



MATHEMATICS

Student Newsletter

Vol.15

Fall '10

Welcome New Faculty Member

The Mathematics Department is welcoming another new faculty member this year. Here is a little about her, in her own words.



Dr. Jenni McCool: I was born and raised in West Central Illinois and earned a B.S. in Mathematics from Western Illinois University. I then taught high school mathematics for the next seven years during which I earned a M.S. in Education from Western Illinois University. I thoroughly enjoyed teaching at the high school level but over the years began to feel the need

to learn more about how mathematics was being taught at the primary level.

Thus, I made the decision to quit teaching and return to school to learn more about elementary mathematics education. I earned my Ph.D. in Mathematics Education from Illinois State University in 2009. I enjoy teaching pre-service teachers and working with practicing teachers and their students. There is so much we can learn about students and how they best learn mathematics!

My family and I relocated to the La Crosse area this past year and have fallen in love with this part of the country. My husband and I along with our two sons, ages nine and five, enjoy the wide variety of activities the area has to offer. Besides my love of mathematics and teaching, I enjoy camping, hiking, and reading. I look forward to meeting all of my new students here at UWL!

Student Activities

Cassandra Jens, a statistics emphasis math major with a biology minor, worked with Dr. Allen this

summer as part of the Wisconsin Alliance for Minority Participation (WiscAMP). She investigated mathematical models involving the spread of a zombie infection amongst a human population. In a recent paper by Munz, Hudea, Imad, and Smith (2009), the authors studied models based on the SIR model with linear mass action transmission and determined that with the introduction of a zombie infection into a population, the infection will overtake the healthy population.

We changed the SIR model to use non-linear mass action transmission, and found that under certain circumstances the human population can survive a zombie infection. We numerically analyzed local bifurcation structures of the system and determined the point at which the human population can survive a zombie outbreak. Cassandra presented our results at the Fourth Annual Research Poster Session August 5th. We are currently writing a paper of these results to be submitted to *Involve*, the MAA journal for undergraduate research.

Jason Rubbert, a statistics emphasis math major, was awarded a Dean's Distinguished Fellowship for this past summer. He worked with Dr. Toribio to develop a statistical method to access the goodness-of-fit of N-mixture models using Bayesian approach. These N-mixture models are used in estimating animal abundance and are being used by agencies like the US Geological Survey to monitor bird populations. Jason will be continuing his research on this topic this school year and will receive \$2000 as part of a Faculty Research grant received by Dr. Toribio.

Constance Sutter received a Dean's Distinguished Summer Research Fellowship for this past summer. She worked on a mathematical biology research project with Dr. Peirce. During migratory seasons, many waterfowl feed on snails from the Upper Mississippi River. Frequently these snails harbor

parasites that lead to mortality in approximately 5,000 – 20,000 waterfowl each year. To successfully devise an intervention strategy, Connie determined the stages in the parasites' life cycle that contribute the most to the total number of waterfowl die-offs. This was done by studying the value of partial derivatives representing the sensitivity of the total die-offs to model parameters. Her knowledge of linear algebra, differential equations, and *Mathematica* came together to produce results that can be used by local biologists.

Raymond Leach worked on an interdisciplinary research project with Dr. Wendt last year. Their project involved modeling the effects of global and regional trade organizations on international trade patterns. Ray's model improves upon existing models by addressing two concerns that are not addressed by current models and suggests that the benefits of membership in trade organizations are felt most greatly by countries whose internal infrastructure is robust enough to handle the demands of international trade.

Ray presented his work at the National Conference for Undergraduate Research in Missoula, MT and at the 2010 International Studies Association Convention in New Orleans, LA. Ray and Dr. Wendt plan to submit their results for publication this fall.

Ryan Haunfelder, a senior in the math with statistics emphasis program was selected to participate in the Dean's Distinguished Fellowship program during the past summer. The Fellowship provided funding for Ryan to work on a research project related to statistics.

Ryan presented the results of his research at the 4th annual summer SAH poster session on August 5th. Drs. Bennie and Elfessi served as faculty mentors for Ryan's summer research. Ryan has received funding through a grant from CURM (the Center for Undergraduate Research in Mathematics) to continue with related research in the 2010-11 school year along with fellow math majors Maria Jansen and Cassy Jens. Ryan is currently working on applications to graduate programs in statistics for the 2011-12 academic year.

Students Head to Graduate School

Michael K. Brown graduated last winter with degrees in math and philosophy. He is starting

graduate school in mathematics at the University of Nebraska. He will also be a TA there.

Amanda Welter graduated from UW-L in May 2010. She majored in math with statistics emphasis and music. This fall she started the PhD program in statistics at North Carolina State University in Raleigh, NC. On top of classwork, she has gotten the opportunity to be a research assistant working in the biostats department at Duke University (This is funding her graduate education!). She loves everything about North Carolina - the weather, the faculty, the department, her fellow classmates, and being surrounded by STATISTICS all the time!!! (If you're looking to get out of WI for a few years, it's a great place to be!) Although she loves North Carolina, she misses La Crosse a lot!! She misses the small department, the faculty, and all her math and stat friends! When she finishes her PhD she hopes to become a professor at a small teaching college somewhere in the midwest...She'd really like to come back to La Crosse and teach!

Raymond Leach joined the Ph.D. program in Economics at Claremont Graduate University in Claremont, California.

Trevor Oswald graduated from UW-L in December 2009. He majored in math with statistics emphasis and minored in computer science. This fall he started the PhD program in statistics at the University of Missouri-Columbia. Trevor is a TA for three recitation periods of STAT 1200 "Introductory Statistical Reasoning." He says it is a really good and challenging experience...to see what it's like on the other side of the classroom. What Trevor misses most about UW-L is being close to most of his best friends, and all of the fun that they had in the Statistics department between kick sphere or bowling for primes. He says that what he probably likes most about his new location, which he hasn't gotten to experience yet, is the small amount of snow that falls during the winter. After graduating Trevor would like to get a corporate job, and then eventually get into teaching.

Dylan Lukes graduated from UW-L in May 2009 with majors in statistics and economics. Dylan recently returned to Wisconsin from Edinburgh, Scotland. Dylan spent the past year studying at the University of Edinburgh where he earned a master's degree in economics. Dylan was pleased to find

that his graduate work in economics drew heavily on his background in statistics. Dylan was the 2009 recipient of the outstanding senior in math award.

Jonathan Coblentz graduated from UW-L in May 2009. He majored in math with an emphasis in applied and minored in economics. This fall he started the PhD program in applied math at Arizona State University. He's a TA and his duties include grading for a differential equations course and tutoring for upper undergraduate level math courses. Arizona is great so far, there's lot's of great hiking around and plenty of good restaurants. He's hoping in the near future to teach mathematics at a university similar to La Crosse.

A View from the Trenches

With so many of our students now attending graduate school, we thought you might enjoy hearing what things are like from their point of view. Here are a few words from **Jared Hart**, a May 2008 graduate currently attending graduate school in Kansas.

"I graduated from UW La Crosse in May 2008. I moved to Lawrence, Kansas in August 2008 for graduate school, and I am in my third year of graduate studies in the University of Kansas Mathematics Department. I work as a teaching assistant for the math department that pays my tuition and a stipend for living expenses. Last spring I received a masters degree and I am now working towards a PhD. I hope to graduate in another two years. My area of study is Fourier and harmonic analysis.

There are some things that are good to consider when choosing a where to go to graduate school. It is a good idea to visit the school and look for a couple things. It is important that you get along well with the faculty since you will be working with them a lot and choosing from them for an adviser. It is also a good idea to look around the city. Check out the cost of living and make sure it is a place that you would like to live. It is also important that you are offered a teaching or research assistantship through the university. Graduate school tuition is very expensive and it is not common for a math graduate student to pay their own tuition.

Graduate school is a challenging experience, but it is fun and rewarding as well. If you enjoy learning and the college student lifestyle, graduate

school will be a lot of fun for you. It is an exciting experience that is a lot like going to college for the first time again."

UW-L Math Teams Earn High Honors in International Contest

This February, eight teams of UW-L students participated in the annual Mathematical Contest in Modeling (MCM). The UW-L teams competed against over 2600 teams from 13 countries.

The team of **Jacky Chan, John Nehls, and Joey Powers** earned a 'finalist' ranking for their submission, "No Sting in Your Swing," in which they developed a theoretical model of impact between various types of bats (including aluminum, ash, and 'corked'), and a baseball. This placed them among the top 9 papers in the world and top 5 in the nation (out of 920 who chose the same problem).

Additionally, two UW-L teams placed in the top 15% of submissions: **Cody Hunt, Ali Khalili, and Hoang Vo** for "The Bat, The Ball, and The Spot That Is Oh So Sweet" and **Hillary Brummond, Leslie Kent, and Katie Ott** for "Criminology: Modeling Potential Crime Scenes". Two more teams placed in the top 40% of all papers: **Maria Jansen, Jimmy McDermott, and Amanda Welter** for "Scratching the Surface of the Great Pacific Ocean Garbage Patch" and **Paul Benzschawel, Brandon Groth, and Matt Zuberbuehler** for "Geographic Profiling: Criminals Beware."

Other students participating in the contest were **Jamin Brunette, Sam Chen, Andy Doyle, Ryan Haunfelder, Megan Herrick, Justin Jessen, Jessica Klister, Zach Levonian, Douglas MacFarland, Chris Miller, Naomi Sperry, and Austin Zeng**.

Only three schools in the country fielded more teams than UW-L, and only four schools placed more teams in the top 40% of papers.

Faculty advisors for the contest were Robert Allen, Barbara Bennie, James Peirce, Ted Wendt, and Huiya Yan. Contact any of the advisors if you're interested in competing in the 2011 MCM Contest.

UW-L to Host Annual Mathematical Modeling Contest

On October 2nd, 2010, the University of Wisconsin-La Crosse Department of Mathematics

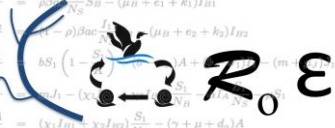
will host the Second Annual Wisconsin Mathematical Modeling Challenge (WMMC). This regional math contest gives undergraduate students the opportunity to apply their math skills to real world problems. In teams of three, students have 23 hours to develop and test a model and write a one-page summary of their findings; teams have one additional (24th) hour to finalize a 10 minute presentation explaining their results. Soon after preparing their presentations, teams present their findings to other student WMMC participants. The event concludes with an award ceremony that highlights the work of winning teams as determined by students and advisors.

If you're interested in competing in this year's contest, contact Ted Wendt.

New Program in Mathematical Biology

$\frac{dS_H}{dt} = A - \beta ac \frac{I_1}{N_S} S_H - (\mu_H + \epsilon_1) S_H$
 $\frac{dI_1}{dt} = \beta ac \frac{I_1}{N_S} S_H - (\mu_H + \epsilon_1 + k_1) I_1$
 $\frac{dI_2}{dt} = (\mu_H + \epsilon_2 + k_2) I_2$
 $\frac{dJ_1}{dt} = bS_1 (1 - \frac{I_1}{N_S}) - (A + \mu_J) J_1$
 $\frac{dA}{dt} = (\chi_1 I_1) - (\chi_2 I_2) \frac{S_1}{N_S} - (\gamma + \mu + d_0) A$
 $\frac{dI_3}{dt} = \alpha I_1 \frac{S_2}{N_S} - (\mu + d) I_3$

Collaboration on Riverine Ecology



This year, the Mathematics and Biology departments begin a new program in mathematical biology (funded by the National Science

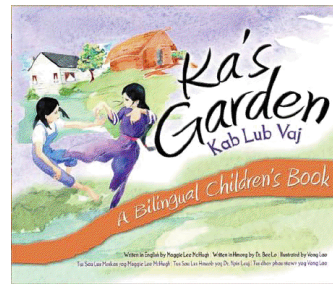
Foundation). The program will focus on the ecology of species invasions and disease outbreaks in the Upper Mississippi River region. Research topics will span a range of issues and students working in interdisciplinary pairs will develop questions under a number of scientific themes, including: non-parametric statistical methods applied to evolutionary river ecology, mathematical epidemiological dynamics, data-driven statistical models, and individual, energetic models. The project will provide a rigorous learning and research experience in mathematical biology for 4 students (2 math and 2 bio). Each pair of students will be supervised by a corresponding pair of faculty mentors – one from each department. Students will receive training in each step of the research process, from project planning (in the spring semester of 2011) through to the dissemination of their results to peers and the general public (fall semester 2011). Each student will receive a summer research stipend, room/board, and travel to the national meeting of the Ecological Society of America in Austin, TX.

Applications are open to U.S. citizens in their sophomore or junior years who have a genuine interest in studying and developing biologically-based mathematical models. If you are interested, consider attending the orientation night on

Thursday September 30th at 5:30 in Cowley 151

or contact Dr. Peirce before the application deadline of Oct. 21st.

Connecting Hmong Culture and Mathematics Education



Through a collaborative project, area schools will have a new bilingual children's book to help students learn about the Hmong culture and language,

as well as school subjects like math and science. Author Maggie Lee McHugh is a 2006 graduate of UW-La Crosse with a Mathematics and English Education major. She is currently the Math and English Specialist at Student Support Services and a master's student in education.

Collaborators on this project include faculty, staff, and students from various departments and majors including Dr. Bee Lo, Modern Languages; graduate student and UW-L Art major alumnus Vong Lao; and undergraduates PaHoua Vang, School of Education, and Ya Cha Thao, Recreational Therapy. The creation and publication of Ka's Garden was supported by several UW-L grants under the guidance of Dr. Jennifer Kosiak. These grants include the Graduate Student Research, Service, and Educational Leadership Grant Program, Undergraduate Research & Creativity Grant Program, UW-L Foundation Small Grant Program, and the Office of the Provost.

Ka's Garden tells the story of a young girl's first garden in Laos. Through the experience, Ka learns respect for nature and the interconnectedness of the earth, animals, and humans. This bilingual book celebrates the Hmong way of living in harmony with nature.

Ka's Garden is also the focus of a book signing and pre release celebration at the University of Wisconsin – La Crosse on **September 23, 2010**. Author Maggie Lee McHugh, author Dr. Bee Lo,

and illustrator Vong Lao will be available at the Cleary Alumni & Friends Center from 4:30 to 7:00 pm to answer questions and sign Ka's Garden. The celebration will feature readings of Ka's Garden in both English and Hmong, and performances by traditional Hmong dancers and musicians. There will also be educational stations for parents, children, and teachers. Proceeds from the sale of the book will go to establishing a scholarship for a Hmong student dedicated to his or her higher education.

Be Informed...Check Out the Website

The Mathematics Department website has lots of information and resources available for students. The site is located at:

<http://www.uwlax.edu/mathematics/dept/index.htm>

On this website you will find links to the most up-to-date information on various topics including

- ***Tutor Center and Tutor Schedule***
- ***Math Coffees***
- ***Upcoming talks***
- ***Internships***
- ***Faculty Web pages***
- ***UW-L Math Majors/Minors Guide***
- ***UW-L Math Club***
- ***Statistical Consulting Center***

And MUCH MORE. Be sure to check it out on a regular basis!!

Math Club & Math Coffee Happenings

The Math Club is a recognized student academic club that offers social and educational activities. Anyone interested in mathematics, computer science, or statistics is encouraged to become a member. Activities in the past have included interesting mathematical talks (presented at a level appropriate for undergraduate math majors) by invited speakers (referred to as *Math Coffees*), math modeling contests, outdoor activities, trips to student mathematics conferences, and friendly sporting contests with faculty and other academic clubs. Membership and participation are very casual. Everyone is welcome. Watch for flyers indicating time and location for future Math Club meetings.

We are always looking for new students to help out! If you are interested in helping with the Math Club, have any suggested topics for a Math Coffee or you are interested in giving a talk, contact Drs. Peirce, Wendt, or Allen. More information can be found at <http://www.uwlax.edu/mathematics/mathclub.html>

Employment Opportunities For You

Do you enjoy helping your friends, roommates, classmates, etc. with their math homework? Would you like to get PAID for doing it?! The Mathematics Department has several opportunities for you to do just that. We are always on the lookout for good tutors to work in the Math Tutoring Center, but you may not be as aware of some other positions that are available. The Math Department hires students as:

- Tutors for the Math Tutoring Center
- Peer Graders
- Peer Teaching Assistants

You can also put your name on the Department's Private Tutor list which is given out to students looking for additional individual help. For more information on any of these programs, please ask your instructor or anyone in the Math Department. We're ALWAYS looking for good help!

400Level Course Offering For Spring 2011

In order to help you begin to plan your schedule for Spring 2011, we thought it might be helpful to give you some information on the schedule for next semester.

MTH 408 – Analysis II
MTH 413 – Topics in Linear Algebra
MTH 446 – Analysis of Variance and
Design of Experiments
MTH 448 – Operations Research
MTH 461 – Mathematical Physics