The University of Montana
Department of Mathematical Sciences

Hashisaki Winner Erin Mondloch

Last spring, math and physics double major Erin Mondloch received the Joseph Hashisaki Memorial Scholarship, the math department's premier award for undergraduate students. It is named in honor of Joe Hashisaki, a member of the Department from 1953-1962, who founded the Two-Year College Mathematis Journal and was a co-author of the first mathematics textbook specifically for prospective elementary teachers. The money for this $1,500-award comes from the Joseph Hashisaki Memorial Scholarship Fund. Here Erin tells a bit about herself:

I am a senior in physics and mathematics from Missoula. I enrolled at UM in the fall of 2003 with a Presidential Leadership Scholarship. As a student at UM, I have been involved in research, outreach, and teaching. For the past four years I have worked for Dr. Andrew Ware in the Department of Physics and Astronomy, assisting with research in computational plasma physics. I have presented this research in poster sessions at three national conferences. Last summer I participated in a National Science Foundation Research Experience for Undergraduates program at the University of Rochester's Institute of Optics. I have also worked on outreach projects such as UM Health Careers Opportunity Program's Science Opportunities for Kids and the Physics Department's high-altitude ballooning program, BOREALIS. In addition, I have been a teaching assistant for the introductory physics classes Physics 121, 122 and 221. I am very grateful for the Joseph Hashisaki Memorial Scholarship, which allows me to continue my coursework and involvement in math and physics. This May, I will graduate from UM with a BA in physics and mathematics. Next fall I intend to begin studying in a PhD program for physics.

In This Issue:

And quite a bit more!

Meet our Undergraduate Teaching Scholars!

Hi, I'm **Trish Vannatta**! I am originally from Culbertson, MT; however, I would consider myself established in Missoula, since I have been married for 3 years and have lived here for 5 years now. At the end of my college career, I will have a double degree in psychology and math education. I plan to use my math education degree to become a secondary teacher. I helped assemble the lockers this year with the Math Club and I've also attended a few of the wonderful guest lectures that have been offered. I am a teaching scholar this semester for Introduction to Probability and Statistics taught by Dr. Patterson. I am gaining many valuable skills for my future teaching career; such as preparing group activities to incorporate into the math curriculum; one-on-one and small group tutoring, and getting experience incorporating technology into the math curriculum. I am having a lot of fun as a teaching scholar. I really appreciate this priceless opportunity!!

Meet more of our Undergraduate Teaching Scholars on page 6, where you will also find a description of this scholarship program.

Do you ever wonder what Graduate Students do in the Summer?

Michael Gilliam was one of the recipients of the 2007 Graduate Student Summer Research Awards, which are funded by the George and Dorothy Bryan Endowment. Here he reports on his adventures, mathematical and otherwise.

I will never forget the summer of '07. For this native Californian, the summer did not seem to come soon enough. When the academic summer finally did commence, it was a tornado of new experiences. The winds of this tornado took me past the elegant beauties of summer research, then on by the frustrations of teaching my first stand-alone class, then flying into the quintessential American mid-western towns of Steamboat and Boulder, and finally zipping on to

I'd like to take this column to tell you about some of the happenings around the Department of Mathematical Sciences this fall.

In September, we hosted "Who Wants to Be a Mathematician," a traveling math competition for high schoolers put on by the American Mathematical Society. The eight contestants, selected on the basis of a qualifying test, came from all across Montana. Ken Ono, a number theorist from the Univ. of Wisconsin, gave a fascinating talk on Ramanujan as part of the event. Most of the contestants brought their own cheering sections and everyone had a great time. You can see pictures and a description at www.ams.org/wwtbam. We hope to sponsor more events for talented high school math students.

Al Kelley, a 1955 UM forestry graduate who went on to get a Ph.D. in mathematics at Berkeley, gave a wonderful talk in October on his journey from forestry to mathematics, his discovery and naming of the center manifold, and his work on computer programming in mathematics. He is retired from UC- Santa Cruz and was in town on Homecoming Weekend to receive a Distinguished Alumni award. Al was a classmate of our own Keith Yale's at Berkeley. Several friends and members of Al's family attended the talk, including John de Pillis, another classmate of Al's at Berkeley and author of the great book "777 Mathematical Conversation Starters."

We have many interesting people on our faculty. One of the most interesting surely is Associate Professor of Mathematics Education Bharath Sriraman. Bharath grew

L to R: John de Pillis, Keith Yale, Al Kelley, Zane Smith (classmate of Al's at UM), and George McRae after Al's talk in October.

up in Bombay, India, but spent a good part of his early life traveling around the world with his father on merchant marine ships. Along the way, he learned several languages and immersed himself in new cultures. You can read about his story in the November issue of the newsletter of UM's Central and Southwest Asia program at www.umt.edu/cap/. Another article on his recent experiences in Turkey is in the November issue of the International Programs newsletter at www.umt.edu/ip/. I highly recommend both.

Best regards,

Dave Patterson

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Vera Stephan (1924-2007)

Vera Stephan in 1980 (Photo courtesy of Rudy Gideon)

Vera Stephan (formerly Hanner), administrative assistant in the Department of Mathematical Sciences for 25 years, died in Polson, Montana, on August 22. She was 83 years old. According to the obituary in the *Missoulian*, Vera was born and educated in Nebraska and owned businesses in Nebraska and Montana before working for the University. Her hobbies were cooking, fishing, flower gardening and sewing. She is survived by her husband Ken Stephan, a daughter, stepdaughter, two sons and two stepsons.

Vera was the head of the departmental office from the mid-60's until her retirement in 1989. Professor Emeritus Johnny Lott remembers Vera as "a wonderful, no-nonsense person who was incredibly efficient. A constant smoker with a ready smile, a fisherwoman who truly enjoyed it, she worked, raised children, lost a husband after a lengthy illness, remarried, and kept the department together. It was a joy knowing her." *D.P.*

Department News

Emeritus Professor **Bill Ballard** donated two boxes of valuable math books to the department. Some of the books were added to the collection of the Mansfield Library, while others went to the Undergraduate Lounge or the department's reading room. Thanks a lot!

Associate Professor **Bharath Sriraman** has just finished editing the third monograph for the journal *The Montana Mathematics Enthusiast*. It is a "Festschrift" commemorating the 60th birthday of Professor **Günter Törner**, a well-known German mathematician and mathematics educator. It arrived hot off the press just in time to be presented as a surprise to Professor Törner during his visit to UM this past October. BTW, both the journal and the monograph series have now become a part of Information Age Publishing, which will publish print versions of the journal as well as the monograph. The journal's philosophy of open access has been maintained as the online version of all products will be available for free at the journal website http://www.montanamath.org/TMME.

Assistant Professor **Jakayla Robbins** accepted a position at the University of Kentucky in order to be closer to her family. Good luck in your new job – we are sad to see you leave.

Jim Williamson retired after 16 years in the math department. During his time here, he was head writer on several multi-million dollar curriculum development grants directed by Mathematics Education Professor **Rick Billstein**. Before coming to UM, Jim Williamson had already had an illustrious career: as a secondary teacher, he won the nation's highest honor for math teachers, the Presidential Award for Excellence in Science and Mathematics Teaching! He also worked as the Mathematics Specialist for the Billings Public Schools and as state math supervisor in the Montana Office of Public Instruction. He served a two-year term as president of the Montana Council of Teachers of Mathematics. Currently he is still working part-time, helping to wrap up some projects. We hope you enjoy retirement!

Lecturer **Carol Ulsafer** (Ph.D. 1984) retired after teaching for the math department for the last 11 years. Before coming to UM for her doctoral studies, Carol had already been a tenured Associate Professor at North Central College in Naperville, Illinois. After earning her Ph.D. in 1984, she joined the high-tech firm Education Logistics, Inc., which had been founded a few years earlier by former UM math professor **Hien Nguyen**. In her nearly ten years at Edulog, she rose to the position of Vice President. In the mid-nineties, Carol decided to return to teaching, and has been teaching at UM ever since. For much of this time, she was the coordinator of our multi-section precalculus course, but often also taught more advanced courses like calculus or linear algebra. Fortunately, Carol has not yet left us completely – she is still teaching a course for us this semester. Best wishes for your retirement!

Carol was the last member of the notorious **Dinosaur Club**, which was founded many years ago in pre-historic times, i.e., before yours truly arrived at UM, which is, coincidentally, the same year Carol started teaching here again. Other famous members of the Dinosaur Club included Emeritus Professors **Keith Yale**, **George Votruba**, **Bill Derrick** and **Rudy Gideon**. With Carol's retirement, even futile efforts, doomed from the start, to induct Professor **George McRae** could not prevent the inevitable: the Dinosaur Club has finally become extinct. *N.V.*

Math Students Travel Many Miles to Attend Conference

By Mary Riegel

In April of this year I, along with fellow math grads, Liam Rafferty, Joe Mousel, Lahna Von Epps, and Professor Jen Halfpap, had the opportunity to attend the Pacific Northwest Section meeting of the Mathematical Association of America. Supported by the department, the five of us left after class on a Thursday and drove over nine hours to attend this annual "local" meeting held at Linfield College in McMinnville, Oregon.

The meeting began Friday afternoon with mini-courses on either "Combinatorial Game Theory" by Elwyn Berlekamp of UC Berkley and David Wolfe of Gustavas Adolphus College or "Population Modeling for Calculus Students" by Sharon Brown and Chris Dugaw of Humboldt State University.

Saturday started off with a bang in the form of a lecture by Berlekamp entitled "Fibonacci Plays Billiards" which explored various properties of the famous Fibonacci sequence in relation to elastic collisions on billiard tables of differing dimensions. Following this wakeup to our mathematical senses, we had the opportunity to attend a series of contributed paper sessions and lectures. These presentations covered a wide variety of topics and were delivered by both professors and students from the local MAA section.

Rounding out the meeting we had the opportunity to explore the Evergreen Aviation Museum before dining under the nose cone of the HK-1 flying boat, the "Spruce Goose". In the end, we drove almost 20 hours round trip to listen to a series of math lectures: some frustrating, some entertaining, but all interesting, and I would willingly drive as far again.

My Year in Shanghai

By Adam Nyman

After spending most of my life living in bustling cities like Boston, Seattle and Los Angeles, I welcomed the idea of settling down in Missoula with my partner Gabo. After several years here, however, we began longing for the kind of jolt that only a major metropolitan center could provide. Since Shanghai qualifies as such a place, and since I have a colleague at Fudan University, I jumped at the chance of visiting for a year through the University of Montana Faculty Exchange Program.

The year was ridiculously eventful. Without question, the highlight of the trip was the birth of my daughter, Maya, in December. As you can imagine, this event colored my perceptions of all other aspects of my experience.

Let me back up and tell you some of my impressions of Shanghai: Unlike in the U.S., crossing a street in the city was a (dangerous) adventure. With all manner of bicycle, motorcycle, car, van, truck, and bus whizzing by (often ignoring traffic lights), one had to look both ways multiple times to even contemplate crossing a street. I was deeply impressed by the sense of community those in our neighborhood experienced. During the evening, people gathered outside to talk, eat, and play Go. I miss that sense of general togetherness in the U.S.

The view from Adam's office at Fudan University

The Math Department at Fudan is housed in one of two new thirty story towers on campus. Our department in Missoula had to scheme for years to get a single elevator in our ancient building. The tower housing the math department has five elevators, a gym, and a $200,000 painting. My host, Wu Quanshui was absolutely the most gracious host I have ever had – his family made sure we found acceptable housing, introduced us to local eateries, and generally did their very best to make us feel at home. I hope we can one day return his hospitality.

During the Fall Semester, I taught a graduate course in Commutative Ring Theory (in English). I had a very high enrollment, as many students from Fudan want to come to the U.S. to pursue doctoral research and saw my course as a preview of American graduate mathematics. My students were amazingly dedicated, and I received many stimulating questions. I assigned a great deal of challenging homework – to learn mathematics you have to do it – a lot. This was novel to my students. The norm at Fudan was to assume the students were solving problems on their own. On my last day in China, the chair of the department approached me and said many of the professors were going to change the way they ran their courses because many students preferred to have assigned homework!

A temple in Xian which Adam visited

One of the nice aspects of exchange is that one has more time to pursue research. During the year, I puzzled over a question that has interested me since graduate school: Is there an algebraic analogue of the Reitz Representation Theorem in analysis? A representation theorem in analysis asks, e.g., when a linear map from a space of functions to the real numbers is equal to integrating against a fixed function. The analogous problem in algebra had been solved only in very special cases. My colleague S.P. Smith and I discovered a very general representation theorem in algebra. Our solution is leading to all kinds of other questions that will keep me busy for years to come.

Graduate student John Hart was able to join his Ph.D. advisor Adam Nyman for a semester in China – isn't that something? Here is John's report:
My arrival at Shanghai's Pudong airport was an interesting one. Groggy from lack of sleep and being the last one off the plane made me think that my luggage was just late instead of not there. After about 30 minutes the realization hit me that something wasn't quite right. So off I went to see what could be done - turns out you need to know where you are staying to do this, and I did not.

My stay in China was very interesting, from my whirlwind fling with my roommate (that's a story I won't go into here), to my trip to Beijing with my sister for the spring festival, to

Adam Nyman and John Hart

Adam's presentation of a generalization of Watt's theorem, which will be published shortly.

I did not nor do I speak much Chinese, so when I went for the first time to a local noodle shop in Pudong I walked around until something of interest grabbed my attention and I pointed. This was pretty much my m.o. the entire trip.

Math Professor Wins Early Career Award

Associate Professor **Bharath Sriraman** received the 2007 *Outstanding Early Career Scholar Award* from the *School Science and Mathematics Association* (SSMA). This award is given annually to a scholar for contributions to science or mathematics education within the first five years after earning a doctoral degree. As recipient of this award, Bharath also gave an invited lecture at SSMA's annual convention in Indianapolis. It is not hard to see why Bharath was selected for this award; to quote from the nominating letter of Professor Alan Zollman of Northern Illinois University: "Since earning his Ph.D. in 2002, Bharath's scholarly work has been very prolific and includes over 100 refereed journal articles, papers in conference proceedings, major book reviews, chapters in research handbooks and editorial work for journal issues and research monographs."
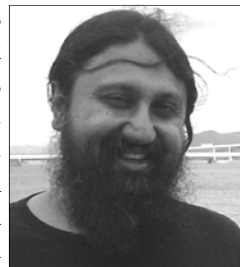
Congratulations, Bharath!

Grad Student's Summer, *Continued from page 1*

discover the calming eye of the gale winds, the heartthrob of my life. As one can tell, there were many new experiences that I took on with gravitas, but none were more challenging for my cerebral noodle than the summer research.

Before the first day of research, I thought it would be best if I was well prepared for the nuances of this so called "research." I had done some research with a well-known professor at Berkeley, and I remembered the importance of organization. So a few days prior to meeting with Professor Halfpap, I went out and purchased new pencils, paper, and a couple of new binders, so that I could be well organized. The days past and the next thing I remember I was sitting in the Professor's office chatting about the upcoming weeks. After pinpointing some weekly and monthly goals, the Professor did something I never expected! She handed me a stack of exposition and open problems from a handful of great mathematicians including the following: Csordas, Lucas, Shapiro, and Levin. This surprised me because I had never done research in mathematics. I made an erroneous prognosis of what the following weeks would be like; I just assumed that I would only be concerned with open problems.

After the meeting I headed back to my newly assembled atelier and began to read like a madman. We first focused on a recently submitted dissertation, written by Andrzej Piotrowski. After consuming the dissertation, I continued on working through other expositions, where I quickly learned that definitions, in mathematics, are sometimes not universal. It was not a solecism when I used the word "consuming;" I worked diligently on understanding the dissertation as well as the expositions, so that I could get sufficient background and new techniques for solving problems. I read, read, and read some more and eventually some ideas started to solidify.

A generalization of what I studied can be simply stated as exploring operators that preserve or decrease the number of non-real zeros of a complex polynomial. For example, consider the linear differential operator T defined by

$$T = \exp\left(\frac{-D^2}{4}\right) = \sum_{k=0}^{\infty} (-1)^n \frac{D^{2n}}{4^n \cdot n!} \,,$$

where D is the differentiation operator (i.e., $D(f)=f'$). One can check that if $p(x)$ is a polynomial of degree n, then $T(p(x))$ also has degree n, so the two polynomials $p(x)$ and $T(p(x))$ have the same number of roots in $\mathbb{C}$: exactly n, provided one counts roots with their multiplicities. The surprising theorem is that $T(p(x))$ cannot have more non-real roots then $p(x)$. In other words, the operator T will preserve or reduce the number of non-real roots of any complex polynomial.

Another amazing result can be found with a function in the Laguerre-Poly class, i.e., a function, $f(z)$, of the form

$$f(z) = cz^m e^{\alpha z - \beta z^2} \prod_k (1 - \frac{z}{a_k}) e^{\frac{z}{a_k}}$$

where $c, \alpha, \beta, a_k \in \mathbb{R}$, $\beta \geq 0$, $a_k \neq 0$, $m \in \mathbb{N}$, and $\Sigma_k \, 1/a_k < \infty$. The result is the following: the operator that maps x^n to $f(n)x_n$ will preserve or decrease the number of non-real zeros for any complex polynomial. Since any entire function can be approximated uniformly on compact subsets of $\mathbb{C}$ with complex polynomials, this theory helps us to understand entire functions even more, possibly aiding, according to some of the mathematicians above, in solving the Riemann Hypothesis.

Finally, after a great deal of reading and attempted problem solving, the summer came to pass. I learned a great deal of definitions, theorems, and lemmas and more importantly I learned what it is like to collaborate on ideas in the mathematical field. This was an amazing experience in my life and I would encourage every student to give research a try.

Wintersession Courses— January 2008

The Math Department will offer the following upper-division special-topics courses during the two-week period January 7-18, 2008. (Math 395, 1 credit each):

Topic	Instructor	Days
Cryptography	Jenny McNulty	TWR
Exploring Mathematics with Maple	Richard Lane	TWR
LaTeX Document Preparation	Karel Stroethoff	Daily

Meet our Undergraduate Teaching Scholars!

The goals of the Undergraduate Mathematics Scholar Program are to keep students actively involved in their studies, and to increase their interest, excitement and confidence about studying mathematics. Each year we can make several awards to undergraduate students through this program, usually at two levels, Teaching Scholars ($1,500 per semester) and Tutorial Scholars ($1,250 per semester). Based on their interests and the needs of the department, scholars are assigned faculty mentors to assist with teaching an undergraduate course they have already taken. The intent is that the scholars learn about teaching by doing it (under the supervision of their mentors), and that they also master the subject matter of the course at an advanced level.

When we selected the awardees for this year, we were able to make seven one-semester awards, all at the higher level. I asked our Teaching Scholars to shortly introduce themselves to you, so here are six of them, in their own words. But I cannot resist mentioning that the average GPA of our Teaching Scholars is 3.83! (And since we mathematicians still give lots of C's, and worse, even in upper-division courses, that does mean something.)   *N.V.*

My name is **Tamatha Abell**. I am an applied math and astronomy double major. I have lived in Missoula for most of my life but have spent some time in California and Oregon. After I graduate, I plan to find a job, hopefully at the Blue Mountain Observatory or somehow astronomy related. However, that is going to be fairly tricky living here, so if that does not work out I will try to find some job in my related field of study. I would really prefer to stay in this town, so I don't want to move until I fully exhaust all possibilities first. I will be a teaching scholar next semester, and I am very excited about it. Part of me would love to teach and I think that this opportunity is really going to open some windows in that direction.

My name is **Katie Banner** and this is my third year here at UM. I grew up in Corvallis, Oregon with not the slightest idea of where I wanted to attend college. However, the first time I visited the University of Montana I knew I wanted to spend at least four years in Missoula. The allure of the campus combined with an excellent mathematics program and a division one soccer team was too much for me to resist. Currently, I am an applied math major and am completing the pre-engineering program. I am also a member of the women's soccer team. Math has always been my favorite subject and I am very excited not only to help others, but to learn more myself through the Undergraduate Teaching Scholar Program. Thank you for this wonderful opportunity.

Nicole Crouch: I graduated in 2005 from Sentinel High School in Missoula. I am a junior double-majoring in Spanish and Math with the Education option, working towards a secondary teaching certificate. I plan to study abroad in Argentina during the Spring 2008 semester, and perhaps do a little traveling as well. I was a Teaching Scholar for Math 152 – Honors Calculus I, with Dr. Sriraman. On Fridays, I would hold lectures and lead discussions on topics related to the current material. I was also available to answer any questions the students had and held review sessions for upcoming tests. This program improved my communication skills as well as prepared me for my future studies and my career in the classroom.

Clark Kogan: I am a Missoula native, double majoring in Math and Physics and am working this semester as a Teaching Scholar for Dr. Thomas Tonev's Calculus III class. I am very interested in applying statistics to the social sciences, and am also interested in gathering together the masses of available technology to increase people's efficiency at work. The Teaching Scholar position is giving me a good review of Calculus III, and has made me realize that I actually do remember a lot of the mathematics that I have learned.

Kristen Waarvik: I am a senior studying mathematics and special education. I grew up in Glasgow, a small town on the Hi-Line of Eastern Montana. This is my last semester here at UM, and I am staying busy as the President of the Math Club, a teaching scholar, and working in the Math Learning Center. Also, I am doing practicum work at Hellgate High School in math with students in regular and special education. I will be finishing up my undergraduate degree in the spring by student teaching in Big Fork, Montana and abroad in Scotland. I am really excited to be a teacher, and I am thankful for the great experience the teaching scholar position has given me in working with math students.

The Undergraduate Mathematics Scholar Program was created in the mid-nineties with substantial contributions by Gloria Hewitt (then chair of the department) and by Jack and Lily Eidswick. Lily Eidswick taught in the department for quite a few years. Nowadays, this program is principally supported through the George and Dorothy Bryan Endowment, established by a very generous gift of John and Charles Bryan in honor of their parents. Charles Bryan, a professor and former chair of the department, retired in 1989.

Alumni News

We recently heard from **Maria Haverhals Andersen**, who graduated from UM in 1996 with three bachelor degrees: Chemistry, Environmental Biology, and Mathematics. Since then, she has earned an M.S. in Mathematics and an M.B.A. from the University of Wyoming and is now a math instructor at Muskegon Community College in Michigan. Not yet finished with school, she is close to completing a Ph.D. in Higher Education Leadership from Western Michigan University. In addition to writing two blogs, including one on Math & Technolog(http://www.tcmtechnologyblog.blogspot.com), she also operates the website http://TeachingCollegeMath.com, and recently finished an Instructor's Resource Binder with over 500 pages of algebra assessments and activities for the 4th edition Elementary Algebra textbook by Tussy and Gustafson. We are impressed!

Jonathan Comes (M.A. 2004), now a Ph.D. student at the University of Oregon, gave a very interesting talk in our algebra seminar in September. The presentation, called *Partition Algebras and their Subalgebras*, was an introduction to his research area. We'd love to have events like this happen more frequently!

Scott Gragg (B.A. 1995) has been selected to the Grizzly Sports Hall of Fame! After he played for the Griz (earning many awards), he had an illustrious 11-year career in the National Football League, playing for the New York Giants, San Francisco 49ers, and New York Jets. He is now a math teacher and head football coach at his former high school in Silverton, Oregon, while pursuing a master's degree in education at nearby George Fox University. Scott and his wife Toni have two children, Anna (9) and Brian (7). Congratulations!

An article in the *SIAM Journal on Scientific Computing* by **Aaron Luttman** (Ph.D. 2006) and his former Ph.D. co-advisor Associate Professor **John Bardsley** was highlighted in the August 17 issue of *Science* in the "Editor's Choice" section! In the article, they used variational calculus to deal with an imaging problem that had arisen when scientists studied photosynthesis. In particular, they developed an algorithm that vastly improves the quality of videos showing stomata (minute openings on the surface of a leaf) at work.

Aaron is also continuing his research on isomorphisms between uniform algebras with Professor **Thomas Tonev** and Ph.D. student **Scott Lambert**. He gave an invited talk on this topic at the "Classical Analysis Conference 2007" at the University of North Carolina at Chapel Hill in September.

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

Adam and I would meet twice a week on average at Fudan University, a 30-minute cab ride from my apartment. We worked on commutative algebra, homological algebra and algebraic geometry. This always proved interesting as we would meet at different coffee shops or at Adam's apartment, depending on whether or not I needed to get my daily fix of java.

I would like to thank the math department for making this trip possible by continuing to pay my T.A. stipend while I was in China. To Dave Patterson who I know worked extra hours trying to get the funding, thanks. I am sure this went by the graduate committee who must have thought I would hook up with the Chinese Mafia; no comment and thanks. And of course many many thanks to Adam for the trip, the meetings, the coffee, the beer. And thanks to Gabo (Adam's wife) who put up with me coming over and asking Adam all sorts of stuff when they had just had Maya (their new baby), "hi Maya".

I enjoyed the trip a lot but as they say, there's no place like Missoula.

Cheers, John Hart

Soon after his return, John passed his Ph.D. Comprehensive Exam – Congratulations!

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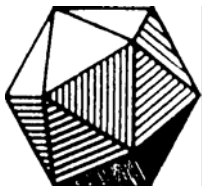
by Nikolaus Vonessen

A long wish has finally come true: **The lockers for math majors are here!** They were ordered over the summer and arrived in early September in many heavy boxes. To save money, we had ordered them unassembled, so there were many parts, and in particular a lot of nuts and bolts. I didn't count them, but the packing list claims we received 720 of each. And every one of them had to be tightened…

But with the help of quite a few students and faculty members, we built the 24 half-high lockers in two work parties (with lemonade and pizza provided by the math department).

It needs to be stressed that over half of the funds were raised by students: the Math Club contributed $1,000 of the total bill of about $1,700 (the rest was covered by the math department). Math majors can use the lockers for free; only a $25 refundable security deposit is required.

Assembling the lockers are, on the left: Stephen Schutten and Professor George McRae; *on the top* Math Club President Kristen Waarvik, Tricia Vannatta, Math Club Secretary Morgan Eichwald and a mystery mathematician (see page 2 for a hint).

The Math Club is always looking for outside speakers, especially alumnae and alumni, to talk about their professional lives, and how they use mathematics or statistics in their careers. Please let me know if you can help out! **(406-243-6222 or nikolaus.vonessen@umontana.edu)**

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