraic solution of cube roots had been one of the most prominent unanswered questions in mathematics at the dawn of the sixteenth century. Cardano's contribution was merely the culmination of centuries of breakthroughs and setbacks that reached a crescendo in renaissance Italy.

The problem had come to the forefront in 9<sup>th</sup> century Baghdad after Al-Khowarizmi published the general algebraic solution to quadratic equations. That means that this problem tantalized the greatest mathematical minds in the world for over 700 years—twice as long as Fermat's famous Last Theorem.



Al-Khowarizmi

Finally, in 1539, Cardano found the general algebraic solution to the cubic. In 1540, his apprentice

Ludovico Ferrari extended Cardano's method to find a general algebraic solution to *quartic* equations. In 1545, Cardano astounded the mathematical community by unveiling both at once in *Ars Magna*.

The ease with which Cardano's methods were extended to quartics gave hope that algebra was on the verge of a quantum leap—that soon it would be possible to solve equations of *any* degree. Yet the fact that Ferrari had made no progress in solving quintic (fifth degree) equations in the five years that had elapsed between his solution of the quartic and the publication of *Ars Magna* was telling. The problem proved to be resilient, and it evaded Ferrari, Cardano and the best mathematical minds of the coming centuries (a time known as the Heroic Age of Mathematics because of the many magnificent problems that were solved). The problem even outlasted the great Leonhard Euler, who had vanquished so many others. It became the "quintessential" question of algebra. (I don't ask that you forgive my puns, only that you indulge me by continuing to read the second installment of this article in the next edition of *Mathnet*.) □

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began. And then you write disconnected *Mathnet* articles babbling on about these things and you don't really care if it makes any sense or not because you just want to talk about it.

Well, as long as I'm talking about it, I remember teaching my first class for Sinclair in the summer of 1972 in a room on the first floor of the YMCA building on Monument Avenue. That was the last quarter that classes were taught in the "Y," because in the fall we moved into the newly constructed campus which consisted of only six completed buildings at the time. Now there are 19 buildings. I know, then why is the Automotive and Fire Science building called Building 20? Because there is no Building 18. Go figure. Anyway the class in the "Y" was a College Algebra class and since a podium room wasn't available I taught the whole thing on an eight foot wide portable blackboard. (My eraser got quite a workout that quarter and the board kept rolling away from me every time I tried to use it.) At that time we took students from developmental math to calculus in three courses totaling 14 credit hours. Now we do it in four courses totaling 18 credit hours. We've also added courses in nursing math, statistics, business calculus, linear algebra, multivariable calculus, teacher prep math, mathematical modeling and math in the modern world to our regular curriculum since that time.

Well that's enough babbling about the past for now. Plenty of time for that later. Right now there are many very interesting things under way in the department and I am excited to still have several more months to be a part of them. We have to complete the implementation of the new three-quarter algebra sequence; complete our department review; complete our self study for college realignment; decide on and pursue other initiatives for the coming year arising out of our discussions last year; implement our Achieving the Dream initiatives including the pre-quarter phone call effort, the Math 101 with study skills component offerings and the establishment of a Math/English/Student Success Course learning community; and, of course, continue all of the many ongoing initiatives in the department. For me the Sinclair Mathematics Department has for many years been and continues to be a busy,

vibrant, exciting and wonderful place to work. I count myself blessed to be part of it.

Al Giambrone ■

## DEPARTMENT COLLOQUIUM



We will have a Department Colloquium on Friday, October 13, 2006, at 2:30 p.m. in Room 1001. All members of our full- and part-time faculty are welcome, as well as students or anyone else interested in mathematics. The speakers and titles are as follows:

**Brett Holland,**  
Graduate Student in Applied Mathematics  
Wright State University  
"Infinite Spiraling Areas  
Inscribed in Regular Polygons"

**Samual A. Wright, Maj, USAF**  
Assistant Professor of Statistics  
"The Defense of the Gungans or  
Using Vector Calculus to Save the Day"

Please encourage your students to attend.

Refreshments will be served.

## Harvey's Joke Corner

Multiply  $\sqrt{33}$  (root 33) by  $\sqrt{2}$  (root 2) to get a famous highway.

Heard during class:

Man: "May I have your phone number?"

Woman: "999-9999."

Man: "Well, you just had to say no once!"

At 5'9½", I am either the world's tallest 5'9" math teacher or the world's shortest 5'10" math teacher.

