Mathematics Students Present Poster

Current undergraduate UND Mathematics student Kirsten Hogenson and her collaborator Kaitlyn Murphy, an undergraduate mathematics student at Montclair State University, presented the poster “Minimum Ranks of Ciclos and Estrellas Graph Families” at the Joint Mathematics Meetings of the American Mathematical Society (AMS) and the Mathematical Association of America (MAA) in San Francisco, California, on January 15, 2010. The poster described the work that Kirsten and Kaitlyn did at a “Research Experience for Undergraduates” activity (REU) at Iowa State University in June and July of 2009.

Kirsten and Kaitlyn’s presentation was part of the MAA Undergraduate Poster Session at the Joint Meetings. The Joint Meetings are an annual event drawing participants from across the U.S. and around the world. More than 350 students presented over 250 separate posters at the MAA poster session, and more than 150 judges evaluated the posters and selected ten winners. Three judges stopped by to inspect Kirsten and Kaitlyn’s poster and asked a few questions. There was also a one-hour period for the general public to inspect the posters and ask questions.

In addition to the poster session, Kirsten also participated in some of the other activities at the Joint Mathematics Meetings. She attended a talk on the mathematics of musical scales. She also attended a talk on how to prepare and apply for “postdocs.” A postdoc is usually a temporary research-related employment position that a person receives soon after earning a Ph.D. degree. The Joint Meetings also gave Kirsten the chance to visit informally with some of the people she had met at previous mathematical events.

Kirsten received funding for her trip from the University of North Dakota President’s Office as well as from the MAA. In each case, she had to apply for this funding. One of Kirsten’s advisers from Iowa State also had access to a modest amount of travel funding, which she provided to Kirsten. The U.S. National Science Foundation (NSF) supported the original REU activity at Iowa State.

Kirsten has been admitted for graduate study at Iowa State and plans to begin work on a Ph.D. in mathematics this fall. We wish Kirsten the best of luck at Iowa State, and we hope that she keeps us posted on her progress!

Further information on the 2010 Joint Mathematics Meetings is available on the Web at

http://www.ams.org/amsmtgs/2124_intro.html

Information on Kirsten’s Iowa State REU activity, including some pictures, is available at

http://orion.math.iastate.edu/reu/REU09.html

Student Presents Talk

Undergraduate UND Mathematics student Danica Belanus presented the talk “Generalized Ducci Sequences” at the Nebraska Conference for Undergraduate Mathematics in January of this year. Last fall, Danica also attended a workshop at the Statistics and Applied
Mathematical Sciences Institute (SAMSI) in Raleigh, North Carolina. The UND Mathematics Department, together with other offices here at UND, covered the cost of Danica’s trip to Nebraska, and SAMSI paid for her travel to North Carolina. Next fall Danica plans to begin work on a master’s degree in Mathematics here at UND. We wish Danica the best of luck, and we look forward to seeing her here next fall!

Scholarships

The Mathematics Department has selected four students to receive special scholarships for the 2010-2011 academic year. The recipients are as follows:

- **Eric B. Timian** (Jay O. & Marie Bjerkaas Scholarship)
- **Danica R. Belanus** (Ronald C. & Ann C. Bzoch Memorial Scholarship)
- **Micah W. Rude** (Paige Plagge Memorial Scholarship)
- **Chelsea T. Poolman** (Judy Ann Utton Memorial Scholarship)

We congratulate Chelsea, Danica, Eric, and Micah for their awards, and we thank the generous donors who have made these scholarships possible!

Students Earn Master’s Degrees

**Megan Garrity** is receiving her M.S. degree from the Mathematics Department this spring. The title of her independent study report is “Elliptic Curves in Cryptology,” and her adviser is **Dr. Joel Iiams**. Megan presented a talk on her work this past April. She is planning to get married in June of this year, and after the wedding, Megan and her fiancé, Blake, plan to move to Fargo, North Dakota, where Blake will start a job at the accounting firm Eide Bailly. Megan is currently seeking employment as an instructor at one of the colleges in the Fargo-Moorhead area.

**Joseph A. Kucera** is also receiving his M.S. degree in Mathematics this spring. His adviser is **Dr. John Collings**, and the title of his independent study report is “The Historical Development of Golf Ball Aerodynamics of Peter Guthrie Tait.” Joseph also presented a talk on his work this past April. After graduation, Joseph hopes to teach mathematics at the community college level.

Where They Are and What They Are Up To

**Joe Champion** (BS 2001, MS 2003) is finishing up work on a Ph.D. in Educational Mathematics at the University of Northern Colorado in Greeley, CO, and has successfully defended his dissertation: “The Mathematics Self-Efficacy and Calibration of Students in a Secondary Mathematics Teacher Preparation Program.” Joe has found that the job prospects for new doctorates in mathematics education are very good. He has landed a job as an Assistant Professor of Mathematics at Texas A & M University-Corpus Christi, where he will begin work in August of this year.

Joe says that his work at Northern Colorado has gone well and that his mathematical studies and teaching experience at UND, both as a GTA and as a lecturer, have provided him with good preparation for his studies and research in mathematics education. “The great faculty at UND, especially **Joel Iiams, Jerry Metzger, Bruce Dearden, and Richard Millspaugh**, are responsible both for my initial interest in math and for me doing well in Ph.D.-level math classes.”

Joe has been happily married to Melissa (Landry) Champion for almost five years, and the couple is very excited about starting a new life in southern Texas. You can reach Joe and Melissa in Colorado by telephone at (512) 971-4088 or by mail at 5213 W. 11th St., Apt. 1305, Greeley, CO 80634.

**Yin Chang** (MS 2004) is pursuing a Ph.D. in statistics at Montana State University in Bozeman, Montana. She is currently very busy writing up her dissertation and expects to graduate this summer. Yin also serves as a teaching assistant and teaches statistics courses.

**Jennifer Kosiak** (MS, 1999) received a Ph.D. in mathematics from Montana State University in 2004. Her mathematical specialty area is mathematics education. Jennifer is currently an Associate Professor in the Mathematics Department at the University of Wisconsin-La Crosse, where she teaches a variety of courses in mathematics and mathematical instruction methods. Her research has primarily focused on two areas. First, she examines the effectiveness of using a student-centered framework to promote understanding of algebraic procedures. In her second research area, Jennifer studies the development and application of digital learning objects to enhance student learning in mathematics. When she is not busy working with students and teachers, Jennifer enjoys spending time with her two Labrador retrievers, Molly and Cody.
Mike Simmers (MS 1993) is currently serving in a tenure-track position in the Department of Mathematical Sciences at the University of Wisconsin-Stevens Point. He teaches both mathematics and mathematics education courses. The mathematics courses are mainly precalculus and applied calculus courses for students in business and related fields. Mike’s math education teaching has mainly involved courses for future elementary school teachers, but he is now moving into instructional methods courses for high school teachers.

Mike is active in research in mathematics education. He studies the reasons why many students from kindergarten through grade twelve develop a dislike of mathematics. He is currently seeking funding for a ten-year longitudinal study that would follow the mathematical development of groups of students beginning with the third grade and continuing through to their graduation from high school. He hopes to study six to eight groups of different socio-economic and ethnic backgrounds from across the U.S. Mike is also interested in getting teachers to teach study skills, and he is interested in conceptual quizzes or study guides designed to help students study mathematics more effectively and efficiently. Finally, Mike would like to revise some of the certifications for future teachers. He says that elementary school teaching majors should take more ordinary mathematics courses, and that secondary teaching majors should take more courses in methods of teaching. He is also in favor of the idea of having elementary school students receive mathematics instruction from a teacher who specializes in mathematics.

Mike was recently reviewed at UW-Stevens Point and was awarded an extension contract for years five and six of the tenure process. The next stage of this process is for review committees to consider him for tenure. Mike is excited about this and hopes to give additional professional talks at regional and national conferences and to publish additional articles.

Mike earned a Ph.D. in Education from UND in 2003, and he also worked here in the Mathematics Department for many years. Mike says that he misses UND and the wonderful people here!

William B. Treumann (minor in Mathematics, 1942) is 94 years old and now lives in St. Paul, Minnesota. Bill first enrolled at UND in 1937 at the age of 21. He took algebra, trigonometry, and analytic geometry from Sewell Mason and calculus from Raymond Staley. The Mathematics Department faculty consisted of only three or four people at the time. In 1938, Staley earned a Ph.D. from the University of Michigan and became the first member of the department to hold this degree. Bill notes, however, that several members of the UND Chemistry Department held Ph.D. degrees. Bill also remembers UND president John West, Physics professor Robert Witmer and a “young guy” in the Mathematics Department named Phil Rognlie.

Tuberculosis delayed Bill’s university studies. He had spent three years as a patient at the North Dakota tuberculosis sanatorium before coming to UND. After one year at UND, he returned to the sanatorium for another year. He finally graduated from UND in 1942 with a major in Chemistry and a minor in Mathematics. He then went to the University of Illinois, where he worked as a teaching assistant, earning an annual salary of $400! After receiving an M.S. and a Ph.D. in Physical Chemistry from Illinois, Bill went on to teach physical chemistry at the North Dakota Agricultural College (NDAC), which later became North Dakota State University (NDSU). After nine years at NDAC, Bill worked at Moorhead State University for twenty-one years. (Moorhead State is now Minnesota State University Moorhead.) He lived in Fargo until 2007, when he moved to St. Paul to be near a son. Bill has a grandson, David Treumann, who has earned a Ph.D. in Mathematics from Princeton University. David currently holds a postdoctoral position at Northwestern University.

Gilsdorf Receives Award

UND Mathematics faculty member Dr. Tom Gilsdorf has received a UND Arts & Sciences 2010 Spirit Award in recognition of his work over the past few years. Several other Arts & Sciences faculty members also received similar awards this year. UND officials formally announced Tom’s award at the annual UND Founders Day banquet here in Grand Forks on February 25, 2010. We congratulate Dr. Gilsdorf on his award!

Faculty Footnotes

Dr. Bruce Dearden and Dr. Jerry Metzger have published the article “Running modulus recursions” in the Journal of Integer Sequences.

Dr. Ryan Zerr has published “Equivalence relation groupoids associated with certain linearly ordered dimension groups” in the Journal of Mathematical Analysis and Applications.

A picture of Mathematics Department faculty member Dr. Cheryl Halcrow appears on the outside back cover of UND’s 2009-2011 Undergraduate and Graduate Academic Catalog! You can view the catalog and the picture on the Web by visiting http://www.und.edu/dept/registrar

and clicking on the link to the catalog. Dr. Halcrow is standing second from the left.
Mathematics Department Hosts Math Track Meet

Every year the UND Mathematics Department holds the Mathematics Track Meet. The Mathematics Track Meet is a competitive event in which selected students in grades seven through twelve from Grand Forks and surrounding communities come to Witmer Hall here on the UND campus to take several short individual and team exams. The purpose of the Math Track Meet is to stimulate interest in mathematics among high school and middle school students in the region.

This year’s Math Track Meet took place on Presidents’ Day (February 15, 2010), and approximately 160 students participated. We awarded a total of thirty wooden plaques and thirty-six medals in recognition of individual and team achievements. We also passed out special Math Track Meet T-shirts to most of the participants! As usual, almost all faculty and lecturers in the Mathematics Department helped out with the Math Track Meet in one way or another. We also received help from several GTA’s and undergraduate students, as well as some Grand Forks area teachers. The Math Log would like express special appreciation to Dr. Mohammad Khavanin for directing and coordinating the 2010 Math Track Meet. We would also like to acknowledge the UND President’s Office and the UND Alumni Association for their financial support. Expenses for the 2010 Math Track Meet totaled approximately $1950!

A Boy and a Girl

Caleb Fletcher Zerr was born on December 1, 2009. Caleb’s parents are Ryan and Jessica Zerr. Ryan is an Associate Professor in the Mathematics Department, and Jessica is a Lecturer in UND’s English Department.

Sarah Grace Prescott was born on December 28, 2009. Sarah’s parents are Timothy and Cynthia Prescott. Tim is an Assistant Professor in the Mathematics Department, and Cindy is an Assistant Professor in the UND History Department.

UND Mathematics Professor Discusses On-Line Instruction

One of the more recent innovations in higher education across the U.S. has been on-line instruction. The purpose of on-line instruction is to allow students to earn college credit without coming to the campus for regularly scheduled classes. On-line courses can be very helpful to students in the military who are stationed overseas, students living in remote locations, people whose work schedules conflict with regularly scheduled classes, or anyone else who has difficulty coming to the campus for traditional instruction. Correspondence courses have served such students for many years, but on-line courses are different from correspondence courses in several ways. The University of North Dakota has begun to offer a variety of courses on-line, in particular, several Mathematics courses. Dr. Timothy Prescott is currently teaching three on-line courses for the Mathematics Department: College Algebra, Calculus II, and Elementary Differential Equations. As of this writing, he has a total of 31 students in these classes. Tim recently discussed his on-line teaching experiences with the Math Log editor.

The main distinctive feature of Tim’s on-line courses is that students communicate with the instructor and with each other over the Internet. They do this by using electronic mail (e-mail) as well as Blackboard. Blackboard is a computer software system that students and instructors access from an Internet Web browser. Users can reach Blackboard from anywhere in the world, provided they have a password and a computer with an Internet connection. Tim can “post” announcements and other course information on Blackboard, which the students then read when they log in to Blackboard.

Tim’s students do not attend classroom lectures, but in other ways, his courses are very similar to traditional UND classes. Each course has a textbook, and students progress through the textbook at a regular pace in the same way that they would for an on-campus course. Students are under pressure to keep up with the course, since Tim assigns homework and collects it on regular due dates. Tim also gives midterm and final exams,
which students must take by announced dates.

The textbooks for Tim’s courses are divided into sections, and Tim gives a homework assignment for each section. He posts these assignments on Blackboard, along with a couple of paragraphs giving some guidance on how to proceed. For example, he may briefly describe the purpose of the section or indicate which points are the most important. If a particular section contains several formulas for the student to memorize, Tim may tell the students to memorize certain formulas and not others.

Answering Questions over the Internet

As you may remember from your mathematical studies, students often have questions! One way that Tim answers his students’ questions is by using Blackboard to maintain a blog for each course. The course blog is simply a mechanism for Tim and his students to post questions and comments for each other. It works like an old-fashioned bulletin board. If a student has a question, the student logs in to Blackboard and posts it on the blog. If other students log in to Blackboard minutes or hours later, they can read the first student’s question. Within a reasonable period of time, Tim will log in to Blackboard himself, read the question, and post an answer. From that point onward, any student who reads the blog will see the original question as well as the answer. It is even possible for one student to answer another student’s question before Tim gets a chance to answer it himself!

In some ways, the blog is more flexible than the standard practice of actually visiting the teacher in person. Students can post questions at any time. They do not have to come during the teacher’s scheduled office hours. On the other hand, blog users face certain obstacles. In particular, typing mathematical symbols is often a challenge. Tim and his students have ways of doing this, however. For example, to type the rational function

\[ f(x) = \frac{x^2 + 1}{x^3 + 4}, \]

Tim and his students could type \( f(x)=(x^2+1)/(x^3+4) \).

Students may also send in questions by e-mail at any time. If a question arrives during normal working hours, Tim usually responds before the end of the day. On rare occasions, Tim has had to answer a student’s question by calling the student from his cell phone.

Electronic Homework

When Tim assigns homework to be handed in, he uses computer software (LaTeX) to prepare a typeset worksheet with five to eight problems and some space for the student to work each problem. These worksheets do not suffer the same notational limitations as the blog. In fact, they are very professional in appearance and contain mathematical symbols and expressions similar to those in a textbook.

Students obtain the problem worksheets by logging in to Blackboard and printing them from an office printer. They use an ordinary pencil to write their solutions directly onto the worksheet and then “scan in” the worksheet with an optical scanner. Optical scanners are widely available. We have one here in the Mathematics Department, and there are scanners at UND’s Chester Fritz Library and at libraries, offices, and other locations around the world. The student simply places the worksheet face down on the scanner and presses one or two buttons. The scanner then creates a computer file containing the handwritten solutions. There is then a way for the student to “upload” the solution file to Blackboard. Once the upload is complete, Tim can log in to Blackboard and view the assignment on his computer screen. He can see exactly what the student wrote on the worksheet!

When Tim grades the worksheets, he makes “post-it” notes. He does all of this on the computer. He finds a blank portion of the worksheet and uses the computer to type some comments into the blank spot. If the student did not leave enough room for Tim’s comments, there is a way for Tim to attach an additional blank page to the assignment. After Tim finishes the grading, the student can log in to Blackboard and see the worksheet along with the marks and comments that Tim has made on it.

Supervised Exams

Each of Tim’s students must find a proctor for the midterm and final exams. Certain UND rules determine who may serve as a proctor. Some students take exams at testing centers for college entrance exams. In other cases, a librarian may serve as a proctor. In still other cases, military members may have an officer supervise an exam. The student may have to pay the proctor.

At the time of an exam, the proctor obtains the exam via the Internet by first typing in a password and then printing off a paper copy on an office printer. The student then takes the exam under the same conditions as if it were a traditional on-campus exam. Finally, the proctor scans in the completed exam and uploads it to Blackboard for Tim to grade.

Blackboard allows Tim to “electronically” save and retrieve copies of all of his students’ past work. By typing just a few strokes, Tim can view each student’s past homework assignments and exams on his computer screen. He can see the student’s handwritten solutions as well as the notes and comments that he put on each problem himself. Tim also uses Blackboard as an electronic grade book. By logging in to Blackboard,
Tim can view the past exam and test scores of each of his students. The students can likewise log in to Blackboard and view their own individual past scores.

As you can now see, on-line courses have most of the same features of ordinary college courses: assignments, supervised exams, grades, and individualized help from the instructor. But you may remember something else from your days here at UND: the teacher evaluation. Near the end of the semester, Tim directs his students to an on-line evaluation of the course and the instructor, which the students fill out by using an Internet Web browser. The University uses data from these on-line evaluations in much the same way as it uses data gathered from courses that are taught here on campus in the traditional setting.

Technologies and Successful Students

To some extent many of the above instructional procedures reflect Tim’s individual teaching style. Instructors of on-line courses at UND have a surprising degree of freedom to decide which technologies they will use and how they will teach their students. Teachers now have the ability to record ordinary classroom lectures on videotape and make these recordings available over the Internet. Tim knows a history professor who has done this. Students in remote locations can access the video recordings without paying special mailing or long-distance telephone fees. You may also have heard of “chat rooms.” A chat room is simply a more interactive version of the blogs that Tim uses. There are also ways of having ordinary “telephone” conversations over the Internet. Other technologies for on-line instruction will no doubt become available in the years to come.

The purpose of all of these on-line technologies, of course, is to enable on-line students to have the same learning opportunities as on-campus students. Indeed, the general philosophy of on-line instruction here at UND is that on-line courses should be just like ordinary courses. The content, academic standards, and main features of both types of courses should be essentially the same. For purposes of degree requirements and graduation, on-line courses should count the same as ordinary traditional courses.

Nevertheless, on-line study differs from traditional study in obvious ways. So I asked Tim if it takes a special type of student to succeed in on-line courses. He replied by saying that on-line students need to have motivation and self-discipline. Tim does not see his students on a regular basis. If a student fades away, there is not much that Tim can do about it. It is important for students to keep up with the course and not fall behind. Some students may think that on-line courses are easier than regular courses, but this is usually not the case. As in any course, students need to ask questions if they do not understand concepts or exercises.

In the end, most students will likely prefer on-campus courses to on-line courses. For many students, however, attending on-campus classes is difficult or impossible, and on-line instruction may be the better option. In any case, it seems that UND will continue to offer on-line courses. In fact, the University now offers students the option of earning degrees in certain academic areas entirely on-line. Although the Mathematics Department currently has no plans to do this for a Mathematics degree, some existing on-line degree programs require coursework in our department. For this reason, the Mathematics Department will likely offer introductory courses in on-line format for years to come.

The Pseudo-Sum

By Larry Peterson

Well, it seems that I only have space for a few comments here! Workers are beginning a major renovation and expansion of the Education building, located just west of Witmer Hall.

According to UND’s Office of University Relations, the expansion will add approximately 14,000 square feet to the building. After the work is finished, the Education Building will be connected to nearby Gillette Hall and will have a much more modern appearance. The renovation and expansion project will take approximately one year.

Another interesting event here at UND was a visit this past April by author Roxana Saberi. If you have been following the news carefully, you may know that Saberi gained national attention after her detention in Iran for alleged espionage activities. During her campus visit, Saberi spoke at UND’s Chester Fritz Auditorium and autographed copies of her book Between Two Worlds.

The biggest story in the news, however, is probably the decision by the North Dakota State Board of Higher Education to retire the UND “Fighting Sioux” nickname and logo. This decision resulted from an earlier agreement with the National Collegiate Athletic Association (NCAA) and came immediately after the North Dakota Supreme Court dismissed a lawsuit that had delayed action on the nickname and logo issue. For more news on this story, check the Summer 2010 issue of the UND Alumni Review Magazine, which you may have received a few weeks ago.

I hope that things are going well for you. Keep us informed about your activities! We often get news from the alumni of our graduate program, but we are interested in hearing from everyone!
THANK YOU!

The following persons are responsible for monetary gifts to the UND Alumni Association specifically designated for the improvement of the Department of Mathematics:

James L. Elliott
Dr. Ernest N. Gullerud
Carol Hokana and Nick Bonifanti
Dr. Deann and Lee E. Christianson
Richard and Annamarie Langlie

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If you would like to make a monetary contribution to UND, to the UND Mathematics Department, or to one of our scholarships, please make checks payable to the “UND Alumni Association” or to the “UND Foundation.”

Your generosity is gratefully acknowledged and sincerely appreciated!

Your teachers and friends are wondering what you are doing. Help us satisfy their curiosity! Photos are also welcome!

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Use additional sheets if necessary. You can also send us news items and comments by e-mail! Just send a message to

udmath@und.edu

Be sure to say that the information is for the Math Log!

Spring 2010