This past January, when I started my term as department head, we had a visit from UConn’s new president, Susan Herbst. We told her about our accomplishments and plans, and also called attention to the lack of resources, both human and material, that we are facing. Both President Herbst and Dean Teitelbaum have responded positively to our concerns: this fall we are welcoming three new tenure track faculty, several more searches are presently under way and UConn will (at last) begin renovations to our building. On later pages you can read about our new faculty, new Ph.D. graduates, our REU program, news from alumni, and more.

The passing last year of Miki Neumann, who had been a leading member of the department for over 25 years and head for the previous 8 years, was a very substantial loss, and not seeing him around still fills us with sorrow. At the initiative of several members of the department, a Michael Neumann Memorial Dissertation Award has been endowed at the UConn Foundation. It will distinguish an outstanding Ph.D. dissertation written in the department each year. This fund has received substantial support from Miki’s family, current and former members of the department, former students, and members of his congregation, and we are grateful to all of them.

I hope this newsletter showcases well what we have done this past year as we prepare for a new one.
FACULTY NEWS
NEW FACULTY

This fall we welcome three new tenure-track faculty who all work in differential geometry.

**Lan-Hsuan Huang** (top photo, left) received her Ph.D. at Stanford in 2009 under Rick Schoen. Until this past spring she was a Ritt Assistant Professor at Columbia, with short-term visiting positions at the Max Planck Institute in Germany and Mittag-Leffler Institute in Sweden. Her work is on problems in differential geometry inspired by general relativity.

**Ovidiu Munteanu** (top photo, right) received his Ph.D. at UC Irvine in 2008 with advisor Peter Li. Afterwards he was a Ritt Assistant Professor at Columbia. His interests are in curvature and its applications to the geometry and topology of manifolds, and he will be teaching our undergraduate differential geometry course this fall.

**Damin Wu** (bottom photo) received his Ph.D. at MIT in 2005, working under Shing-Tung Yau. After graduate school he held a postdoctoral position at Stanford for a year and then was an assistant professor at Ohio State, being promoted to associate professor there shortly before coming to UConn. His work is on geometry and partial differential equations on complex manifolds.

Our new faculty this year also includes postdoctoral fellows **Dongwen Liu** (algebra) and **Michael Pruitt** (numerical PDEs), visiting assistant professor **Thomas Laetsch** (probability/geometry), and assistant professors in residence **Robert Heffernan** (algebra) and **David Ferrone** (harmonic analysis).
BASS BIRTHDAY CONFERENCES

Our colleague Professor Richard Bass turned 60 this past year, and there were two conferences organized to commemorate this, one at the Banff International Research Station in Canada last September and one in Nigata, Japan this past March. We congratulate Rich on this well-deserved double honor, and wish him many more productive years!

FACULTY RESEARCH RECOGNIZED

This year the National Science Foundation awarded grants to assistant professors Arend Bayer and Dmitry Leykekhman and associate professor Alexander Teplyaev. Teplyaev and assistant professor Milena Hering received supplements to their NSF grants to support our REU program, which is described elsewhere in this newsletter. Associate professor Fabiana Cardetti received a grant from the Connecticut Department of Education.

Cardetti, associate professor Xiaodong Yan, and assistant professor in residence Amit Savkar obtained internal large grants to support their research.

Professor Emil Valdez received two prizes for his research: the 2011 David Garrick Halmstad Prize, which is awarded to the best paper published during the previous year in an actuarial journal, and the 2012 Lloyd’s of London Science of Risk Prize in the category Insurance Operations and Markets. The first prize was for the paper “Hierarchical Insurance Claims Marketing”, co-authored with Jed Frees, and the second was for the paper “Optimal Capital Allocation Principles”, co-authored with Andreas Tsanakas, Jan Dhaene, and Steven Vanduffel.

FACULTY TEACHING RECOGNIZED

Associate professor Fabiana Cardetti received the 2012 AAUP Teaching Promise Award, and Jim Trimble, one of the directors of our undergraduate actuarial program, was named Educator of the Year by the UConn USG Academic Affairs Committee.

RESEARCH HIGHLIGHTS

Richard Bass: Harmonic Functions

A harmonic function is a function \( f(x_1, \ldots, x_n) \) that satisfies Laplace’s equation:

\[
\frac{\partial^2 f}{\partial x_1^2} + \frac{\partial^2 f}{\partial x_2^2} + \cdots + \frac{\partial^2 f}{\partial x_n^2} = 0.
\]

For example, in two variables (using \( x, y \) instead of \( x_1, x_2 \)), the polynomial \( x^3 - 3xy^2 \) is harmonic. So is \( e^x \cos y \). Harmonic functions arise in partial differential equations, complex variables, probability, and mathematical physics. In physics, the gravitational potential at points in space due to the pull of the sun, Earth, moon, and other planets is a harmonic function of three variables. The real and imaginary parts of differentiable functions in complex analysis are harmonic. For example, \( x^3 - 3xy^2 \) is the real part of \((x + iy)^3\).

An important general fact about harmonic functions is that their value at a point is equal to their average value over any ball centered at the point, where the average value of a function is defined using integrals, as in calculus. A special fact about harmonic functions that are nonnegative, meaning \( f(x_1, \ldots, x_n) \geq 0 \) for all \((x_1, \ldots, x_n)\), is that their value at a point controls in a “uniform way” their values at nearby points. A precise version of this uniform control is known as Harnack’s inequality: if we have two radii \( r < R \), there is a constant \( C \) depending only on \( r \) and \( R \) such that for any point \( x \) and any non-negative
harmonic function $f$ on the ball centered at $x$ with radius $R$, $f(y) \leq Cf(z)$ for all $y$ and $z$ in the ball centered at $x$ with radius $r$.

In 1960 Jürgen Moser proved a far-reaching generalization of Harnack’s inequality. He showed that this inequality holds for solutions of a large class of partial differential equations, not just Laplace’s equation. (John Nash, of A Beautiful Mind fame, was working on closely related problems just before his 30-year bout with schizophrenia, but I don’t think there is a connection there.) Since Laplace’s equation arises in the study of heat distribution in a homogeneous material, Moser’s generalization could be interpreted physically in terms of heat distribution in non-homogeneous materials.

After the publication of Moser’s paper there has been a huge amount of research aiming to determine when Harnack’s inequality holds. One direction is deciding which partial differential equations have solutions that satisfy the inequality. Another direction is working on more general spaces than Euclidean space, such as manifolds, fractals, and infinite graphs.

I have recently been working on necessary and sufficient conditions for the Harnack inequality to hold, and a paper I have written on this problem will appear in the Journal of the European Mathematical Society.

Ralf Schiffler: Cluster Algebras

The article “Bases for Cluster Algebras from Surfaces”, that I co-authored with Gregg Musiker and Lauren Williams, is about a recently established interplay between algebra and geometry. Unlike many other connections between algebra and geometry, where geometric problems are reduced to algebraic ones, in our work we used geometry as a means to understand an abstract algebraic structure called a cluster algebra.

As the simplest example, start with a regular polygon. A diagonal in the polygon, which is a line segment connecting one vertex to another, cuts the polygon into two pieces. For example, a pentagon has 5 diagonals and a hexagon has 9 diagonals. A triangulation of a polygon is a maximal set of non-crossing diagonals. A triangulation of the pentagon has 2 diagonals and a triangulation of the hexagon has 3 diagonals. In general, a triangulation of a polygon with $n$ vertices has $n-3$ diagonals.

Fix a triangulation and label the diagonals in it as $1, 2, \ldots, n-3$. To each diagonal of this triangulation, we associate a variable $x_1, x_2, \ldots, x_{n-3}$ and we let $F$ be the set of all rational functions in these variables. (A rational function is a ratio of polynomials, such as $(x_1 + x_2)/(x_1^2 x_2 - 5).$) The cluster algebra associated to these variables is a subset of $F$ that is closed under addition and multiplication, and is the smallest such set that contains a prescribed set of distinguished rational functions that are called cluster variables.

For a regular polygon, the cluster variables correspond to all of its diagonals. So for the hexagon we have 9 cluster variables, and 3 of them correspond to an initial triangulation. The other cluster variables are determined by crossing patterns in the initial triangulation.

In a more general setup, we can replace a polygon by a different surface, like a sphere or a torus in which we cut out a certain number of holes. The diagonals in the polygon are replaced by curved arcs in the surface, and triangulations of the surface are still defined as maximal sets of non-crossing arcs.

In an earlier work, we used crossing patterns of the arcs in a triangulation to give an explicit formula for all the cluster variables. In our new article, we use that explicit formula to define a basis for the cluster algebra. Recall from linear algebra that a basis is a linearly independent spanning set: every element of the cluster algebra is a (unique) linear combination of the basis.

Our basis has infinitely many elements. For the cluster algebra associated to a polygon, its basis consists of products of compatible cluster variables corresponding to the diagonals
in any crossing-free collection of diagonals. So, for example, the product of the cluster variables corresponding to the diagonals in a triangulation is a basis element. But each diagonal is also allowed to appear with a multiplicity, and different multiplicities give different basis elements. These multiplicities correspond to powers in the cluster algebra, so if the diagonal with label 2 appears with 5 times in a crossing-free collection of diagonals then the corresponding variable appears in the fifth power, as $x_2^5$.

For more complicated surfaces than polygons, the arcs in triangulations do not suffice to construct a basis of the cluster algebra, and we need to use additional curves that are not connected to the boundary of the surface in the way a diagonal has its endpoints on the boundary of a polygon.
GRADUATE PROGRAM

Our graduate program had a passing of the torch in January, when Emeritus Professor Ron Blei stepped down as graduate program director and Associate Professor Reed Solomon took over. Although Blei officially retired three years ago, his work as graduate program director kept him coming into the department. We wish him all the best on his well-deserved “second” retirement.

GRADUATE DEGREES

This past year 42 students received graduate degrees:

<table>
<thead>
<tr>
<th>Degree Type</th>
<th>Number</th>
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<tbody>
<tr>
<td>Math Masters</td>
<td>3</td>
</tr>
<tr>
<td>Actuarial Science Masters</td>
<td>21</td>
</tr>
<tr>
<td>Applied Financial Math Masters</td>
<td>11</td>
</tr>
<tr>
<td>Ph.D. degrees</td>
<td>7</td>
</tr>
</tbody>
</table>

Information about Ph.D. recipients, including dissertation titles and first jobs, is below.

- **Avraham Bourla** (advisor Andrew Haas); Aug. 2011
  “The Bi-sequences of Approximation Coefficients for Gauss-like and Renyi-like Maps on the Interval”
  Visiting Professor, Trinity College, Hartford, CT

- **Lucas David-Roesler** (advisor Ralf Schiffler); May 2012
  “Algebras from Surfaces and Their Derived Equivalences”
  Visiting Instructor, Lebanon Valley College

- **David Ferrone** (advisor Wolodymyr Madych); May 2012
  “Finite Biorthogonal Transforms and Multiresolution Analyses On Intervals”
  Assistant Professor in Residence, University of Connecticut

- **John Haga** (advisor Maria Gordina); May 2012
  “Levy Processes in a Step 3 Nilpotent Lie Group”
  Assistant Professor, Wentworth Institute of Technology

- **Benjamin Salisbury** (advisor Kyu-Hwan Lee); May 2012
  “A Combinatorial Description of the Gindikin-Karpelevich Formula ”
  Postdoctoral Fellow, CUNY

- **Ryan Schwarz** (advisor Sarah Glaz); August 2011
  “Zero-Divisor Conditions in Commutative Group Rings”
  Lecturer, SUNY New Paltz

- **Hui Shan** (advisor Jeyaraj Vadiveloo); May 2012
  “Managing a Portfolio of Life Settlement Policies”
  Senior Consultant, Deloitte Consulting

MATH DEPARTMENT TA TRAINING PROGRAM

Sarah Glaz, Graduate Director for Instructional Development

A large share of the lower division courses offered by the mathematics department is taught by graduate student TAs. This past academic year, we offered 14 courses at or below the differential equations level. Seven of these courses were taught in large lectures with enrollment of 150 to 200 students per lecture. The rest of the courses were taught in 125 sections with average enrollment of 32 students per section. TAs taught 70

Entering graduate students start their TA training in the week before the beginning of the fall semester with a bonding and pedagogy-learning lunch, followed by faculty-mentored sessions of teaching practice. The TAs continue in a semester-long mathematics pedagogy
course which was taught this year by Professor Amit Savkar. In addition, each new TA was paired with an experienced TA who volunteered to act as a mentor for the entire first year.

One of the most successful initiatives of our TA program was the institution of classroom observations and individual teaching consultations for all first year TAs. This practice, which involves a considerable investment of time, was by necessity scaled down, due to budget cuts.

In spite of the strain imposed by budget cuts, we continued our efforts to support our graduate student TAs in the performance of their teaching duties. This support is particularly crucial for first-year TAs, who are often fresh out of college and have no prior teaching experience. Our support is geared towards helping the TAs balance their teaching duties and student responsibilities in a way that neither suffers. Our support is also geared towards improving their classroom performance to the benefit of their students, and the benefit of the teaching component of their future careers as mathematicians.

In addition to general pedagogical support, most of the lower division courses taught by TAs were coordinated by faculty, providing TAs with course specific support.

Our website http://www.math.uconn.edu/Graduate/TAProgram/taprogram.php, updated every semester, is geared towards helping the TAs with all aspects of their teaching that can be placed online. It also includes sections useful for course coordinators, postdocs, and new faculty.

The TA Program extends its teaching support to experienced TAs who need assistance with teaching issues. Graduating TAs receive support with the teaching component of their job applications, including teaching recommendations and help with composing teaching statements.

Our efforts and our TAs' natural talents rewarded us with a successful year of teaching. All indications, including student evaluations of teaching, show that the quality of instruction provided by our TAs exceeds all expectations.

**MASTER’S PROGRAM in APPLIED FINANCIAL MATHEMATICS**

Jim Bridgeman, Director

The master’s program in applied financial mathematics, a joint offering of the Departments of Finance, Statistics, and Mathematics that is administered by the math department, continues to grow. We had 25 students this past year (10 new and 15 returning). There will be 25–35 students this coming year, including 15–25 new students (out of 170 applicants, up twenty-five percent).

Last year we became an affiliated academic program member of the International Association of Financial Engineers (IAFE). This assures access for program participants to the IAFE career fair and advanced seminars in New York, and access for faculty to key IAFE events. A local financial engineering practitioner, Ed Perry, took over as instructor for the stochastic finance course (Advanced Financial Mathematics), which has moved to a twice-yearly offering. Ed’s involvement adds a sharply realistic focus to that course and also frees up resources for us to offer a 3-credit Yield Curve Models course on a regular basis starting next spring.
UNDERGRADUATE PROGRAM

In the 2011-2012 academic year, our department had about 550 undergraduate majors and 111 of them graduated.

NEW MATH–PHYSICS TRACK APPROVED

We currently have four tracks in the major: math, applied math, math–statistics, and actuarial science. A fifth math–physics track, run jointly with the physics department, has been under discussion for several years and it reached final approval this summer. We look forward to offering this additional option in Fall 2013.

THE REU PROGRAM

Dan Kelleher

For the fifth summer our department hosted an NSF-supported REU program in which a group of undergraduates worked on mathematics research projects. In previous summers there was one research project and 5 or 6 students. This summer there were four projects (algebraic geometry, analysis on fractals, mathematics education, and stochastic analysis) and 9 students: Jed Chou (Arizona State), Nikhaar Gupta (Berkeley), Max Margenot (UConn), Cathy Matta (Cabrini College), Jason Marsh (UConn), William Oakley (NC State), Becky Simonsen (Columbia), Ben Whitney (Harvard), and David Wierschen (UConn). In the photo below are David Wierschen and Becky Simonsen, who worked on a project about Lyapunov exponents of stochastic processes.

Every week the students met to discuss what they were working on. On Fridays there was a weekly seminar where students heard talks on different topics in mathematics, how to use LaTeX and Mathematica, and a panel on applying to graduate school. Our students presented their research at Mt. Holyoke and at the Young Mathematicians Conference at Ohio State University; Jed Chou took home third prize for his presentation at OSU. You can read more on the web page http://homepages.uconn.edu/~emm11019/REU2012/.

Faculty involved in the program were Fabiana Cardetti, Masha Gordina, Milena Hering, and Sasha Teplyaev. The program was coordinated for the most part by graduate students Elise Villella and Dan Kelleher, and research was overseen by Kelleher along with fellow graduate students Alex Baldenko, Gabe Feinberg, and Becca Tramel, as well as postdoctoral
fellow Jay Wilkins. The undergraduates received funding from UConn’s SURF grants and from Hering’s and Teplyaev’s NSF grants.

THE UCONN MATH CLUB
Keith Conrad, Faculty Advisor

This year the Student Activities Office created a centralized website, called UConntact, for all student organizations. The math club’s UConntact page can be seen at http://uconntact.uconn.edu/organization/math_club. At the Photo Gallery link in the left margin of that page you’ll find a photo album with the math club’s yearbook photos from the 1930s and 1940s. The first yearbook photo, from 1933, is below. From searching through the old yearbooks online we learned that the math club was founded on May 11, 1932, so this past spring was its 80th anniversary.

One of the more popular talks in the math club this year, by Sujit Nair from United Technologies, discussed mathematical ideas used in data mining, e.g., the Netflix prize problem.

At the end of the spring semester there was a panel discussion on preparing for graduate school in mathematics. This panel had met in the fall semester in the past, but the spring was chosen this year to provide more timely advice to rising seniors.

Student officers this year were Antoni Brzoska (president), Stacy Roberts (vice-president), and David Wierschen (treasurer).
ACTUARIAL SCIENCE PROGRAM
Jim Trimble and Michael Braunstein, Directors

The University of Connecticut’s actuarial science program continues to be recognized as one of the best in the world, as the Society of Actuaries renewed our designation as a Center of Actuarial Excellence. Only 23 programs (14 in the United States) currently qualify for this distinction, and it helps our program attract high quality students. Actuarial science was the second most popular major among incoming freshman honors students who had declared a major. Several UConn students were awarded prestigious and highly competitive national scholarships in the past academic year. Among our undergraduates, Tracy Margiott received a John C. Wooddy scholarship, Danielle Gilmour received a Casualty Actuarial Society Trust Scholarship, and Justin Teal and Micah Todd were awarded Derek Hughes/NAPSLO Educational Foundation scholarships. Our first-year actuarial science Ph.D. student Wenyuan Zheng was named a James C. Hickman Scholar.

In August 2011 we hosted the 46th Actuarial Research Conference, an event that focused on the academic frontiers of actuarial science and its business applications. There were 154 participants, including 47 practicing actuaries, which is an unusually high proportion of practitioners for an academic conference. Our hosting of this meeting relied on the support of industry sponsors, the Actuaries Club of Hartford/Springfield, the Society of Actuaries, the Casualty Actuarial Society, and the Actuarial Foundation.

ONLINE TEACHING
Amit Savkar

This summer I offered a fully online version of Math 1070 (Math for Business and Economics) during the second summer session, which lasts six weeks. My course was designed to be equivalent, in terms of what students learn, to a traditional course taught during the regular semesters. The course was divided into several modules.

- The students looked at a video on a specific topic. These videos were made using smart boards, voice-overs, and Camtasia (software that allows recording of the screen from a smart board). To make students more involved when watching the videos, quiz questions were included that assessed student understanding before they could proceed to the next part of the video.
- Students read sections of the textbook.
- Homework problems, which used an online homework system (WebAssign). Quizzes were also assigned to the students through WebAssign, and the quiz questions were randomly selected from a pool of homework questions. This allowed me to assess how well the students understood the homework.
- Office hours. These were run using software called Collaborate, which allows students to ask questions in real time, and with a tablet PC I wrote out the solutions to the questions in real time. The software was able to handle 20 students online simultaneously, and students could “raise” their hands at any point by pressing a button on their keyboard.

As in a traditional version of Math 1070, there were two midterms and one final exam, which were all proctored in person. The students had to take the exam on campus or at a registered testing center, such as Sylvan. I conducted a live review session before each exam using Podcast technology. The students could see the review session and ask questions in real time, as with the online office hours. For those who could not login during the time of the review session, a recorded version was provided through HuskyCT.
Student assessment of the course was conducted each week with surveys, which asked questions about different aspects of the course: the learning objectives, the material covered in the videos, the quizzes in the videos, online office hours, and so on.

The exams used in this course were nearly identical to the ones used in a 2009 traditional course, in order to test the effectiveness of the online teaching compared with traditional teaching (by the same instructor). The results on these exams in 2009 and 2012 are in the table below.

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<tbody>
<tr>
<td></td>
<td>Midterm 1</td>
<td>Midterm 1</td>
<td>Midterm 2</td>
<td>Midterm 2</td>
<td>Final</td>
<td>Final</td>
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<tr>
<td>Average</td>
<td>80.2</td>
<td>83.7</td>
<td>79.5</td>
<td>78</td>
<td>80.2</td>
<td>74.6</td>
</tr>
<tr>
<td>Median</td>
<td>85</td>
<td>85</td>
<td>84</td>
<td>81</td>
<td>82</td>
<td>74</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>15.2</td>
<td>10.9</td>
<td>15.7</td>
<td>16.3</td>
<td>19.8</td>
<td>15.7</td>
</tr>
</tbody>
</table>

There were 216 students in the 2009 course and only 14 in the 2012 online course, so the online sample size is not big enough to run any meaningful statistics, but is nevertheless notable that the midterm exams had similar averages in 2009 and 2012. Unfortunately the average for the final exam dropped significantly, and I am still investigating possible reasons for this drop.
ALUMNI NEWS

Here are messages from two of our alumni about their experiences and future plans. If you have news that you’d like to share, please let us know by emailing one of the editors of this newsletter (email addresses are on the last page).

Adam Gamzon

I received my Ph.D. in mathematics from UMass Amherst this past spring. As an undergraduate at UConn, I participated in an REU on computational topology in 2005, between my junior and senior years, and wrote a senior thesis in number theory while taking the first-year graduate algebra sequence. My interest in number theory developed further in graduate school, where I wrote a Ph.D. thesis about abelian surfaces under the direction of Tom Weston, which earned the department’s Distinguished Thesis award. The thesis problem was a generalization of a result of Weston and Chantal David about elliptic curves (abelian surfaces are two-dimensional analogues of elliptic curves).

At UMass I was a mentor to younger graduate students in several ways. I founded a graduate student reading seminar on number theory, ran review sessions for qualifying exams in algebra and complex analysis, and helped first-year graduate students transition to graduate school and the Amherst area (although, with the exception of my first year, I lived in West Hartford throughout graduate school). My teaching assignments were introductory calculus and linear algebra courses, and I regularly thought about ways to improve my teaching. For example, inspired by the success of the website MathOverflow, a Q & A site for research mathematicians, I developed an online message board for my own classes that would allow students to ask and answer each others’ questions. In 2009, UMass awarded me a Residential First Year Experience Student Choice Award. A calculus student of mine nominated me because of my stimulating style of lecture, that generated interest in the subject.

My time in graduate school was simultaneously the most challenging and the most rewarding period of my life so far. I experienced the intense high of getting married after my first year of graduate school (my wife and I are in the photo above, on a trip to Israel last year) and the intense low of losing my mother at the end of my fourth year. These experiences, coupled with the demands of teaching and of in-depth mathematical study caused me to undergo personal reflections about why I wanted to study mathematics and helped me to determine career goals. Moreover, through the medium of our shared love of
mathematics, I have formed potential life-long friendships with colleagues that include both graduate students and professors.

I will begin a two-year Fulbright research fellowship in Israel this fall, sponsored by Ehud de Shalit and David Kazhdan at Hebrew University. During this time, I plan on branching out from my Ph.D. research to analyze a question about modular Galois representations that is related to the work in my thesis. In addition to this, I want to help organize a session at a conference planned for 2014 jointly sponsored by the American Mathematical Society and the Israel Mathematical Union.

David Lindsay

During my first two years at UConn (as a Physiology and Neurobiology major), I enrolled in the Advanced Calculus sequence. Taught by Professors Abikoff and Blei, Advanced Calculus was far more than “integrate this, differentiate that.” We rigorously defined the real numbers, convergence, and continuity, and applied these concepts to the results taught in a traditional calculus course. At the end of four semesters I was hooked on math, and that fall I enrolled in graduate abstract algebra.

The course was significantly harder than classes I had taken in the past, but the instructor, Professor Hering, was understanding and encouraged me to study harder to understand the material. At some point, it occurred to me that if I took four more graduate classes and wrote a thesis, I could get a masters degree. I approached Professor Blei, then graduate director, and proposed the idea. He gave his stamp of approval and I asked Professor Hering if she would consider advising a masters thesis. We agreed to study chip firing and I began meeting with her once a week to develop a suitable topic. Two years, four more courses (in algebra, real and complex analysis, and geometry/topology), and many thesis drafts and boxes of multicolored chalk later, I received two degrees from UConn: an undergraduate degree in the spring and a master’s degree this summer. Now I am at the University of Pennsylvania in my first year of an MD/PhD training program studying bioengineering with a focus on biomedical imaging. I hope to apply machine learning to problems in radiology with a goal of improving computer aided diagnosis and surgical planning.
DEPARTMENT NEWS
MSB RENOVATION

When President Herbst visited us in January we explained to her, in words and pictures, the state of our building. She of course saw on her own the unattractive exterior scaffolding, but we pointed out our frequent water leaks, heating and cooling problems, and other difficulties. In August President Herbst announced the search for an architect to design a new master plan, with particular attention to repairing MSB. You can read her comments in an article in the Hartford Courant on Aug. 15, 2012. So far the main change is a colorful tarp placed over the scaffolding (see photo below), but we have heard that the brickwork on MSB will be replaced this year.

Our department is facing an office shortage, and one idea we are considering to alleviate the problem is to move our department journal collection over to the main library (nowadays our faculty and graduate students prefer to access research articles electronically rather than from hardbound volumes), convert the room containing these journals into a hi-tech colloquium room, and convert our current colloquium room into several new offices.

MCCABE LECTURE

For the last three years the math department has held an annual Lecture in Entrepreneurship & the Mathematical Sciences, supported through a generous donation of Thomas McCabe. The first McCable lecturer, in 2010, was Harold Schwenk, who talked about applications of queuing theory to business. In 2011 the lecturer was Cleve Moler, who talked about the evolution of MATLAB. This year’s lecturer was Ray Sidney, who talked about the early days of Google (he was their second software engineer). After Sidney’s talk, he and McCabe took questions from the audience.

In the photos below, Ray Sidney giving his talk is on the left and Tom McCabe and his wife Linda are on the right. The photos were taken by Tina Covensky.
AWARDS DAY

Our Awards Day was on April 26th, 2012. After brief remarks by CLAS Dean Jeremy Teitelbaum, Professor Emeritus Stuart Sidney was the master of ceremonies.

Briana K. Hennessy, Robert K. Janes, Kevin T. Landry, Aaron J. Palmer, and Benjamin Robert Root were initiated into Pi Mu Epsilon, the national mathematics honor society.

The Bernard Sippin ’52 scholarship was given to Jonathan Bruneau and Anthony Quarella.

The CIGNA Award for Outstanding Actuarial Science Major went to Brian Basiaga.

Christopher Adams was named the ING Actuarial Graduate Program Scholar.

Ushani K.M.G. Dias and Matt Lamoureux received the Louis J. DeLuca Memorial Award for being Outstanding Teaching Assistants.

David Ferrone received the Connie Strange Graduate Community Award.

Antoni Brzoska received an award for Outstanding Performance in the William Lowell Putnam Competition.

**Calculus Competition**
- First Place Overall (tie): Antoni Brzoska and Scott Norton
- First Place Intermediate: Yu Zhang
- Second Place Intermediate (tie): Tyler Silber and Elizabeth Tripp
- Fourth Place Intermediate: Aaron Carta
- First Place Beginner: Yu Zhang
- Second Place Beginner: Elizabeth Tripp
- Honorable Mention Beginner (tie): Russell Bentley and Hannah Tripp

The lecture following the ceremony was “Square Values of Polynomials”, by Professor Michael Zieve of the Univ. of Michigan.
STU’s PUZZLE CORNER

Stu Sidney

Cheating With A Die

A gambler plans to cheat with an unbalanced die. (A die is a cube whose faces are numbered 1 through 6. It is balanced if when it is rolled, each of the six numbers has the same probability 1/6 of appearing on top; otherwise it is unbalanced.) In the game in question, the payoff is based on the total showing on the tops of two rolls of the die.

Not being “the sharpest knife in the drawer,” as my daughter would say, he figures he will use brute force to estimate the probability of each total, from a minimum of 2 to a maximum of 12. On his computer he sets up a grid with the numbers 2 to 12 across the top and the numbers 1 through \( N \) going down, where \( N \) is the (very large) number of times he will roll the die twice. He will mark a check in the \( k \)th box of the \( j \)th row if his \( j \)th double roll gives a total of \( k \). At the end, he will figure that the probability of getting \( k \) is the number of checks in the \( k \)th column divided by \( N \).

He runs the experiment (\( N \) iterations of the double roll) and puts in all the right checks. Before he can see how many checks are in each column, a software glitch kills all the columns except those numbered 3, 5, 10, 11 and 12. So he is able to estimate the probabilities of these totals:

\[
P(3) = \frac{1}{18}, \quad P(5) = \frac{7}{108}, \quad P(10) = \frac{17}{144}, \quad P(11) = \frac{1}{18}, \quad P(12) = \frac{1}{9}.
\]

(I told you, lots of repetitions.) I’ll bet you can help the cheater out by figuring out the value of, say, \( P(7) \), at least if you’re allowed to assume that the five values given above are exact and the additional information that the probability of getting each of 1, 2, 3, 4, 5, 6 on a single roll is a rational number.

Please keep in touch. Offer suggestions or solutions via e-mail to sidney@math.uconn.edu.
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Editorial Staff

Keith Conrad kconrad@math.uconn.edu
Wolodymyr R. Madych madych@math.uconn.edu

Department of Mathematics
The University of Connecticut
196 Auditorium Road, Storrs, CT 06269-3009

Phone: (860) 486-3923
Fax: (860) 486-4238