

The Mackinac Gazette

Volume 6

Spring 2007

Mathematics Faculty Recognized with Awards

Several department faculty were recognized this year for outstanding work in the classroom, service to professional organizations, and career-long achievements.

Professor Ed Aboufadel was honored by the university in receiving the 2006 Outstanding Teacher Award, the highest prize Grand Valley confers on faculty in recognition of excellence in the classroom. Ed is the first winner

of this award from the mathematics department since Karen Novotny was recognized in 1993.

Professor David Coffey has been awarded one of just seven 2007 Pew Teaching Excellence Awards that are granted university-wide; he will receive this honor formally at the spring awards banquet hosted by the Provost. The department and its students extend their congratulations

to both Ed and Dave for their ongoing efforts to do outstanding work in their classroom instruction.

Professor Charlene Beckmann was the recipient of multiple awards in the past year from two different organizations. From MCTM, the Michigan Council of Teachers of Mathematics, Char was granted both their 2006 Service Award for outstanding service to mathematics education and MCTM, as well as a Regional Director Award for outstanding contributions and leadership in mathematics education within MCTM Region 4. The former award is in recognition of her many different levels of service to MCTM, including her work as president in 2003. The latter award recognizes Char for a host of professional achievements and for being "one of the strongest advocates of mathematics and education in Michigan."

Char was also recognized for her career-long accomplishments as a teacher and scholar by both the College of Arts and Sciences and the Department of Mathematics at Western Michigan University with their respective Outstanding Achievement Awards for Alumni; she earned her Ph.D. from Western in 1988. Both award citations acknowledge Char's success as a published scholar, her service to organizations such as MCTM, and her 2002-03 Award for Distinguished University teaching from the Michigan Section of the MAA. The GVSU mathematics department congratulates Char for all of this well-deserved recognition from WMU and MCTM.

Greetings from the Editors

In this sixth annual edition of the alumni newsletter, we are proud to share news of accomplishments of GVSU mathematics students, alumni, and faculty, as well as to offer a closer look at some of the many people who make the department an enjoyable place to teach and learn.

Current students are engaged in exciting activities such as mathematics competitions, research experiences for undergraduates, mathematics conferences, and study abroad programs. In addition to gaining recognition from within the university, some of these students have been further honored with external awards and scholarships. Our alumni continue to find success in a wide range of endeavors in education, industry, and academia. And, as evidenced by the other article on this page, department faculty are being regularly recognized for excellence in their work, especially in

teaching. The department at large has also been busy with a wide range of endeavors such as hosting the annual Math in Action conference, a sequence of public lectures titled "The Art of Mathematics," and Family Math Nights in area elementary schools. More information about these and other activities can be found on the mathematics home page at <http://www.gvsu.edu/math/>.

With this newsletter, we invite you to read on to learn more about what has been happening in GVSU mathematics. We especially appreciate hearing from alumni about their achievements and lives following graduation; we warmly encourage our current and former students to stay in touch.

David Austin
Matt Boelkins
Reva Kasman

Mathematics Department Welcomes New Faculty

Feryal Alayont is a new assistant professor in the mathematics department this year. Feryal became interested in mathematics at a young age and has always enjoyed solving mathematics problems, particularly when she could find novel ways for doing so. After completing her undergraduate degree in her native country of Turkey, Feryal earned a Ph.D. at the University of Minnesota and spent three years at the University of Arizona in a post-doctoral teaching position.



Feryal's mathematical interests are in the theory of automorphic forms and L -functions, which she describes as being related to the theory of numbers. She is also intrigued by coding theory and enjoyed teaching a course on that topic at Arizona. In addition, Feryal is very interested in the scholarship of teaching and reads extensively to help understand how best to teach undergraduates.

Besides her research, Feryal has enjoyed teaching Math 210, Communicating in Mathematics, and some of the calculus courses. She particularly appreciates working with freshmen since she has the opportunity to help them learn to write, work in groups, discuss mathematics, and develop better habits that will serve them well throughout their academic careers. In the future, she would also like to develop a number theory course to broaden students' exposure to mathematics.

Outside of her professional life, Feryal enjoys photography, especially photographing nature, flowers, landscapes, and architecture. She posts many of her photos on her office door and encourages students to take ones they particularly like. Feryal is also looking forward to more opportunities to ride her bicycle now that the snow has melted.

Marcia Frobish joined the mathematics department this year as a new affiliate faculty member. Originally from Jackson, Michigan, Marcia comes to us from Northern Illinois in Dekalb, Illinois, where she earned a Master's degree in mathematics and was an instructor for five years.

As a sophomore in high school, Marcia had an excellent female math teacher who she found both inspiring and goofy. Through this experience and others, she learned that mathematics was a lively discipline and decided she wanted to help others learn mathematics.

Marcia appreciates the opportunity she has at Grand Valley to create an active learning environment in her classes and especially enjoys using hands-on activities for students in the algebra courses she teaches. For instance, to help students understand the idea of proportion, she has asked them to drop bouncy balls and measure the heights to which they bounce. She also maintains an interest in mathematics education and hopes to teach mathematics for future elementary teachers some day.



Besides her degrees in mathematics, Marcia has a degree in German and has enjoyed traveling in Europe. In her time outside the classroom, she also enjoys kick-boxing and karate, in which she has earned a blue belt while acquiring many forms over the last four years. Scrapbooking is another passion of hers. This coming summer, Marcia will be working for the West Michigan Whitecaps; though her exact duties are not clear at this time, she is looking forward to spending lots of time at the baseball park on summer evenings.

New Website Shows Possibilities for Careers in Mathematics

While mathematicians may sometimes be driven by the abstract beauty of their subject, the reality is that once our students graduate, they need to find a job! At some point nearly all math majors ask themselves, "What can I do with this degree?" Well, the American Mathematical Society (AMS) is helping answer that question. The AMS has started the Early Career Profile Network, which includes anecdotal data about the careers of math majors who have graduated within the last 6 years. Grand Valley is proud to be participating in this project, and you can view our most recent profiles at <http://www.gvsu.edu/math/profiles>. If you know of someone who we might like to include on the site, let us know!

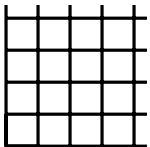
One of the students currently profiled on the site is **Laura Roede**, who graduated with a math major and chemistry minor in 2004. After her time at GVSU, Laura did a Master's degree in Biostatistics at the University of Michigan's School of Public Health. This led to her current job as a consultant for Deloitte and Touche, where she works on problems in the Life Sciences and Health Care Regulatory sector. Laura was actually recruited for the job by someone who saw her resume

on the School of Public Health website and thought she would fit their needs!

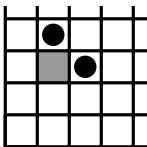
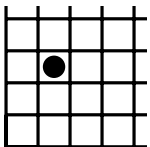
Much of Laura's work involves statistics programming with SAS, which she learned as a graduate student. She has worked on a Medicaid audit, which required going through all hospital admittance records and running queries to investigate patient eligibility. In another project, Laura was involved in analyzing financial data to help health care providers come up with better pricing strategies.

Laura was always enthusiastic about her education, and she encourages students to "be open to learning new things all the time." She has learned so much about health care and consulting since being on the job. Laura points out that when starting your job your degree is not the most important thing anymore, but that being a math major gives you the problem solving skills to tackle almost anything. She tells students not to take the easy way out – be ambitious and absorb whatever you can, rather than just trying to fulfill degree requirements. Laura says some of her most useful classes were actually ones that she chose as electives. When starting a new job, Laura advises, "Be prepared to be overwhelmed, and just hang in there."

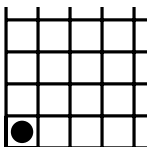
Anyone for a game of checkers?



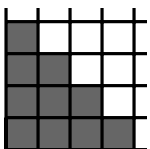
Suppose you have a checkerboard that extends infinitely far above and to the right.



You are not allowed to move checkers on the board. However, you may remove a checker provided you replace it with two more, one above and one to the right of where the checker was removed.



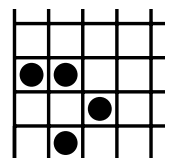
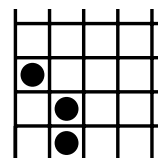
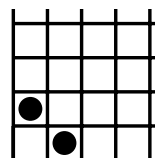
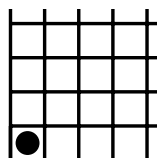
Suppose that you begin with a single checker in the lower left corner.



Can you arrange the checkers, without stacking them, so that there are none in the shaded region?

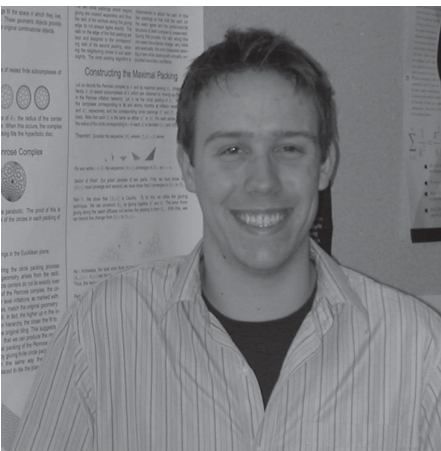
Here is one way you could start:

A solution is given on page 5.



Matthew Stamps Named Department's Outstanding Graduate

Matthew Stamps has accomplished a lot during four years at Grand Valley. Besides taking almost every mathematics course offered for majors, Matthew has completed two summer research projects, spent a semester studying mathematics in Budapest, and worked as a tutor in the Math Lab and as a student assistant for students in Math 110. Now that he is graduating, Matthew's efforts are being officially recognized: he is this year's Outstanding Graduate in the mathematics department, and he has been awarded the Niemeyer Award, a prestigious university-wide award made annually to only two students for excellence both in their coursework and their extra-curricular activities.



The son of Christen Pearson, a professor in Grand Valley's English department, Matthew graduated from Jenison High School, where his enthusiasm and talent for mathematics earned him the affectionate nickname "Cosine." By his sophomore year at GVSU, he

was already taking senior-level courses like Numerical Analysis and Complex Analysis. At the end of that year, he spent the summer at Valparaiso University in northern Indiana working in the Valparaiso Experience in Research for Undergraduates in Mathematics program. Along with a few other students, Matthew investigated a problem in applied mathematics that asked how tollbooths could best be placed in traffic networks so as to even out traffic flow.

The following summer, Matthew was awarded a grant through Grand Valley's Summer Student Scholars program to work with faculty mentor David Austin on a more theoretical problem in the subject of circle packings. A presentation he gave on this work at the Joint Meetings of the American Mathematical Society and Mathematical Association of America won a prize last January.

Matthew spent the Fall 2006 semester in Hungary as a part of the Budapest Semester in Mathematics program. This highly selective program supports about fifty talented undergraduates from around North America as they study mathematics with Hungarian research mathematicians. Besides studying the Hungarian language, Matthew took the courses Conjecture and Proof, Graph Theory, and Number Theory. These courses place a particular

emphasis on problem-solving; many of the problems can be simply stated but require a really creative idea to solve. Here is a typical problem: "Consider a set of thirteen real numbers with this property: If you remove any one of them, the remaining twelve can be divided into two groups of six having the same sum. Must all thirteen numbers be equal?" Matthew did a superb job in this competitive environment. For instance, while 44 students started Conjecture and Proof, only 12, including Matthew, completed the course. Besides studying mathematics, Matthew also enjoyed experiencing a new culture and traveling around the Hungarian countryside on his bicycle.

In addition to his studies, Matthew served as president of the Math & Stats Club last year and is currently the president of the local chapter of Pi Mu Epsilon, the national mathematics honor society. He has worked with students in Math 110 (Algebra) as part of the Structured Learning Assistance Program, in which students with relatively low grades attended a special hour of instruction led by Matthew.

Matthew enjoys outdoor activities such as running, rock climbing, and kayaking. Last summer, he worked as a student assistant in a kayaking course, and he has been a member of the staff at the Climbing Center for some time.



Graduate study in mathematics awaits Matthew now. He has offers from Indiana University and the University of California at Davis, both of which look very attractive.

Matthew is the fourth mathematics major to win the Niemeyer Award in the past five years, the others being Chris Frayer, John Skukalek, and Kris Lund. We are proud to have such talented and dedicated majors.

Mathematics Department Honors Students

On Friday, April 13, the department will be honoring many of its most notable students at the annual awards banquet. It is always an exciting event to celebrate with these exceptional students and their families. Here is the list of this year's recipients.

Department Scholarships

Thanks to generous contributions to the Mathematics Endowment Fund, we will be awarding financial support to the following students. The selection criteria included a personal essay, grade point average, letters of recommendation, and extra-curricular mathematical endeavors.

Michelle Coffell
Cody Copus
Brenna Dorgan
Daniel Gorski
Emily Jacoby

Outstanding Sophomore Award

Rebeka Tabbey is the recipient of this award, which recognizes a student's achievements early in her academic career and encourages continued success in mathematics.

Department Senior Awards

The following students are being honored for their excellent work in the mathematics major and their overall contributions to the department. We wish them the best of luck in their future endeavors as they graduate.

Matthew Flickinger
Eric Hedrick
Nathan Johnson
Rebecca Mousseau
Katherine Ondrusek
Matthew Stamps
Jessica Thompson

Amanda Wigent
Kathryn Wippel
Aarika Woodard

Miriam Schaefer Scholarship

We are thrilled that the Michigan Council of Teachers of Mathematics has chosen once again to honor a Grand Valley student with this scholarship. Gerard Kwiatkowski, a mathematics major concentrating on secondary education, is one of five statewide recipients this year.

Pi Mu Epsilon inductees

The Mathematics Department is pleased to be inducting 24 students into the GVSU chapter of Pi Mu Epsilon, the national mathematics honor society.

Playing Checkers

There is no way to get all of the checkers out of the shaded region. Here is one way to see this:

Assign numbers to each of the squares, beginning with 1 in the lower right square. When you move up or to the right, the number in a square is divided by 2.

Now think about the sum of the numbers in the squares that contain checkers. When there is a single checker in the lower left corner, this sum is 1. However, when a checker is removed

and replaced with two checkers, this sum will not change. Therefore, the sum will always be 1.

Let's determine the sum of the numbers in all the squares. Notice that the numbers in the bottom row form a geometric series: $1 + 1/2 + 1/4 + 1/8 + 1/16 + \dots = 2$. Since the numbers in the second row are half those in the first, the sum of the numbers in that row is 1. Likewise, the sum of numbers in the third row is $1/2$. Therefore, the sum of all the numbers is $2 + 1 + 1/2 + 1/4 + 1/8 + 1/16 + \dots = 4$.

By subtracting the numbers in the shaded region, we can then determine that the sum of numbers in the unshaded region is $3/4$. Since the sum of the numbers in squares containing a checker must be 1, there is no way to move all the checkers into the unshaded area.

This is a problem that Matthew Stamps encountered during the Budapest Semester in Mathematics (see page 4).

REU Students Capture Prizes

This past summer was the 6th year of the GVSU Mathematics REU (Research Experience for Undergraduates), funded by the National Science Foundation. This program continues to generate exciting results as students do joint research with faculty, write papers, and give talks at conferences. From the 2006 group, two pairs of students received noteworthy honors. At the 2006 MathFest in Knoxville, **Amanda Taylor** (University of Maine-Farmington) and **Christy Hediger** (Muhlenberg College), who worked with Prof. Will Dickinson this summer, won one of the seven MAA awards for their talk "San Gaku and Other Problems in Various Geometries." At the Student Poster Session at the 2007 Joint Mathematics Meeting in New Orleans, **Dan Schultheis** (University of Washington) and **Lisa Morales** (Cal State Polytechnic-Pomona), who worked with Prof. Steve Schlicker, won an award for their poster "Properties of Segments in the Hausdorff Metric Geometry." Congratulations to the REU students and faculty for their efforts that resulted in these prizes.

Students and Faculty Enjoy International Study Programs

Gerard Kwiatkowski and **Emily Jacoby** are two of several current GVSU mathematics majors who have enjoyed the privilege of studying abroad. By demonstrating how being abroad can widen one's perspective on education and life in general, their experiences highlight the reasons the university and the mathematics department are actively encouraging all students to take advantage of this opportunity.



From Hopkins, MI, Gerard is in his fourth year as a mathematics major at GVSU with an emphasis in secondary education. He spent the winter semester of 2006 studying abroad at Instituto Tecnológico de Estudios Superiores de Monterrey in Monterrey, Mexico. While there, he primarily took Spanish and culture/history classes, but he also had the unique experience of taking differential equations in Spanish!

Gerard says that the experience helped him to empathize with his students for whom English is a second language and that it also emphasized to him the universal language of mathematics – although his differential equations instructor taught in Spanish, all of the symbols and many of technical terms were similar to English ones. As to the overall experience of studying abroad, Gerard particularly enjoyed the very different cultural setting from GVSU at Tecnológico de Monterrey, as it is located in the center of a city of over three million residents. He said that the people of Monterrey are exceptionally kind; he felt welcome from day one, and this kindness made it very easy to adjust to the social and cultural differences that exist between Monterrey and Allendale. Gerard also enjoyed traveling extensively in Mexico; his favorite city was Guanajuato, located in the center of the silver mining region of Mexico that produces some of the highest quality silver in the world and at very economical prices. Other interesting aspects of the city are the mummies that the city is famous for and the fact that the old silver mines have been converted to underground streets, so you typically drive below ground while above ground streets are used for pedestrian traffic.

Gerard has also been extremely active in campus and community life, which he says has been among the best part of his time at GVSU. He has been involved with the Latino Student Union, Upward Bound, the Math Lab, and the Math 110 SLA (Structured Learning Assistance). After teacher assisting and student teaching in the 2007-08 academic year, Gerard looks forward to moving to San Antonio, Texas to teach high school mathematics while pursuing a masters degree in bilingual education with an emphasis in dual immersion at The University of Texas at San Antonio.

Originally from Holland, MI, Em Jacoby is finishing her third year at GVSU with a major in mathematics. She has especially appreciated all of the opportunities to study abroad and gain general education credit, so much that she has traveled to other countries to study three times! Em has studied at Sprachinstitut Tübingen (Tübingen, Germany), at American University in Cairo, Egypt, and at the Jordan Field School, where she studied archaeology with base camp at Yarmouk University, Irbid, Jordan. At these institutions, her studies have included an intensive German Language course at Tübingen that met 26 hours a week in which the other 6 students in the class were from around the world, none from America; courses in Egyptian History and Culture, as well as Arabic, at American University; and classes in History, Middle East Studies, and Archaeology at the Jordan Field School where actual survey and excavation are supplemented with lectures by field director and supervisors.



Em says she loved such diverse experiences as living abroad in cities where she would ride the city bus or walk to school and walk daily to a market to purchase fresh bread and cheese, waking up to the call to prayer as it echoed loudly from hundreds of mosques around the city, and eating yogurt flavored ice cream (similar to Italian gelato) on the crowded sidewalks on the evening of holy day when families spend time together outside of their homes. While she found it difficult at first to be so alone in these adventures, she overcame the initial desire to hide in her apartment and found confidence by seeking new and eccentric experiences each day. This has led her to seek diversity in her routine in the States as well.

In addition to her studies, Em enjoyed traveling extensively while abroad. She has climbed a mountain at the foot of the Alps to reach a famous castle and stayed in a hostel established in the 1200s in Damascus where the beds were mattresses laid on the roof. Her studies and travels have made her much more aware of world news and interested in participating in her own country's democracy with the viewpoint of having personal relationships with those whom our foreign policies affect. As for her own education, studying abroad has made her realize how easy it is to be a lifelong learner and how difficult it is to truly understand social concepts. Em sees mathematics as a form of stability in her life; mathematical theorems are true for all time and, unlike in the social realm, the concepts need not at any point be unlearned or reformatted.

When in residence at GVSU, Em has greatly appreciated her mathematics courses and the enthusiasm her professors bring to their courses. Grading Calculus II papers has served as a source of both employment and enjoyment. After GVSU, she plans to continue studying with a possible desire to become an academic, and perhaps one day work at one of the universities at which she has studied, such as at the American University in Cairo.

Professor Marge Friar spent a full week in July 2006 attending a Chautauqua National Science Foundation Short Course for College Teachers titled "Ancient Maya Mathematics in the Highlands of Guatemala." In the course, twenty-four participants from the United States and South America (including mathematicians, math educators, physical science educators, anthropologists, an economist, a librarian, and an art historian) worked with the Mayan number system. In our familiar base-ten system (also called the Hindu-Arabic number system), we use ten digits (0,1, 2, ..., 9). The Mayans, however, used only three symbols: a dot representing one, a horizontal bar representing five, and a shell symbol representing zero. The Mayans developed the important concept of zero 1500 years before it was used by Europeans. And while we use a place value system based upon powers of ten, the Mayans used a place value system based upon powers of twenty. They held 20 as a sacred counting number (based on their total fingers and toes!).



Understanding the history of numeral systems is important to everyone who teaches mathematics, but particularly teachers of elementary school students: this history reminds us of the early stages in the human development of numbers, much in the same way that early elementary students develop their own understanding of numbers. In fact, Professor Friar's favorite courses to teach are the mathematics courses for those studying to be elementary teachers. She loves the content and the approach the department takes in teaching the course by modeling how we encourage our students to teach mathematics. She says the short course was a particularly enjoyable experience for the opportunity it presented to learn more about the Mayan numeration system in the very land where it was conceived. She looks forward to opportunities to share the Mayan numeral system and its history with students in her Math 221 and 222 classes (Mathematics for Elementary Teachers I & II), such as through her pictures of a Mayan stone structure that shows the bars and dots of their numeration system.

Like our students who study abroad, Marge found the entire experience to be one that widened her perspective on the world. She shares that one of the most thrilling parts of the trip was taking excursions that very few non-Mayan people in the world will ever get to have. For example, one day they needed to leave the tour bus, which could no longer travel through the rutted path through the sugarcane field, and walk until they found two large boulders which were carved Mayan ruins that are still used today by Mayans on pilgrimages. In addition, while traveling by tour bus, the participants saw both the gorgeous landscape of Guatemala along with the poverty of people living in shacks, with laundry hung over bushes and on rooftops. Marge says that it was difficult to see trash strewn over the side of a beautiful lush mountain, and simultaneously surprising to see a Guatemalan man at a make-shift café (comedor) with a laptop computer. The group also traveled from Guatemala City to Antigua (a World Heritage site for its Spanish colonial architecture), as well as to Panajachel (on the shores of Lake Atitlan) and Chichicastenango.

Professor Friar has taught in the mathematics department at GVSU since 1982. She particularly enjoys working with colleagues dedicated to excellence in classroom teaching. Away from school, she has been fortunate to enjoy a wide range of travels, including trips to Mexico, Finland, Russia, Sweden, Estonia, and the Bavarian region of Germany.

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