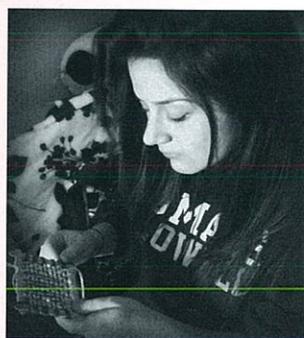


## Connections Between Mathematics and Arts picking up STEAM

**W**hen John Maeda, the president of Rhode Island School of Design, was recently asked about Steve Jobs' impact on design, he commented that Steve had added Arts to the STEM subjects, Science, Technology, Engineering and Mathematics, turning STEM to STEAM. Shelley Rasmussen has been contributing to this trend in recent semesters. Here is a report on her most recent STEAM activity.



Math Major Betty Makovoz



Aysha Mirie practicing origami

Mathematics majors Betty Makovoz and Adam Lanoue are collaborating with Mathematics Professor Shelley Rasmussen and the Revolving Museum in Lowell to design mathematics-and-art projects for students ages 12 and up. Also participating is psychology graduate student Aysha Mirie, daughter of Mathematics Professor Rida Mirie.

The Revolving Museum offers many after-school enrichment activities for kids, with the philosophy that the arts can improve, enrich and even save lives.

Adam and Aysha are looking into the connections between origami and mathematics. Betty is investigating how weaving can illustrate mathematical ideas. This fall, the kids at the Revolving Museum will design and construct creations from paper and/or yarn based on the themes developed by Betty, Aysha and Adam. These creations will then be combined into a chandelier-type of mobile for public display.



Adam Lanoue practicing origami

## UMass Lowell selected for UTeach Replication

**U**Mass Lowell has recently been selected from among several universities in Massachusetts to be the exclusive site for replication of a highly successful program for the preparation of STEM teachers. UTeach, which originated at the University of Texas in 1997, has been acclaimed as a model for training teachers in the areas of Science, Technology, Engineering, and Mathematics (STEM). As of 2011, eleven UTeach programs had been launched nationwide. UMass Lowell will add to this number, starting with a small cohort in the spring of 2012 and a full cohort of at least 40 students per year within two years.

The program will have three co-directors, Anita Greenwood (Education), Ken Levasseur (Mathematical Sciences), and David Kazmer (Engineering). The program builds upon a bachelor's degree in science or engineering with a series of unique courses that prepare students for the classroom. Among the features of the program are

- Early recruitment of students beginning in the freshman year.
- A network of personal, academic, social and professional support to promote retention.
- A mathematics course geared toward Knowledge for Teaching Mathematics.
- Utilization of experienced master and mentor teachers who model best practices.
- Early and on-going guided field experiences with diverse student populations.
- Structured assessments that involve students in an on-going self-assessment of their own professional growth and development.
- A network for continuous professional development of program graduates.

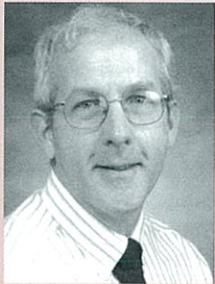
We look forward to the full implementation of the program with hopes that it makes a positive impact on the educational system of the region. For a sense of what is to come, the UTeach program web site U. of Texas Austin is <http://uteach.utexas.edu/>.

The fall semester is well under way, and Sunnycrest Farm in Londonderry is pressing the best apple cider this side of Rigel IV. All is right with the world.

Congratulations to Zahra Fardmanesh-Karimy and Chuck Ormsby, the 2011 winners of the Department of Mathematical Sciences Teaching Excellence Awards.

Congratulations also to Marvin Stick, winner of the Student Government Association's Exceeding Expectations Award for excellent teaching.

Jim Propp has been awarded the very prestigious Chancellor's Professorship at UC Berkeley for the spring 2012 semester. This visiting professorship will permit him to participate in a special semester at the Mathematical Sciences Research Institute on random spatial processes, while also teaching a graduate course in this area. Congratulations, Jim.



Steve Pennell

Congratulations to Enrique Gonzalez-Velasco, whose book *Journey Through Mathematics: Creative Episodes in Its History* was recently published by Springer Verlag.

Alex Olsen has been inducted into the Chelmsford High School Alumni Association Hall of Fame. Congratulations, Alex.

Congratulations to spring and summer graduates Andrew Balchunas, Joshua Bodah, Adam Boudreau, Bryan Crompton, Katlyn Deluca, Olivia Ellis, Carissa Gray, Thomas Harrington, Thomas Haynes, Fabrice Kamayou, Rich Lee, Melissa Levicki, Angus MacDonald, Jeffrey Michael McGrath, Eva Moscat, Joseph Nickerson, Daniel Pina, Jeanne Reed, and Amanda Webb.

Bryan Crompton had the highest GPA in the College of Sciences at the May 2011 commencement. He is now enrolled in the doctoral program in the Department of Mathematics at the University of Wisconsin – Madison.

The team of Joshua Bodah, Brendan DeCourcy, and Michael McGuinness earned Honorable Mention for their entry in last spring's Mathematical Contest in Modeling run by COMAP, the Consortium for Mathematics and Its Applications. Congratulations to the team and their coach, Kiwi.

Last May 6 we held our annual Alumni/Awards dinner at the Inn and Conference Center. Joanna Sutton, Owen Welsh, and Michael Lunderville were awarded Arthur S. Zamanakos scholarships; Stephanie Quintal and Matthew Brady were awarded Bernard and Yana Shapiro scholarships; Michael Strain won the Richardson-Bedell scholarship; and Jamie Muntz was awarded the Mary Hall Prize for best performance in Calculus I. Corey Cheever was named Outstanding Graduate Student. Corey has completed his MS degree and is now teaching at Lawrence High School.

Enrollment continues to rise, as does the number of math majors: we now have 147 undergraduate math majors. We are fortunate to have several new adjunct faculty members in the department this fall to help us staff the additional classes we offer. Welcome to Indu Anand, Abdeslam Elhajjajy, David Gleason, Faize Jamil, Richard Kaufman, Anzhi Li, and Kyung-Taek Lim. Professor Anand used to be a full-time faculty member in the department. Welcome back, Indu.

Best wishes for an enjoyable fall season, and early wishes for a happy holiday season. Please keep in touch, and stop in to visit the next time you are in the area. Remember to check out our web site for items of interest. Check out *Cotangents*, our new blog: <http://blog.uml.edu/cotangents/>

## The *Tangents* Problem

Since no solution to the Grasshopper Puzzle (see below) have been received, Prof. Propp has offered a hint in the form of a related but simpler problem that will be the problem for this issue.

Imagine  $2N+1$  coins laid out on a line, with one coin at each integer between  $-N$  and  $N$ . Start by pointing at the coin at 0 with your left index finger, and then iterate the following rule: use your right hand to turn over the coin that your left hand is pointing at, and then move your left hand either 1 step to the right or 1 step to the left according to whether the coin you just turned over shows Heads or Tails. Eventually you will be pointing at either  $N+1$  or  $-N-1$  (where there is no coin, so the game ends). In the case where you end up pointing at  $N+1$ , what can be concluded about the net increase/decrease in the number of coins that show Heads, from the start of the game to its end? What about in the case where you end up pointing at  $-N-1$ ?

### The Grasshopper Puzzle. (The Spring 2011 problem)

A grasshopper starts on the number line at 3. When she's at position  $k$  (with  $0 < k < 10$ ), she steps either one position to the left or one position to the right. More specifically, if she's never been to position  $k$  before, she steps randomly; but if she's been to position  $k$  before, she does the opposite of what she did the last time she was at  $k$ . When the grasshopper reaches either position 0 or position 10, she hops back to position 3 in a single jump.

Show that, when the grasshopper hops (from position 0 or position 10) to position 3 for the 10th time, she has visited position 0 exactly 7 times and position 10 exactly 3 times.

Up to four correct solutions from among all that are submitted by February 1, 2012 will earn the solver a "UML Math" T-shirt. You may submit your solution to [mathematics@uml.edu](mailto:mathematics@uml.edu) or mail it to Ken Levasseur, Department of Mathematical Sciences, North Campus/Olney Hall, UMass Lowell, Lowell MA 01854.

## From the UMass Lowell College of Arts and Sciences Blog

# Propp awarded Chancellor's Professorship at UC Berkeley

By Fred Martin

**P**rof. James Propp of the Mathematical Sciences Department has been awarded the 2011–2012 Chancellor's Professorship in Mathematics at the University of California, Berkeley.

Propp will teach a graduate course in the mathematics department while conducting research at the Mathematical Sciences Research Institute (MSRI). His course will focus on recent advances in the theory of random surfaces and the theory of random aggregation. Many of the researchers who contributed to this work will also be in residence at MSRI, and he is excited at the prospect of serving as a liaison between those visiting researchers and the Berkeley graduate students taking his course.

Prof. Propp also plans to organize and host an evening presentation open to the public, showcasing the visual beauty of this branch of mathematics.

Propp says he fell in love with Berkeley (the university and the city) when he did his graduate work there in the 1980s, and says he is delighted that the Math Department has invited him to return in such an honored capacity. He noted that "my kids are really excited that they'll get to go to the Exploratorium again next year."

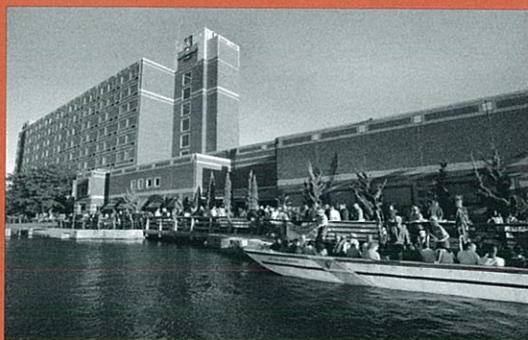
## 2011 Alumni-Awards Banquet

### Next Banquet set for May 4, 2012

The 2011 Alumni-Awards Banquet was held at the UMass Lowell Inn & Conference Center on May 6. Attendees included Dean Tamarin, alumni, students, staff, and faculty. Attendees came to wine, dine and congratulate our 2011 scholarship winners. Each award winner was given a book prize and certificate in addition to a stipend. The following awards were announced.

- Outstanding Graduate Student: Corey Cheever
- Mary Hall Prize winner: Jamie Muntz
- Richardson-Bedell Scholar: Michael Strain
- Bernie and Yana Shapiro Scholars: Stephanie Quintal and Matthew Brady
- Arthur Zamanakos Scholars: Joanna Sutton, Owen Welsh and Michael Lunderville

The 2012 Alumni Reception/Awards Banquet will be on May 4 at the UMass Lowell Inn & Conference Center on 50 Warren St., Lowell. All alumni are welcome to attend. Visit <http://faculty.uml.edu/math> for details.



## UML Mathematical Sciences Online

Have you visited Mathematical Sciences web page lately? Our address is <http://faculty.uml.edu/math>

Have you lost your past issues of *Tangents*? Go to the alumni section of the UMass Lowell Math web page for links to back issues.

You can follow us on Twitter:  
<http://twitter.com/UMassLowellMath>.

Steve Pennell, Chair

Writers: Ken Levasseur, Ann Marie Hurley, Dan Klain, Ravi Montenegro, Guntram Mueller (emeritus), Alex Olsen, Raj Prasad, Jim Propp, Marvin Stick

*Tangents* is produced biannually by the Publications Office for the Department of Mathematical Sciences. Your comments are welcome.

## Alumni Update

**Dana Peterson** (B. S. 1960, Lowell Tech) writes...*My first job on graduating from LTI in 1960 was with IBM in Endicott, New York. My LTI Physics and Math education prepared me so well for my entrance into the professional realm. Further I have always been totally proud of the super education I received at LTI, and all the teachers who guided and taught me. I was further blessed with my opening association at IBM which miraculously introduced me into optics, the field where I happily remained—through employment in Bausch and Lomb, General Motors, and Eastman Kodak, where I worked for 28 years until I retired in 1991.*

**Sharyn Walczewski** (M. S., Mathematics, 1994) retired in June 2011 from public school teaching in Lexington MA, with 25.5 years of service. She is presently tutoring mathematics (grades 5-12) in the Acton area.

**Hugo Guerra** (B. S., Mathematics 1995, M. S.;Mech. Engineering, 2007) Married to Yvette Guerra (BS in accounting and Finance, Class of 1995) and they have three children. Hugo is currently Senior Process Engineer (OE) with Shire HGT in Lexington, MA.

**Richard Reddy** (B.S. Information Systems, 2002) recently completed an M. S. program in Applied Physics at UMass Boston, delivering a thesis on Semiquantal Analysis of Bose-Einstein Condensates.

**Charu Gupta** (M. S., 2010) writes...*I was a graduate student in Mathematics department with the probability and statistics option. I graduated in spring 2010 with the GPA of 4/4. I have been working in a pharmaceutical company in Lexington, MA as a biostatistician/SAS programmer since then.*

## Thanks For the Contributions!

Our thanks to all who have contributed to the Department of Mathematical Sciences over the past few years. Your generosity has allowed us to make purchases, award scholarships, and engage in activities that would otherwise have been impossible.

Many of you have responded generously to fundraising contacts. These contributions can benefit the Department of Mathematical Sciences directly if you specify that you wish to have your gift directed to Mathematics. Otherwise it will provide valuable assistance to the University at the College level.

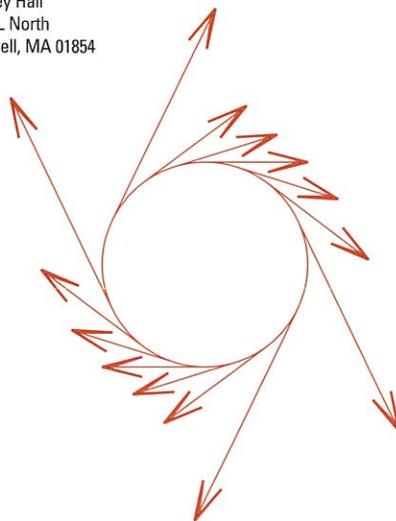
## What Are You Up To?

Want to keep your classmates up to date on what you're doing and where you are? Take a few moments to tell us where you are, and whatever else you might like to share.

We can be contacted by mail at Department of Mathematical Sciences, North Campus, UMass Lowell, Lowell MA 01854. Telephone: (978) 934-2410. Email: [mathematics@uml.edu](mailto:mathematics@uml.edu)

You might also wish to contact our Office of Alumni Relations, Southwick Hall 250, UML North, Lowell MA 01854-3629. Toll free telephone: (877) UML-ALUM. Email: [Alumni\\_Office@uml.edu](mailto:Alumni_Office@uml.edu)

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