



Reflections on NCUWM

by Anita Sindelar

There were over 200 of us present in Lincoln for the eighth annual Nebraska Conference for Undergraduate Women in Mathematics (NCUWM) held in February. I felt privileged and excited to be a part of the group representing varied parts of the country and age groups. It was a blast being surrounded by women who are intrigued by the same ideas that captivate me. Together we grew and shared in the experience as we enjoyed all that the weekend had to offer.

The event was very well organized. From pioneers in the field I learned a bit about the history of women in mathematics. I also attended 14 talks given by undergrads about research they had done or were doing, three plenary sessions with women who had achieved a great deal in the

field of mathematics, and two panel discussions that I found to be very helpful: "Careers Using Mathematics" and "Choosing a Mathematics Graduate Program". The many talks opened my eyes to an array of important areas in math, some of which I hadn't known existed. The encouraging and innovative information presented was extremely motivating.

I said, "Until next time," on Sunday to the friends I had made. As the plane took me home, I could not help

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UM student Anita Sindelar (second from right) with other attendees of the Nebraska Conference for Undergraduate Women in Mathematics, February 2006.

The Undergraduate Mathematics Scholars Program

by Mark Kayll

More than several years ago now (1997), the Department received a substantial endowment from the Bryan Family. (Charles Bryan was a long-serving Professor specializing in Numerical Analysis before retiring in 1989. His ties with the Department were instrumental in planting the seeds that led eventually to his family's generous gift.)

The George and Dorothy Bryan Endowment is the principal source of support for the Department's Undergraduate Mathematics Scholars Program. The purpose of this program is to make students a crucial part of the learning environment and to increase their interest, excitement, and confidence for studying mathematics. Teaching Scholars and Tutorial Scholars work with faculty in different capacities depending on their assigned course and faculty pairing.

Now that the program has been running successfully for nine years, we thought it would be interesting to hear from a sampling of instructors who worked with our Undergraduate Scholars this past year. Professors **Jakayla Robbins**,

Thomas Tonev, and **Jenny McNulty** share their experiences below.

Jakayla Robbins: **Hallie Torrey** served as a Tutorial Scholar for my *Calculus I* (Math 152) and *Calculus II* (Math 153) courses this year.

Every Friday students worked together in small groups to complete an exploratory worksheet. Traditional lectures were only able to scratch the surface of a topic. The worksheets helped students to gain a deeper understanding of concepts covered in lecture. Fridays were somewhat informal and provided students with the opportunity to ask questions of their peers and the instructor.

As one can imagine, it was not uncommon to have several students trying to ask me different questions at the same time. It certainly was helpful for me and beneficial to my students to have Hallie in class every Friday to serve as an extra source of information. She brought a different perspective to the class and was well-received by my students.

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Chair's Notes

by David Patterson

We are well into summer and the fire season is heating up. We had a bit of excitement over July 4 when fireworks in East Missoula started a grass fire on Mount Jumbo that, the next day, burned over to the west side, visible from campus. Those of you who know me may not be surprised that I worked in my office, which has a clear view of Mount Jumbo, all day on July 5 and never noticed the smoke, helicopters and retardant planes. The fire burned over 300 acres before being controlled.

I am pleased to report that interior work started in early July for an addition to the Mathematical Sciences Building which will house an elevator, bathrooms, and seven new offices. The plan evolved from simply adding an interior elevator — that would have significantly reduced the size of several rooms — to the current plan which addresses the lack of bathrooms and adds some badly needed office space. The College of Arts and Sciences and the Administration/Finance Office responded to our concerns about the original plan and reallocated money from another project to make an addition possible. We are grateful to all those involved in the process, including Disability Services, Facilities Services, and the higher administration, for their hard work and support. The architect has carefully designed the addition to match the original architecture. We will post pictures of the construction periodically on our web page.

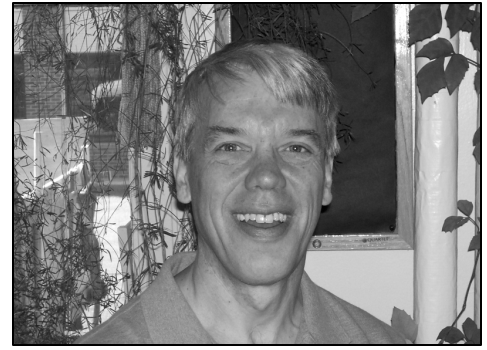
It's now been a full year since I became Department Chair. I am continually impressed by the activities of our faculty and students, and we highlight many of these in the newsletter. This coming year, two faculty are going on international exchanges — **John Bardsley** to the University of Helsinki and **Adam Nyman** to Fudan University in Shanghai. **Karel Stroethoff** received a sabbatical which he will use to continue his research in functional analysis and to begin the process of converting some of his extensive course notes into textbooks. **Libby Knott** will visit the University of Idaho in the fall to work on a grant for developing online courses. These kinds of activities broaden and strengthen our programs.

I am amazed and deeply gratified by the generosity of donors to our department. Donations to the Excellence Fund allowed us to support the travel of three students to conferences this year (see articles by Anita Sindelar and Aaron Luttmann in this newsletter), the Graduate Student Seminar (page 4), to bring in outside speakers, to supplement our scholarship funds, and to support other activities related to teaching and research. And now a plea: if you haven't donated before, please consider it. Five years ago, annual tuition and fees for full-time undergraduate students were about \$3000 for residents and \$8100 for nonresidents. Next year, the corresponding figures are \$4700 and \$13,400. Our scholarships have not kept pace. Donations to any of the endowed scholarship funds or to the department's Excellence Fund (earmarked, if you wish, for scholarships) would be greatly welcomed. Scholarships are vital to attracting and retaining math majors.

Finally, I wish to echo the invitation in our Alumni News column — we'd love to hear from you about what you're doing and so would your classmates (send news to Linda Azure, Math Department Office, azure@mso.umt.edu). I'd also welcome any feedback you can give us, good or bad, on our program and your experience here. Feedback is vital to improving what we do. Contact me via email, snail mail, or telephone.



dapatterson@mso.umt.edu
406-243-6748



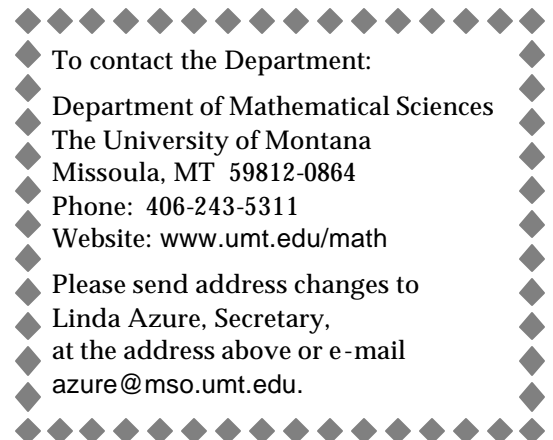
Faculty:

David Patterson, *Chair*
Mark Kayll, *Associate Chair & Newsletter Editor*

John Bardsley, *Applied Mathematics*
Rick Billstein, *Mathematics Education*
Lauren Fern, *Lecturer*
Jon Graham, *Statistics*
Jennifer Halfpap, *Analysis*
Jim Hirstein, *Mathematics Education*
Leonid Kalachev, *Applied Mathematics*
Mark Kayll, *Combinatorics*
Libby Knott, *Mathematics Education*
Jenny McNulty, *Combinatorics*
George McRae, *Optimization*
Adam Nyman, *Algebra*
David Patterson, *Statistics*
Jakayla Robbins, *Combinatorics*
Matt Roscoe, *Lecturer*
Greg St. George, *Analysis*
Regina Souza, *Lecturer*
Bharath Sriraman, *Mathematics Education*
Brian Steele, *Statistics*
Emily Stone, *Applied Mathematics*
Karel Stroethoff, *Analysis*
Thomas Tonev, *Analysis*
Carol Ulsafer, *Lecturer*
Nikolaus Vonessen, *Algebra*

Faculty Emeriti:

William Ballard	Johnny Lott
Mary Jean Brod	Merle Manis
Charles Bryan	Robert McKelvey
Bill Derrick	William Myers
Rudy Gideon	Howard Reinhardt
Stanley Grossman	George Votruba
Gloria Hewitt	Keith Yale
Don Loftsgaarden	



To contact the Department:
Department of Mathematical Sciences
The University of Montana
Missoula, MT 59812-0864
Phone: 406-243-5311
Website: www.umt.edu/math
Please send address changes to
Linda Azure, Secretary,
at the address above or e-mail
azure@mso.umt.edu.

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Hallie was also willing to help students outside of class. She provided students with her phone number and e-mail so that they could ask her questions anytime.

The Tutorial Scholar program benefited not only my students, but also Hallie. The program allowed her to interact with other UM mathematics students and helped her to refine her communication skills. She gained skills that will help her in her future studies and career.

Thomas Tonev: One feature that makes UM a very special place to study is its care for students. The Mathematical Sciences Department should be commended for its efforts in this respect. Its Teaching and Tutorial Scholars program is a free-of-charge students-ask-students and students-help-students program.

Introduction to Abstract Mathematics (Math 305) is a tough course for most students. It is a kind of dividing point in the level of understanding and involvement with mathematics. For those who pass it successfully, their relationship with mathematics elevates to a higher, advanced level, while for those who fail the course, their relationship with mathematics—be it love or hate—remains within a relatively elementary level.

The fall 2005 Tutorial Scholar for Math 305 was **John Case Jr.**, a Department major who graduated this past spring. His goal as a Tutorial Scholar was to help students to better grasp the material of this challenging course. For this purpose, he held office hours three times a week for individual consulting. Students met him either in the Basement Conference Room in the Math Building, or in his Corbin Hall office. They had his email address and home phone number to arrange alternative sessions if they couldn't make it to the office hours or felt they needed additional assistance. John

and I had several meetings to direct him on his duties, rules, standards, and expectations.

John helped students with their written homework assignments and in preparation for the midterm tests. He helped me with the group work activities during classes and with the review sessions for the whole class prior to the midterms, which were led entirely by him. Overall, John's contributions to the course were highly successful in elevating the learning of my Math 305 students this year.

Jenny McNulty: **Andrew Bissell** was the Teaching Scholar for *Honors Calculus* (Math 152-153) this year. At the time, Andrew was a graduating senior majoring in Economics and Mathematical Sciences.

As a Teaching Scholar, Andrew conducted weekly problem sessions and ran a review session before exams. In addition to being knowledgeable about mathematics, Andrew was a great role model for these highly motivated, energetic, creative honors students. The students benefited from Andrew's problem sessions in many ways.

First, problems are very important in learning mathematics and these sessions gave students the opportunity to see many examples worked out in detail. In addition, as an undergraduate student Andrew's perspective was quite different from that of the professor; Andrew often remembered learning the material and could counsel the students on the difficulties and coach them on particular misconceptions that they might have had. This served to reinforce the material discussed in the lecture. On several occasions, he told students, "this is how I remember it"; this type of advice helped the students quite a bit. The students related well to Andrew as is evidenced by a late-night plea by one group to come help them study before an exam. Overall, Andrew was a tremendous asset to the Honors Calculus course.

Graduate Summer Research Awards

by Karel Stroethoff

This is already the ninth year that the Department is supporting several graduate students to do research over the summer with Graduate Summer Research Awards. Like the Undergraduate Mathematics Scholars Program (see the separate article on p. 1), these awards are also supported by the George and Dorothy Bryan Endowment.

This summer's recipients are **Seth Braver**, **Scott Lambert**, and **Hillary VanSpronsen**, all students in our doctoral program. Seth will be continuing the research he started last summer, which is to illuminate Lobachevsky's theory of parallels. Hillary is completing the research project she initiated with her Graduate Summer Research Award two summers ago; this summer's award will help her finish analyzing the data she has been collecting for her dissertation research on students' proof-writing, before she begins her faculty posi-

tion at Michigan Technological University this fall. Scott is using the award to study algebraic properties of mappings between function algebras. He has already participated in a major conference in this area of analysis, where his presentation of his preliminary results was well-received (see the separate article on the SIU-E Function Space Conference on p. 4).

Last summer's Award recipients were also all doctoral students: **Seth Braver**, **Dara Laobeul** and **Aaron Luttmann**. Seth was able to make a good start on his dissertation research last summer. Dara completed a research project on mathematical problems related to astronomical imaging. Aaron worked on both his dissertation research (on video segmentation in applied mathematics) as well as function algebras in analysis. He successfully defended his PhD dissertation this past semester and already has several papers submitted for publication.

Successful New Seminar

by Aaron Luttman

Seminar courses are a fundamental component of the Department's graduate program. There is a wide variety of topics covered, from Analysis to Statistics to Mathematics Education, and the students enrolled are encouraged—often required—to give presentations on the material being studied. These are excellent opportunities to learn how to speak about mathematics to a mathematical audience; they can also be a source of nerves and fear for some students.

Early last fall, the Department's graduate students came together to organize the “Graduate Student Seminar” (GSS). This was a new type of seminar, the primary difference from other seminars being that no professors were invited to attend. The new seminar had two primary goals. The first was to offer graduate students a chance to attend a general seminar where they can learn about the research of their fellow students. Thus, for example, Statistics students can see the work of Combinatorics students, a chance they might not otherwise have. In fact, this year we were treated to presentations in Algebra, Analysis, Applied Mathematics, Combinatorics and Optimization, Geometry, and Statistics, so every attendee was introduced to student research in most mathematical fields represented at UM. The second goal of the seminar was to give participants an opportunity to learn and practice presenting their mathematical research to a mathematical audience of their peers. By excluding professors, we achieved a more relaxed forum than the traditional seminar courses, and this gave students valuable presentation experi-



Dr. Aaron Luttman, UM's newest math Ph.D.

ence without the added stress of facing their professors.

Even though professors were not invited to attend GSS, the Department was very supportive of our efforts. With no faculty participation, it was not possible to give academic credit for GSS—most Department seminars can be taken for 1 or 2

credits—so the Department had to be a little more inventive in the way it would support GSS. The only thing more important to graduate students than credits is free food, so to encourage participation, the Department paid for pizza to be ordered in for lunch at each seminar presentation, a gesture greatly appreciated by all the GSS attendees.

This was truly an exciting inaugural year for GSS, and the returning graduate students—again with the support of the Department—are excited to continue it next year.

UM's Presence at SIU-E Function Spaces Conference

by Aaron Luttman

Last May **Scott Lambert**, **John Case**, and I attended The Fifth International Conference on Function Spaces at Southern Illinois University in Edwardsville, along with Professor **Thomas Tonev**.

All four of us representing the University of Montana presented our research on Banach algebras, and all of our talks were very well received. The conference gave us students our first chance to present our research at an international conference in analysis, and we all greatly benefitted from the opportunity. Quite a few attendees—several of them internationally renowned in the field—passed along helpful suggestions for new directions in which our research could go. I personally received tremendous encouragement from many of the other participants.

Of course we were not there solely to present our work, but also to be exposed to the cutting-edge research currently being undertaken by others in our and closely-related fields. Considering we had the opportunity to attend up to ten talks per day (and took advantage of the opportunity!), it's safe to say that we did, in fact, get that exposure. We all came back with a long list of new things to do.

A third benefit from the conference that was not planned was that we were able to work closely with a group of colleagues from Japan who attended the conference and do research closely related to that of Scott and me. We were able to

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Doctoral Student Scott Lambert

Alumni News

Jim Lowdermilk (M.A. 1994) shared some of his latest. He owns and operates 'Mathemagician Tutoring' and teaches part-time at Arapahoe Community College in Colorado. In the Summer 2003 edition of *The Ostrakon* (the Egyptian Study Society's official research publication), he published an article, "Unit fractions: inception and use". In Boston this past April, he presented a paper "The development of the Egyptian civil calendar and its effects on society" at the annual meeting of the American Research Center in Egypt.

Great news from **Steve Mihina** (B.A. 1989, M.A. 1995), who just completed his tenth year of teaching at Highland Community College in Freeport, Illinois. During 2005-06, he was awarded HCC's Outstanding Faculty Award. Congratulations, Steve!

Please send in your news; we're always glad to hear from you, and your classmates will enjoy reading about you in this column.

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acknowledging the new feeling of support that filled me. Never before had I realized the community I was a part of as a woman in math, the magnitude of the field, or the boundless opportunities available to me now and in the future. The NCUWM was no doubt inspiring and invigorating. I will encourage my peers to attend similar functions; this was an invaluable experience in one student's education.

Ed.'s notes: Anita Sindelar is an undergraduate student in UM's Applied Analysis Option. The NCUWM website is located at <http://www.math.unl.edu/~ncuwm/9thAnnual/>

(Continued from page 4 - SIU-E)

meet several different times and discuss the directions in which we and they are taking the research— how we can complement each others' work in order to produce more significant results. This will lead quite possibly to a much closer collaboration between our group and theirs.

I don't generally submit reports about the conferences I attend, but in this case I thought it appropriate. We would not have been able to experience this great conference without the financial support of the Department, so it's important that the Department know how much we appreciate the support. This particular function is extremely important for the development of mathematics graduate students, and I, for one, am grateful that the Department chose to assist me in attending this conference.

Honor Roll of Donors

William and Lee Ballard

Ruth Brocklebank

Carolyn and Alfred Chase

James Coghlan

James and Marjorie Elander

William and Vicki Fitzgerald

Frank Gilfeather

Gary Glaze

Francis T. Hannick

Mary Hashisaki

Gloria C. Hewitt

James Hirstein

Lt. Col. Gregory and Sydney Hulla

Stephen Johnson

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Mark Kayll

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David A. Patterson

David Sherry and Jeanne Ambruster Sherry

Greg St. George

Elena and Thomas Tonev

R. Lynn Turnquist

Regina Souza and Nikolaus Vonessen

Susan Walker

Richard and Carla Welter

Keith and Martha Yale

Degree Recipients

Name	Degree	Date	Title	Advisor
Tiffany Horsch	M.A.	2005	<i>Minimizing Cost of Transporting Sugar Beets</i>	Kayll
Aaron Luttmann	Ph.D.	2006	<i>A Three-dimensional Variational Approach to Video Segmentation</i>	Bardsley & Stone
Jane Whitmire	Ph.D.	2006	<i>The Use of Computer Manipulatives in Building Integrated Concrete Understandings in Secondary Mathematics Education</i>	Knott
Samantha Allen	M.A.	2006	<i>What Does "Algebra for All" Mean to Me as a Middle School Teacher?</i>	Hirstein
Jasmine Nettiksimmons	M.A.	2006	<i>Multiple Imputation: An Epidemiological Application</i>	Patterson
Beth Robinson	M.A.	2006	<i>A Study of Catalan Numbers: Bijections and Identities</i>	Kayll
Cindy Scavarda	M.A.	2006	<i>Using the Autologistical Model to Assess Fire Danger Variables</i>	Graham
Rebekah Yates	M.A.	2006	<i>Classifying Quadratic Forms</i>	Nyman

2006 B.A. Recipients: Paul Bailey, Chelsea Bestram, Andrew Bissell, John Case, Philip D'Aquin, Craig Dugas, Erin Ford, Dustin Frye, Shannon Johnson, Curtis Norman, Cody Ray, Ryan Sikorski

Student Profile: Cody Ray

by John Bardsley

Cody Ray transferred to UM in the fall of 2004 from Walla Walla Community College and graduated with his Mathematical Sciences BA this past May. Having completed the Applied Analysis Option, Cody focused on the department's applied courses. His primary interests included computational mathematics and visualization.

Following these interests, Cody created a variety of *Mathematica* animations (movies) for use in UM's Math 412 – *Partial Differential Equations* (PDEs). These animations were used in the classroom when he took PDEs in the spring of 2005, were in use once again during this past term (spring 2006), and will continue to appear in the offerings of Math 412 well into the future. To see Cody's animations, please visit the Math 412 website http://web.math.umt.edu/bardsley/courses/412_18/412_18.html.

Cody's keen interest and excellent performance in his coursework have allowed him to take full advantage of the department's educational opportunities, and during commencement week, he was recognized by the national Mortar Board Society as UM's outstanding graduating senior in Applied Analysis. Together with several summer internships with the U.S. Department of Energy, Cody's UM Math degree has prepared him for success beyond his bachelor's degree. In particular, he was recently awarded a Teaching Assistantship in the Department of Mechanical Engineering at Oregon State University. He begins graduate studies this fall.



Recent graduate Cody Ray

The path that Cody has chosen to take through our program, followed by his success in obtaining a T.A. in a graduate engineering department, hints at the wide range of opportunities available for UM graduates in the Mathematical Sciences. The department wishes Cody the best of luck as he continues his studies at OSU.

2006 Mathematics Scholarships & Awards

Joseph Hashisaki Memorial Scholarship

*(for outstanding upper division
math majors, \$1500)*

Anita Sindelar

Mac Johnson Family Endowment Scholarships

*(for students who have completed at least one semester of
calculus and shown exceptional talent in mathematics,
\$1000)*

Natalie Creamer
Kristen Waarvik

N.J. Lennes Awards

*(cash prizes based on performance
on a competitive exam)*

Jeongki Cho (1st)
Arlo Johnson (2nd)
Michael Michalak (3rd)
Gabe Carroll (Honorable Mention)
Will Fletcher (Honorable Mention)
Hallie Torrey (Honorable Mention)

Mathematical Contest in Modeling

*(an international contest sponsored by the Consortium
for Mathematics and its Applications)*

Andrew Bissell (Honorable Mention)
John Case (Honorable Mention)

William L. Putnam Mathematical Competition

*(an international competition sponsored by the
Mathematical Association of America)*

Veronica Arevalo Schoedl (Top UM Contestant)

Undergraduate Teaching Scholar

*(works with a professor to improve a class,
\$1500/semester)*

Beth Hegland

Undergraduate Tutorial Scholars

*(assist students in a lower-division course,
\$1250/semester)*

Hallie Torrey
Kristen Waarvik

John A. Peterson Mathematics Education Award

*(book award to outstanding senior
in mathematics education)*

Chelsea Bestram

Graduate Student Distinguished Teaching Awards

*(\$500 awards to two
outstanding teaching assistants)*

Sharon O'Hare
Beth Robinson

Graduate Student Summer Research Awards *(\$3200)*

Seth Braver
Scott Lambert
Hillary VanSpronsen

Bertha Morton Scholarships

(UM's Graduate School Scholarship)

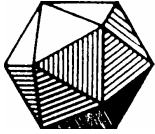
Seth Braver
Rebekah Yates

President's Senior Recognition Awards

Chelsea Bestram (Mathematics Education)
Andrew Bissell (Combinatorics & Optimization)
John Case (Pure Mathematics)
Craig Dugas (Combined Major—CSMS)
Dustin Frye (Statistics)
Cody Ray (Applied Analysis)

Pi Mu Epsilon New Members

Andrew Bissell
Jasmine Nettiksimmons
Beth Hegland
Hallie Torrey
Anita Sindelar



Math Club Corner

<http://www.math.umt.edu/mathclub/>



by Jon Graham

The Math Club (Undergraduate Math Seminar) seeks to expose undergraduate mathematical sciences majors to a variety of mathematical topics, both theoretical and applied. This weekly series consists of faculty and student presentations, book discussions, and some traditional Club-sponsored activities such as Gambling Day, Pi Day, and the Math Film Festival.

Spring 2006 featured, among others, a talk on Fibonacci numbers by **Bente Winston** of Sussex School, a discussion of philosophy, mathematics, and literature by UM Assistant Professor

Bharath Sriraman, and a hands-on demonstration of *Geometer's Sketchpad* by UM Lecturer **Matt Roscoe**. The Club celebrated Pi Day (March 14) with a Pie sale and once again sponsored the Math Film Festival as part of April's Math Awareness Month. We also read and discussed *e: The Story of a Number* by Eli Maor. Finally, we arranged a friendly Math Counts mock competition between Math Club students and Sussex middle school students to help prepare the middle-schoolers for the state competition.

It deserves mentioning that Professor **Jenny McNulty**, the Math Club's faculty advisor for the past four years, is stepping down from this position to take on new challenges

within the department.

Dr. McNulty has been the driving force in getting our majors interested in and participating in this seminar and should be recognized for her outstanding efforts to promote mathematics at UM.

Finally, we encourage you to support the Math Club. We are thrilled to have alumni and others who are willing to speak to our members about careers, courses, and life. Also, we are always looking for weekly seminar speakers. If you're interested, please contact Associate Professor Jon Graham (faculty advisor) at 406-243-2561, jgraham@mso.umt.edu, or by mail to the department.

The University of
Montana

Department of Mathematical Sciences (MMAI01)
Mathematics Building
Missoula, MT 59812-0864

NON-PROFIT ORG.
U.S. POSTAGE
PAID
MISSOULA, MT 59812

