

Volume 3, Issue 3

Mathematics Department
Nazareth College
4245 East Avenue
Rochester, NY 14618
(585) 389-2667

Causing Writing Problems:
Matt Koetz
(mkoetz1@naz.edu)
Heather Ames Lewis
(hlewis5@naz.edu)

We're on Facebook!

At the suggestion of one of our alums, we formed a group for Naz Math Alumni called, well, **Nazareth Math Alumni**. See you on Facebook!

*Said by Andrew Wiles after finishing his proof of Fermat's Last Theorem

Inside this issue:

- O Pioneers!.....2
- On the Road Again2
- Departmental Awards ..3
- Career Night.....4
- Wolfram Alpha5
- Sudoku5
- Pi are Round!6
- Problems.....6

Our Newsletter

The Wiley Wiles

("I think I'll stop here."*)

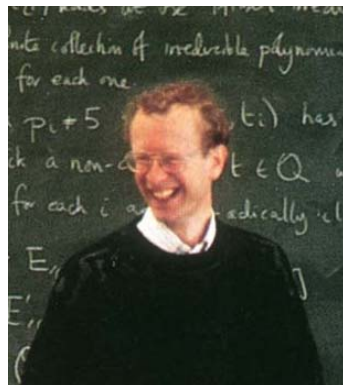
Summer, Math, and Money

For most of our students, summertime involves some kind of work – after all, being a college student is expensive business. For a few, this work takes the form of being paid to do research in mathematics.

Last year, two math majors were able to participate in such programs [typically referred to as *Summer Research Programs* or as *REUs*,

which stands for *Research Experience for Undergraduates*]. **Ashley Patchen ('09)** went to the University of Wisconsin-Eau Claire and studied "Numerical Investigations of the Persistence of Mass-action Chemical Reaction Networks". Sounds pretty scary, doesn't it? But Ashley said it was a lot of fun in addition to being a lot of

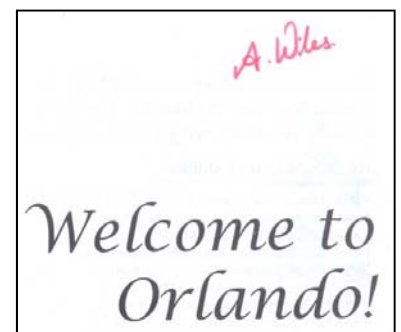
(Continued on page 4)



Sir Andrew Wiles was born in Cambridge, England in 1953, attended Oxford for his B.A., then went back to Cambridge for his Ph.D. He is best known for proving Fermat's Last Theorem, a feat which took him more

than eight years, and about which he said, "Doing mathematics in that...way is certainly not my style, I certainly have no wish to repeat it." Wiles is a member of both the Royal Society and the National Academy of Sciences, and has won numerous awards for his work, including the Schock Prize, the Prix Fermat, the Wolf Prize, and the Cole Prize. He is the subject of one of the most famous episodes of *Nova* entitled "The Proof".

Best of all, the Math Department has a program from the 1996 Joint Mathematics Meetings in Orlando, Florida, with his signature on it. [Don't worry, Nelson Rich asked for the signature – no one stole Wiles's program!]



O Pioneers!*



Katie Gravelle (above) and Jolie Roat (right) giving their talks at NCUWM.

Every February the University of Nebraska—Lincoln hosts the Nebraska Conference for Undergraduate Women in Mathematics, and for the past four years now, we have had students attend and give talks there. This year, **Katie Gravelle ('09)** and **Jolie Roat ('09)**, both past attendees, traveled to Lincoln to listen to some of the more than 100 presentations, participate in panel

discussions on graduate school and careers in mathematics, and meet nearly 200 other math majors.

Katie, who also attended the conference last year, gave a talk entitled, “Mathematical Literature,” while Jolie, a two-time attendee, spoke on “Polynomial

Parametric Curves in Two Dimensions,” her research project from last spring. Jolie will also be in Lincoln this summer as part of the Nebraska IMMERSE pre-graduate program before she heads to graduate school at Iowa State University.

The two also met up with **Sara Reynolds ('08)** who is in graduate school at UNL studying mathematical biology.

**The headline is the title of the famous 1913 novel by Willa Cather about pioneer life in Nebraska.*



On the Road Again

For the past 12 years the Math Department has taken a group of students to the annual Hudson River Undergraduate Mathematics Conference, held every April. This year 11 students

and one faculty member made the journey across the state, this time to Union College in Schenectady. Six Nazareth students gave talks based on their research in MTH 490: **Joe Mihalich**

presented “Linearity of Lexicographic Codes”, **Jolie Roat ('09)** answered the question “What Color Is Your Hat?”, and **Chris Zimmerman ('09)** spoke on “Winning Impartial Games”.

We left Nazareth the afternoon before the conference, stopping at the home of **Kait Gecsedí ('10)** to enjoy a wonderful home-cooked meal, ice cream sundaes, and a game of touch football. Also joining in the fun and learning were **Peter Baez ('09)**, **Patty Semple ('09)**, **Allison Shuler ('09)**, and **Kyler Star ('09)**.

Department of Mathematics
Undergraduate Research
Spring 2009 Presentations
Hudson River Undergraduate Mathematics Conference
Union College, Schenectady, NY



“The Cat and the Hat Game”
Joe Mihalich

“Winning Impartial Games”
Chris Zimmerman



“Not Your Average Game”
Cooper Murphy



“What Color is Your Hat?”
Jolie Roat



“Strategies for the Nine-Player Hat Problem and Some Connections to Coding Theory”
Caitlyn Parmelee



“Linearity of Lexicographic Codes”
Ashley Patchen



Nazareth
COLLEGE

(‘09) talked about “The Cat and the Hat Game”, **Cooper Murphy ('09)** discussed “Not Your Average Game”, **Caitlyn Parmelee ('10)** told us about “Strategies for the Nine-Player Hat Problem and Some Connections to Coding Theory”, **Ashley Patchen ('09)** pre-

Departmental Awards



On Sunday, March 29, the department held its annual awards ceremony to honor the outstanding achievements of our students. This year's speaker was **Tim Perrotta ('03)**, shown above with his wife Christine. Tim is the Underwriting Director at Providium Consulting Group in Fairport, and is also on the Mathematics Advisory Council. He spoke to a packed house that included Nazareth College President **Daan Brave-man** and VPAA **Sara Varhus**, and Tim's fellow grad **Erin McReynolds ('03)** on, "The Trivial Many, and the Vital Few: Putting the 80/20 Rule Into Practice."

The *Outstanding Senior Award* was given to two students who distinguished themselves "on the basis of [their] academic achievement in the Department of Mathematics". This year's winner was **Kyler Star ('09)**, a Mathematics major and current Appalachian Trail hiker.

The *Brauer Award*, established by Evan Brauer in 1997 in memory of his father, Herbert J. Brauer, was given to **Katie Gravelle ('09)** in recognition of her exceptional teaching abilities. Katie is a Mathematics major with certification in elementary and middle school teaching.

The *Sr. Dorothea Kunz Distinguished Service Award* is given to a graduating Mathematics major, who, "on the basis of her or his leadership and service, has made a lasting contribution to

the department of Mathematics." This year's winner, **Jolie Roat ('09)**, was President of the Math Club, and she was instrumental to its success, reorganization, and revitalization. At the close of the ceremony, ten people were inducted into Pi Mu Epsilon, the national mathematics honor society: These new members are **Adele Flanagan ('09)**, **Elyse Matson ('09)**, **Scott Paeplow ('08)**, **Amanda Paganin ('10)**, **Caitlyn Parmelee ('10)**, **Ashley Patchen ('09)**, **Jennifer Polastro ('09)**, **Allison Shuler ('09)**, **Kyler Star ('09)**, and **Christopher Zimmerman. ('09)**.



Summer, Math, and Money (cont.)

(Continued from page 1)



Amanda Paganin, back from the summer.

work. In a recent talk about her experiences, she did caution people that summer experiences can vary even within the program: some of the people in her program were building on the work done in previous summers, and so a lot of time had to be spent learning background material before any new work could be done.

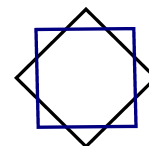
Career Night

Our majors were treated recently to information and advice from four people out in the financial world. The speakers were: **Matt Bader ('08)**, a Credit Risk Representative at Paychex; **Jeff McCormick ('00)**, an Equity Research Analyst at

Another student to spend her summer days mathematizing was **Amanda Paganin ('10)**, who studied at Illinois State University [<http://www.math.ilstu.edu/reu/>]. This opportunity was unusual in that it is the first one we've heard of that is geared specifically towards current and future teachers (officially for secondary teachers, but since our future elementary school teachers are actually certi-

fied to teach in 1st through 9th grade, they qualify for the program).

Amanda studied Z_n , the integers modulo n (e.g., Z_3 is the set $\{0,1,2\}$ using addition and multiplication mod 3); in particular, she looked at partitions of Z_n and the patterns that were generated.



Manning and Napier, **Rebecca Kalita**, a Quantitative Strategies Research Assistant at Manning and Napier; and **Jodi Houlihan ('97)**, a Commercial Credit Analyst at Canandaigua National Bank and Trust.

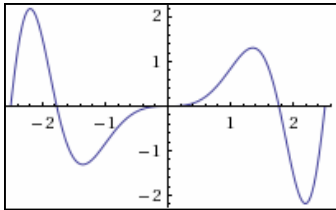
The four speakers shared what their jobs entailed and the things that they liked about their work. They also gave advice about how to find internships, how to avoid mistakes [have a notebook and write down any mistakes that happen, so they don't happen again] and which courses to take, including several mathematics courses (probability, statistics, mathematical modeling), some economics, computer programming, and physics. Physics? Yes, not because you need physics in particular, but because in the financial world one of your primary responsibilities is to solve problems, and any course that uses math but gets you thinking about how to solve problems in different ways is good training.



Wolfram Alpha

Have you heard of Wolfram Alpha? The **free** site (at www.wolframalpha.com) was created by the same people as the computer algebra system *Mathematica* (which is similar to *Maple*), and it's like a combination of Wikipedia, Google, and Mathematica, with some extra stuff thrown in.

If you enter "x*sin(x^2)", it will graph it for you:



And take the derivative:

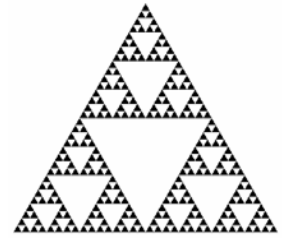
$$\frac{d}{dx}(x \sin(x^2)) = \sin(x^2) + 2x^2 \cos(x^2)$$

(Plus if you select "Show steps" it will show how to use the product rule and then the chain rule to get that derivative.)

Likewise, it will integrate the expression (again showing the steps upon request), show different ways to represent the function as a Taylor Series, and give alternate forms for the expression. All of this just because you typed the function in!

But Wolfram Alpha does more. If you type in a date, it will tell you all sorts of things that happened on that date. If you enter "Population of the United States", it will tell you 306 million people, draw you a graph of the population over the years, give the annual rate of growth (0.949%), the life expectancy (78.1 years), and more.

It makes me wonder how it's going to impact homework assignments.



The picture that appears when you type in "Sierpinski"

If you type a number like 34 into Wolfram|Alpha, you learn all sorts of interesting facts about the number.



Sudoku



		8				6		
		2			6		1	
	5		4		2		8	
	2		5			3		
		6				4		
		1			4		7	
	4		3		1		5	
	3		7			8		
		5				1		

brainfreezepuzzles.com

Rules: Fill in the grid so that each row, column, and 3x3 block contains 1-9 exactly once.

3	2	5	1	5	4	6	3	1	8	9	5
4	1	5	2	3	8	5	9	5	1	3	6
6	1	4	5	9	3	5	8	3	1	2	5
5	3	3	1	8	5	9	2	5	6	4	1
8	9	2	6	5	1	1	5	4	3	3	5
5	8	1	5	2	9	4	3	3	5	6	1
1	5	3	8	1	6	2	4	9	5	5	3
9	4	5	3	5	1	5	6	8	2	1	3
2	3	6	5	1	5	3	1	5	4	8	9
3	6	8	9	4	5	1	5	1	3	5	2
1	5	1	3	6	3	8	5	2	9	5	4
5	5	9	4	3	2	3	1	6	5	1	8

Solution to the 2008 Pi Day Puzzle; the solution to the 2009 version hasn't yet been published.



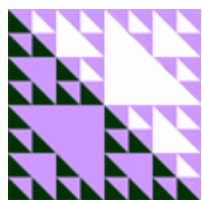
Our annual π -Day celebration took place on March 12 this year, not on the 14th, as usual due to Spring Break. With 17 entries, judges **Yousuf George**, **Pam Welch ('08)**, and music professor **Jon Turner** had their work cut out (hah!) for them. The Math Club chose a different



format this year, awarding prizes in three categories. **Heather Lewis** won "Best Taste" for her chocolate peanut butter ice-cream pie, using a recipe courtesy of **Heather Eckman ('08)** and the expression $\sqrt{6/1 + 6/4 + 6/9 + \dots}$ [which adds up to π , of course], while **Ryann Mirabito ('12)**, **Cara Breslin**, and **Rachel Steubing** (not pictured) won both "Best Presentation" and "Most Creativity" for



their Berry Pie Calculator. Also winning an unofficial "Students' Choice" award were **Cooper Murphy ('09)** and **Chris Zimmerman ('09)** for their Pizza Pie.



Problems

Solutions to Problems 3.2:

3.2.1: symmetry (left/right, up/down, 180° rotation, all of the above, no symmetry)

3.2.2: 9

3.2.3: -1

3.2.4: 26

Problem 3.3.1: What are the next two numbers in the sequence 1, 8, 72, 46, 512, 612, ...?

Problem 3.3.2: Choose a positive real number x and compute $100x^2$, x^3 , and 1.05^x , then arrange the three results from least to greatest. How many orders are possible?

Problem 3.3.3: Express $|x|$ in terms of the maximum function, and express $\max(x,y)$ as an absolute value.

Problem 3.3.4: (This one is kind of hard.) What is the area of the largest semicircle that can be inscribed in a unit square?

Send solutions, articles, alumni news, or suggestions to Heather (hlewis5@naz.edu) or Matt (mkoetz1@naz.edu).