Bryn Mawr’s Math Department is honored by the American Mathematical Society, winning the seventh annual Exemplary Program Award.

**Special Points of Interest:**

- Math graduate student Chris Micklewright was chosen to give the Graduate School of Arts and Sciences convocation address.
- Catherine Owens ’12 and Prof. Grundman recently published a paper based on Catherine’s senior research in *INTEGERS: The Electronic Journal of Combinatorial Number Theory*. (Catherine is now in her first year of law school.)
- For more, see page 7.

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THE MATHEMATICS OF DANCE AND THE DANCE OF MATHEMATICS

BY AMY N. MYERS

What do math and dance have in common? More than you might think. Mathematician and dancer Karl Schaffer describes the connections as “the geometry of the moving body, the symmetries of dancers arrayed across the stage, the rhythmic patterns of dance phrasing, the complex connections between dancers, the varied paths through space.”

Dr. Schaffer, professor of mathematics at De Anza College, is co-founder and co-artistic director of the Dr. Schaffer and Mr. Stern Dance Ensemble (www.mathdance.org). This fall the Bryn Mawr math and Swarthmore dance departments hosted Karl for a three-week residency sponsored by the Mellon Creative Residencies Program.

While visiting the Tri-Co Dr. Schaffer composed several short pieces based on the mathematical principles of symmetry, plane tessellations, and triangular numbers. Student dancers presented these nontrivial mathematical ideas to the public through a series of compelling dance sequences in an informal performance at the end of the residency.

Dr. Schaffer also gave a math colloquium lecture and two public workshops on math and dance as part of the residency. He visited classes and met with faculty members from a variety of different departments. In addition he taught attendees of the Distressing Math Collective (DMC) how to make all five regular polyhedra from three loops of rope.

The Dr. Schaffer and Mr. Stern Dance Ensemble has toured throughout North America since 1988. They have received five National Endowment for the Arts grants for their artistic and educational work linking dance and mathematics. Their most recent concert, “The Daughters of Hypatia,” celebrates the lives, work, and struggles of great women mathematicians. The Tri-Co was lucky to catch Karl while on sabbatical during De Anza College’s fall quarter.
What Draws Mawrters to Financial Math?

By Laura Wreschnig

In polite conversation, one should avoid the topic of finance. Bankers are to many people a necessary evil, privy to complex monetary exchanges that few understand. Popular culture is unfriendly to financiers—witness the coin-filled ceramic piggy bank, a sly echo of the preened and pot-bellied bank professional. The financial crisis of 2008 has done little to alleviate the hostility that “main street” feels toward Wall Street. Record numbers of layoffs also harm the industry. This economic sector, infamous for its cutthroat behavior, has become more difficult than ever to break into as even the mightiest of firms tighten their fiscal belts.

Perhaps it was that increase in competitiveness that enticed droves of students to enroll in Math 310: Introduction to the Mathematics of Financial Derivatives, a course taught this spring by Professor Leslie Cheng. An unprecedented number of Mawrters and Haverford students pre-registered for the course, and a record number of them later appeared in the large Physics lecture hall for the first class meeting. (To provide perspective to those who have not recently rambled our hallowed halls: roughly 35 students attended my largest math course prior Math 310, while this course serves about 70.) The high enrollment reflects a strong interest in finance across a broad spectrum of majors.

I chose to take the course because I felt the need to bolster my skills base in the wake of headline after headline lamenting the plight of unemployed twenty-somethings. With graduation only a year away, it feels more important than ever to have backup plans upon backup plans. My classmates share my concern. Lina Li, a junior interested in pursuing a career in medicine, attends the course because she finds it “very applicable to real life.” “It is useful,” she adds, “learning the math behind all of it.” Lina’s views reflect those of many in the class, who have taken the course not only out of curiosity, but also out of common sense.

There are also significant numbers of students who attend Math 310 because a career in finance is their first choice. Amy Zhao ’14, a junior economics major, is one of these students. She explains that “the combination of mathematical and qualitative analysis” draws her to the industry. She likes how the Math of Financial Derivatives focuses on deriving one specific quantitative answer to a given problem. In her economics courses, by contrast, quantitative results are subject to multiple interpretations and lengthier analyses. Amy and Lina agree that fractures have developed in both the financial industry’s culture and in its regulatory system, but at the same time they feel it is not beyond redemption.

As a result of attending this enormously popular course, I have discovered that my initial assumption, that the recent tumult in the financial sector would lessen its appeal to job seekers, was incorrect. Not only has the complex dealings of the major banks encouraged students in other disciplines to learn the inner workings of the financial sector, but it has also given many economics and math majors a strong desire to mend the flawed structures upon which so many of our futures depend.
CIRCLE CONSIDERS CIRCLES

BY AMY N. MYERS

Venn diagrams help us think about sets, logic, counting, probability, and more. We typically draw them with congruent circles to help us visualize the intersections among two or three sets.

Why do we stop at three sets? Can we find no interesting problems whose analyses require the consideration of four or more sets? When we try to arrange four congruent circles to represent the intersections among four sets, we quickly realize this task is not as straightforward as it is for fewer sets. Is there a clever way to arrange the circles, or is such a diagram simply impossible?

This fall members of the Philadelphia Area Math Teachers Circle (PAMTC) met to tackle these questions and more. PAMTC describes itself as a “‘book group’ for middle grades math teachers” that uses a “collaborative problem-solving model” where members “work together to discuss, interrogate, and solve challenging, fun math puzzles.” It was created by Tri-Co math faculty who invited Bryn Mawr math professor Amy Myers to lead the November meeting.

Amy led PAMTC members through a discussion of how many regions are required by a Venn diagram for \( n \) sets \( (2^n) \), the maximum number of regions that can be created by \( n \) intersecting circles \( (n^2 - n + 2) \), and a consideration of the values of \( n \) for which these numbers are equal (only \( n = 1, 2, \) and 3). Small groups of circle members worked for nearly two hours to arrive (with minimal prompting) at all results on their own.

PAMTC is supported by the Verizon Foundation, the American Institute of Mathematics, the Mathematical Association of America, and the National Association of Math Circles.
A MATHEMATICAL CAN OF WORMS
BY AMY N. MYERS

In October a group of Bryn Mawr math faculty and students attended the Eastern Pennsylvania and Delaware (EPaDel) meeting of the Mathematical Association of America held at Millersville University. There they applauded as the winner of the 2012 EPaDel Student Paper Competition, Katie Link ’12, was announced. In addition to this important recognition, Ms. Link also received a $200 prize for her paper entitled “Guinea Work Disease (Dracunculiasis): Opening a Mathematical Can of Worms”. The coordinator of the Student Paper Competition Committee described the paper as a “delightful presentation of original work.” Katie wrote it for her honors thesis advised by Professor Donnay.

BRYN MAWR SUPPORTS FUTURE MATH AND SCIENCE TEACHERS
BY LAURA WRESCHNIG

The Robert Noyce Teacher Scholarship Program is authorized by the National Science Foundation (NSF), and provides funding to colleges and universities to support talented students in becoming K-12 math and science teachers. Professor Victor Donnay recently applied for and won such funding for Bryn Mawr College.

Prof. Donnay has long had a passion for math and science education. As a result of an earlier NSF initiative, he and a colleague developed a course called Changing Pedagogies in Math and Science Education, which he has taught several times over the years. After giving a talk on the importance of making math and science courses more accessible to liberal arts students, Prof. Donnay was encouraged by an NSF spokesperson to apply for Noyce funding. Thanks to Prof. Donnay’s efforts, Bryn Mawr now supports the ambitions of future educators Dorothy Shu ’13, Hannah Weinstein ’13, and Tasnim Aziz ’13, the first Bryn Mawr students to benefit from the Noyce program.

MATHEMATICS AND SUSTAINABILITY
BY LAURA WRESCHNIG

April is Math Awareness Month, and this year’s theme is The Mathematics of Sustainability. Because of his past work in this area, Professor Victor Donnay was tapped to lead the national committee in charge of promoting this year’s celebration. As committee chair, Prof. Donnay has, among other things, enabled a series of essays on mathematics and sustainability. The diverse group of authors includes architects, energy coordinators for schools, the mastermind of the Greenworks Philadelphia program, and even a member of the Philadelphia Phillies baseball team. Each piece examines the role mathematics plays in the author’s sustainable initiatives, and can be found at http://www.mathaware.org/index.html.

Professor Donnay’s work with sustainability does not end with Math Awareness Month. He is currently coordinating a series of projects conducted by senior math majors that test the feasibility of various sustainability-minded schemes. The projects are proposed by clients who would like a mathematical analysis that presents the pros and cons of adopting a certain sustainable measure. For example, the Bryn Mawr College Office of Admissions wanted to understand the financial viability of adopting a paperless application processing method. Not only would the system save trees, but it could possibly also save money in the form of abandoned ink and paper purchases. Another project concerned the environmental costs and benefits of composting in Bryn Mawr dining halls. Students presented their results only a few months ago, and already new projects are in the pipeline. Professor Donnay explains that the ideas stem from one another, as previous semesters’ analyses present new avenues for investigation.
Two-Body Problem Solved

By Amy N. Myers

For physicists, the solution to a “two-body problem” consists of a description of how two objects move in reaction to one another. For mathematicians, solving a “two-body problem” refers to two married professors finding positions at universities within commuting distance of the same home.

This year new faculty members Djordje Milicevic and Liz Beazley have solved the mathematical version of this dilemma with positions at Bryn Mawr and Haverford Colleges, respectively.

As an undergraduate student, Liz studied at Washington and Lee University in the state of Virginia, where she grew up. She attended the University of Chicago for graduate school, and held a post-doctoral position at the University of Michigan. Djordje did his undergraduate work in his native Belgrade, Serbia, and completed his graduate degree at Princeton. He too did post-doctoral work at the University of Michigan, where he met Liz. Together the couple moved to Massachusetts for jobs at Amherst University (Djordje) and Williams College (Liz). After deferring an offer from Bryn Mawr, Djordje spent the past year in Bonn, Germany, at the Max Planck Institute, while Liz landed a position at Haverford. We are now thrilled to have them both finally settled here in the Bi-Co.

From an early age Djordje knew he was good at mathematics. He did well in mathematics competitions, and enjoyed the “thrill of discovery” in uncovering the “tricks” required to solve competition problems. But it wasn’t until high school that Prof. Milicevic’s interest in mathematics “crystallized” into a life-long pursuit. He attended the unique high school in Serbia focused on mathematics, where courses began on “day one” with the axioms of geometry. Although the axiomatic approach to geometry required him to begin by proving frustratingly obvious results, it quickly taught Djordje what mathematics was all about.” The seeds of his ultimate interest in analytic number theory were sewn by a textbook acquired almost at random during a school trip to Moscow, where he and his classmates would buy just about any math book they could get their hands on. Although Djordje was unable to comprehend the material contained in the textbook at the time, there was “something about it” that attracted him even then.

Liz also discovered the joy of mathematics in high school. In her first calculus course, she learned that math was “more about ideas and theory instead of algorithms and answers.” Prof. Beazley spent her junior year of college studying abroad with the Budapest Semesters in Mathematics program, and highlights this experience as “pivotal” in her mathematics career. When it comes to research, she describes herself as a “chameleon” because her projects include topics from so many different fields: algebra, geometry, representation theory, combinatorics, and number theory. All of the problems she investigates are motivated by questions arising in algebraic geometry, which is her primary field of research.

When asked what he enjoys most about his new position at Bryn Mawr. Prof. Milicicv praises the students. They are serious, creative, brilliant, and “engage in material for the material’s sake.” Prof. Beazley agrees. “There is a great deal of personal responsibility assumed for the learning process,” she explains. Her students are “deep independent thinkers,” and “the best collaborators [she has] ever witnessed in [her] teaching career.” The appreciation is mutual.
SPECIAL POINTS OF INTEREST:
(CONTINUED FROM PAGE 1)

- Maeve O’Hara ’08 won the Lindback Foundation Award for Distinguished Teaching at Bodine High School in Philadelphia.
- Hoang Ha ’13 and Brenda Martinez ’13 both won Outstanding Presentation Awards for their efforts at MathFest and the Joint Meetings, respectively. (These are large annual international conferences attended by thousands of mathematicians.)

MEET THE EDITORS

Yifan Liu is a sophomore majoring in math. She likes challenges (for example, taking complex analysis as a frosh), and is passionate about math as well as other fields such as film, computer science, and economics. Besides academics, she also loves being involved in extracurricular activities: running the Bi-Co Finance Club and the Chinese Culture Study Association, conducting physics and computer science research, and, of course, editing for the Bi-Co Newspaper and the Mathematics Alumnae Newsletter. She wants to make her time at Bryn Mawr the most memorable experience of her life, and to show you how awesome the math department and the College are through the newspapers!

Amy N. Myers is a continuing non-tenure-track professor in the math department. She enjoys teaching 100- and 200-level courses (especially combinatorics and the history of math), supervising the MAA Student Chapter Board of Directors, running the College's math placement system, and managing math student workers. This is her sixth year at Bryn Mawr.

Laura Wreschnig is a junior double majoring in economics and mathematics. She enjoys tutoring and TA’ing in economics, watching X-Files reruns on Netflix, and buying copious amounts of mozzarella sticks from Uncommon Grounds.