The University of Montana

Department of Mathematical Sciences

A Newsletter for Alumni, Faculty, Staff, and Friends **Spring 2000**

Math Awareness 2000

The Department held its annual Awards Ceremony on April 25 as part of its celebration of national Mathematics Awareness Month. This ceremony is where we formally present a number of departmental scholarships and awards for the following year as well as recognizing math majors who have received university-wide or national awards. We feel privileged that, due to the generosity of many donors to the department, we have a number of scholarships and awards with which to support our best students. The funds which support these programs come primarily from the George and Dorothy Bryan Endowment, the Mac Johnson Family Endowment, and the Joseph Hashisaki Fund. The awardees for 2000-01 are on page 5.

Other activities for Math Awareness Month were a well-attended math film festival organized by the Math Club (see page 6) and the annual departmental picnic on May 5. Rain forced us into the Bonner Park Bandshell for the picnic and forced cancellation of the softball game, but we still had a good time. It was just as well for the students that the softball game was cancelled, since based on past years, there's a high probability that the faculty would have won the game!

N.J. Lennes Awards: Daniel Wedul, Young-A Choi, Colin Dundas, Amanda Deisher

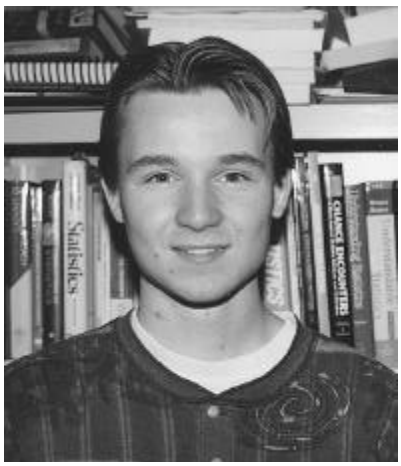
UM Math Major Wins Goldwater Scholarship

Scott Jones, a UM junior mathematics major, was recently named a Barry M. Goldwater Scholar for the 2000-01 academic year. The prestigious Goldwater Scholarships are given in nationwide competition to college sophomores and juniors majoring in math, science or engineering. The scholarships provides up to $7500 to cover the cost of tuition, books, and room and board. There were 309 Goldwater Scholars selected nationwide this year from 1176 nominations. Only 24 of the scholarships went to math majors.

Scott has been doing research in Ramsey theory, specifically in Rado numbers. This research started last summer when Scott attended an NSF-sponsored REU (Research Experience for Undergraduates) program in Ramsey Theory at the University of Idaho under the direction of Daniel Schaal from South Dakota State University and Arie Bialostocki of the University of Idaho. Scott is continuing his research with Schaal. He has also received a Watkins scholarship from UM to work on his senior thesis next year with his co-advisors, George McRae and Mark Kayll.

Scott has been a top student ever since he came to UM three years ago. He was the recipient of a departmental Hashisaki Scholarship, given to our top math majors, for 1999-2000 and also for 2000-2001. Scott was a departmental Tutorial Scholar two years ago, working with Honors Calculus students, and a Teaching Scholar this past year where he worked in both the Finite Math course and in Honors Calculus.

Scott was born in Sidney, Montana, but spent most of his childhood (from age 3 on) in Asia, where his parents were teachers in American schools. Scott graduated from high school at Nagoya International School in Nagoya, Japan, where he lived for seven years. Scott's family moved back to Montana when Scott graduated and now lives near Kalispell. Scott's wife, Elizabeth, is from Kalispell and a junior in Elementary Education at UM.



Scott Jones

Notes from the Chair's Desk

Spring has arrived in Missoula. Students would rather be outside enjoying the beautiful warm days, but final exams are approaching quickly. Trees and flowers on campus are in full bloom. Time for graduation, when we say goodbye to many of our students as they head off to new challenges. Time to take stock of how we're doing and prepare for the renewal of the school year with another group of eager mathematics learners.

Two more of our long-time mathematics faculty have announced their retirement plans this year: Keith Yale and George Votruba. Keith began as a student in this department in 1957, and he has been on the faculty since 1967. George joined the mathematics faculty in 1968. Thus, the department will lose 65 years experience teaching a wide variety of courses, from the very basic beginnings through graduate research analysis. Actually, we will not lose them totally just yet, both Keith and George plan to return to do some retirement teaching. On behalf of the department, we thank these scholars for their service to the university. I'm sure many readers of this newsletter will remember the contributions of Keith and George.

As the semester draws to a close, we are busy trying to be sure we can cover all the classes in the fall. We will have one new faculty member and three visiting teachers joining us next year. About ten new teaching assistants and some new part-time faculty will help carry the load. For the first time in three years, we expect no major summer renovations in the mathematics building. With a little luck, we might be able to start the fall semester without the delays of the past few years.

Our students continue to be our greatest pride. Elsewhere in this newsletter, you will find a list of the mathematics award recipients for this spring. It's a list of dedicated young people who have worked hard to gain this recognition. These students, along with many of their colleagues, continue to make joining this department one of the finest career choices a college mathematics teacher can make.

Once again, I encourage you to keep in touch. It's always exciting to hear from friends and former students. Drop us a note. And when you talk to young mathematics students who are looking for a challenge, tell them Grizzly Math is "as good as it gets."

James Hirstein

Faculty:
James Hirstein, *Chair*
David Patterson, *Assoc. Chair*

Rick Billstein, *Mathematics Education*
Mary Jean Brod, *Secondary Mathematics*
William Derrick, *Applied Mathematics*
Rudy Gideon, *Statistics*
Jon Graham, *Statistics*
Gloria C. Hewitt, *Emeritus, Algebra*
James Hirstein, *Mathematics Education*
Leonid Kalachev, *Applied Mathematics*
Mark Kayll, *Operations Research*
Libby Krussel, *Mathematics Education*
Don Loftsgaarden, *Emeritus, Statistics*
Johnny Lott, *Mathematics Education*
Jenny McNulty, *Operations Research*
George McRae, *Operations Research*
David Patterson, *Statistics*
Greg St. George, *Functional Analysis*
Brian Steele, *Statistics*
Karel Stroethoff, *Complex/Functional Analysis*
Thomas Tonev, *Complex/Functional Analysis*
Nikolaus Vonessen, *Algebra*
George Votruba, *Functional Analysis*
Mark Wilson, *Algebra*
Keith Yale, *Complex/Functional Analysis*

1999 Honor Roll of Donors

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Duane Adams
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Elaine Bohanon
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William Cadieux
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Daniel Hansen
Mary J. Hashisaki
Lawrence Heilbronn
Robert & Marjorie Howe
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Joseph Kratofil
Fat Lam
Don Loftsgaarden
Emma Lommasson
Johnny Lott
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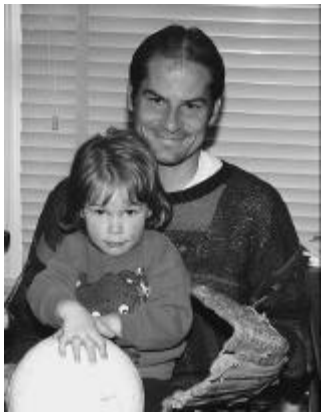
Loreen McRae
Edwin Mertz
Vera Myers
Ross Nickerson
Ruben O'Neal
John & Margaret Ottman
Thomas Payne
Howard & C.W. Reinhardt
Richard & Betty Remington
Ed Risse
Adele Rothan
Steve Rummel
David Sherry
Regina Souza
Sam Sperry
Greg St. George
Maynard & Shirley Stevenson
William Stoner
Thomas & Elena Tonev
Carol Ulsafer
John Ulvila
Nikolaus Vonessen

Graham Wins Teaching award

by David Patterson

It was recently announced by the College of Arts and Sciences that Jon Graham, Associate Professor of statistics in the Department of Mathematical Sciences, has been selected as the recipient of a 2000 Helen and Winston Cox Educational Excellence Award. This award is given annually to one or two tenure-line faculty members who have been on the faculty six years or less. Awardees are selected on the basis of "superior teaching, accessibility to students beyond normal office hours, scholarly / professional activity, and campus / community service," with the primary emphasis on excellence in teaching. The Cox Award comes with a cash award, $750 of which is given to the Mansfield Library for the recipient to use to buy research materials.



Jon Graham with his daughter Emily

Jon is known as a dedicated and demanding teacher. Whether it's a theory course for mathematics graduate students, or an applied course for students in other departments, Jon consistently receives top marks from students. Jon also consults extensively with students and faculty in other departments and serves on the dissertation committees of many graduate students, a role for which he receives compliments from both the students and their advisors. A few of the many written comments from Jon's student evaluations and from letters of support students wrote follow:

"Jon's an excellent teacher: approachable, clear and effective teaching style…He demanded a lot from us, but it was hard to complain (not that I didn't some days) because he was working even harder…"

"What also makes Dr. Graham a great teacher is his visible passion for teaching and learning."

"As a result of the time I spent with Jon, I changed my area of emphasis to statistics. The course of my life literally changed as a result of my interactions with Jon…Jon did an excellent job of mentoring me and guiding me through my academic career, and played a crucial role in preparing me for my current occupations as an environmental statistician."

Congratulations, Jon!

Conway to Visit in September

by Mark Kayll

For the third year running, a mathematician will open the President's Lecture Series at the University of Montana. And for the third year running, we have been lucky enough to attract a speaker of international reputation. Ron Graham and Maria Klawe were the distinguished visitors in 1998 and 1999. The 2000 Series brings us John Conway, John von Neumann Professor of Mathematics at Princeton University, who will give two talks on September 7. The first talk will be the keynote address for the Big Sky Conference on Discrete Mathematics and the second will be a general interest talk for the President's Lecture Series.

Among outsiders to mathematics, Professor Conway is perhaps best known for his invention in the 1960s of the Game of Life, now a popular screen saver. In the words of Martin Gardner, "The game made Conway instantly famous, but it also opened up a whole new field of mathematical research, the field of cellular automata."

Within mathematics, Conway's discoveries abound. His analysis of the game Go led to his invention of *surreal numbers*, a number system that includes the real numbers and extends into the transfinite. A more down-to-earth Conway invention is the "Doomsday Algorithm", a rule for determining the day of week of any given date. Created in response to a challenge by Martin Gardner, the rule is simple enough for Conway to apply in his head, usually in under two seconds.

Along with deep insight, Conway brings infectious enthusiasm to his mathematical pursuits. His lectures this fall - whether on numbers, games, knots, geometry, codes, or another topic in his sphere of influence - are eagerly awaited by all of us.

The Big Sky Conference on Discrete Mathematics brings together mathematicians and computer scientists with research interests in discrete mathematics. This year's conference runs from September 7-9. See the math department's web page for more details.

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Howard Reinhardt: from Idaho to Montana, a Mathematician Speaks

by Johnny Lott

Howard E. Reinhardt, currently Professor Emeritus of the Department of Mathematical Sciences at The University of Montana, was born in Idaho, the son of a farmer. In a recent interview, Dr. Reinhardt talked of some of his first memories of mathematics learned from his father,

> *One of my first memories of my father is of him holding me and I asked him for a problem, and he giving me a problem. He would say how much is 1 and 4 , and I would say 5. And he would say how much is 2 and 3, and I would say 5. And he would say, "The same for both problems?" I would say "Yes," and we would both laugh. So already then I was getting pleasure out of problems, getting some rewards for solving problems."*

From the early pleasures of solving problems with his father, Howard's love of problems has influenced his life. He went to the University of Idaho as an undergraduate interested in journalism, chemistry and mathematics. After World War II when he was completing his degree, he studied mathematics primarily as a result of being able to complete the degree more rapidly than one in chemistry or journalism. Another reason he claims to have chosen mathematics over chemistry was his lack of coordination in working on quantitative experiments due to his left-handedness. After completing school in Idaho and with money left on the GI bill, he returned to school at the State College of Washington (now Washington State University) and completed a master's degree in mathematics in 1951. While there, he studied under a young faculty member, Bill Ballard, who would be a colleague later in Montana. With a master's degree in hand, Howard went to work in industry until he was called back to Washington to teach. During that year, he was convinced to return to school for a doctorate.

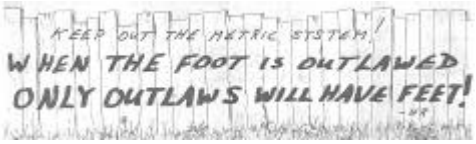
Applying only to the University of Washington and the University of Michigan, he was accepted at both but chose Michigan, and according to him, "clearly my life has been very different because of that particular choice." In Michigan he met and married his wife Chin Won. Also while there he met a Montana faculty member, Don Higman, who was instrumental in getting

Reinhardt to take a job at The University of Montana. Dr. Reinhardt came to Missoula without an interview , without visiting, and without today's faxes and emails.

At the University of Montana early in his career, he was asked by Ted Ostrom, the department chair, to teach a class in number theory. When, Howard told Ostrom that he didn't know number theory, Dr. Ostrom replied that it was time he learned. That class, clearly a highlight for Dr. Reinhardt, had as students Merle Manis, George McRae and Keith Yale, all of whom later became faculty members here. The problems posed in that class intrigued both the students and Dr. Reinhardt and had a lasting influence on both. Dr. Reinhardt later became a problem editor for *The Mathematics Monthly* in the early 1980s and has always been a regular contributor of problems to the Lennes Exam. In fact, the latest Lennes Exam had an *Idaho* problem from the number theory realm: Show that the sum of two consecutive odd primes is the product of at least three (possibly repeated) prime factors.

While at The University of Montana, Dr. Reinhardt was both a faculty member, a department chair and eventually Dean of the College of Arts and Sciences. After about five years in Montana, he spent one year at the University of Wisconsin at the Mathematics Research Center and at that time made a decision to return to Montana and his teaching career here. Clearly The University of Montana has been a better place because of that decision.

Dr. Reinhardt's dissertation in statistics was entitled *Using Least Favorable Distributions in Testing Composite Hypotheses*. The statistical interest of Dr. Reinhardt is also seen in his co-authoring an undergraduate statistics book with Dr. Don Loftsgaarden and "Some Statistical Paradoxes," a chapter in the 1981 National Council of Teachers of Mathematics Yearbook *Teaching Statistics and Probability* in which he discussed some famous paradoxical problems. Paradoxes and problems are also evident in Howard's sense of humor. In the 1970's when it appeared that the United States might be moving on a more rapid pace toward the metric system and there were numerous letters to the editors opposing such a move, Dr. Reinhardt inspired a cartoon along the lines of the graffiti seen on the fence.



Dr. Reinhardt wrote articles, was interested in teaching, helped bring the Ph. D. program to this campus, and edited the *CAS Forum* while a faculty member. When asked about what he liked about being here, he said, "The students can have a good quality edu-

(Continued on page 5)

(Continued from page 4)
cation at this institution, and I think making that possible has been an important part of what I liked about being here." Students at all levels felt that Dr. Reinhardt helped provide them a quality education on this campus. From working with precollegiate students like Deb Dunwebber and Shelly Kelley to directing the dissertation of doctoral student Paul Smith, Howard exhibited his love of problems and mathematics. That love is exemplified in the following statement from Dr. Reinhardt,

> *There is the beautiful theory of mathematics, but there are also glorious problems. I think one isn't a good mathematician unless he recognizes both of those things. Good mathematics starts at, I think, because my career started that way, with pleasure in doing problems—going back to when my father said 2 + 3 and 1 + 4 are the same things.*

1999 Graduate Degree Recipients

Name	Degree	Date	Project Title	Advisor
James Barta	M.A.T.	Fall 1999	*Correlation of High School Math Student Enrollment*	Lott
Kelly Jensen	M.A.T.	Fall 1999	*Effect of Learning Math Through Hands-on Activities on the Attitude and Achievement of Pre-service Elementary Teachers*	Hirstein
Supawan Gai Lertskrai	M.A.	Spring 1999	*Asymptotic and Numerical Estimates for the Dissolution of a Spherical Bubble in the Case of a Fast Reaction*	Long / Kalachev
Yueju Li	M.A.	Spring 1999	*Comparison of Tests of Fit Between Pearson's CC and Two Kolmogorov-Smirnov Type Tests* (*Lilliefors*)	Gideon
Jiang Qun	M.A.	Summer 1999		Gideon
Jeffrey Stratton	M.A.	Spring 1999	*Testing for Normality Using a Correlation-Type Statistic*	Graham
Jayleen Wangle	M.A.	Spring 1999	*Radicals in Rings*	Hewitt

Mathematics Scholarship and Award Winners

- Joseph Hashisaki Memorial Scholarships (for outstanding upper division math majors): Scott Jones, Amanda Deisher, Molly Schulte
- Mac Johnson Family Endowment Scholarships (for students who have completed at least one semester of calculus and shown exceptional talent in mathematics): Samantha Allen, Young-A Choi, John Keintz, Nikki Semmelroth
- N.J.Lennes Awards (cash prizes based on performance on a competitive exam): (1st) Amanda Deisher, (2nd) Colin Dundas, (Honorable Mentions) Young-A Choi, Daniel Wedul
- Undergraduate Teaching Scholar (works with a professor to improve a class): Amanda Deisher
- Undergraduate Tutorial Scholars (assist students in a lower-level course): Karrin Allen, Cathy DeGrandpre, Hong Fang, Jennifer Hudson, Kelsey Keene, John Paterson, Molly Schulte, Grant Swicegood
- Undergraduate Technical Scholars (work on computer tools for a class): John Giovanini
- John A. Peterson Mathematics Education Award (book award to outstanding senior in mathematics education): Michelle Beatty
- Graduate Student Distinguished Teaching Awards (cash awards to two outstanding teaching assistants): Michael Kraemer and Debbie Preston
- Summer Graduate Research Scholarships: Michael Kraemer and Dave Perkins
- Pi Mu Epsilon New Members: Cathy DeGrandpre, Lily Eidswick, Jason Harris, Mark Heaphy, James Hirstein, Jennifer Hudson, Kelsey Keene, Michael Obland, W. Carl Saunders, John Spritzer, Fu-Chan Wei

University-wide scholarships and awards to math majors:

- Bertha Morton Scholarship: Michael Kraemer
- President's Senior Recognition Awards: Michelle Beatty (Mathematics Education), John Keintz (Statistics / Operations Research), James McCreight (Pi Mu Epsilon), Joe Petersen (Pure / Applied Math)
- Watkins Scholar for 2000-2001: Scott Jones

πμε/MAA Math Club Corner

With the conclusion of finals week, it is amazing to look back and see how quickly the Pi Mu Epsilon / MAA Math Club schedule of meetings was filled. One would never have guessed that so many activities could have fit into such a brief semester.

We were fortunate to have speakers from both the academic and professional worlds. Dr. William Derrick and Dr. Brian Steele, both professors from the department, journeyed to MA311 to give presentations in their fields of interest. Dennis Hoffman was a guest of the department and spoke on Actuarial Science as a career field.

The highlights ending the semester were the student presentations. The diversity of the student members was evident in the broad range of topics selected. We saw first hand how math does indeed span all dimensions. The following were titles: *Economic Theory, Statistical Sampling in Old London, Phoenix-Quest – Math Software, Special Relativity, Trisection of Angles by Orgami, More Math Party Games for Topologists, How to Avoid Bad Logic*, and *GIMPS* (the Great Internet Mersenne Prime Search).

left to right: Mick, Keith, MaryJean, Amanda, Carl, Fu-Chan, Maria, John, Yer

The Math Club celebrated Math Awareness Month with a Math Film Festival open to the public. The afternoon of movies, popcorn, and mathematics kicked off with a popular classic *Donald in Mathmagic Land*, followed by *Shape of the World* and The *Shape of Space*. The event was well attended and enjoyed by students, faculty, staff, families and guests.

πμε / MAA Math Club

Current active members include:

Amanda Deisher ..... President

Carl Beatty	James Billington
Cory Fuchs	Scott Jones
Maria Saria	Sheryl Schopfer
John Spritzer	Yer Thao
Mick Wiedrick	Fu-Chan Wei

Faculty Advisors:

Mary Jean Brod	Keith Yale

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