2009

The Wright Message, 2009

University of Northern Iowa. Department of Mathematics.

University of Northern Iowa

Department of Mathematics

The WRIGHT Message 2009

Dear Department Alumni and Friends,

Welcome to another edition of *The Wright Message*, where we share news of the Mathematics Department. New this year – alumni who earned a minor in mathematics are receiving the newsletter. Many of you will want to read about our successful professional development master's degree program for middle grade teachers and the educational resources available via the SOAR project. Also, look for the Math Walk Challenge; it contains a problem to solve and a way to inject mathematics in conversations.

The year was filled with the normal bustle of teaching and learning, research, and outreach. Budget woes touched the department (we were unable to fill a faculty vacancy), but we maintained our programs and even were able to invigorate undergraduate research in the department. (See the item on the following pages.) We engaged in two reviews: one mandated by the Board of Regents and the other mandated internally by the Provost's office. I particularly thank the faculty who worked hard on these self-studies and reports. We have identified areas for improvement, but in all, the Mathematics Department is healthy and strong.

In May, I had the pleasure of meeting some of our alumni. John and Marla Peterson visited the campus. Both John (class of '62) and Marla (class of '63) earned bachelor's and master's degrees from SCI (UNI, as it was known then) and PhDs from Ohio State before very successful academic careers. Also, five golden graduates (class of 1959) with degrees in Mathematics were here for commencement and I visited with most of them. The five were Phil Beckman (Hampton, Illinois), Adolph Knobloch (Algona, Iowa), Eldon Meyers (Mason City, Iowa), Ronald Moehlis (Cedar Falls, Iowa) and Susan McCauley Rock (Washington Island, Wisconsin). It was really good to see where some of our graduates have gone and hear those golden stories. If you are visiting Cedar Falls, please stop in at Wright Hall 220. We enjoy hearing from you!

I take this opportunity to offer a very sincere thank you to the many alumni and friends who have so generously supported the Department and our students through contributions to our Foundation accounts in the past year. In total, we received $126,834 between 1 July 2008 and 30 June 2009. This total includes two large donations, one from the Marcia Traer estate and one from the FINE (First in the Nation in Education) Foundation. Most of the money goes to support scholarships, although contributions to some accounts do support other activities (equipment, faculty and student travel, etc.). If you are able to help us this year, please use the enclosed form to direct your contribution to the appropriate account. Thank you!

I hope this past year has treated you kindly and that the coming year will be even better!

Sincerely,

Jerry Ridenhour

Jerry Ridenhour, Professor and Head

2009-2010 Tenure-Stream Faculty

Russell Campbell	Min Lee	Glenn Nelson	Vera Rayevskaya	Adrienne Stanley
Mark Ecker	Larry Leutzinger	Genevra Neumann	Jerry Ridenhour	Bridgette Stevens
Joel Haack	Bin Liu	Jihwa Noh	Suzanne Riehl	Diane Thiessen
Theron Hitchman	Shangzhen Luo	Vicki Oleson	Doug Shaw	Brian Townsend
Elizabeth Hughes	Catherine Miller	Michael Prophet	Nikolay Silkin	Jack Wilkinson
Syed Kirmani	Douglas Mupasiri	Edward Rathmell	Marius Somodi	

Mathematics Education Program

The Mathematics for the Middle Grades MA Program began its 11th cohort this summer. Our program follows a professional development model that is set in the context of classroom practice. Program content, understandings, and experiences directly and explicitly link to teaching mathematics. Since participants are teachers, the fall and spring courses are offered online using an asynchronous learning environment. Summer courses involve both online and on-campus components. This gives our teacher-students the opportunity to work with classmates face-to-face, as well as direct access to faculty, technology and instructional resources. With encouragement and support from peers and faculty, our teacher-students use their classrooms as a learning laboratory to improve their practice and their students' mathematics achievement.

Included among the fourteen graduate students in this new cohort are mathematics teachers, mathematics coaches, a published author, participants from the FINE Foundation ARRC (Applying Research Results in Classrooms) Program, and a curriculum developer. All bring a wealth of knowledge and experience to the program. Ten are UNI alumni with five that earned K-8 mathematics minors. Three currently teach outside Iowa and one attends the summer sessions from Japan via live video conferencing. Our faculty members continue to work together to meet the changing needs of our students. For more information about the program or to enroll in the next cohort, please contact Dr. Bridgette Stevens, Program Coordinator, at bridgette.stevens@uni.edu .

Projects and Grants

Invisible to most students, but an integral part of the Mathematics Department, is our work in projects and grants. These activities extend the reach of our faculty and allow us to impact the study of mathematics beyond our campus. The Iowa Mathematics and Science Education Partnership (IMSEP) makes competitive grant awards to projects that support its three goals: to improve mathematics and science performance of Iowa students; to prepare more high quality mathematics and science teachers for Iowa's schools; and to promote statewide collaboration and cooperation. We have five IMSEP grants in addition to a federally funded project.

Number Sense 1: Mathematics Professional Development for Elementary Teachers, coordinated by Vicki Oleson, is a project that provides quality professional development for teachers in Iowa. This workshop is aligned with the Iowa Core Curriculum, Every Student Counts, and the Iowa Professional Development Model. Area Education Agency (AEA) consultants facilitated this workshop for twenty-five educators in Northwest Iowa.

Integrated Learning: A Pilot Project Connecting the University and School connected UNI professors, pre-service teachers at UNI, and Cedar Falls public school teachers. This project, developed by Vicki Oleson, offered professional development in teaching mathematics and mentoring for five Cedar Falls teachers. It also provided a quality clinical experience for fifty UNI pre-service teachers. This partnership developed a model for connecting the university and a public school.

Dr. Elizabeth Hughes has partnered with Keystone AEA 1 for her project ***Assessment, Reflection, Community, and Knowledge (ARCK)***. The project provides a three-year professional development program for 22 high school mathematics teachers. ARCK supports them in their endeavors to implement the new Iowa Core Curriculum with emphasis on formative assessment, integrating technology into mathematics instruction and enacting lessons in which students engage in solving cognitively challenging mathematical tasks.

Dr. Jihwa Noh's project ***Establishing a Professional Development School in Middle School Mathematics*** is designed to improve field experiences for UNI pre-service mathematics teachers by establishing a Professional Development School for Mathematics in George Washington Carver Academy (formerly Logan Middle School) in Waterloo. The project provides additional support to UNI pre-service teachers and their mentor teachers during their field experience.

Dr. Bridgette Stevens is collaborating with faculty at Iowa State University in her project ***Increasing and Maintaining Mathematical Cognitive Demand: Implementing High-Quality Critical Thinking Instructional Tasks in Middle Grades and High School Mathematics***. The project engages Iowa middle grades and high school mathematics teachers in professional development in which teachers' instructional practices are examined through the lens of implementing and maintaining high-level critical

thinking mathematics tasks that challenge students to think and reason.

SOAR (Student Online Achievement Resources) is a federally-funded project designed to assist with the unique challenges children of military families face as they transition from one school district to another. Through this project, a team of educators in our department's Center for the Teaching and Learning of Mathematics is providing online resources in the areas of mathematics and literacy for students, parents, and teachers. The link to *Making Sense,* the *SOAR* on-line resources developed by UNI, is http://www.makingsenseonline.org/. Everyone is invited to view and use these videos and resources that connect to real-life situations and promote understanding of mathematics and literacy topics. The project team plans to complete a total of 75 mathematics and 75 literacy videos with resources by 2011.

Summer Research for UNI Math Students

Three UNI students participated in undergraduate research opportunities in the department this summer. The McNair Scholars Program at UNI provided support for one of the students and the College of Natural Sciences (CNS) Summer Undergraduate Research Program provided support for the other two.

Anna Schumacher is UNI's first McNair Scholar in mathematics. The McNair Scholars Program is named in honor of Challenger astronaut Dr. Ronald McNair. This federally funded program helps first generation college students and historically underrepresented students prepare for Ph.D. programs. As part of this program, students participate in summer undergraduate research. Anna studied the behavior of complex polynomials this summer with mentor Dr. Genevra Neumann. Anna will present her work at a regional McNair conference.

CNS has supported undergraduate research for many years – but this was the first time our department has been part of the program. Five faculty members offered summer projects in various areas of mathematics and mathematics education; students listed their top choices of projects. A strong pool of ten students applied for the two summer positions. The CNS program culminated in an undergraduate research poster session held on July 31.

Corey Gevaert, a senior in mathematics education, worked on "Isometries of a Giant Product Space" with mentor Dr. TJ Hitchman. He studied the distance preserving transformations of a large geometry that is negatively curved (being warped like a saddle at each point). "The cool part is that he learned tons of mathematics and proved a theorem classifying the isometries of this space," said TJ Hitchman. Corey hopes to use his experience with mathematics research to inform his teaching. In addition to student teaching this fall, Corey will be presenting his research at the Iowa Section Meeting of the Mathematical Association of America.

Jeremy Cue worked on "Teacher Questioning and Accountable Talk in a Mathematics Classroom" with mentors Drs. Elizabeth Hughes and Amy Hillen (Kennesaw State University). He analyzed a set of algebra lessons taught by a first-year high school teacher using two different research-based frameworks in order to determine the extent to which the teacher supported his students' learning through questioning and facilitated mathematical discussions.

"This experience has significantly improved my knowledge base regarding math education, and I know I will take a good deal of what I've learned this summer into my own classroom someday. Even better than this, however, is that I had the opportunity to work intimately with two very knowledgeable math educators, and working with them has been a very enjoyable and beneficial experience for me," said Jeremy Cue. He and Elizabeth plan to present this research at the Iowa Council of Teachers of Mathematics conference. Jeremy will be student teaching in spring 2010.

TJ, Corey, Elizabeth and Jeremy plan to share their experiences with undergraduate research at a department colloquium. They hope that this summer was just a beginning for our department and that more faculty and students will have the opportunity to engage in summer research collaborations in the future.

Student Competitions

UNI Math was represented in the 69th Annual William Lowell Putnam Competition by three students: Corey Gevaert, Ehrich Pakala and Jacob Pliner. The Putnam is a very challenging competition

for undergraduates in the United States and Canada which blends problems from all across the undergraduate mathematics curriculum. We are proud to report that all three students achieved positive scores (which puts them in the top half of contestants) and that Ehrich Pakala scored in the top third of all students who entered the competition. Dr. TJ Hitchman coached the students throughout the fall semester to prepare them for the contest, which is held on a Saturday in December. Congratulations to Corey, Ehrich, and Jacob!

The Iowa Collegiate Mathematics Competition

Each spring the colleges and universities in Iowa gather together for a day of mathematics and mingling at the Iowa Collegiate Mathematics Competition. This is a team format contest run through the Iowa Section of the Mathematical Association of America. This year the contest was held in Ames and UNI was represented by two teams: Mac Roepke and Ehrich Pakala as one team and Hannah Miller and Jen Boden as another. By scoring in the top half, both teams did well, especially since three-person teams are more typical. Congratulations!

TEAM News

Students in the mathematics department club TEAM (Teaching Educators about Mathematics) held their third annual Mathematics Fair in February. Around 75 fourth, fifth and sixth graders and their families from the Cedar Valley area visited the fair. The fair featured 25 booths where students took part in interactive and fun mathematical activities. Support for the fair was provided by various Cedar Valley businesses and TEAM membership dues. The fair was also featured on the evening news.

TEAM is entering its fourth year at UNI and is made up of elementary and middle grades teaching students that share an interest in learning more about teaching mathematics in new and interesting ways. The organization meets monthly to share effective lessons that embody the National Council of Teachers of Mathematics' Principles and Standards for School Mathematics. TEAM also works to send student members to statewide, regional, and national mathematics teacher meetings, such as the Iowa Council of Teachers of Mathematics Annual Meeting in Des Moines. Dr Brian Townsend is the faculty mentor.

Alliance Program

Nine undergraduates from across the country participated in the fourth Alliance summer research program hosted by UNI. The students had "a great opportunity to learn about and experience the culture and practice of a research university." They studied differential equations and linear algebra. The students also undertook research projects in groups of three. Dr. Douglas Mupasiri supervised two groups and Dr. Vera Rayevskaya supervised the third. The culminating event of the summer was a symposium at the University of Iowa where the students presented their projects. The UNI program is part of the Iowa Board of Regents Universities partnership in the National Alliance for Graduate Studies in the Mathematical Sciences.

Two Endowment Funds

Marcia Traer established a charitable gift annuity with the UNI Foundation in 1996 and directed that proceeds from that annuity support scholarships to juniors or seniors pursuing a mathematics degree. Marcia graduated from Iowa State Teachers College with a degree in mathematics education in 1936 and was employed by McGladney & Pullen for many years, retiring in 1983. She died March 8, 2008, in Davenport, Iowa, and bequeathed an additional gift to her fund. So far, her endowment has supported 17 students since the first **Marcia E. Traer Scholarship** award in 1997. Currently, the award averages $1700 per student.

Dr. Fred W. Lott, Jr. (1917-2003) was a UNI professor of mathematics from 1949 to 1984 and also the assistant vice president for academic affairs from 1971 to 1984. He was an active mathematician, a textbook author, and a consultant to both industry and the government. In 1995, he established the **Dr. Fred W. Lott, Jr., Scholarship Fund** which now awards $2500 to incoming freshman mathematics majors. Twenty-two students have benefited from this award. His wife Kathryn now resides in the Des Moines area.

MATHEMATICS CONTRIBUTION FORM

We truly appreciate the support that you give to the Mathematics Department. You may use this form and enclosed envelope to direct your gift to the area most important to you. If you prefer, you may give via the UNI Foundation secure website: https://www.adv.uni.edu/foundation/pledgeform.aspx If giving electronically, please note that you will need to enter the specific name(s) of the Mathematics Fund(s) in the "Other" box near the bottom of the web form. Thank you!

$_____ Mathematics Department Fund (Alumni Scholarships, faculty development and travel, equipment, and support for all programs) 11-220127

$_____ Mathematics Education Leadership Fund for Excellence (discretionary fund for all Mathematics Education programs in the UNI Department of Mathematics) 30-221015

$_____ Actuarial Science Fund (provides the John E. Bruha Award in Actuarial Science, covers student fees on successfully completed actuarial exams) 10-221288

$_____ Mathematics Leadership Fund (for the enhancement of teaching secondary mathematics) 10-221162

Additional funds, established by alumni and friends, provide scholarships to students in our programs. These scholarships are described on the reverse of this sheet.

$_____ directed to _____

$_____ directed to _____

Name(s)	Email
Home address	Phone (home)
City, State, Zip	Phone (work)

Type of Payment:

□ **Check** enclosed, payable to the UNI Foundation

□ **Credit Card:** Please charge my card
$_____ beginning (mo/yr) ___/___
Please complete card information below.

Signature (required) _____ **Date** _____

Return to: UNI Foundation, Attn: Accounting, 1223 W 22rd Street, Cedar Falls, IA 50614-0239

100340

Credit card information will not be kept on file.
Charge my: VISA MasterCard Discover American Express (circle one)
Card # _____
Exp. Date _____

MATHEMATICS SCHOLARSHIP FUNDS

The following funds are named for UNI emeritus faculty members.

- Diane Sorenson Baum Fund – scholarships for elementary education majors with a K-8 mathematics minor (10-210591)
- E.W. Hamilton Endowed Scholarship – scholarships for students enrolled in any mathematics program (11-210174)
- Fred W. Lott Scholarship in Mathematics – scholarships for incoming freshmen who are mathematics majors (30-211124)
- Michael H. Millar Endowed Scholarship – scholarships to graduate students (30-211718)
- Augusta Schurrer Endowed Scholarship for Mathematics Excellence – scholarships for students majoring in Mathematics – Teaching (30-211292)
-
- Paul Trafton Mathematics Education Graduate Student Scholarship – scholarships for graduate students in the Mathematics for the Middle Grades program (10-212193)
- Carl and Wanda Wehner Math Teaching Endowed Scholarship – scholarships for juniors or seniors majoring in Mathematics – Teaching (30-210474)

The following funds have been established by alumni and friends of the department:

- Patricia Lange Memorial Endowed Math Scholarship – scholarships for students in any mathematics major (30-210976)
- Marcia E. Traer Endowed Scholarship Fund – scholarships for juniors or seniors in any mathematics major (30-211199)
- John F. and Ruth Cross Endowed Scholarship – scholarships for Statistics and Actuarial Science majors (30-211516)
- Rich and Dee James Secondary Mathematics Teaching Endowment – scholarships for juniors or seniors in mathematics education (30-212220)
- Marian Rigdon Ponder Math Education Scholarship – scholarships for incoming freshmen mathematics education majors (10-212206)
- Prem Sahai Actuarial Science Endowed Scholarship – scholarship for Actuarial Science majors (30-211550)
- Irvin and Dorothy Brune Mathematics Education Endowed Scholarship – scholarships for incoming freshmen mathematics education majors (30-211613)
- Robert W. Bettle Math Education Scholarship Endowment Fund – scholarships for seniors in mathematics education (30-211269)

Applause and Congratulations!

- Three faculty members were promoted from associate to full professor. Congratulations to Drs. Mark ECKER, Douglas MUPASIRI, and Doug SHAW.
- The College of Natural Sciences (CNS) Liberal Arts Core Teaching Award went to instructor Dean FRANZEN and the University Book and Supply Teaching Award in CNS went to Dr. Bridgette STEVENS.
- The Iowa Council of Teachers of Mathematics (ICTM) recognized two members of our department. Dr. Ed RATHMELL received the Lifetime Achievement Award for his many contributions to the field of mathematics education in Iowa and nationally. Megan BALONG was named a Friend of Mathematics. Megan is an adjunct in our department, a member of the Price Lab School mathematics faculty, and a consultant for the department's Center for Teaching and Learning Mathematics.
- Emeritus faculty members Carl (mathematics/computer science) and Wanda (chemistry) WEHNER received the 2008 UNI Alumni Association Heritage Honours Alumni Service Award, recognizing their long and continuous service to both the university and the community.
- Karen SABEY, one of our instructors, completed her Doctor of Education degree. Her research, *Secondary Preservice Teachers' Understanding of Euclidean Geometry*, was supervised by Drs. Linda Fitzgerald and Elana Joram in the UNI department of Curriculum and Instruction.
- Emeritus professors Drs. Bonnie LITWILLER and David DUNCAN continue to write for education journals – they now have over 1020 articles in print!
- Dr. Genevra NEUMANN is the co-author of a featured article in the June /July 2008 issue of the Notices of the American Mathematical Society. *From the Fundamental Theorem of Algebra to Astrophysics: A "Harmonious" Path*, written with Dr. Dmitry Khavinson (University of South Florida), has recently been translated into Chinese.
- Dr. Doug SHAW presented "Mathematics from the Perspective of Games, Puzzles, and Other Wackiness" as part of the *Citizen Science on Saturdays* series, sponsored by CNS to engage Iowans in science and mathematics.
- Junior Mac ROEPKE spent the year studying m-ary partition sequences, which count the number of ways to decompose a natural number as a sum of powers of m. Mac presented his findings in a department colloquium and will try to prove his conjecture about the long-term behavior of these sequences. Dr. HITCHMAN is his mentor.

Math Walk Challenge

Make mathematics visible and provide exercise for both body and mind – Create a Math Walk! This is simply a tour peppered with questions to promote mathematical thinking. Depending on your audience, your walk may contain open-ended questions or questions more suitable for competition. Here are some ideas to incorporate into your walk:

- Scavenger hunt: Seek two and three dimensional objects such as circles, polygons, parallel lines, prisms, cylinders, or pyramids.
- Estimate the pitch of a roof, or the height, area, or volume of something.
- Count the number of rectangles (of all sizes) in a large, subdivided window or some other design.
- Look for various symmetries in hubcaps of cars in a parking lot.
- Compute the fraction of a building wall which is glass.

We've posted an example Math Walk at http://www.uni.edu/math/projects. Here is a question from it:

> Walk to the Campanile and notice the curved benches placed around it. Assume the curve is a circular arc. (Ignore the blocks at the ends.) What is the radius of the circle from which this curve forms a piece? Explain your solution method!

If you create a Walk, please share it! We'll include links to your Walks on our website.

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Back Row: Marius Somodi, Jerry Ridenhour, Joel Haack, Nikolay Silkin, Mark Ecker, Ed Rathmell, Russell Campbell, Adrienne Stanley, Theron (TJ) Hitchman
Middle Row: Min Lee, Suzanne Riehl, Jack Wilkinson, Bridgette Stevens, Vera Rayevskaya, Genevra Neumann, Larry Leutzinger, Brian Townsend, Bin Liu
Front Row: Michael Prophet, Betty Bagenstos, Deb Blanchard, Shangzhen Luo, Vicki Oleson, Catherine Miller, Diane Thiessen, Elizabeth Hughes
Not Pictured: Syed Kirmani, Douglas Mupasiri, Glenn Nelson, Jihwa Noh, Doug Shaw, Elaine Robinson